

ORDER 41. LYTHRACEÆ. (LOOSESTRIFE FAMILY.)

Herbs, with mostly opposite entire leaves, no stipules, the calyx enclosing but free from the 1-4-celled many-seeded ovary and membranous capsule, and bearing the 4-7 deciduous petals and 4-14 stamens on its throat; the latter lower down. Style 1; stigma capitate, or rarely 2-lobed. — Flowers axillary or whorled, rarely irregular, perfect, sometimes dimorphous or even trimorphous, those on different plants with filaments and style reciprocally longer and shorter. Petals sometimes wanting. Capsule often 1-celled by the early breaking away of the thin partitions; placentæ in the axis. Seeds anatropous, without albumen. — Branches usually 4-sided.

* Flowers regular or nearly so.

+ Flowers mostly solitary in the axils of the leaves, sessile or nearly so.

1. **Didiplis**. Calyx short, without appendages. Petals none. Stamens 4. Capsule indehiscent. Small aquatic.
2. **Rotala**. Calyx short, the sinuses appendaged. Petals and stamens 4. Capsule septical, with 3-4 valves.
3. **Ammannia**. Flowers not trimorphous. Petals generally 4 or none. Stamens 4. Capsule bursting irregularly.
- + + Flowers in 3-many-flowered axillary cymes (rarely solitary).
4. **Lythrum**. Calyx tubular. Petals usually 6. Stamens mostly 6 or 12. Flowers cymose-spicate in one species.
5. **Decodon**. Flowers trimorphous. Petals 5 (rarely 4). Stamens 8-10. Capsule 3-4-valved, loculicidal.

* * Flowers irregular and unsymmetrical, with 6 petals and 11 stamens.

6. **Cuphea**. Calyx spurred or enlarged on one side at base. Petals unequal.

1. **DIDIPLIS**, Raf. WATER PURSLANE.

Calyx short-campanulate or semiglobose, with no appendages at the sinuses (or a mere callous point). Petals none. Stamens 4, short. Capsule globular, indehiscent, 2-celled. — Submersed aquatic (sometimes terrestrial), rooting in the mud, with opposite linear leaves, and very small greenish flowers solitary in their axils. ("Didiplis means *two doubling*;" from *δύς*, twice, and *διπλός*, double.)

1. **D. linearis**, Raf. Leaves when submersed elongated, thin, closely sessile by a broad base, when emerged shorter and contracted at base; calyx with broad triangular lobes; style very short; capsules very small. (*Ammannia Nuttallii*, Gray.) — From Minn. and Wisc. to Tex., east to N. C. and Fla.

2. **ROTALA**, L.

Calyx short-campanulate or semiglobose, with tooth-like appendages at the sinuses (abnormally, in our species). Petals 4 (in ours). Stamens 4, short. Capsule globular, 4-celled, septical, the valves (under a strong lens) transversely and densely striate. (Name a diminutive of *rota*, a wheel, from the whorled leaves of the original species.)

1. **R. ramósior**, Koehne. Leaves tapering at base or into a short petiole, linear-oblongate or somewhat spatulate; flowers solitary (rarely 3) in the axils and sessile; accessory teeth of calyx as long as the lobes or shorter.

(*Ammannia humilis*, Michx.) — Low or wet ground, Mass. to Fla., west to Ind., Kan., and Tex. — With *Ammannia*-like habit, an exception in the genus.

3. **AMMANNIA**, Houston.

Flowers in 3-many-flowered axillary cymes. Calyx globular or bell-shaped, 4-angled, 4-toothed, usually with a little horn-shaped appendage at each sinus. Petals 4 (purplish), small and deciduous, sometimes wanting. Stamens 4-8. Capsule globular, 2-4-celled, bursting irregularly. — Low and inconspicuous smooth herbs, with opposite narrow leaves, and small flowers in their axils, produced all summer. (Named after *Paul Ammann*, a German botanist anterior to Linnaeus.)

1. **A. coccinea**, Rottb. Leaves linear-lanceolate (2-3' long), with a broad auricled sessile base; cymes subsessile, dense; petals purplish; stamens more or less exserted; style usually slender; capsule included. (*A. latifolia*, Gray, Manual, not L.) — N. J. to Fla., west to S. Ind., Kan., and Tex. The style varies much in length, sometimes in the same specimen. Apparently the more developed form of the southern *A. latifolia*, Linn., which, as limited by Koehne, has apetalous flowers, with included stamens and short style.

4. **LYTHRUM**, L. LOOSESTRIFE.

Calyx cylindrical, striate, 5-7-toothed, with as many little processes in the sinuses. Petals 5-7. Stamens as many as the petals or twice the number, inserted low down on the calyx, commonly nearly equal. Capsule oblong, 2-celled. — Slender herbs, with opposite or scattered mostly sessile leaves, and purple (rarely white) flowers; produced in summer. (Name from *λύθρον*, blood; perhaps from the styptic properties of some species.)

* Stamens and petals 5-7; flowers small, solitary and nearly sessile in the axils of the mostly scattered upper leaves; proper calyx-teeth often shorter than the intermediate processes; plants smooth.

1. **L. Hyssopifolia**, L. Low annual (6-10' high), pale; leaves oblong-linear, obtuse, longer than the inconspicuous flowers; petals pale-purple; stamens usually 4-6, included. — Marshes, near the coast, Maine to N. J. (Eu.)

2. **L. lineare**, L. Stem slender and tall (3-4° high), bushy at top, with 2 margined angles; leaves linear, chiefly opposite; petals whitish; flowers with 6 included stamens and a short style, or the stamens exserted and style short; ovary on a thick short stalk; no fleshy hypogynous ring. — Brackish marshes, N. J. to Fla. and Tex.

3. **L. alatum**, Pursh. Tall and wand-like perennial; branches with margined angles; leaves oblong-ovate to linear-lanceolate, acute, with a cordate or rounded base, the upper mostly alternate; calyx 2-4" long; petals rather large, deep-purple; stamens of the short-styled flowers exserted; fleshy hypogynous ring prominent. — Ont. to Minn., south to Ga., Ark., and Col.; also near Boston.

