

of alternation of generations (see chap. v.); (b) in studying the great variety of reproductive processes, both sexual and asexual, which occur in the Algæ and Fungi; and (c) in investigating the nuclear changes before and after the union of the sex-cells. The most striking new departure has been the introduction of experimental methods.

From time to time there have been isolated experimental observations on the physiological conditions of sex and reproduction in plants. Thus we have De Bary's case of starved fern prothallia which only produced antheridia, or the familiar case of the yeast plant, which usually multiplies by buds, but produces spores when starved. But no connected series of experiments was ever undertaken until Dr. G. Klebs took the subject in hand. His work, published in 1896, is a fine instance of the success which attends an adherence to scientific method. With great care and patience he experimented with fifteen genera of Algæ (*Vaucheria*, *Hydrodictyon*, &c.) and two genera of Fungi (*Eurotium* and *Mucor*), making sure in each case that he had a pure culture to start with. His aim was to discover whether external conditions determine the occurrence of the various forms of reproduction, and what these conditions are. The factors investigated were nutrition, moisture, light, temperature, and chemical reagents; and the general result is a proof that certain external conditions determine the occurrence of asexual reproduction (by zoospores), while others as certainly evoke sexual reproduction (by gametes).

A single illustration may be given. In the case of *Vaucheria*, zoospores are always formed when filaments which have been kept moist for some days are soaked in water, or when they are removed from a very dilute nutrient solution and placed in pure water, or when those which have been growing in water or in a very dilute nutrient solution are placed in the dark. On the other hand, if the filaments are placed in a 2-4-per-cent solution of cane-sugar in bright light, sexual reproduction by gametes always occurs.