

cerning the structure and growth of plants. About the same time Theodor Schwann<sup>1</sup> extended this theory to animal organisms. A variety of circumstances combined to make the announcement of the *cellular theory*, which will always be associated with those two names, an epoch in the history of scientific, indeed of general, thought.

The historian of botany, Julius Sachs, describes the publication of Schleiden's great work as a burst of daylight,<sup>2</sup> and Du Bois-Reymond says: "In order to measure the magical progress which it marks, one must have witnessed the rise of the cellular theory, when it suddenly spread daylight in the darkness of the hidden structure

to be found among men of pure science in Germany. Opposed to the idealistic philosophy as a follower of Fries, and on the other side to the dry systematisation of the Linnæan school, he was the man at once to broaden the scientific view and to create a popular interest in the "life of the plant"-world. The titles of his two best known works are characteristic, 'Die Botanik als inductive Wissenschaft' (1842-45), and his short-lived periodical (filled with the labours of his equally important co-editor, Nägeli), 'Zeitschrift für wissenschaftliche Botanik.'

<sup>1</sup> Through the friendship of Schleiden and Schwann (1810-82, a pupil of Johannes Müller and professor at Louvain), two independent courses of research and scientific thought were brought together. Schleiden placed the "cell"—a term used before him by Hooke, Malpighi, Grew, Wolff, Brown, and Mirbel—in the forefront of his description as the element of form and as the origin of life, or—as we now express it—as the morphological and embryological unit, in the plant. A similar series of great

names, beginning with Bichat and leading up to Johannes Müller, marks the studies of animal tissues. Schwann, struck with the analogy of Schleiden's nucleated cells and similar structures which he had observed in the notochord, conceived and verified on a large scale the idea "that a common principle of development exists for the most different elemental parts of the organism, and that the formation of cells is this principle." This is the beginning of the cellular theory, which produced at once a reconstruction of the whole of "general anatomy" by Jacob Henle (1809-85), and subsequently the "cellular pathology" of Rudolph Virchow. As the latter has himself said, he aims at the establishment of a general *biological* principle, and thus the discovery of Schleiden and Schwann is characterised as the transition from the "historical" to the "biological" study of animated nature.

<sup>2</sup> See Julius Sachs, 'Geschichte der Botanik vom 16 Jahrh. bis 1860,' p. 203, and in many other passages.