

lobes, often subsclabrous above, more or less densely pubescent beneath; flowers 1' broad, in broad cymes; fruit bright scarlet with a light bloom, 1' broad. (*C. tomentosa*, var. *mollis*, Gray. *C. subvillosa*, Schrad.) — E. Mass. to Mo. and Tex. Sometimes 20–30° high, blooming two weeks before the type.

6. *C. tomentosa*, L. Branches gray, rarely with stout gray spines; shoots, peduncles, and calyx villous-pubescent; glands none; leaves large, pale, prominently veined, densely pubescent beneath, ovate or ovate-oblong, sharply serrate, usually incisely lobed, contracted into a margined petiole; flowers small, ill-scented; fruit dull red, obovate, rarely globose ($\frac{1}{2}$ ' broad), upright. — Western N. Y. to Mich., Mo., and Ga. In flower 2–3 weeks after n. 5.

7. *C. punctata*, Jacq. Branches horizontal; glands none; leaves smaller, mostly wedge-obovate, attenuate and entire below, unequally toothed above, rarely lobed, villous-pubescent becoming smooth but dull, the many veins more impressed, prominent beneath; fruit globose (1' broad), red or bright yellow. (*C. tomentosa*, var. *punctata*, Gray.) — Quebec to Ont. and south to Ga.

8. *C. Crus-galli*, L. (COCKSPUR THORN.) Branches horizontal, with slender thorns often 4' long; glabrous; leaves thick, dark green, shining above, wedge-obovate and oblanceolate, tapering into a very short petiole, serrate above the middle; fruit globular, dull red ($\frac{3}{8}$ ' broad). — Thickets, common.

* * * *Corymbs* simple, few- (1–6-) flowered; calyx, bracts, etc., glandular.

9. *C. flava*, Ait. (SUMMER HAW.) Tree 15–20° high, somewhat pubescent or glabrous; leaves wedge-obovate or rhombic-obovate, narrowed into a glandular petiole, unequally toothed and somewhat cut above the middle, rather thin, the teeth glandular; styles 4–5; fruit somewhat pear-shaped, yellowish, greenish, or reddish ($\frac{1}{2}$ ' broad). — Sandy soil, Va. to Mo., and southward.

Var. *pubescens*, Gray. Downy or villous-pubescent when young; leaves thickish, usually obtuse or rounded at the summit; fruit larger ($\frac{3}{4}$ ' broad), scarlet or sometimes yellow. — Va. to Fla.

10. *C. parvifolia*, Ait. (DWARF THORN.) Shrub 3–6° high, downy; leaves thick, obovate-spatulate, crenate-toothed ($\frac{1}{2}$ – $\frac{1}{4}$ ' long), almost sessile, the upper surface at length shining; flowers solitary or 2–3 together on very short peduncles; calyx-lobes as long as the petals; styles 5; fruit globular or pear-shaped, yellowish. — Sandy soil, N. J. to Fla. and La.

18. AMELANCHIER, Medic. JUNE-BERRY.

Calyx 5-cleft; lobes downy within. Petals oblong, elongated. Stamens numerous, short. Styles 5, united below. Ovary 5-celled, each cell 2-ovuled, but a projection grows from the back of each and forms a false cartilaginous partition; the berry-like pome thus 10-celled, with one seed in each cell (when all ripen). — Small trees or shrubs, with simple sharply serrated leaves, and white racemose flowers. (*Amelancier* is the name of *A. vulgaris* in Savoy.)

1. *A. Canadensis*, Torr. & Gray. (SHAD-BUSH. SERVICE-BERRY.) A tree 10–30° high, nearly or soon glabrous; leaves ovate to ovate-oblong, usually somewhat cordate at base, pointed, very sharply serrate, 1– $3\frac{1}{2}$ ' long; bracts and stipules very long-silky-ciliate; flowers large, in drooping nearly glabrous racemes; petals oblong, 6–8" long; fruit on elongated pedicels, globose, crimson or purplish, sweet and edible. (Var. *Botryapium*, Torr. & Gray.) — Dry open woodlands; Newf. to Fla., west to Minn., E. Kan., and La. Fruit ripen-

ing in June. — Var. *rotundifolia*, Torr. & Gray, appears to be only a broad-leaved form.

Var. (?) *oblongifolia*, Torr. & Gray. A smaller tree or shrub (6–10° high), the young leaves and racemes densely white-tomentose; leaves oblong or sometimes rather broadly elliptical, acute, mostly rounded at base, finely serrate, 1–2' long; flowers in denser and shorter racemes; petals 3–4" long, oblong-spatulate; fruit similar but more juicy, on shorter pedicels. — Low moist grounds or swampy woods; N. Brunswick to Va., west to Minn. and Mo. — A form of this with broader leaves (broadly elliptical or rounded), often very obtuse at the summit, and rounded, subcordate or acute at base, and usually coarsely toothed, is common from Manitoba to Minn. and Iowa, and is sometimes cultivated for its fruit.

2. *A. oligocarpa*, Roem. A low shrub 2–4° high, soon glabrous; leaves thin, oblong, acute at both ends, finely serrate, 1–2' long; flowers few (1–4), rather long-pedicelled; petals oblong-obovate; fruit broad-pyriform, dark purple with a dense bloom. (*A. Canadensis*, var. *oligocarpa*, Torr. & Gray.) — Cold swamps and mountain bogs; Lab. to northern N. Eng. and N. Y., and the shores of Lake Superior.

3. *A. alnifolia*, Nutt. A shrub 3–8° high, usually glabrate or nearly so; leaves somewhat glaucous and thickish, broadly elliptical or roundish, very obtuse or rarely acute, often subcordate at base, coarsely toothed toward the summit, $\frac{1}{2}$ –2' long; raceme short and rather dense; petals cuneate-oblong, 3–8" long; fruit globose, purple. (*A. Canadensis*, var. *alnifolia*, Torr. & Gray.) — A western mountain species, which occurs in Minn. and N. Mich., and which the broad-leaved form of *A. Canadensis* sometimes closely simulates.

ORDER 34. CALYCANTHACEÆ. (CALYCANTHUS FAMILY.)

Shrubs with opposite entire leaves, no stipules, the sepals and petals similar and indefinite, the anthers adnate and extrorse, and the cotyledons convolute; the fruit like a rose-hip. Chiefly represented by the genus

1. CALYCANTHUS, L. CAROLINA ALLSPICE. SWEET-SCENTED SHRUB.

Calyx of many sepals, united below into a fleshy inversely conical cup (with some leaf-like bractlets growing from it); the lobes lanceolate, mostly colored like the petals, which are similar, in many rows, thickish, inserted on the top of the closed calyx-tube. Stamens numerous, inserted just within the petals, short; some of the inner ones sterile (destitute of anthers). Pistils several or many, enclosed in the calyx-tube, inserted on its base and inner face, resembling those of the Rose; but the enlarged hip dry when ripe, enclosing the achenes. — The lurid purple flowers terminating the leafy branches. Bark and foliage aromatic; the crushed flowers exhaling more or less the fragrance of strawberries. (Name composed of *κάλυξ*, a cup or calyx, and *άνθος*, flower, from the closed cup which contains the pistils.)

1. *C. floridus*, L. Leaves oval, soft-downy underneath. — Virginia(?) and southward, on hillsides in rich soil. Common in gardens. April–Aug.

2. *C. lævigatus*, Willd. Leaves oblong, thin, either blunt or taper-pointed, bright green and glabrous or nearly so on both sides, or rather pale beneath; flowers smaller. — Mountains of Franklin Co., Penn. (Prof. Porter), and southward along the Alleghanies. May–Aug.