* * Stamens 12 (rarely 8 or 10), twice the number of the petals, 6 longer and 6 shorter; flowers large, crowded and whorled in an interrupted spike.

L. SALICARIA, L. (SPIKED LOOSESTRIFE.) More or less downy and tall; leaves lanceolate, heart-shaped at base, sometimes whorled in threes; flowers purple, trimorphous in the relative lengths of the stamens and style. — Wet meadows, N. Scotia to Del. (Nat. from Eu.)

5. DÉCODON, Gmel. SWAMP LOOSESTRIFE.

Calyx short, broadly bell-shaped or hemispherical, with 5-7 erect teeth, and as many longer and spreading horn-like processes at the sinuses. Petals 5. Stamens 10 (rarely 8), exserted, of two lengths. Capsule globose, 3-5-celled, loculicidal. — Perennial herbs or slightly shrubby plants, with opposite or whorled leaves, and axillary clusters of trimorphous flowers. (Name from *δέκα*, ten, and *δούς*, tooth.)

1. *D. verticillatus*, Ell. Smooth or downy; stems recurved (2-8° long), 4-6-sided; leaves lanceolate, nearly sessile, opposite or whorled, the upper with clustered flowers in their axils on short pedicels; petals 5, wedge-lanceolate, rose-purple ($\frac{1}{2}$ long); stamens 10, half of them shorter. (*Nesaea verticillata*, HBK.) — Swampy grounds, N. Eng. to Fla., west to Ont., Minn., and La. Bark of the lower part of the stem often spongy-thickened.

6. CÛPHEA, Jacq.

Calyx tubular, 12-ribbed, somewhat inflated below, gibbous or spurred at the base on the upper side, 6-toothed at the apex, and usually with as many little processes in the sinuses. Petals 6, very unequal. Stamens mostly 12, approximate in 2 sets, included, unequal. Ovary with a curved gland at the base next the spur of the calyx, 1-2-celled; style slender; stigma 2-lobed. Capsule oblong, few-seeded, early ruptured through one side. — Flowers solitary or racemose, stalked. (Name from *κνφός*, gibbous, from the shape of the calyx.)

1. *C. viscosissima*, Jacq. (CLAMMY CUPHEA.) Annual, very viscid-hairy, branching; leaves ovate-lanceolate; petals ovate, short-clawed, purple; seeds flat, borne on one side of the placenta, which is early forced out of the ruptured capsule. — Dry fields, R. I. to Ga., west to Kan. and La.

ORDER 42. ONAGRACEÆ. (EVENING-PRIMROSE FAMILY.)

Herbs, with 4-merous (sometimes 2-3- or 5-6-merous) perfect and symmetrical flowers; the tube of the calyx cohering with the 2-4-celled ovary, its lobes valvate in the bud, or obsolete, the petals convolute in the bud, sometimes wanting; and the stamens as many or twice as many as the petals or calyx-lobes, inserted on the summit of the calyx-tube. Style single, slender; stigma 2-4-lobed or capitate. Pollen grains often connected by cobwebby threads. Seeds anatropous, small, without albumen. — Mostly herbs, with opposite or alternate leaves. Stipules none or glandular.

* Parts of the flower in fours or more.

+ Fruit a many-seeded pod, usually loculicidal.

++ Calyx-limb divided to the summit of the ovary, persistent.

1. *Jussiea*. Petals 4-6. Stamens twice as many. Capsule elongated.

2. *Ludwigia*. Petals 4 or none. Stamens 4. Capsule short.

++ ++ Calyx-tube prolonged beyond the ovary (scarcely so in n. 3) and deciduous from it. Flowers 4-merous.

3. *Epilobium*. Seeds silky-tufted. Flowers small, not yellow. Lower leaves often opposite.

4. *Oenothera*. Seeds naked. Flowers mostly yellow. Leaves alternate.

+ + Fruit dry and indehiscent, 1-4-seeded. Leaves alternate.

5. *Gaura*. Calyx-tube obconical. Filaments appendaged at base.

6. *Stenosiphon*. Calyx-tube filiform. Filaments not appendaged.

** Parts of the flower in twos. Leaves opposite.

7. *Circæa*. Petals 2, obcordate or 2-lobed. Stamens 2. Fruit 1-2-seeded, bristly.

1. JUSSIÆA, L.

Calyx-tube elongated, not at all prolonged beyond the ovary; the lobes 4-6, herbaceous and persistent. Petals 4-9. Stamens twice as many as the petals. Capsule 4-6-celled, usually long, opening between the ribs. Seeds very numerous. — Herbs (ours glabrous perennials), with mostly entire and alternate leaves, and axillary yellow flowers, in summer. (Dedicated to Bernard de Jussieu, the founder of the Natural System of Botany.)

1. *J. decurrens*, DC. Stem erect (1-2° high), branching, winged by the decurrent lanceolate leaves; calyx-lobes 4, as long as the petals; capsule oblong-club-shaped, wing-angled; seeds in several rows in each cell. — Wet places, Va. to Fla., west to S. Ill., Ark., and La.

2. *J. repens*, L. Stem creeping, or floating and rooting; leaves oblong, tapering into a slender petiole; flowers large, long-peduncled; calyx-lobes and obovate petals 5; pod woody, cylindrical, with a tapering base; seeds quadrate, in 1 row in each cell, adherent to the spongy endocarp. — In water, Ill. and Ky. to E. Kan., Ark., and Tex.

2. LUDWIGIA, L. FALSE LOOSESTRIFE.

Calyx-tube not at all prolonged beyond the ovary; the lobes 4, usually persistent. Petals 4, often small or wanting. Stamens 4. Capsule short or cylindrical, many-seeded. Seeds minute, naked. — Perennial herbs, with axillary (rarely capitate) flowers, through summer and autumn. (Named for C. G. Ludwig, Professor of Botany at Leipsic, contemporary with Linnæus.)

