

several pairs of secondary roots (Figs. 13, 14 and 17); the so-called "scutellum" (S), which is more or less shield-shaped, and closely appressed to the endosperm, which it absorbs; furthermore, the small lobe-like organ called "epiblast" (E), which is situated opposite the scutellum, and which is not developed in *Zea*; between the scutellum and epiblast is the plumule (PL.) covered by a sheath, the so-called "coleoptile," which in *Zea* is borne on a stem-like organ of quite considerable length. The first green leaf of the seedling (L.) is to be seen in Fig. 17, having broken through the coleoptile. Considering the position of these three organs, scutellum stands opposite the epiblast, and the coleoptile is not only situated on the same side of the axis as the scutellum, but, furthermore, it turns like this toward the plumule, or let us say toward the first green leaf. In other words, in cases where the epiblast is suppressed, which is very commonly the case, the scutellum and coleoptile appear as two organs situated above each other, on the same side of the axis. The question then arises to define whether the cotyledon is represented by one or several of these organs, and whether these organs are really leaves, parts of leaves or independent leaves.

Strange to say, but according to Richard, A. de Jussieu, Hofmeister, and Sachs, the coleoptile should represent the cotyledon, while the scutellum and epiblast should merely be parts of stem and root. Another view was held by Schleiden, and Decaisne, who identified the scutellum and the epiblast as the cotyledon, the coleoptile as the first leaf succeeding this. Or these three organs may be defined as constituting the cotyledon, as proposed by Gaertner, who has been followed by Hegelmaier, Klebs, Van Tieghem (1872), Celakovsky and Schlickum; thus the scutellum should represent the absorbing portion of the cotyledon, the coleoptile its sheath, while the epiblast should be a mere protuberance of the coleorhiza (Schlickum) or a part of scutellum (Van Tieghem, Celakovsky); to this may be added that Van Tieghem, by means of the anatomical method, reached the conclusion that the stem-like portion between the coleoptile and scutellum is not an internode, but a node which has become unusually stretched.

Depending more on the actual position of these organs than on their structure and homologies Warming has made a very different suggestion, and he considers scutellum alone as the cotyledon, the epiblast as the first leaf succeeding this, and the coleoptile as the second, thus presuming that the epiblast should actually have become completely suppressed in the *Cyperaceæ*; hence the peculiar position of the sheath just above the cotyledon in these. According to this same author the stem-like portion necessarily becomes an internode. The reason why Van Tieghem