3. *C. glaucus*, Willd. Leaves oblong-ovate or ovate-lanceolate, conspicuously taper-pointed, glaucous-white beneath, roughish above, glabrous, large (4–7' long), probably a variety of the preceding. — Virginia (?) near the mountains and southward. May–Aug.

✓ ORDER 35. SAXIFRAGACEÆ. (SAXIFRAGE FAMILY.)

Herbs or shrubs, of various aspect, distinguishable from Rosaceæ by having copious albumen in the seeds, opposite as well as alternate leaves, and usually no stipules, the stamens mostly definite, and the carpels commonly fewer than the sepals, either separate or partly so, or all combined into one compound pistil. Calyx either free or adherent, usually persistent or withering away. Stamens and petals almost always inserted on the calyx. Ovules anatropous.

Tribe I. SAXIFRAGACEÆ. Herbs. Leaves alternate (rarely opposite in n. 2 and 6). Fruit dry, capsular or follicular, the styles or tips of the carpels distinct.

* Ovary 2- (rarely 3-) celled with axile placentas, or of as many nearly distinct carpels.

1. *Astilbe*. Flowers polygamous, paniced. Stamens (8 or 10) twice as many as the small petals. Seeds few. Leaves decompound.
2. *Saxifraga*. Flowers perfect. Petals 5. Stamens 10. Seeds numerous, with a close coat.
3. *Boykinia*. Flowers perfect. Stamens only as many as the petals, which are convolute in the bud and deciduous. Calyx-tube adherent to the ovary. Seed-coat close.
4. *Sullivantia*. Flowers perfect. Stamens 5. Calyx nearly free. Seeds wing-margined.
- * Ovary 1-celled, with 2 parietal placentas alternate with the stigmas. Sterile stamens none.
5. *Tiarella*. Calyx nearly free from the slender ovary. Petals entire. Stamens 10. Placentas nearly basal.
6. *Mitella*. Calyx partly cohering with the depressed ovary. Petals small, pinnatifid. Stamens 10.
7. *Heuchera*. Calyx bell-shaped, coherent with the ovary below. Petals small, entire. Stamens 5.
8. *Chrysosplenium*. Calyx-tube coherent with the ovary. Petals none. Stamens 10.
- * Ovary 1-celled, with 3–4 parietal placentas opposite the sessile stigmas. A cluster of united sterile filaments at the base of each petal.
9. *Parnassia*. Sepals, petals and proper stamens 5. Peduncle scape-like, 1-flowered.

Tribe II. HYDRANGEÆ. Shrubs. Leaves opposite, simple. Ovary 2–5-celled; the calyx coherent at least with its base. Fruit capsular.

* Stamens 8 or 10.

10. *Hydrangea*. Calyx-lobes minute in complete flowers. Petals valvate in the bud.
 - * Stamens 20–40.
 11. *Decumaria*. Calyx-lobes small. Petals 7–10, valvate in the bud. Filaments subulate. Style 1.
 12. *Philadelphus*. Calyx-lobes conspicuous. Petals 4–5, convolute in the bud. Filaments linear. Styles 3–5.
- Tribe III. ESCALLONIEÆ.** Shrubs. Leaves alternate and simple. Ovary 2–5-celled. Fruit capsular.
13. *Itea*. Calyx 5-cleft, free from the 2-celled ovary, which becomes a septicidal capsule.

✓ **Tribe IV. RIBESIEÆ.** Shrubs. Leaves alternate and simple, with stipules adnate to the petiole or wanting. Fruit a berry.

14. *Ribes*. Calyx-tube adnate to the 1-celled ovary. Placentas 2, parietal, many-seeded.

1. ASTILBE, Don. FALSE GOATSBEARD.

Flowers dioeciously polygamous. Calyx 4–5-parted, small. Petals 4–5, spatulate, small, withering-persistent. Stamens 8 or 10. Ovary 2-celled, almost free, many-ovuled; styles 2, short. Capsule 2-celled, separating into 2 follicles, each ripening few seeds. Seed-coat loose and thin, tapering at each end. — Perennial herbs, with twice or thrice ternately-compound ample leaves, cut-lobed and toothed leaflets, and small white or yellowish flowers in spikes or racemes, which are disposed in a compound panicle. (Name composed of α -privative and $\sigma\tau\iota\lambda\beta\eta$, a bright surface, because the foliage is not shining.)

1. *A. decandra*, Don. Somewhat pubescent (3–5° high); leaflets mostly heart-shaped; petals minute or wanting in the fertile flowers; stamens 10. — Rich woods; mountains of S. W. Va. to N. C. and Ga. Closely imitating *Spiræa Aruncus*, but coarser.

2. SAXIFRAGA, L. SAXIFRAGE.

Calyx either free from or cohering with the base of the ovary, 5-cleft or parted. Petals 5, entire, imbricated in the bud, commonly deciduous. Stamens 10. Styles 2. Capsule 2-beaked, 2-celled, opening down or between the beaks, or sometimes 2 almost separate follicles. Seeds numerous, with a close coat. — Chiefly perennial herbs, with the root-leaves clustered, those of the stem mostly alternate. (Name from *saxum*, a rock, and *frango*, to break; many species rooting in the clefts of rocks.)

* Stems prostrate, in tufts, leafy; leaves opposite; calyx free from the capsule.

1. *S. oppositifolia*, L. (MOUNTAIN SAXIFRAGE.) Leaves fleshy, ovate, keeled, ciliate, imbricated on the sterile branches (1–2" long); flowers solitary, large; petals purple, obovate, much longer than the 5-cleft-calyx. — Rocks, Willoughby Mountain, Vt., and northward. (Eu.)

* * Stems ascending; leaves alternate; calyx coherent below with the capsule.

2. *S. rivularis*, L. (ALPINE BROOK-S.) Small; stems weak, 3–5-flowered; lower leaves rounded, 3–5-lobed, on slender petioles, the upper lanceolate; petals white, ovate. — Alpine region of the White Mts., to Lab. (Eu.)

3. *S. aizoides*, L. (YELLOW MOUNTAIN-S.) Low (3–5' high), in tufts, with few or several corymbose flowers; leaves linear-lanceolate, entire, fleshy, distantly spinulose-ciliate; petals yellow, spotted with orange, oblong. — N. Vt. to S. W. New York, N. Mich., and northward. June. (Eu.)

4. *S. tricuspidata*, Retz. Stems tufted (4–8' high), naked above; flowers corymbose; leaves oblong or spatulate, with 3 rigid sharp teeth at the summit; petals obovate-oblong, yellow. — Shore of L. Superior, and northward. (Eu.)

* * * Leaves clustered at the root; scape many-flowered, erect, clammy-pubescent.

← Petals all alike.

5. *S. aizoon*, Jacq. Scape 5–10' high; leaves persistent, thick, spatulate, with white cartilaginous toothed margins; calyx partly adherent; petals ob-

ovate, cream-color, often spotted at the base. — Moist rocks, Lab. to N. Vt., L. Superior, and northward. (Eu.)

6. *S. Virginiensis*, Michx. (EARLY S.) Low (4–9' high); leaves *obovate or oval-spatulate*, narrowed into a broad petiole, crenate-toothed, thickish; flowers in a clustered cyme, which is at length open and loosely panicle; lobes of the nearly free *calyx erect, not half the length of the oblong obtuse (white) petals*; follicles united merely at the base, divergent, purplish. — Exposed rocks and dry hillsides; N. Brunswick to Ga., and west to Minn., Ohio, and Tenn.; common, especially northward. April–June.

