

**76. ASPRÉLLA**, Willd. BOTTLE-BRUSH GRASS. (Pl. 11.)

Spikelets 2-3 or sometimes solitary on each joint of the rhachis of a terminal spike, raised on a very short callous pedicel, loosely 2-4-flowered (when solitary flatwise on the rhachis). Glumes none! or small, awn-like, and deciduous. Otherwise nearly as in *Elymus*. (Name a diminutive of *asper*, rough or prickly.)

1. *A. Hystrix*, Willd. Perennial; culms 3-4° high; leaves and sheaths smoothish; spike loose (3-6' long); the spreading spikelets 2-3 together, early deciduous; flowers smoothish or often rough-hairy, tipped with an awn thrice their length (1' long). (*Gymnostichum Hystrix*, Schreb.)—Moist woodlands. July, Aug.

**77. ARUNDINÀRIA**, Michx. CANE. (Pl. 11.)

Spikelets flattened, 5-14-flowered; the flowers somewhat separated on the jointed rhachis. Empty glumes very small, membranaceous, the upper one larger. Flowering glumes and palet herbaceous or somewhat membranaceous, the glume convex on the back, many-nerved, tapering into a mucronate point or bristle. Squamulæ 3, longer than the ovary. Stamens 3. Grain oblong, free.—Arborescent or shrubby grasses, simple or with fascicled branches, and with large spikelets in panicles or racemes; blade of the leaf jointed upon the sheath; flowers polygamous. (Name from *arundo*, a reed.)

1. *A. macrosperma*, Michx. (LARGE CANE.) (Pl. 11, fig. 1, 2.) Culms arborescent, 10-40° high and  $\frac{1}{2}$ -3' thick at base, rigid, simple the first year, branching the second, afterwards at indefinite periods fruiting, and soon after decaying; leaves lanceolate (1-2' wide), smoothish or pubescent, the sheath ciliate on one margin, stoutly fimbriate each side of the base of the leaf; panicle lateral, composed of few simple racemes; spikelets 1-3' long, purplish or pale, erect; flowering glume lanceolate, acute or acuminate, glabrous or pubescent, fringed (5-12" long).—River-banks, S. Va. (?), Ky., and southward, forming cane-brakes. April.

Var. *suffruticosa*, Munro. (SWITCH CANE. SMALL CANE.) Lower and more slender (2-10° high), often growing in water; leaves 4"-1' broad; spikelets solitary or in a simple raceme at the summit of the branches, or frequently on leafless radical culms. (*A. tecta*, Muhl.)—Swamps and moist soil, Md., S. Ind. to S. E. Mo., and southward. Sometimes fruiting several years in succession.

## SERIES II.

## CRYPTOGAMOUS OR FLOWERLESS PLANTS.

VEGETABLES destitute of proper flowers (i. e. having no stamens nor pistils), and producing instead of seeds minute one-celled germinating bodies called *spores*, in which there is no embryo or rudimentary plantlet.

## CLASS III. ACROGENS.

Cryptogamous plants with a distinct axis or stem, growing from the apex, and commonly not with later increase in diameter, usually furnished with distinct leaves; reproduction by antheridia and archegonia, sometimes also by gemmation.

SUBCLASS I. VASCULAR ACROGENS, OR PTERIDOPHYTES.<sup>1</sup>

Stems containing woody fibre and vessels (especially scalariform or spiral ducts). Antheridia or archegonia, or both, formed on a minute prothallus which is developed from the spore on germination, the archegonium containing a nucleus, which after fertilization becomes an oöspore and at length grows into the conspicuous spore-bearing plant.

## ORDER 130. EUISETACEÆ. (HORSETAIL FAMILY.)

Rush-like, often branching plants, with jointed and mostly hollow stems from running rootstocks, having sheaths at the joints, and, when fertile, terminated by the conical or spike-like fructification composed of shield-shaped stalked scales bearing the spore-cases beneath.—A single genus.

<sup>1</sup> The orders of this Subclass have been elaborated anew for this edition by Prof. DANIEL C. EATON of Yale University.



**1. E. arvense, L.** HORSETAIL. SCOURING RUSH. (Pl. 21.)

Spore-cases (*sporangia, thecae*) 6 or 7, adhering to the under side of the angled shield-shaped scales of the spike, 1-celled, opening down the inner side and discharging the numerous loose spores. To the base of each spore are attached 4 thread-like and club-shaped elastic filaments, which roll up closely around the spore when moist, and uncoil when dry. — Rootstocks perennial, wide-creeping, hard and blackish, jointed, often branched and sometimes bearing small tubers. Stems erect, cylindrical, hollow, jointed; the surface striated or grooved with alternate ridges and furrows, the cuticle in most species containing silica in the form of minute granules, rosettes, or tubercles; the joints containing besides the central air-cavity a circle of smaller hollows beneath the furrows and a set of still smaller ones beneath the ridges; the nodes closed and solid, each bearing instead of leaves a sheath which is divided into teeth corresponding in number and position to the principal ridges of the stem; stomata in the furrows, each with two pairs of guard-cells, of which the outer pair is marked with radiating lines of silica. Branches, when present, in whorls from the base of the sheath, like the stem, but without the central air-cavity. Prothallus green, formed upon the ground, often variously lobed, usually dioecious. (The ancient name, from *equus*, horse, and *seta*, bristle.)

