

4. *E. CICUTARIUM*, L'Her., Ait. Hort., Kew, II, 414; Brewer and Watson, Bot. Calif. I, 94; Vasey, Rep. Depart. Agric., 1881-2, 253, Pl. 22. Loosely white-villous; leaves oblong, pinnately 9-11-divided; divisions remote, ovate, pinnatisect with oblong or linear sharply serrate segments; stipules scarious, lanceolate, acute; peduncles about 9-flowered; sepals about 8 mm. long, mostly abruptly pointed, the awn tipped with 1-2 long white hairs; petals rose-purple, about 5 mm. long; beak 30-40 mm.; divisions of capsule 1×5 mm., obliquely truncate; seed $.8 \times 2.5-3$ mm.—Oregon to Nevada and Texas; also met with occasionally as a weed or ballast-plant elsewhere (Mich., *Tuthill, Bailey*; Mass., *Murray, Lowell, Oakes*; Maine, *Farlow*; New York, *Knieskern, Holton*; Pennsylvania, *Redfield*; New Jersey, *Parker*; New Brunswick, *Hay*). Introduced from south Europe. Flowering in dry places when less than an inch high. Relished by cattle, and said to impart a pleasant taste to their milk.—Pl. 10, fig. 18.

So far as their vegetation is concerned, the species of *Erodium* agree in the main with *Geranium*. As a rule they are less branched. (Note 5.) The inflorescence differs chiefly in that the umbels are more than 2-flowered, and the pedicels are always more or less reflexed during the maturation of the fruit, to become erect, ultimately.

The flowers are usually turned more to one side when open, than in *Geranium*, and this change in their position is accompanied by a slight degree of irregularity, the two or three petals on the lower side being larger, by which they are fitted to serve as an alighting place for insect visitors—chiefly bees. The flowers are usually distinctly protandrous, and secrete an abundance of nectar. In the main they differ very little from those of *Geranium* in the way in which they are pollinated. *E. cicutarium* has been shown by Ludwig to be gynodioecious. (Note 6.)

The contrivances for dissemination are even more interesting in this genus than in the last. The fruit is essentially the same in both, the segments of the ovary being prolonged in flat bands that extend along an axile beak and form the styles above. These appendages or awns consist in both genera almost exclusively of mechanical (bast) fibres. In *Geranium*, those forming the outer part contract to a greater extent than those nearer the axis, as the fruit ripens, so that ultimately the base of the awn curves outwards in a radial plane, as has already been explained. In *Erodium* the carpels remain practically indehiscent and are firm and sharp-pointed at the base, gradually enlarging upwards, and are covered below with obliquely ascending stiff hairs, supported at the base by firm cells projecting from the epidermis of the ovary. The awn is similar to that of the last genus, but while its outer fibres merely shorten in drying, the inner ones, for the lower half, contract spirally, so that the ripened carpel is not only thrown elastically from the plant, but the awn ultimately becomes coiled below into a close helix, from the top of which the upper half bends away in a gradual curve. The awn is also bearded below, on the inner side, and when it at length becomes twisted, the long loose hairs point outwardly in such a manner as to act in some measure as a parachute, favoring the further removal of the fruit by the wind.

When moistened, the awns become straight, resuming their coiled form again when allowed to dry, and repeating these changes with every alternation of moisture and dry-

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