* Leaves all alternate, sessile or nearly so.

+ Flowers peduncled in the upper axils, with conspicuous yellow petals (4-8" long), equalling the ovate or lanceolate foliaceous lobes of the calyx.

1. *L. alternifolia*, L. (SEED-BOX.) Smooth or nearly so, branched (3° high); leaves lanceolate to linear-lanceolate, acute or pointed at both ends; capsules cubical, rounded at base, wing-angled. — Swamps, E. Mass. to Fla., west to Mich., E. Kan., and La.

2. *L. hirtella*, Raf. Hairy all over; stems nearly simple (1-2° high); leaves oblong, or the upper lanceolate, blunt at both ends; capsules nearly as in the last, but scarcely wing-angled. — Moist pine barrens, N. J. to Fla. and Tex.

+ + Flowers small, sessile (solitary or sometimes clustered) in the axils, with very small greenish petals (in n. 5) or mostly none; leaves mostly lanceolate or linear on the erect stems (1-3° high) and numerous branches; but prostrate or creeping sterile shoots often produced from the base, thickly beset with shorter ovate or spatulate leaves. (Our species glabrous, except n. 3.)

3. *L. sphærocarpa*, Ell. Minutely pubescent, especially the calyx, or nearly glabrous; leaves lanceolate or linear, acute, tapering at base, those of the runners obovate with a wedge-shaped base and glandular-denticulate:

bractlets minute, obsolete, or none; capsules globular or depressed (sometimes acute at base), not longer than the calyx-lobes (less than 2" long). — Water or wet swamps, E. Mass. to Fla. and La. Bark below often spongy-thickened.

4. **L. polycarpa**, Short & Peter. Leaves narrowly lanceolate, acute at both ends, those of the runners oblong-spatulate, acute, entire; *bractlets linear-awl-shaped and conspicuous on the base of the 4-sided somewhat top-shaped capsule*, which is longer than the calyx-lobes. — Wet places, E. Mass. and Conn. to Mich., Minn., E. Kan., and Ky.

5. **L. linearis**, Walt. Slender, mostly low; leaves narrowly linear, those of the short runners obovate; minute petals usually present; *bractlets minute at the base of the elongated top-shaped 4-sided capsule*, which is 3" long and much longer than the calyx-lobes. — Bogs, pine barrens of N. J., and southward.

6. **L. cylindrica**, Ell. Much branched; leaves oblong- or spatulate-lanceolate, much tapering at the base or even petioled; *bractlets very minute at the base of the cylindrical capsule*, which is 3" long, and several times exceeds the calyx-lobes. — Swamps, S. Ill. to Fla. and Tex.

* * Leaves all opposite; stems creeping or floating.

7. **L. palustris**, Ell. (WATER PURSLANE.) Smooth; leaves ovate or oval, tapering into a slender petiole; petals none, or small and reddish when the plant grows out of water; calyx-lobes very short; capsules oblong, 4-sided, not tapering at base, sessile in the axils (2" long). — Ditches, common. (Eu.)

8. **L. arcuata**, Walt. Smooth, small and creeping; leaves oblanceolate, nearly sessile; flowers solitary, long-peduncled; petals yellow, exceeding the calyx (3" long); capsules oblong-club-shaped, somewhat curved ($\frac{1}{2}$ " long). — Swamps, Va. to Fla.

3. EPILOBIUM, L. WILLOW-HERB.

Calyx-tube not or scarcely prolonged beyond the ovary; the limb 4-cleft or -parted, deciduous. Petals 4. Stamens 8; anthers short. Capsule linear, many-seeded. Seeds with a tuft of long hairs at the end. — Mostly perennials, with nearly sessile leaves, and violet, purple, or white flowers; in summer. A large genus, many of its species of difficult limitation. The following provisional arrangement has been made by Prof. W. TRELEASE, mainly in accordance with Haussknecht's revision of the genus. (Name composed of *ἐπί*, upon, and *λόβιον*, a little pod.)

§ 1. Flowers large, purple, in a long raceme; calyx-limb deeply parted; petals entire; stamens and style successively deflexed; stigma of 4 long lobes.

1. **E. angustifolium**, L. (GREAT WILLOW-HERB. FIRE-WEED.) Stem simple, tall (4-7°); leaves scattered, ample, lanceolate, nearly entire. — Low grounds, especially in newly cleared lands; N. Eng. to N. C., west to Minn. and E. Kan., and far north and westward. (Eu., Asia.)

§ 2. Flowers mostly small and corymbed or paniced; calyx-limb 4-cleft; petals mostly deeply notched; stamens and style erect.

* Stigma 4-parted; stem terete.

E. hirsutum, L. Densely soft-hairy, stout, branching (3-5° high); leaves mostly opposite, lance-oblong, serrulate, sessile; flowers in the upper axils or

in a leafy short raceme; petals 6" long, rose-purple. — Waste grounds, Mass. to N. Y. and Ont. (Nat. from Eu.)

* * Stigma clavate; stem terete, without decurrent lines (or with traces in n. 2); leaves numerous, the lower opposite, subentire, with revolute margins.

2. **E. lineare**, Muhl. Usually much branched above and minutely hoary-pubescent, 1-2° high; leaves linear-lanceolate, tapering to a short but distinct petiole, acutish; flowers numerous, pale; capsules hoary, on pedicels as long as the leaves. (*E. palustre*, var. *lineare*, Gray, mainly.) — Bogs, N. Eng. to Penn., Iowa, and northward.

3. **E. strictum**, Muhl. Erect, 1-2½° high, densely beset with soft spreading somewhat glandular white hairs; leaves broader, more obtuse and with evident veins, very short-petioled or sessile; pubescence of the capsule soft and spreading. (*E. molle*, Torr.) — Bogs, Mass. to Minn., south to Va. and Ill.

* * Stigma clavate; stem somewhat quadrangular with 2-4 ridges or hairy lines decurrent from some of the leaves.

+ Tall and mostly branching, many-flowered; leaves rather large, toothed, not revolute, the lower opposite; seeds papillose.