7. *S. Pennsylvanica*, L. (SWAMP S.) Large (1–2° high); leaves *oblanceolate, obscurely toothed* (4–8' long), narrowed at base into a short and broad petiole; cymes in a large oblong panicle, at first clustered; lobes of the nearly free *calyx recurved, about the length of the linear-lanceolate (greenish) small petals*; filaments *awl-shaped*; follicles at length divergent. — Bogs, N. Eng. to Va., west to Minn. and Iowa.

8. *S. erosa*, Pursh. (LETTUCE S.) Leaves *oblong or oblanceolate, obtuse, sharply toothed*, tapering into a margined petiole (8–12' long); scape slender (1–3° high); panicle elongated, loosely flowered; pedicels slender; *calyx reflexed, entirely free, nearly as long as the oval obtuse (white) petals*; filaments *club-shaped*; follicles nearly separate, diverging, narrow, pointed, 2–3" long. — Cold mountain brooks, Penn. to Va. and N. C.

9. *S. Forbesii*, Vasey. Stem stout, 2–4° high; leaves *denticulate, oval to elongated oblong* (4–8' long); filaments *filiform*; follicles *short, ovate*; otherwise as in the last. — Shaded cliffs, near Makanda, S. Ill. (Forbes); E. Mo. (Lettermann.)

— Petals unequal, with claws, white, all or some of them with a pair of yellow spots near the base; leaves oblong, wedge-shaped or spatulate; calyx free and reflexed.

10. *S. leucanthemifolia*, Michx. Leaves coarsely toothed or cut, tapering into a petiole; stems (5–18' high) bearing one or more leaves or leafy bracts and a loose, spreading corymbose or paniculate cyme; petals lanceolate, the 3 larger ones with a heart-shaped base and a pair of spots, the 2 smaller with a tapering base and no spots. — Mts. of Va. to N. C. and Ga.

11. *S. stellaris*, L., var. *comosa*, Willd. Leaves wedge-shaped, more or less toothed; scape (4–5' high) bearing a small contracted panicle, many or most of the flowers changed into little tufts of green leaves; petals all lanceolate and tapering into the claw. — Mt. Katahdin, Maine, north to Lab. and Greenland. (Eu.)

3. BOYKÍNIA, Nutt.

Calyx-tube top-shaped, coherent with the 2-celled and 2-beaked capsule. Stamens 5, as many as the deciduous petals, these mostly convolute in the bud. Otherwise as in Saxifraga. — Perennial herbs, with alternate palmately 5–7-lobed or cut petioled leaves, and white flowers in cymes. (Dedicated to the late Dr. Boykin of Georgia.)

1. *B. aconitifolia*, Nutt. Stem glandular (6–20' high); leaves deeply 5–7-lobed. — Mountains of southwestern Va. to Ga. and Tenn. July.

4. SULLIVÁNTIA, Torr. & Gray.

Calyx bell-shaped, cohering below only with the base of the ovary, 5-cleft. Petals 5, oblanceolate, entire, acutish, withering-persistent. Stamens 5, shorter than the petals. Capsule 2-celled, 2-beaked, many-seeded, opening between the beaks; the seeds wing-margined, imbricated upward. — A low and reclined-spreading perennial herb, with rounded and cut-toothed or slightly lobed smooth leaves, on slender petioles, and small white flowers in a branched loosely cymose panicle, raised on a nearly leafless slender stem (6–12' long). Peduncles and calyx glandular; pedicels recurved in fruit. (Dedicated to the distinguished bryologist who discovered our species.)

1. *S. Ohionis*, Torr. & Gray. — Limestone cliffs, Ohio to Ind., Iowa, and Minn. June.

5. TIARÉLLA, L. FALSE MITRE-WORT.

Calyx bell-shaped, nearly free from the ovary, 5-parted. Petals 5, with claws, entire. Stamens 10, long and slender. Styles 2. Capsule membranaceous, 1-celled, 2-valved; the valves unequal. Seeds few, at the base of each parietal placenta, globular, smooth. — Perennials; flowers white. (Name a diminutive from *tiára*, a tiara, or turban, from the form of the pod, or rather pistil, which is like that of Mitella, to which the name of *Mitre-wort* properly belongs.)

1. *T. cordifolia*, L. Leaves from the rootstock or summer runners heart-shaped, sharply lobed and toothed, sparsely hairy above, downy beneath; stem leafless or rarely with 1 or 2 leaves (5–12' high); raceme simple; petals oblong, often subserrate. — Rich rocky woods, N. Eng. to Minn. and Ind., and southward in the mountains. April, May.

6. MITÉLLA, Tourn. MITRE-WORT. BISHOP'S-CAP.

Calyx short, coherent with the base of the ovary, 5-cleft. Petals 5, slender, pinnatifid. Stamens 5 or 10, included. Styles 2, very short. Capsule short, 2-beaked, 1-celled, with 2 parietal or rather basal several-seeded placenta, 2-valved at the summit. Seeds smooth and shining. — Low and slender perennials, with round heart-shaped alternate leaves on the rootstock or runners, on slender petioles; those on the flowering stems opposite, if any. Flowers small, in a simple slender raceme or spike. Fruit soon widely dehiscent. (Diminutive of *mitra*, a cap, alluding to the form of the young pod.)

1. *M. diphylla*, L. Hairy; leaves heart-shaped, acute, somewhat 3–5-lobed, toothed, those on the many-flowered stem 2, opposite, nearly sessile, with interfoliar stipules; flowers white, in a raceme 6–8' long; stamens 10. — Hillsides in rich woods; N. Eng. to N. C., west to Minn. and Mo. May.

2. *M. nuda*, L. Small and slender; leaves rounded or kidney-form, deeply and doubly crenate; stem usually leafless, few-flowered, very slender (4–6' high); flowers greenish; stamens 10. — Deep moist woods, in moss, N. Eng. to N. Y., Mich., Minn., and northward. May–July.

7. HEÛCHERA, L. ALUM-ROOT.

Calyx bell-shaped, the tube cohering at the base with the ovary, 5-cleft. Petals 5, spatulate, small, entire. Stamens 5. Styles 2, slender. Capsule 1-celled,

with 2 parietal many-seeded placentæ, 2-beaked, opening between the beaks. Seeds oval, with a rough and close seed-coat. — Perennials, with the heart-shaped leaves principally from the rootstock; those on the stems, if any, alternate. Petioles with dilated margins or adherent stipules at their base. Flowers in small clusters disposed in a prolonged and narrow panicle, greenish or purplish. (Named in honor of *John Henry Heucher*, a German botanist of the beginning of the 18th century.)

* *Flowers small, loosely paniced; stamens and styles exerted; calyx regular.*

1. *H. villôsa*, Michx. Stems (1–3° high), petioles, and veins of the acutely 7–9-lobed leaves villous with rusty hairs beneath; calyx 1½" long; petals spatulate-linear, about as long as the stamens, soon twisted. — Rocks, Md. to Ga., west to Ind. and Mo. Aug., Sept.

2. *H. Rugéii*, Shuttlw. Stems slender, ½–2° high, glandular-hirsute, as well as the petioles, etc.; leaves round-reniform, with 7–9 short and broad rounded lobes; flowers very small (1" long); petals linear-spatulate, twice as long as the calyx-lobes; fruit narrow. — Shaded cliffs, S. Ill. to Tenn. and N. C.

3. *H. Americana*, L. (COMMON ALUM-ROOT.) Stems (2–3° high), etc., glandular and more or less hirsute with short hairs; leaves roundish, with short rounded lobes and crenate teeth; calyx very broad, 2" long, the spatulate petals not longer than its lobes. — Rocky woodlands, Conn. to N. C., west to Minn., Mo., and Miss.

