

the reserve food is assimilated (several *Cruciferae*). Very peculiar is the structure of the cotyledon in several *Monocotyledones*, for instance the *Gramineae*, where a part of the cotyledon is developed as a flat, shield-shaped organ, the so-called scutellum, whose function it is to absorb the food-substances of the endosperm; a similar organ occurs, also, in Palms, *Commelinaceae*, *Canna*, etc., where it represents the apex of the cotyledon.

It is, therefore, very natural that the cotyledons exhibit a number of forms depending upon their function; beside that their varied position in the seed necessarily exercises some influence upon the outline of their leaf-blades. However, the cotyledons are not the only part of the seedling in which modifications as to structure and function may be observed; the primary root and the hypocotyl exhibit, also, some certain types of development, which are of no small interest. The root, for instance, may develop as a nutritive or a storage-root; or it may be the only organ by which the vegetative reproduction takes place in the first season, as in *Rhexia*. Finally, the hypocotyl may persist during the whole life of the plant or die off after the first season; it may persist as an ordinary stem, or develop as an organ for storing nutritive matters. It is, also, important to notice the position and vitality of the plumule; most frequently it gives rise to the main stem above ground, but not a few cases are known, where it stays under ground during the first year, developing into a rhizome; or, it lives only one season, after which it becomes replaced by buds from the axils of the cotyledons. In this way we must expect to find a rich illustration of biologic plant-types by merely examining seedlings; and, if we follow the successive development of these same seedlings, we are gradually led into that most interesting chapter of botany, which teaches us about the morphology of the shoot with its innumerable variations in respect to position and form of the vegetative and floral organs.

In the present paper I intend only to describe some types of seedlings during the first year of their growth, and we might begin with the *Monocotyledones*.

Characteristic of the seedlings of this class of plants is the presence of a single cotyledon, which may be epigeic or hypogeic, and the short duration of the primary root.

A very simple type is represented by *Agave* (Fig. 1). We notice in this that the primary root does not become arrested in its development so early as in most of the other *Monocotyledones*, but that it attains quite a considerable length; the cotyledon is thread-like and forms a sharp knee for penetrating the soil, while the apex remains enclosed in the seed until the endosperm has become absorbed; after that the apex of the