

sterile. As Prof. Vines says, "The view that the foliage-leaf is the primitive leaf-member, and that the floral leaves are its derivatives, is based upon the fact that, as a rule, the vegetative precede the reproductive organs in ontogenesis. The opposite view, that the most highly specialized floral leaf, the sporophyll, is primitive, is based upon the fact that, phylogenetically, the reproductive precede the vegetative leaves."

It is refreshing, as Sachs says, to pass from the period of the "Naturphilosophie" to "a chapter in morphology where there is less dogmatism and less poetry, but a firmer basis of observation and induction". The increasing perfection of the microscope, the formulation of the cell-theory in 1838-39, the beginning of embryological inquiries of a more penetrating sort than hitherto, the emergence of a palæontological study of plants, the glimmering light of more concrete evolutionary ideas (Alex. Braun, Unger, Nägeli), and perhaps some healthful influence from the sister science of zoology, combined to strengthen a new movement, about 1840, in the history of the morphology of plants. Reacting from the vagaries of the speculative school, botanists began to take their science more seriously, and the key-note is struck in the title of Schleiden's text-book (1842-43), *Die Botanik als inductive Wissenschaft*.

Foundations
of exact
Morphology.

Matthias Jacob Schleiden (1804-1881), Schwann's colleague in Jena and one of the founders of the cell-theory, did much anatomical and embryological work, but his chief historical importance is probably expressed in his text-book, with the suggestive title already cited, which came as a tonic to his times. "The difference", Sachs says, "between this and all previous text-books is the difference between day and night." Schleiden was a combative critic, whose own work gave solidity to his polemic, and who certainly did much to re-assert the dignity of botany—as an inductive science.

Another leading spirit in the new movement was Carl von Nägeli. He did much to clear up the phenomena of cell-formation, and may almost be said to have introduced the "apical cell" to botanists; he laboured