** *Flowers larger, in a very narrow panicle; calyx (3–4" long) more or less oblique; stamens short; leaves rounded, slightly 5–9-lobed.*

4. *H. hispida*, Pursh. Stems 2–4° high; hispid or hirsute with long spreading hairs (occasionally almost glabrous), scarcely glandular; stamens soon exerted, longer than the spatulate petals. — Mountains of Va. and N. C., west to Minn. and E. Kan. May, June.

5. *H. pubescens*, Pursh. Stem (1–3° high) and petioles granular-pubescent or glandular above, not hairy, below often glabrous; stamens shorter than the lobes of the calyx and the spatulate petals. — Rich woods, in the mountains, from Penn. to Ky., and southward. June, July.

8. CHRYSOSPLENIUM, Tourn. GOLDEN SAXIFRAGE.

Calyx-tube coherent with the ovary; the blunt lobes 4–5, yellow within. Petals none. Stamens 8–10, very short, inserted on a conspicuous disk. Styles 2. Capsule inversely heart-shaped or 2-lobed, flattened, very short, 1-celled with 2 parietal placentæ, 2-valved at the top, many-seeded. — Low and small smooth herbs, with tender succulent leaves, and small solitary or leafy-cymed flowers. (Name compounded of χρυσός, golden, and σπλήν, the spleen; probably from some reputed medicinal qualities.)

1. *C. Americanum*, Schwein. Stems slender, decumbent and forking; leaves principally opposite, roundish or somewhat heart-shaped, obscurely crenate-lobed; flowers distant, inconspicuous, nearly sessile (greenish tinged with yellow or purple). — Cold wet places, N. Scotia to N. Ga., west to Minn.

2. *C. alternifolium*, L. Stems erect; leaves alternate, reniform-cordate, doubly crenate or somewhat lobed; flowers corymbose. — Decorah, Iowa, west to the Rocky Mts., and north through Brit. Amer. (Eu., Asia.)

9. PARNÁSSIA, Tourn. GRASS OF PARNASSUS.

Sepals 5, imbricated in the bud, slightly united at the base, and sometimes also with the base of the ovary, persistent. Petals 5, veiny, spreading, at length deciduous, imbricated in the bud; a cluster of somewhat united gland-tipped sterile filaments at the base of each. Proper stamens 5, alternate with the petals, persistent; anthers introrse or subextrorse. Ovary 1-celled, with 4 projecting parietal placentæ; stigmas 4, sessile, directly over the placentæ. Capsule 4-valved, the valves bearing the placentæ on their middle. Seeds very numerous, anatropous, with a thick wing-like seed-coat and little if any albumen. Embryo straight; cotyledons very short. — Perennial smooth herbs, with entire leaves, and solitary flowers on long scape-like stems, which usually bear a single sessile leaf. Petals white, with greenish or yellowish veins. (Named from Mount Parnassus; called Grass of Parnassus by Dioscorides.)

1. *P. parviflora*, DC. Petals sessile, little longer than the calyx (3" long); sterile filaments about 7 in each set, slender; leaves ovate or oblong, tapering at base. — Sandy banks, Lab. to Mich., N. Minn., and westward.

2. *P. palustris*, L. Scapes 3–10' high; leaves heart-shaped; flower nearly 1' broad; petals sessile, rather longer than the calyx, few-veined; sterile filaments 9–15 in each set, slender. — Same range as the last. (Eu.)

3. *P. Caroliniána*, Michx. Scapes 9'–2° high; flower 1–1½' broad; petals sessile, more than twice as long as the calyx, many-veined; sterile filaments 3 in each set, stout, distinct almost to the base; leaves thickish, ovate or rounded, often heart-shaped, usually but one low down on the scape and clasping. — Wet banks, N. Brunswick to Fla., west to Minn., Iowa, and La.

4. *P. asarifolia*, Vent. Petals abruptly contracted into a claw at base; sterile filaments 3 in each set; leaves rounded, kidney-shaped; otherwise as in the foregoing. — High mountains of Va. and N. C.

10. HYDRANGEA, Gronov.

Calyx-tube hemispherical, 8–10-ribbed, coherent with the ovary; the limb 4–5-toothed. Petals ovate, valvate in the bud. Stamens 8–10, slender. Capsule 15-ribbed, crowned with 2–4 diverging styles, 2-celled below, many-seeded, opening by a hole between the styles. — Shrubs, with opposite petioled leaves, no stipules, and numerous flowers in compound cymes. The marginal flowers are usually sterile and radiant, consisting merely of a showy membranaceous and colored flat and dilated calyx. (Name from ὕδωρ, water, and ἄγγος, a vase, from the shape of the capsule.)

1. *H. arborescens*, L. (WILD HYDRANGEA.) Glabrous or nearly so, 1–8° high; leaves ovate, rarely heart-shaped, pointed, serrate, green both sides; cymes flat; flowers often all fertile, rarely all radiant. — Rocky banks, Penn. to Fla., west to Iowa and Mo.

2. *H. radiata*, Walt. Leaves densely tomentose and paler or white beneath. — S. C. and Ga. to Tenn. and Mo.

11. DECUMARIA, L.

Flowers all fertile. Calyx-tube turbinate, 7–10-toothed, coherent with the ovary. Petals oblong, valvate in the bud. Stamens 20–30. Styles united

into one, persistent. Stigma thick, 7-10-rayed. Capsule 10-15-ribbed, 7-10-celled, many-seeded, bursting at the sides, the thin partitions at length separating into numerous chaffy scales. — A smooth climbing shrub, with opposite ovate or oblong entire or serrate leaves, no stipules, and numerous fragrant white flowers in compound terminal cymes. (Name said to be derived from *decem*, ten, referring to the fact of its being often 10-merous.)

1. **D. bárbára**, L. Leaves shining, sometimes pubescent; capsule with the persistent style and stigma urn-shaped, pendulous. — Banks of streams: Dismal Swamp, Va., to Fla. and La.

12. PHILADÉLPHUS, L. MOCK ORANGE or SYRINGA.

Calyx-tube top-shaped, coherent with the ovary; the limb 4-5-parted, spreading, persistent, valvate in the bud. Petals rounded or obovate, large, convolute in the bud. Stamens 20-40. Styles 3-5, united below or nearly to the top. Stigmas oblong or linear. Capsule 3-5-celled, splitting at length into as many pieces. Seeds very numerous, on thick placenta projecting from the axis, pendulous, with a loose membranaceous coat prolonged at both ends. — Shrubs, with opposite often toothed leaves, no stipules, and solitary or cymose-clustered showy white flowers. (An ancient name, applied by Linnæus to this genus for no obvious reason.)

1. **P. inodórus**, L. *Glabrous*; leaves ovate or ovate-oblong, pointed, entire or with some spreading teeth; flowers single or few at the ends of the diverging branches, pure white, scentless: *calyx-lobes acute*, scarcely longer than the tube. — Mountains of Va. to Ga. and Ala.

2. **P. grandiflórus**, Willd. A tall shrub, with long and recurved branches; like the last, but *somewhat pubescent*, with *larger flowers*, and the *calyx-lobes long and taper-pointed*. (*P. inodorus*, var. *grandiflorus*, Gray.) — Along streams, Va. to Fla. Often cultivated.

P. coronárius, L., the common MOCK ORANGE or SYRINGA of cultivation, from S. Eu., with cream-colored odorous flowers, has sometimes escaped.

13. ÍTEA, Gronov.

Calyx 5-cleft, free from the ovary or nearly so. Petals 5, lanceolate, much longer than the calyx, and longer than the 5 stamens. Capsule oblong, 2-grooved, 2-celled, tipped with the 2 united styles, 2-parted (septicidal) when mature, several-seeded. — Shrubs, with simple, alternate, petioled leaves, without stipules, and small white flowers in simple racemes. (Greek name of the Willow.)

