

*Tilia*, etc., the leaves possess petioles and blades, but frequently of an outline very distinct from that of the final leaves. In *Liriodendron* for instance, the earliest leaves are very different from those of the mature tree; they are roundish to obovate, or even obcordate, and in the mature tree this simple type of leaf occurs only at the very apex or base of the branches. The study of this, frequently very striking, variation in foliage affords much of interest, not only from a morphological point of view, but also, and quite especially, because many of these seedling-leaves may be looked upon as still representing the foliage of ancestral types.

In the present paper I wished only to call attention to some of the most salient points observable in the seedlings, so far as concerns the external structure of their organs, and it is readily to be seen that even if the number of types is not very large, these seedlings nevertheless illustrate several interesting characteristics, indicating to some extent the future growth of the species. The study of mature rhizomes is often very difficult, when the seedling stage is not known; for instance, when the reproduction depends upon the cotyledonary buds; when the hypocotyl or the primary root, or both, actually become the first visible indication of the rhizome in its many, and highly differentiated modifications. It is, therefore, necessary to study our plants from this point of view, and I hope the few types which I have described may prove helpful in this respect. The literature upon the subject is very extensive, but there are some works in which very complete lists of papers have been compiled, and among these may be mentioned: *Beiträge zur Morphologie und Biologie der Keimung* by Klebs (1), and, *A theory of the origin of Monocotyledons* by Miss Sargent (2). In regard to the Grass-embryo there is a very comprehensive paper by Aug. Schlickum: *Morphologischer und anatomischer Vergleich der Kotyledonen und ersten Laubblätter der Keimpflanzen der Monokotylen* (3), in which the reader will find a well drawn comparison between the various theories that have been expressed in regard to this very complicated structure.

---

(1). *Untersuch. Bot. Institut, Tübingen, 1881-1885*, p. 536.

(2). *Ann. of Botany*, Vol. 17, 1903, p. 1.

(3). *Bibliotheca Botanica Stuttgart*, 1896.

See also: B. Jönsson in *Lund's Univ. Arsskr.* Vol. 38, 1902; Arthur W. Hill in *Ann. of Bot.* Vol. 19 and 21, 1905-1907, and Sir John Lubbock, *Contributions to the knowledge of seedlings*, 1892.