

of instances, through following the development of the individual from seedling to mature plant that the real structure of the subterranean stem-portions may be ascertained. The beginning of the formation of the rhizome, the location of the overwintering buds, the numerous modifications observable in the root-system, the structure of the foliage, etc., all these points deserve equally as much attention as the floral organs; they really deserve a place in the general diagnosis of the species. But it is a slow process to study and follow these various phases of plant life in nature, besides much literary research is involved.

Having been called upon to contribute a paper to the OTTAWA NATURALIST, I thought that it might be appropriate to present a brief sketch of some of the various types of seedlings which I have observed in this country, in the hope that some of the Canadian botanists might take the matter up and continue. At the same time I take the opportunity to insert some drawings which might serve to illustrate some of the characteristics of these seedlings; if sometimes too elementary, the text as well as the figures, I must ask for indulgence on the part of the reader.

Of the two large classes, of phænogamous plants, *Monocotyledones* and *Dicotyledones*, as proposed by Ray, the former germinate with a single, the latter mostly with two cotyledons; there are, however, several exceptions. In certain plants the seedling resembles a thallus, consisting merely of a globular mass of cellular tissue with no root, stem or leaf, as for instance in *Orchideæ*, *Monotropa*, *Orobanche*, etc., and finally among the *Dicotyledones* there are some cases where only one cotyledon becomes developed, the other being either rudimentary or totally wanting. But, common to both classes, when the germination begins the primary root is generally the first organ which appears, then follows the hypocotyl, and after this the cotyledons. Moreover, we find in both classes two types of cotyledons: above ground or epigeic, and subterranean or hypogeic; in the former of these, which is the most frequent, the cotyledons are leaf-like, green and thin, provided with stomata, and are thus able to assimilate: in the latter the cotyledons remain mostly enclosed by the seed; they are pale, fleshy, thick, and frequently grown together. These hypogeic cotyledons, especially characteristic of seeds without endosperm, are the bearers themselves of the reserve food-substance. In *Pinus* the cotyledons combine both types, since they at first serve as organs to absorb the endosperm, and subsequently become organs of assimilation; or the cotyledons contain some food-material and begin the function of assimilation as soon as