§ 1. *Annual-stemmed, not surviving the winter.*

\* *Fruiting in spring from soft and rather succulent pale or brownish fertile stems, the sterile stems or branches appearing later, herbaceous and very different.*

+ *Fertile stems unbranched, destitute of chlorophyll and soon perishing; the sterile branching copiously.*

1. **E. arvense, L.** (COMMON H.) Fertile stems (4–10' high) with loose and usually distant about 8–12-toothed sheaths; the sterile slender (at length 1–2' high), 10–14-furrowed, producing long and simple or sparingly branched 4-angular branches, their teeth 4, herbaceous, lanceolate. — Moist, especially gravelly soil; very common. March–May. Rootstocks often bearing little tubers. — Var. *CAMPÉSTRE*, Milde, is a not uncommon state, in which the sterile stem bears a small fruiting spike at the summit. (Eu.)

+ + *Fertile stems when older producing herbaceous 3-sided branches, and lasting through the summer, except the naked top which perishes after fructification.*

2. **E. pratense, Ehrh.** Sterile and finally also the fertile stems producing simple straight branches; sheaths of the stem with ovate-lanceolate short teeth, those of the branches 3-toothed; stems more slender and the branches shorter than in the last. — Mich. to Minn., and northward. April, May. (Eu.)

3. **E. sylvaticum, L.** Sterile and fertile stems (about 12-furrowed) producing compound racemed branches; sheaths loose, with 8–14 rather blunt teeth, those of the branches bearing 4 or 5, of the branchlets 3, lance-pointed divergent teeth. — Wet shady places; common northward. May. (Eu.)

\* \* *Fruiting in summer; stems all of one kind, or the fertile contemporaneous with and like the sterile, equally herbaceous, producing mostly simple branches, or sometimes nearly naked.*

4. **E. palustre, L.** Stems (10–18' high) slender, very deeply 5–9-grooved, the ridges narrow and acute, roughish, the lance-awl-shaped teeth

whitish-margined; branches always hollow, 4–7-angled, rather few in a whorl. — Wet places, Niagara River (*Clinton*), Wisc. (*Austin*), and northward. June. (Eu.)

5. **E. littorale, Kühlewein.** Stems (8–18' high) slender, deeply 6–16-grooved, the ridges rounded, the teeth shorter than in the last, narrowly white-margined; branches often solid, 3–4-angled, 2–6 in a whorl. — Wet sandy shores, Vt. and N. Y., and northward. — Spores always abortive, whence the plant has been considered a hybrid, perhaps of *E. arvense* and *E. limosum*. July. (Eu.)

6. **E. limosum, L.** (Pl. 21, fig. 1–5.) Stems (2–5' high) slightly many-furrowed, smooth, sometimes continuing unbranched, but usually producing ascending branches after fructification; sheaths appressed, with 10–22 (commonly about 18) dark-brown and acute rigid short teeth. — In shallow water; rather common. — Air-cavities none under the grooves, but small ones under the ridges. A form in which the branches bear numerous small spikes is var. *POLYSTACHYUM*, Brückner. June, July. (Eu.)

§ 2. *Stems all alike, evergreen, unbranched, or producing a few slender erect branches; fruiting in summer. Central air-cavity of the stem very large.*

\* *Stems tall and stout (1½–4' or even 6' high), simple, or casually branched, evenly many-grooved; sheaths appressed.*

7. **E. hyemale, L.** (SCOURING-RUSH. SHAVE-GRASS.) Stems 1½–4' high, 8–34 grooved, the ridges roughened by two more or less distinct lines of tubercles; sheaths elongated, with a black girdle above the base and a black limb; ridges of the sheaths obscurely 4-carinate, the teeth blackish, membranaceous, soon falling off. — Wet banks; common northward. Formerly in common use for polishing wood and metal. (Eu.)

8. **E. robustum, Braun.** Stems tall and stout (sometimes 8–10' high and nearly an inch thick), 20–48-grooved, the ridges roughened with one line of transversely oblong tubercles; sheaths rather short, with a black girdle at base and a black limb; ridges of the sheaths tricarinate, the blackish teeth soon falling off. — River-banks, Ohio and westward.

9. **E. lævigatum, Braun.** Stems 1–4' high, rather slender, pale green, 14–30-grooved, the ridges almost smooth; sheath slightly enlarged upward, with a black girdle at the base of the mostly deciduous white-margined teeth, and rarely also at the base of the sheath; ridges of the sheath with one keel, or sometimes obscurely tricarinate. — By streams and in clayey places, Ohio to Minn., and westward.

\* \* *Stems slender, in tufts, 5–10-grooved; sheaths looser.*

10. **E. variegatum, Schleicher.** Stems ascending (6–18' long), usually simple from a branched base, 5–10-grooved; sheaths green variegated with black above, the 5–10 teeth tipped with a deciduous bristle. — Shores or river-banks, N. H. (Bellows Falls, *Carey*) and Niagara to Minn., and northward; rare. (Eu.)

11. **E. scirpoides, Michx.** Stems very numerous in a tuft, filiform (3–6' high), flexuous and curving, mostly 6-grooved, with acute ridges; sheaths 3-toothed, the bristle-pointed teeth more persistent; central air-cavity wanting. — Wooded hillsides, N. Eng. to Penn., Minn., and northward. (Eu.)