

26.
Its improve-
ment.

and botany tell us, the use of the microscope had made little or no progress¹ during the eighteenth century: the study of structures and tissues had lost interest in comparison with the study of the physiological functions of the parts of plants and the organs of animals, which had been respectively furthered by Hales in England and by Haller in Germany.² Our century thus found the morphological studies of the imperceptibly small in a very backward state: it had to improve the instrument for its research *pari passu* with this research itself.³ But it has been truly remarked that the increased use of the microscope necessitated likewise a mental training in the interpretations and delineations of what was observed through it. "By fortifying the eye with the micro-

¹ "So long as, in consequence of the imperfections of optical instruments, deceptive images existed, and, for instance, all microscopical structures appeared as composed of rows of beads, the explanation of what was seen stood under the influence of deceptions, which were only gradually recognised as such" (Carus, 'Gesch. d. Zool.,' p. 629). Compare also what Sachs says (Gesch. d. Bot., p. 241).

² "The characteristic feature of that period lay in this, that the examination of the finer structure is always mixed up with reflections on the functions of elementary organs, so that anatomy and physiology always support each other, but also, in consequence of their imperfect state, do each other injury" (Sachs, *loc. cit.*, p. 240). Similarly Carus (*loc. cit.*, p. 567), "Through the progress which physiology made, thanks to Haller's activity, zootomical investigations

took a direction which brought them into complete dependence on physiology, . . . and retarded the progress of zoology by diverting attention from its primary object—the exposition of animal forms and their differences."

³ As late as 1827 Aug. Pyrame de Candolle could still write ('Organographie végétale,' vol. i. p. 7), "De nos jours, MM. Mirbel, Link, Treviranus, Sprengel, Rudolphi, Kieser, Dutrochet, et Amici ont publié des recherches très délicates sur le tissu végétal, et les ont accompagnées de figures nombreuses et soignées; mais la nécessité d'employer continuellement dans ces recherches un instrument aussi difficile à bien manier que l'est le microscope composé, fait que malgré l'habileté de ces observateurs, l'anatomie délicate des végétaux est encore . . . d'une incertitude désespérante pour les amis de la vérité."