

# THE OTTAWA NATURALIST

VOL. XXII.

OTTAWA, FEBRUARY, 1909

No. 11

## OBSERVATIONS ON SEEDLINGS OF NORTH AMERICAN PHÆNOGAMOUS PLANTS.

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(Continued from page 174).

In passing to describe some types of dicotyledonous seedlings, it might be stated at once that the majority of these possess epigeic cotyledons. There is, thus, a well marked distinction between the two classes *Monocotyledones* and *Dicotyledones*, consisting not only in the number of cotyledons, but also in the structure of these depending upon the different function which they have to perform. We have seen that in very many, really in most of the *Monocotyledones* the cotyledon has acquired a certain shape and internal structure for absorbing the endosperm, for instance the scutellum in *Gramineæ*, and the club-shaped organ in *Smilacæ*, *Commelinacæ*, *Scitamineæ*, etc., instead of being developed as a free, assimilating leaf as in *Alisma*, *Agave*, *Sisyrinchium*, etc. Such peculiar modifications of the cotyledonary leaves are not known from the *Dicotyledones*; in these they generally have the same function to perform as the proper leaves, to assimilate, or, sometimes, they are also the bearers of reserve food-substances, and are then either epigeic or hypogeic, especially the latter. Another striking contrast between these two classes is the usually much stronger development of the primary root, and of the hypocotyl in the *Dicotyledones*. Moreover, these two organs have, in the *Dicotyledones*, very often acquired a certain structure in accordance with their functions; for instance the primary root may be developed as a storage root, and the hypocotyl may, sometimes, attain quite a considerable increase in thickness and contain abundant deposits of food material, or its function may simply be to raise the cotyledons above the ground, thus liberating them from the seed-coat. In the *Monocotyledones*, on the other hand, the primary root seldom persists, and hardly ever as a storage root, and the hypocotyl is seldom developed to any great extent, and shows no modifica-