

besides that it bears a spur of variable length. The five stamens are closely applied to the ovary ; they have short filaments, and at their summit generally a membranaceous appendage formed by the prolongation of the connective ; the two anterior stamens are provided with a spur-like nectary, which protrudes a considerable distance into the petaloid spur ; this nectary shows several modifications in North American species and ought to be studied and described in the diagnoses. Finally, the ovary has a club-shaped style and bears the stigma in a groove on the anterior side.

These perfect flowers are, however, far from being always fertile, and it appears, from our own observations, as if they are sterile in a number of the acaulescent, purple-flowered species, at least in the vicinity of Washington, but whether these same species behave in the same way further north would be worth while determining. The other kind of flower, the cleistogamic, is often, but very incorrectly described as "apetalous," evidently from the fact that it has not hitherto been carefully examined in this country. The term "cleistogamic" is thus designated to such flowers as remain closed, in which the petals are merely present as rudiments or, sometimes, totally absent, and in which the stamens are reduced in number, besides that their anthers are small and contain but a few pollen-grains, which generally emit their tubes while still enclosed in the anther-cell. The pistil is in these flowers smaller than in the perfect ones, and the stigma is often scarcely developed. These flowers nevertheless produce a larger quantity of seeds than the perfect, and they have, in a number of cases, the power of burying themselves in the ground, where the seeds thus become ripened, or they are borne on erect, aerial peduncles like the perfect flowers.

Cleistogamic flowers are known from very nearly sixty genera, especially among the *Papilionaceæ*, *Acanthaceæ*, *Malpighiaceæ*, in certain species of *Oxalis*, *Lamium*, *Linaria*, *Drosera*, *Viola*, etc., while they are rare among the *Monocotyledones* : *Juncus*, *Hordeum*, *Leersia*, *Amphicarpum*, *Commelina*, etc.¹

In the genus *Viola* these flowers were known already to Dillenius and Linnæus, which is readily to be seen from their

¹ Compare Darwin : Different forms of flowers, p. 310.