4. **E. coloratum**, Muhl. Somewhat hoary-pubescent above or glandular, 1-3° high; leaves lanceolate, sharply serrulate or denticulate, acute, narrowed to conspicuous petioles; flowers pale, more or less nodding; peduncles shorter than the leaves; seeds dark, unappendaged; coma cinnamon-color. — Wet places, common.

5. **E. adenocaulon**, Haussk. Differs in its more glandular pubescence above, the often blunter and less toothed leaves abruptly contracted to shorter petioles, flowers erect, paler seeds with a slight prolongation at top, and a merely dingy coma. — Wet places through the Northern States.

6. **E. glandulosum**, Lehm. Subsimpler; pubescence above not glandular; leaves ovate-lanceolate, mostly abruptly rounded to a sessile base and more glandular-toothed; seeds larger. — Canada to the mountains of N. C. (*vide* Haussknecht). (Asia.)

+ + Mostly low, slender and simple (except forms of n. 10); leaves chiefly opposite, less toothed; flowers few, nodding; seeds appendaged at the apex.

+ + Seeds areolate but not papillose; leaves not revolute.

7. **E. anagallidifolium**, Lam. Glabrate, a span high or less; leaves erect or ascending, about equalling the internodes, elliptical-oblong to narrowly obovate, entire or the upper denticulate, tapering to short petioles; flowers purple; sepals rather obtuse; capsules glabrous on peduncles exceeding the leaves. — White Mts. and Adirondacks (*vide* Haussknecht). (Eu.)

8. **E. lactiflorum**, Haussk. Glabrous except the pubescent lines, 6-12' high, with elongated internodes; leaves elliptical or the lowest round-obovate, slightly repand-denticulate, obtuse, tapering into mostly elongated petioles; flowers smaller, white; sepals more acute; seeds more prominently appendaged. — White Mts., and northward (*vide* Haussknecht). (Eu.)

+ + Seeds papillose-roughened.

9. **E. Hornemanni**, Reichenb. Glabrate, 8-18' high; leaves mostly horizontal, ovate, the upper acutish, remotely denticulate, abruptly contracted

to winged petioles, not revolute; seeds often only slightly roughened, short and shortly appendaged. (*E. alpinum*, *Man.*) — White Mts., dells of the Wisconsin River (*Lapham*), and northward. (*Eu.*)

10. *E. palustre*, L. Slender, 1° high or less, often branched, finely pubescent; leaves erect or ascending, about equalling or longer than the internodes, sessile, linear to linear-lanceolate or elliptic-oblong, obtuse, with revolute margins; capsules pubescent to nearly glabrous, mostly shorter than the slender peduncles; seeds fusiform, with long beak. (*E. palustre*, var. *lineare*, *Man.*, in part.) — Penn. to Minn. and the White Mts., north and westward. (*Eu.*)

4. *CENOTHERA*, L. EVENING PRIMROSE.

Calyx-tube prolonged beyond the ovary, deciduous; the lobes 4, reflexed. Petals 4. Stamens 8; anthers mostly linear and versatile. Capsule 4-valved, many-seeded. Seeds naked. — Leaves alternate. Flowers yellow, white or rose-color. (An old name, of unknown meaning, for a species of *Epilobium*.)

§ 1. *Stigma-lobes linear, elongated (except in n. 7); calyx-tube linear, slightly dilated at the throat; anthers linear.*

* *Caulescent annuals or biennials; flowers erect in the bud, nocturnal, yellow, the calyx-tips free; capsules sessile, coriaceous; seeds in two rows in each cell.*

+ *Flowers in a leafy spike; capsules stout, oblong, slightly narrowed above.*

1. *C. biennis*, L. (COMMON EVENING PRIMROSE.) Rather stout, erect (1–5° high), usually simple, more or less pubescent and hairy; leaves lanceolate to oblong- or rarely ovate-lanceolate (2–6' long), acute or acuminate, repandly denticulate, the lowest petioled; calyx-tube 1–2½' long, the tips of the sepals contiguous; petals ½–¾' long; capsule more or less pubescent or hirsute. — Throughout the U. S. — Var. *cruciata*, Torr. & Gray, with small narrow petals, appears to be merely a rare garden (?) sport. *E. Mass.*

Var. *grandiflora*, Lindl., has petals as long as the calyx-tube (1–2½' long). — Same range as the type, but not so common east.

2. *C. Oakesiana*, Robbins. Annual, more slender, not hairy, the puberulence mainly appressed; calyx-tips not contiguous at base; otherwise nearly as in the typical form of the last. (*C. biennis*, var. *Oakesiana*, *Gray*.) — Dry places, *E. Mass.*, *R. I.*, and *Conn.*

+ + *Flowers in a leafy spike or axillary; capsules linear.*

3. *C. rhombipetala*, Nutt. Rarely branching, appressed-puberulent and subcanescent; leaves narrowly lanceolate, acuminate, denticulate, the lowest attenuate to a petiole and rarely pinnatifid, diminishing upward into the close, elongated, conspicuously bracted spike; calyx silky-canescens (tube 1½' long); petals rhombic-ovate (6–10' long). — Ind. to Minn. and Ark.

4. *C. humifusa*, Nutt. Stems decumbent or ascending (½–2° long); hoary-pubescent with short dense appressed hairs; leaves narrowly lanceolate or oblanceolate (½–1' long), sparingly repand-dentate or entire, the radical leaves pinnatifid, the floral not reduced; capsule ½–1' long, silky, curved; seeds smooth. — On the sea-coast, *N. J.* to *Fla.*

5. *C. sinuata*, L. Stems ascending or decumbent, simple or branched (1° high or more), more or less strigose-pubescent and puberulent; leaves oblong or lanceolate (1–2' long), sinuately toothed or often pinnatifid, the floral simi-

lar; capsule 1–1½' long; seeds strongly pitted. — *N. J.* to *Fla.*, west to *E. Kan.* and *Tex.* Very variable.