1. **I. Virgínica**, L. Leaves deciduous, oblong, pointed, minutely serrate; seeds oval, flattish, with a crustaceous coat. — Wet places, Penn. and N. J. to Fla., west to Mo. and La.

14. RÍBES, L. CURRANT. GOOSEBERRY.

✓ Calyx 5-lobed, often colored; the tube coherent with the ovary. Petals 5, inserted in the throat of the calyx, small. Stamens 5, alternate with the petals. Ovary 1-celled, with 2 parietal placenta and 2 distinct or united styles. Berry crowned with the shrivelled remains of the calyx, the surface of the numerous seeds swelling into a gelatinous outer coat investing a crustaceous one. Em-

bryo minute at the base of hard albumen. — Low, sometimes prickly shrubs, with alternate and palmately-lobed leaves, which are plaited in the bud (except in one species), often fascicled on the branches; the small flowers from the same clusters, or from separate lateral buds. (From *riebs*, a German popular name for the currant. *Grossularia* was the proper name to have been adopted for the genus.)

§ 1. **GROSSULÁRIA**. (GOOSEBERRY.) *Stems mostly bearing thorns at the base of the leafstalks or clusters of leaves, and often with scattered bristly prickles; berries prickly or smooth. (Our species are indiscriminately called WILD GOOSEBERRY; the flowers greenish.)*

* *Peduncles 1-3-flowered; calyx as high as broad; leaves roundish-heart-shaped, 3-5-lobed.*

✓ + *Calyx-lobes decidedly shorter than the tube; berries apt to be prickly.*

✓ 1. **R. Cynósbatí**, L. Stamens and undivided style not longer than the broadly bell-shaped calyx; berries large, armed with long prickles or rarely smooth. — Rocky woods, N. Brunswick to the mountains of N. C., and west to Minn. and Mo.

+ + *Calyx-lobes decidedly longer than the short and rather narrow tube; berries smooth, purple, sweet and pleasant.*

2. **R. grácile**, Michx. (MISSOURI GOOSEBERRY.) Spines often long, stout and red; *peduncles long and slender; flowers white or whitish; filaments capillary, 4-6" long, generally connivent or closely parallel, soon conspicuously longer than the oblong-linear calyx-lobes.* (*R. rotundifolium*, Man., in part.) — Mich. to Tenn., west to Tex., Minn., and the Rocky Mts.

✓ 3. **R. rotundifólium**, Michx. Spines short; *peduncles short; flowers greenish or the lobes dull purplish; filaments slender, 2-3" long, more or less exceeding the narrowly oblong-spatulate calyx-lobes.* — W. Mass. and N. Y., south in the Alleghanies to N. C.

4. **R. oxyacanthóides**, L. *Peduncles very short, flowers greenish or dull purplish: stamens usually scarcely equalling the rather broadly oblong calyx-lobes.* (*R. hirtellum*, Michx.) — Newf. to N. J., west to Ind., Minn., and westward. The common smooth-fruited gooseberry of the north, the whitish spines often numerous.

* * *Flowers several in a nodding raceme, small and flattish, greenish.*

5. **R. lacústre**, Poir. Young stems clothed with bristly prickles and with weak thorns; leaves heart-shaped, 3-5-parted, with the lobes deeply cut; calyx broad and flat; stamens and style not longer than the petals; fruit bristly (small, unpleasant). — Cold woods and swamps, Newf. to N. Eng., west to N. Y., Mich., and Minn.

§ 2. **RIBÉSIA**. (CURRANT.) *Thornless and prickless; racemes few-many-flowered, stamens short.*

6. **R. prostrátum**, L'Her. (FETID CURRANT.) Stems reclined; leaves deeply heart-shaped, 5-7-lobed, smooth, the lobes ovate, acute, doubly serrate; *racemes erect, slender, calyx flattish; pedicels and the (pale red) fruit glandular-bristly.* — Cold damp woods and rocks, Lab. to mountains of N. C., west to Mich., Minn., and the Rocky Mts.

7. *R. flóridum*, L'Her. (WILD BLACK CURRANT.) Leaves sprinkled with resinous dots, slightly heart-shaped, sharply 3-5-lobed, doubly serrate; racemes drooping, downy; bracts longer than the pedicels; flowers large, whitish; calyx tubular-bell-shaped, smooth; fruit round-ovoid, black, smooth. — Woods, N. Eng. to Va., west to Ky., Iowa, and Minn.

8. *R. rubrum*, L., var. *subglandulosum*, Maxim. (RED CURRANT.) Stems straggling or reclined; leaves somewhat heart-shaped, obtusely 3-5-lobed, serrate, downy beneath when young; racemes from lateral buds distinct from the leaf-buds, drooping; calyx flat (green or purplish); fruit globose, smooth, red. — Cold bogs and damp woods, N. Eng. to N. J., west to Ind. and Minn.

§ 3. *SIPHOCALYX*. Thornless and prickless; leaves convolute in the bud; racemes several-flowered; calyx-tube elongated; berry naked and glabrous.

9. *R. aureum*, Pursh. (MISSOURI OR BUFFALO CURRANT.) Shrub 5-12' high; leaves 3-5-lobed, rarely at all cordate; racemes short; flowers golden-yellow, spicy-fragrant; tube of salverform calyx (6" long or less) 3 or 4 times longer than the oval lobes; stamens short; berries yellow or black. — Banks of streams, Mo. and Ark. to the Rocky Mts., and westward. Common in cultivation.

ORDER 36. CRASSULACEÆ. (ORPINE FAMILY.)

Succulent herbs, with perfectly symmetrical flowers; viz., the petals and pistils equalling the sepals in number (3-20), and the stamens the same or double their number, — technically different from Saxifragæ only in this complete symmetry, and in the carpels (in most of the genera) being quite distinct from each other. Also, instead of a perigynous disk, there are usually little scales on the receptacle, one behind each carpel. Fruit dry and dehiscent; the pods (follicles) opening down the ventral suture, many-rarely few-seeded. — Stipules none. Flowers usually cymose, small. Leaves mostly sessile, in *Penthorum* not at all fleshy.

• Not succulent; the carpels united, forming a 5-celled capsule.

1. *Penthorum*. Sepals 5. Petals none. Stamens 10. Pod 5-beaked, many-seeded.

• • Leaves, etc., thick and succulent. Carpels distinct.

2. *Tillæa*. Sepals, petals, stamens, and pistils 3 or 4. Seeds few or many.

3. *Sedum*. Sepals, petals, and pistils 4 or 5. Stamens 8-10. Seeds many.

1. PENTHORUM, Gronov. DITCH STONE-CROP.

Sepals 5. Petals rare, if any. Stamens 10. Pistils 5, united below, forming a 5-angled, 5-horned, and 5-celled capsule, which opens by the falling off of the beaks, many-seeded. — Upright weed-like perennials (not fleshy like the rest of the family), with scattered leaves, and yellowish-green flowers loosely spiked along the upper side of the naked branches of the cyme. (Name from *πέντε*, five, and *ῥος*, a mark, from the quinary order of the flower.)

1. *P. sedoides*, L. Leaves lanceolate, acute at both ends. — Open wet places; N. Brunswick to Fla., west to Minn., E. Kan., and Tex. July-Oct. Parts of the flower rarely in sixes or sevens.

2. TILLÆA, Mich.

Sepals, petals, stamens, and pistils 3 or 4. Pods 2-many-seeded. — Very small tufted annuals, with opposite entire leaves and axillary flowers. (Named in honor of *Michael Angelo Tilli*, an early Italian botanist.)