* * *Caulescent perennial; flowers axillary, nodding in the bud, white turning rose-color; capsules sessile, linear; seeds in a single row.*

6. *C. albicaulis*, Nutt. Stems erect (½–4° high), simple or branched, white and often shreddy, glabrous or puberulent; leaves linear to oblong-lanceolate (1–3' long), entire or repand-denticulate, or sinuate-pinnatifid toward the base; calyx-tips free, throat naked; pods ½–2' long, often curved or twisted; seeds lance-linear, smooth. — *W. Minn.* to *N. Mex.*, and westward.

* * * *Caulescent; flowers diurnal, yellow and erect in the bud (except in n. 11); capsules obovate or clavate, quadrangular, the valves ribbed and the angles more or less strongly winged (except in n. 7).*

7. *C. linifolia*, Nutt. Annual or biennial, erect, very slender, simple or diffuse (6–15' high), glabrous, the branchlets and capsules puberulent; radical leaves oblanceolate, cauline linear-filiform ½–1' long; spikes loosely flowered; corolla 2–3" long; stigmas short; capsules obovate to oblong-clavate, 2–3" long, not winged, nearly sessile. — Ill. to *E. Kan.*, *La.*, and *Tex.*

8. *C. pumila*, L. Biennial, puberulent, 1–2° high; leaves mostly glabrous, entire, obtuse, the radical spatulate, the cauline narrowly oblanceolate; flowers loosely spiked; corolla 4–12" long; capsule glabrous, oblong-clavate, 3–6" long, sessile or on a short pedicel, slightly winged. (Incl. *C. chrysantha*, *Michx.*) — Dry fields, *N. Scotia* to *N. J.*, west to *Minn.* and *Kan.* June.

9. *C. fruticosa*, L. (SUNDROPS.) Biennial or perennial, erect, often tall and stout (1–3° high), villous-pubescent or puberulent or nearly glabrous; leaves oblong- to linear-lanceolate, mostly denticulate; raceme corymbed or loose; petals 9–12" long; capsule subsessile or with a pedicel shorter than itself, prominently ribbed and strongly winged. — Common and very variable.

Var. *linearis*, Watson. Leaves linear to linear-lanceolate; capsule usually shorter than the pedicel, rather less broadly winged. (*C. linearis* of *Man.*, in part. *C. riparia*, Nutt.) — *Conn.* to *Fla.*, west to *Mo.* and *La.*

Var. *humifusa*, Allen. Low, decumbent, somewhat woody, diffusely branched, puberulent; branches slender, flexuous; leaves narrow; flowers few, small; capsules pubescent, about equalling the pedicel. (*C. linearis* of *Man.*, in part.) — *Suffolk Co.*, *L. Island.*

10. *C. glauca*, Michx. Perennial, erect (2–3° high), glabrous and glaucous; leaves ovate to ovate-oblong (2–4' long), repand-denticulate; flowers in short leafy corymbs; petals 9–15" long; capsule glabrous, ovoid-oblong, very broadly winged, usually abruptly contracted into a pedicel equalling or shorter than itself. — Mountains of *Va.* to *Ala.*, west to *Ky.* and *E. Kan.*

11. *C. speciosa*, Nutt. Perennial, erect or subdecumbent, finely pubescent; leaves oblong-lanceolate to linear, repand-denticulate, or more or less deeply sinuate-pinnatifid; flowers large, white or rose; capsule clavate-obovate, strongly 8-ribbed, rigid, acute, stoutly pedicelled. — *Mo.* to *Kan.* and *Tex.*

* * * * *Capsule oblong to ovate or orbicular, broadly winged, rigid and sessile.*

+ *Acaulescent or nearly so; flowers white or rose-color.*

12. *C. triloba*, Nutt. Biennial or perennial, nearly glabrous; leaves 2–10' long, somewhat ciliate, long-petioled, runcinate-pinnatifid or oblanceo-

late and only sinuate-toothed; calyx-tips free, the tube slender (2-4' long); petals 6-12" long; capsule ovate, $\frac{1}{2}$ -1' long, strongly winged, net-veined. — Ky. to Miss. and Tex., west to the Pacific.

Var. (?) *parviflora*, Watson. Flowers very small (1-2' long), fertilized in the bud and rarely fully opening; fruit abundant, forming at length a densely crowded hemispherical or cylindrical mass nearly 2' in diameter and often 2-3' high. — Plains of Kan. and Neb.

+ + Low caulescent perennials; flowers axillary, yellow.

13. *œ. Missouriensis*, Sims. Stems decumbent; pubescence short and silky, closely appressed, sometimes dense or wholly wanting; leaves thick, oval to linear, mostly narrowly lanceolate (2-5' long), acuminate, entire or repand-denticulate; calyx-tube 2-5' long; petals broad, 1-2½' long; capsules orbicular, very broadly winged (1-3' long). — Mo. and Kan. to Tex.

14. *œ. Fremontii*, Watson. Hoary with appressed silky pubescence; leaves linear, pointed, entire; calyx-tube 1-2' long; petals $\frac{1}{2}$ -1' long; capsule hoary, oblong, narrowed at base, 9" long. — Central Kan.

§ 2. *Stigma discoid*; calyx-tube more broadly dilated above; anthers oblong-linear; capsule mostly sessile, linear-cylindric; perennial, somewhat woody, with axillary yellow flowers.

15. *œ. Hartwegi*, Benth., var. *lavandulæfolia*, Watson. Stems numerous from a woody base, 3-6' high; leaves numerous, hoary-puberulent, mostly linear, $\frac{1}{2}$ -1' long; calyx-tube 1-2' long; capsule 8-10" long. — Central Kan. to Col. and N. Mex.

16. *œ. serrulata*, Nutt. Slender (3-15' high), simple or branched, canescent or glabrous; leaves linear to lanceolate (1-3' long), irregularly and sharply denticulate; calyx-tube broadly funnelform (2-4" long), strongly nerved; petals broadly obovate (3-4" long), crenulate; capsule 9-15" long. — Wisc. and Minn. to Mo., Tex., and N. Mex.

5. GAÛRA, L.

Calyx-tube much prolonged beyond the ovary, deciduous; the lobes 4 (rarely 3), reflexed. Petals clawed, unequal or turned to the upper side. Stamens mostly 8, often turned down, as is also the long style. A small scale-like appendage before the base of each filament. Stigma 4-lobed, surrounded by a ring or cup-like border. Fruit hard and nut-like, 3-4-ribbed or angled, indehiscent or nearly so, usually becoming 1-celled and 1-4-seeded. Seeds naked. — Leaves alternate, sessile. Flowers rose-color or white, changing to reddish in fading, in spikes or racemes, in our species quite small (so that the name, from *γαῦρος*, superb, does not seem appropriate).

* Fruit sessile or nearly so.

1. *G. biennis*, L. Soft-hairy or downy (3-8° high); leaves oblong-lanceolate, denticulate; spikes wand-like; fruit oval or oblong, acute at both ends, 2-3" long, ribbed, downy. — Dry banks, N. Y. to Minn., and southward. Aug.

2. *G. parviflora*, Dougl. Soft-villous and puberulent, 2-5° high; leaves ovate-lanceolate, repand-denticulate, soft-pubescent; spikes dense; fruit oblong-clavate, narrowed to both ends, 4-nerved, obtusely angled above, 3-4" long. — Mo. to La. and westward.

3. *G. coccinea*, Nutt. Canescent, puberulent or glabrate (6-12' high), very leafy; leaves lanceolate, linear-oblong or linear, repand-denticulate or entire; flowers in simple spikes, rose-color turning to scarlet; fruit terete below, 4-sided and broader above, 2-3" long. — Minn. to Kan., and westward.

* * Fruit slender-pedicelled.

4. *G. filipes*, Spach. Nearly smooth; stem slender (2-4° high); leaves linear, mostly toothed, tapering at base; branches of the panicle very slender, naked; fruit obovate-club-shaped, 4-angled at the summit. — Open places, Va. to Fla., west to Ill., Kan., and Ark.

6. STENÓSIPHON, Spach.

Calyx prolonged beyond the ovary into a filiform tube. Filaments (8) not appendaged at base. Fruit 1-celled, 1-seeded. Otherwise as *Gaura*, which it also resembles in habit. (From *στενός*, narrow, and *σῆφων*, a tube.)

1. *S. virgatus*, Spach. Slender, 2-4° high, glabrous, leafy; leaves narrowly lanceolate to linear, pointed, entire, much reduced above; flowers numerous in an elongated spike, white, $\frac{1}{2}$ ' long; fruit pubescent, oblong-ovate, 8-ribbed, small. — E. Kan. to Col. and Tex.

7. CIRCÆA, Tourn. ENCHANTER'S NIGHTSHADE.

Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous; lobes 2, reflexed. Petals 2, inversely heart-shaped. Stamens 2. Fruit indehiscent, small and bur-like, bristly with hooked hairs, 1-2-celled; cells 1-seeded. — Low and inconspicuous perennials, in cool or damp woods, with opposite thin leaves on slender petioles, and small whitish flowers in racemes, produced in summer. (Named from *Circe*, the enchantress.)

1. *C. Lutetiana*, L. Taller (1-2° high); leaves ovate, slightly toothed; bracts none; hairs of the roundish 2-celled fruit bristly. — Very common. (Eu.)

2. *C. alpina*, L. Low (3-8' high), smooth and weak; leaves heart-shaped, thin, shining, coarsely toothed; bracts minute; hairs of the obovate-oblong 1-celled fruit soft and slender. — Deep woods, N. Eng. to Ga., Ind., and Minn. (Eu.)

ORDER 43. LOASACEÆ. (LOASA FAMILY.)

Herbs, with a rough or stinging pubescence, no stipules, the calyx-tube adherent to a 1-celled ovary with 2 or 3 parietal placentæ; — represented here only by the genus

1. MENTZELIA, Plumier.

Calyx-tube cylindrical or club-shaped; the limb 5-parted, persistent. Petals 5 or 10, regular, spreading, flat, convolute in the bud, deciduous. Stamens indefinite, rarely few, inserted with the petals on the throat of the calyx. Styles 3, more or less united into one; stigmas terminal, minute. Capsule at length dry and opening by valves or irregularly at the summit, few-many-seeded. Seeds flat, anatropous, with little albumen. — Stems erect. Leaves alternate, very adhesive by the barbed pubescence. Flowers terminal, solitary or cymose-clustered. (Dedicated to *C. Mentzel*, an early German botanist.)

* Seeds few, oblong, not winged; petals 5, not large; filaments all filiform.

1. *M. oligosperma*, Nutt. Rough and adhesive (1-3° high), much branched, the brittle branches spreading; leaves ovate and oblong, cut-toothed or angled, often petioled; flowers yellow (7-10" broad), opening in sunshine; petals wedge-oblong, pointed; stamens 20 or more; capsule small, about 9-seeded. — Prairies and plains, Ill. to Kan. and Col., south to Tex.

** Seeds numerous, rounded and wing-margined; petals 10, large and showy; outer filaments petaloid in n. 3; capsule large, oblong; leaves sessile.

2. *M. ornata*, Torr. & Gray. Stout, 1-2° high; leaves oblong-lanceolate, deeply repand-toothed or pinnatifid, the segments acute; calyx-tube leafy-bracteate; petals 2-3' long, yellowish-white; filaments all filiform or the outer dilated below; capsule 1½-2' long; seeds narrowly margined. — On the plains, western part of the Dakotas to central Kan. and Tex.

3. *M. nuda*, Torr. & Gray. More slender, 1-5° high; leaves somewhat lanceolate, rather bluntly or shortly repand-dentate; flowers half as large as in the last; calyx not bracteate; outer filaments narrowly dilated, sterile; capsule about 1' long; seeds plainly winged. — Plains, Dakotas to cen. Kan. and Tex.

ORDER 44. PASSIFLORACEÆ. (PASSION-FLOWER FAMILY.)