1. *T. simplex*, Nutt. Rooting at the base (1-2' high); leaves linear-oblong; flowers solitary, nearly sessile; calyx half the length of the (greenish-white) petals and the narrow 8-10-seeded pods, the latter with a scale at the base of each. — Muddy river-banks, Mass. to Md. July-Sept.

3. SÉDUM, Tourn. STONE-CROP. ORPINE.

Sepals and petals 4 or 5. Stamens 8 or 10. Follicles many-seeded; a little scale at the base of each. — Chiefly perennial, smooth, and thick-leaved herbs, with the flowers cymose or one-sided. Petals almost always narrow and acute or pointed. (Name from *sedeo*, to sit, alluding to the manner in which these plants fix themselves upon rocks and walls.)

* Flowers perfect and sessile, as it were spiked along one side of spreading flowering branches or of the divisions of a scorpioid cyme, the first or central flower mostly 5-merous and 10-androus, the others often 4-merous and 8-androus.

+ Flowers white or purple.

1. *S. pulchellum*, Michx. Stems ascending or trailing (4-12' high); leaves terete, linear-filiform, much crowded; spikes of the cyme several, densely flowered; petals rose-purple. — Va. to Ga., west to Ky., E. Kan., and Tex.; also cultivated in gardens. July.

2. *S. Névii*, Gray. Stems spreading, simple (3-5' high); leaves all alternate, those of the sterile shoots wedge-obovate or spatulate, on flowering stems linear-spatulate and flattish; cyme about 3-spiked, densely flowered; petals white, more pointed than in the next; the flowering 3 or 4 weeks later; leaves and blossoms smaller. — Rocky cliffs, mountains of Va. to Ala.

3. *S. ternatum*, Michx. Stems spreading (3-6' high); leaves flat, the lower whorled in threes, wedge-obovate, the upper scattered, oblong; cyme 3-spiked, leafy; petals white. — Rocky woods, N. Y. to Ga., west to Ind. and Tenn.

+ + Flowers yellow.

S. acre, L. (MOSSY STONE-CROP.) Spreading on the ground, moss-like; leaves very small, alternate, almost imbricated on the branches, ovate, very thick; petals yellow. — Escaped from cultivation to rocky roadsides, etc. July. (Nat. from Eu.)

4. *S. Torrèyi*, Don. Annual; stems simple or branched from the base (2-4' high); leaves flat or teretish, scattered, oblong, 2-3" long; petals rather longer than the ovate sepals; carpels at length widely divergent. — Mo. to Ark. and Tex.

* * Flowers in a terminal naked and regular cyme or cluster, more or less peduncled; leaves flat, obovate or oblong, mostly alternate.

+ Flowers perfect, 5-merous, 10-androus.

5. *S. telephioides*, Michx. Stems ascending (6-12' high), stout, leafy to the top; leaves oblong or oval, entire or sparingly toothed; cyme small; petals flesh-color, ovate-lanceolate, taper-pointed; follicles tapering into a slender style. — Dry rocks, from western New York to N. Ga. and S. Ind. June.

S. TELÉPHIUM, L. (GARDEN ORPINE OF LIVE-FOR-EVER.) Stems erect (2° high), stout; leaves oval, obtuse, toothed; cymes compound; petals purple, oblong-lanceolate; follicles abruptly pointed with a short style. — Rocks and banks, escaped from cultivation in some places. July. (Adv. from Eu.)

S. REFLÉXUM, L. Glabrous, erect, 1° high; leaves crowded, cylindric, subulate-tipped, spreading or reflexed; flowers yellow, pedicelled. — Coast of Mass.; western N. Y.; rare. (Nat. from Eu.)

— — Flowers dioecious, mostly 4-merous and 8-androus.

6. S. Rhodiola, DC. (ROSE-ROOT.) Stems erect (5–10' high); leaves oblong or oval, smaller than in the preceding; flowers in a close cyme, greenish-yellow, or the fertile turning purplish. — Throughout Arctic America, extending southward to the coast of Maine, and cliffs of Delaware River; also in the western mountains. May, June. (Eu.)

ORDER 37. DROSERACEÆ. (SUNDEW FAMILY.)

Bog-herbs, mostly glandular-haired, with regular hypogynous flowers, pentamerous and withering-persistent calyx, corolla, and stamens, the anthers fixed by the middle and turned outward, and a 1-celled capsule with twice as many styles or stigmas as there are parietal placentæ. — Calyx imbricated. Petals convolute. Seeds numerous, anatropous, with a short and minute embryo at the base of the albumen. — Leaves circinate in the bud, i. e., rolled up from the apex to the base as in Ferns. A small family of insectivorous plants.

1. DRÓSERÀ, L. SUNDEW.

Stamens 5. Styles 3, or sometimes 5, deeply 2-parted so that they are taken for 6 or 10, slender, stigmatose above on the inner face. Capsule 3- (rarely 5-) valved; the valves bearing the numerous seeds on their middle for the whole length. — Low perennials or biennials; the leaves clothed with reddish gland-bearing bristles, in our species all in a tuft at the base; the naked scape bearing the flowers in a 1-sided raceme-like inflorescence, which nods at the undeveloped apex, so that the fresh-blown flower (which opens only in sunshine) is always highest. The plants yield a purple stain to paper. (The glands of the leaves exude drops of a clear glutinous fluid, glittering like dew-drops, whence the name, from *δρῶσερός*, dewy.)

1. D. rotundifolia, L. (ROUND-LEAVED SUNDEW.) Leaves orbicular, abruptly narrowed into the spreading hairy petioles; seeds spindle-shaped, the coat loose and chaff-like; flowers white, the parts sometimes in sixes. — Peat-bogs, Lab. to Minn., Ind., and southward; common. July, Aug. (Eu.)

2. D. intermedia, Hayne, var. **Americana**, DC. Leaves spatulate-oblong, tapering into the long rather erect naked petioles; seeds oblong, with a rough close coat; flowers white. (*D. longifolia*, Gray, Manual.) — Bogs, with the same range but less common. June–Aug. — Plant raised on its prolonged caudex when growing in water. (Eu.)

3. D. linearis, Goldie. (SLENDER SUNDEW.) Leaves linear, obtuse, the blade (2–3' long, scarcely 2" wide) on naked erect petioles about the same length; seeds oblong, with a smooth and perfectly close coat; flowers white. — Shore of L. Superior, Mich., and Minn.

4. D. filiformis, Raf. (THREAD-LEAVED SUNDEW.) Leaves very long and filiform, erect, with no distinction between blade and stalk; seeds spindle-shaped; flowers numerous, purple rose-color ($\frac{1}{2}$ ' broad). — Wet sand, near the coast, Mass. to N. J. and Fla.

DIONÆA MUSCIPULA, Ellis, the VENUS'S FLY-TRAP, — so noted for the extraordinary irritability of its leaves, closing quickly at the touch, — is a native of the sandy savannas of the eastern part of N. C. It differs in several respects from the character of the order given above; the stamens being 15, the styles united into one, and the seeds all at the base of the pod.

ORDER 38. HAMAMELIDEÆ. (WITCH-HAZEL FAMILY.)

Shrubs or trees, with alternate simple leaves and deciduous stipules; flowers in heads or spikes, often polygamous or monœcious; the calyx cohering with the base of the ovary, which consists of 2 pistils united below, and forms a 2-beaked, 2-celled woody capsule, opening at the summit, with a single bony seed in each cell, or several, only one or two of them ripening. — Petals inserted on the calyx, narrow, valvate or involute in the bud, or often none at all. Stamens twice as many as the petals, and half of them sterile and changed into scales, or numerous. Seeds anatropous. Embryo large and straight, in scanty albumen; cotyledons broad and flat.

• Flowers with a manifest calyx, or calyx and corolla, and a single ovule suspended from the summit of each cell.

1. Hamamelis. Petals 4, strap-shaped. Stamens and scales each 4, short.

2. Fothergilla. Petals none. Stamens about 24, long; filaments thickened upward.

• • Flowers naked, with barely rudiments of a calyx and no corolla, crowded into catkin-like heads. Ovules several or many in each cell.

3. Liquidambar. Monœcious or polygamous. Stamens very numerous. Capsules consolidated by their bases in a dense head.

1. HAMAMÈLIS, L. WITCH-HAZEL.

Flowers in little axillary clusters or heads, usually surrounded by a scale-like 3-leaved involucre. Calyx 4-parted, and with 2 or 3 bractlets at its base. Petals 4, strap-shaped, long and narrow, spirally involute in the bud. Stamens 8, very short; the 4 alternate with the petals anther-bearing, the others imperfect and scale-like. Styles 2, short. Capsule opening loculicidally from the top; the outer coat separating from the inner, which encloses the single large and bony seed in each cell, but soon bursts elastically into two pieces. — Tall shrubs, with straight-veined leaves, and yellow, perfect or polygamous flowers. (From *ἄμα*, at the same time with, and *μηλίς*, an apple-tree; a name anciently applied to the Medlar, or some similar tree.)

1. H. Virginiana, L. Leaves obovate or oval, wavy-toothed, somewhat downy when young; blossoming late in autumn, when the leaves are falling, and maturing its seeds the next summer. — Damp woods, N. Scotia to Fla., west to E. Minn. and La.

2. FOTHERGÍLLA, L.

Flowers in a terminal catkin-like spike, mostly perfect. Calyx bell-shaped, the summit truncate, slightly 5–7-toothed. Petals none. Stamens about 24,

borne on the margin of the calyx in one row, all alike; filaments very long, thickened at the top (white). Styles 2, slender. Capsule cohering with the base of the calyx, 2-lobed, 2-celled, with a single bony seed in each cell. — A low shrub; the oval or obovate leaves smooth, or hoary underneath, toothed at the summit; the flowers appearing rather before the leaves, each partly covered by a scale-like bract. (Dedicated to the distinguished *Dr. John Fothergill*.)

1. *F. Gardëni*, L. (*F. alnifolia*, L. f.) — Low grounds, Va. to N. C. April, May.

3. LIQUIDÁMBAR, L. SWEET-GUM TREE.

Flowers usually monœcious, in globular heads or catkins; the sterile arranged in a conical cluster, naked; stamens very numerous, intermixed with minute scales; filaments short. Fertile flowers consisting of many 2-celled 2-beaked ovaries, subtended by minute scales in place of a calyx, all more or less cohering together and hardening in fruit, forming a spherical catkin or head; the capsules opening between the 2 awl-shaped beaks. Styles 2, stigmatic down the inner side. Ovules many, but only one or two perfecting. Seeds with a wing-angled seed-coat. — Catkins racemed, nodding, in the bud enclosed by a 4-leaved deciduous involucre. (A mongrel name, from *liquidus*, fluid, and the Arabic *ambar*, amber; in allusion to the fragrant terebinthine juice which exudes from the tree.)

1. *L. Styraciflua*, L. (SWEET GUM. BILSTED.) Leaves rounded, deeply 5-7-lobed, smooth and shining, glandular-serrate, the lobes pointed. — Moist woods, from Conn. to S. Ill., and south to Fla. and Tex. April. — A large and beautiful tree, with fine-grained wood, the gray bark commonly with corky ridges on the branchlets. Leaves fragrant when bruised, turning deep crimson in autumn. The woody pods filled mostly with abortive seeds, resembling sawdust.

ORDER 39. HALORAGÆ. (WATER-MILFOIL FAMILY.)

Aquatic or marsh plants (at least in northern countries), with the inconspicuous symmetrical (perfect or unisexual) flowers sessile in the axils of leaves or bracts, calyx-tube coherent with the ovary (or calyx and corolla wanting in Callitriche), which consists of 2-4 more or less united carpels (or in Hippuris of only one carpel), the styles or sessile stigmas distinct. Limb of the calyx obsolete or very short in fertile flowers. Petals small or none. Stamens 1-8. Fruit indehiscent, 1-4-celled, with a single anatropous seed suspended from the summit of each cell. Embryo in the axis of fleshy albumen; cotyledons minute.

1. *Myriophyllum*. Flowers monœcious or polygamous, the parts in fours, with or without petals. Stamens 4 or 8. Leaves often whorled, the immersed pinnately dissected.
2. *Proserpinaca*. Flowers perfect, the parts in threes. Petals none. Leaves alternate, the immersed pinnately dissected.
3. *Hippuris*. Flowers usually perfect. Petals none. Stamen, style, and cell of the ovary only one. Leaves entire, in whorls.
4. *Callitriche*. Flowers monœcious. Calyx and petals none. Stamen 1. Ovary 4-celled, with 2 filiform styles. Leaves entire, opposite.

1. MYRIOPHYLLUM, Vaill. WATER-MILFOIL.

Flowers monœcious or polygamous. Calyx of the sterile flowers 4-parted, of the fertile 4-toothed. Petals 4, or none. Stamens 4-8. Fruit nut-like, 4-celled, deeply 4-lobed; stigmas 4, recurved. — Perennial aquatics. Leaves crowded, often whorled; those under water pinnately parted into capillary divisions. Flowers sessile in the axils of the upper leaves, usually above water in summer; the uppermost staminate. (Name from *μυρίος*, a thousand, and *φύλλον*, a leaf, i. e., Milfoil.)

* Stamens 8; petals deciduous; carpels even; leaves whorled in threes or fours.

1. *M. spicatum*, L. Leaves all pinnately parted and capillary, except the floral ones or bracts; these ovate, entire or toothed, and chiefly shorter than the flowers, which thus form an interrupted spike. — Deep water, Newf. to N. Eng. and N. Y., west to Minn., Ark., and the Pacific. (Eu.)

2. *M. verticillatum*, L. Floral leaves much longer than the flowers, pectinate-pinnatifid; otherwise nearly as n. 1. — Ponds, etc., common. (Eu.)

** Stamens 4; petals rather persistent; carpels 1-2-ridged and roughened on the back; leaves whorled in fours and fives, the lower with capillary divisions.

3. *M. heterophyllum*, Michx. Stem stout; floral leaves ovate and lanceolate, thick, crowded, sharply serrate, the lowest pinnatifid; fruit obscurely roughened. — Lakes and rivers, Ont. and N. Y. to Fla., west to Minn. and Tex.

4. *M. scabratum*, Michx. Stem rather slender; lower leaves pinnately parted with few capillary divisions; floral leaves linear (rarely scattered), pectinate-toothed or cut-serrate; carpels strongly 2-ridged and roughened on the back. — Shallow ponds, S. New Eng. to S. C., west to Mo. and La.

*** Stamens 4; petals rather persistent; carpels even on the back; leaves chiefly scattered, or wanting on the flowering stems.

5. *M. ambiguum*, Nutt. Immersed leaves pinnately parted into about 10 very delicate capillary divisions; the emerging ones pectinate, or the upper floral linear and sparingly toothed or entire; flowers mostly perfect: fruit (minute) smooth. — Ponds and ditches, Mass. to N. J. and Penn.; also in Ind. — Var. *CAPILLACEUM*, Torr. & Gray, has stems floating, long and very slender, and leaves all immersed and capillary. Var. *LIMBOSUM*, Torr., is small, rooting in the mud, with leaves all linear, incised, toothed, or entire.