Herbs or woody plants, climbing by tendrils, with perfect flowers, 5 monadelphous stamens, and a stalked 1-celled ovary free from the calyx, with 3 or 4 parietal placentæ, and as many club-shaped styles.

1. PASSIFLORA, L. PASSION-FLOWER.

Calyx of 5 sepals united at the base into a short cup, imbricated in the bud, usually colored like the petals, at least within; the throat crowned with a double or triple fringe. Petals 5, on the throat of the calyx. Stamens 5; filaments united in a tube which sheathes the long stalk of the ovary, separate above; anthers large, fixed by the middle. Berry (often edible) many-seeded; the anatropous albuminous seeds invested by a pulpy covering. Seed-coat brittle, grooved. — Leaves alternate, generally palmately lobed, with stipules. Peduncles axillary, jointed. Ours are perennial herbs. (An adaptation of *flos passionis*, a translation of *fior della passione*, the popular Italian name early applied to the flower from a fancied resemblance of its parts to the implements of the crucifixion.)

1. *P. lutea*, L. Smooth, slender; leaves obtusely 3-lobed at the summit, the lobes entire; petioles glandless; flowers greenish-yellow (1' broad); fruit ½' in diameter. — Damp thickets, S. Penn. to Fla., west to Ill., Mo., and La.

2. *P. incarnata*, L. Pubescent; leaves 3-5-cleft, the lobes serrate, the base bearing 2 glands; flower large (2' broad), nearly white, with a triple purple and flesh-colored crown; involucre 3-leaved; fruit as large as a hen's egg. — Dry soil, Va. to Fla., west to Mo. and Ark. Fruit called *maypops*.

ORDER 45. CUCURBITACEÆ. (GOURD FAMILY.)

Mostly succulent herbs with tendrils, diœcious or monœcious (often gamopetalous) flowers, the calyx-tube cohering with the 1-3-celled ovary, and the

5 or usually 2½ stamens (i. e., 1 with a 1-celled and 2 with 2-celled anthers) commonly united by their often tortuous anthers, and sometimes also by the filaments. Fruit (pepo) fleshy, or sometimes membranaceous. — Limb of the calyx and corolla usually more or less combined. Stigmas 2 or 3. Seeds large, usually flat, anatropous, with no albumen. Cotyledons leaf-like. Leaves alternate, palmately lobed or veined. — Mostly a tropical or subtropical order; represented in cultivation by the GOURD (*Lagenaria vulgaris*), PUMPKIN and SQUASH (species of *Cucurbita*), MUSK-MELON (*Cucumis Melo*), CUCUMBER (*C. sativus*), and WATERMELON (*Citrullus vulgaris*).

* Fruit prickly. Seeds few, erect or pendulous. Flowers white. Annual.

+ Ovary 1-celled. Seed solitary, pendulous.

1. *Sicyos*. Corolla of the sterile flowers flat and spreading, 5-lobed. Fruit indehiscent.

+ + Ovary 2-3-celled. Seeds few, erect or ascending.

2. *Echinocystis*. Corolla of the sterile flowers flat and spreading, 6-parted. Anthers 3. Fruit bladdery, 2-celled, 4-seeded, bursting at the top.

3. *Cyclanthera*. Corolla 5-parted. Anther 1, annular. Fruit oblique and gibbous.

• • Fruit smooth. Seeds numerous, horizontal, attached to the 3-5 parietal placentæ. Perennial.

4. *Melothria*. Flowers small, greenish; corolla 5-parted. Slender, climbing. Fruit small.

5. *Cucurbita*. Flowers large, yellow, tubular-campanulate. Prostrate. Fruit large.

1. SICYOS, L. ONE-SEEDED BUR-CUCUMBER.

Flowers monœcious. Petals 5, united below into a bell-shaped or flattened corolla. Anthers cohering in a mass. Ovary 1-celled, with a single suspended ovule; style slender; stigmas 3. Fruit ovate, dry and indehiscent, filled by the single seed, covered with barbed prickly bristles which are readily detached. — Climbing annuals, with 3-forked tendrils, and small whitish flowers; the sterile and fertile mostly from the same axils, the former corymbed, the latter in a capitate cluster, long-peduncled. (Greek name for the Cucumber.)

1. *S. angulatus*, L. Leaves roundish heart-shaped, 5-angled or lobed, the lobes pointed; plant clammy-hairy. — River-banks, and a weed in damp yards, N. H. and Quebec to Fla., west to Minn., E. Kan., and Tex. July-Sept.

2. ECHINOCYSTIS, Torr. & Gray. WILD BALSAM-APPLE.

Flowers monœcious. Petals 6, lanceolate, united at the base into an open spreading corolla. Anthers more or less united. Ovary 2-celled, with 2 erect ovules in each cell; stigma broad. Fruit fleshy, at length dry, clothed with weak prickles, bursting at the summit, 2-celled, 4-seeded, the inner part fibrous-netted. Seeds large, flat, with a thickish hard and roughened coat. — Tall climbing annual, nearly smooth, with 3-forked tendrils, thin leaves, and very numerous small greenish-white flowers; the sterile in compound racemes often 1° long, the fertile in small clusters or solitary, from the same axils. (Name composed of *éxivos*, a hedgehog, and *κύστις*, a bladder, from the prickly fruit.)

1. *E. lobata*, Torr. & Gray. Leaves deeply and sharply 5-lobed; fruit oval (2' long); seeds dark-colored. — Rich soil along rivers, W. New Eng and Penn. to Minn., E. Kan., and Tex. Also cult. for arbors. July-Oct.

3. CYCLANTHERA, Schrad.

Flowers monoecious. Corolla rotate, deeply 5-parted. Stamens united into a central column, the anther solitary in our species and annular. Ovary (1-3-) usually 2-celled and 4-locellate with 4 erect or ascending ovules. Fruit spiny, obliquely ovoid and gibbous, beaked, bursting irregularly. Seeds flattened. — Slender glabrous climbing annuals or perennials, with very small racemose or panicle white sterile flowers and a solitary fertile one in the same axil. (Name from κύκλος, a circle, and ἀνθήρα, anther.)