6. *M. tenellum*, Bigelow. Flowering stems nearly leafless and scape-like (3-10' high), erect, simple; the sterile shoots creeping and tufted; bracts small, entire; flowers alternate, monœcious; fruit smooth. — Borders of ponds, Newf. to N. Eng., west to Mich.

2. PROSERPINACA, L. MERMAID-WEED.

Flowers perfect. Calyx-tube 3-sided, the limb 3-parted. Petals none. Stamens 3. Stigmas 3, cylindrical. Fruit bony, 3-angled, 3-celled, 3-seeded, nut-like. — Low, perennial herbs, with the stems creeping at base, alternate leaves, and small flowers sessile in the axils, solitary or 3-4 together, in summer. (Name applied by Pliny to a Polygonum, meaning pertaining to Proserpine.)

1. *P. palustris*, L. Leaves lanceolate, sharply serrate, the lower pectinate when under water; fruit sharply angled. — Wet swamps, N. Eng. to Fla., west to Minn. and Tex.

2. *P. pectinacea*, Lam. Leaves all pectinate, the divisions linear-awl-shaped; fruit rather obtusely angled. — Sandy swamps, near the coast, Mass. to Fla. and La.

3. HIPPIURIS, L. MARE'S TAIL.

Flowers perfect or polygamous. Calyx entire. Petals none. Stamen one, inserted on the edge of the calyx. Style single, thread-shaped, stigmatic down one side, received in the groove between the lobes of the large anther. Fruit nut-like, 1-celled, 1-seeded. — Perennial aquatics, with simple entire leaves in whorls, and minute flowers sessile in the axils in summer. (Name from ἵππος, a horse, and οὐρά, a tail.)

1. *H. vulgaris*, L. Stems simple (1-2° high); leaves in whorls of 8 or 12, linear, acute; fruit nearly 1" long. — Ponds and springs, Penn. to Ind. and Minn., and northward. (Eu.)

4. CALLITRICHE, L. WATER-STARWORT.

Flowers monœcious, solitary or 2 or 3 together in the axil of the same leaf, wholly naked or between a pair of membranaceous bracts. Sterile flower a single stamen; filament bearing a heart-shaped 4-celled anther, which by confluence becomes 1-celled, and opens by a single slit. Fertile flower a single 4-celled ovary, either sessile or pedicelled, bearing 2 distinct and filiform sessile, usually persistent stigmas. Fruit nut-like, compressed, 4-lobed, 4-celled, separating at maturity into as many closed 1-seeded portions. Seed pendulous, filling the cell; embryo slender, straight or slightly curved, nearly the length of the oily albumen. — Low, slender and usually tufted, glabrous, or beset with minute (microscopic) stellate scales, with spatulate or linear entire leaves, both forms of leaves often occurring on the same stem. (Name from καλός, beautiful, and τρίξ, hair, from the often almost capillary stems.)

* Small annuals, forming tufts on moist soil, destitute of stellate scales; leaves uniform, very small, obovate or oblanceolate, 3-nerved, crowded; bracts none.

1. *C. deflexa*, Braun, var. *Austini*, Hegelm. Stems $\frac{1}{2}$ -1' high; fruit small ($\frac{1}{2}$ " broad), broader than high, deeply notched above and below, on a pedicel often nearly of its own length or nearly sessile; lobes of the fruit narrowly winged and with a deep groove between them; persistent stigmas shorter than the fruit, spreading or reflexed; leaves 1-2" long. (*C. Austini*, Engelm.) — On damp soil, N. Y. and N. J. to Ill., Mo., and Tex. (S. Am.)

* * Amphibious perennials; leaves with stellate scales, the floating ones obovate and 3-nerved, the submersed linear (all uniform and narrow in terrestrial forms); flowers usually between a pair of bracts.

2. *C. verna*, L. Fruit ($\frac{1}{2}$ " long) higher than broad, obovate, slightly obcordate, usually thickest at the base, sessile, its lobes sharply keeled or very narrowly winged above, and with a wide groove between them; stigmas shorter than the fruit, almost erect, usually deciduous; floating leaves crowded in a tuft, obovate, narrowed into a petiole. — Common in stagnant waters, New England to Fla., west to Minn., Tex., and the Pacific. (Eu.)

3. *C. heterophylla*, Pursh. Fruit smaller, as broad or broader than high, deeply emarginate, thick, almost ventricose, sessile or nearly so, its lobes

obtusely angled, with a small groove between them; stigmas as long as the fruit, erect, persistent; floating leaves crowded in a tuft, broadly spatulate, often retuse, abruptly narrowed into a long petiole. — Stagnant water, Mass. and N. J. to S. Ind. and Mo.

* * * Submersed perennial, with numerous uniform linear 1-nerved leaves; flowers without bracts; carpels separate nearly to the axis.

4. *C. autumnalis*, L. Stems 3-6' high; fruit large (1" wide or more), flattened, circular, deeply and narrowly notched, sessile or nearly so, its lobes broadly winged, and with a very deep and narrow groove between them; stigmas very long, reflexed, deciduous; leaves all linear from a broader base, retuse or notched at the tip (2-6" long). — W. Mass., Lake Champlain and N. New York, Lake Superior, and westward. (Eu.)

ORDER 40. MELASTOMACEÆ. (MELASTOMA FAMILY.)

Plants with opposite 3-7-ribbed leaves, and definite stamens, the anthers opening by pores at the apex; otherwise much as in the Onagraceæ. — All tropical, except the genus

1. RHÉXIA, L. DEER-GRASS. MEADOW-BEAUTY.

Calyx-tube urn-shaped, coherent with the ovary below, and continued above it, persistent, 4-cleft at the apex. Petals 4, convolute in the bud, oblique, inserted along with the 8 stamens on the summit of the calyx-tube. Anthers long, 1-celled, inverted in the bud. Style 1; stigma 1. Capsule invested by the permanent calyx, 4-celled, with 4 many-seeded placenta projecting from the central axis. Seeds coiled like a snail-shell, without albumen. — Low perennial herbs, often bristly, with mostly sessile 3-5-nerved and bristly-edged leaves, and large showy cymose flowers; in summer; the petals falling early. (A name in Pliny for some unknown plant, probably from ῥήξ, a crevice, from the place of growth.)

* Anthers linear, curved, with a minute spur on the back at the attachment of the filament above its base; flowers cymose, peduncled.

1. *R. Virginica*, L. Stem square, with wing-like angles; leaves oval-lanceolate, sessile, acute; calyx-tube and pedicels more or less hispid with gland-tipped hairs; petals bright purple. — Sandy swamps; coast of Maine to Fla., west to northern N. Y., Ind., Mo., and La. Slender rootstocks tuberiferous.

2. *R. aristosa*, Britt. Branches somewhat wing-angled; leaves linear-oblong, sessile, not narrowed at base, naked or very sparsely hairy; hairs of the calyx mostly below the throat, not gland-tipped; petals sparsely villous, bright purple. — Egg Harbor City, N. J. (*J. E. Peters*); also Sumter Co., S. C. (*J. D. Smith*).

3. *R. Mariana*, L. Stems cylindrical; leaves linear-oblong, narrowed below, mostly petiolate; petals paler. — Sandy swamps; N. J. to Fla., west to Mo. and La.

* * Anthers oblong, straight, without any spur; flowers few, sessile.

4. *R. ciliosa*, Michx. Stem square, glabrous; leaves broadly ovate, ciliate with long bristles; calyx glabrous. — Md. to Fla. and La.