1. *C. dissécta*, Arn. Annual; leaves digitately 3-7-foliolate, the oblong divisions somewhat lobed or toothed; tendrils simple or bifid; fruit 1' long, on a short peduncle. — Central Kan. to Tex. and Mex.

4. MELÔTHRIA, L.

Flowers polygamous or monoecious; the sterile campanulate, the corolla 5-lobed; the fertile with the calyx-tube constricted above the ovary, then campanulate. Anthers more or less united. Berry small, pulpy, filled with many flat and horizontal seeds. — Tendrils simple. Flowers very small. (Altered from μέλωθρον, an ancient name for a sort of white grape.)

1. *M. péndula*, L. Slender, from a perennial root, climbing; leaves small, roundish and heart-shaped, 5-angled or lobed, roughish; sterile flowers few in small racemes; the fertile solitary, greenish or yellowish; berry oval, green, 4-6" long. — Copses, Va. to Fla., west to S. Ind. and La.

5. CUCÚRBITA, L.

Flowers monoecious, mostly solitary. Calyx-tube campanulate; corolla campanulate, 5-lobed to the middle. Filaments distinct; anthers linear, united, sigmoid. Ovary oblong, with short thick style, 3-5 2-lobed stigmas, and 3-5 parietal placentas; ovules numerous, horizontal. Fruit smooth, fleshy with a hard rind, indehiscent. — Prostrate scabrous vines, rooting at the joints, with large yellow flowers and large fruit. (The Latin name for the Gourd.)

1. *C. foetidissima*, HBK. Root very large, fusiform; leaves thick, triangular-cordate; flowers 3-4' long; fruit globose or obovoid, 2-3' in diameter. (*C. perennis*, Gray.) — Central Neb. to Tex., and westward.

ORDER 46. CACTACEÆ. (CACTUS FAMILY.)

Fleshy and thickened mostly leafless plants, of peculiar aspect, globular or columnar and many-angled, or flattened and jointed, usually with prickles. Flowers solitary, sessile; the sepals and petals numerous, imbricated in several rows, the bases adherent to the 1-celled ovary. — Stamens numerous, with long and slender filaments, inserted on the inside of the tube or cup formed by the union of the sepals and petals. Style 1; stigmas numerous. Fruit a 1-celled berry, with numerous campylotropous seeds on several parietal placentæ.

1. *Mamillaria*. Globose or oval plants, covered with spine-bearing tubercles. Flowers from between the tubercles. Ovary naked; berry succulent.
2. *Opuntia*. Branching or jointed plants; the joints flattened or cylindrical.

1. MAMILLARIA, Haw.

Flowers about as long as wide, the tube campanulate or funnel-shaped. Ovary often hidden between the bases of the tubercles, naked, the succulent berry exerted. Seeds yellowish-brown to black, crustaceous. — Globose or oval plants, covered with spine-bearing cylindrical, oval, or conical tubercles, the flowers from distinct woolly or bristly areoles at their base. (Name from *mamilla*, a nipple, referring to the tubercles.)

1. *M. vivipara*, Haw. Simple or caespitose, 1-5' high, the almost terete tubercles bearing bundles of 5-8 reddish-brown spines (10" long or less), surrounded by 15-20 grayish ones in a single series, all straight and very rigid; flowers purple, with lance-subulate petals and fringed sepals; berry oval, green; seeds pitted, light brown. — Plains, Dakotas to Kan., and westward.

2. *M. Missouriensis*, Sweet. Smaller, globose, with fewer (10-20) weaker ash-colored spines; flowers yellow, 1-2' broad; berry subglobose, scarlet; seeds few, black, pitted. (*M. Nuttallii*, Engelm.) — S. Dak. to central Kan., Tex., and westward.

2. OPÚNTIA, Tourne. PRICKLY PEAR. INDIAN FIG.

Sepals and petals not united into a prolonged tube, spreading, regular, the inner roundish. Berry often prickly. Seeds flat and margined, covered with a white bony arillus. Embryo coiled around albumen; cotyledons large, foliaceous in germination. — Stem composed of joints (flattened in ours), bearing very small awl-shaped and usually deciduous leaves arranged in a spiral order, with clusters of barbed bristles and often spines also in their axils. Flowers in our species yellow, opening in sunshine for more than one day. (A name of Theophrastus, originally belonging to some different plant.)

* *Spines small or none; fruit pulpy.*

1. *O. vulgaris*, Mill. Prostrate or spreading, light green; joints broadly obovate (2-4' long); leaves minute (2-2½" long), ovate-subulate, generally appressed; bristles short, greenish yellow, rarely with a few small spines; flowers pale yellow (about 2' broad), with about 8 petals; fruit 1' long. — Sandy fields and dry rocks, Nantucket to S. C., near the coast; Falls of the Potomac.

2. *O. Rafinesquii*, Engelm. Prostrate, deep green; joints broadly obovate or orbicular (3-5' long); leaves (3-4" long), spreading; bristles bright red-brown, with a few small spines and a single strong one (9-12" long) or none; flowers yellow (2½-3½' broad), sometimes with a reddish centre; petals 10-12; fruit 1½' long, with an attenuated base. — Sterile soil, Nantucket and southward along the coast to Fla., and in the Mississippi valley, from Mich. to Minn., and south to Ky. and Ark.

** *Very spiny, fruit dry and prickly.*

3. *O. Missouriensis*, DC. Prostrate, joints light green, broadly obovate, flat and tuberculate (2-6' long), leaves small (1½-2" long); their axils armed with a tuft of straw-colored bristles and 5-10 slender radiating spines (1-2' long); flowers light yellow (2-3' broad); fruit with spines of variable length. — Wisc. to Mo., westward across the plains, very variable.

4. *O. fragilis*, Haw. Subdecumbent; joints small (1-2' long or less), ovate, compressed or tumid, or even terete; leaves hardly 1" long, red; bristles