

BIOGENETICAL SECTION.

A SKETCH OF OUR KNOWLEDGE OF THE DEVELOPMENT OF THE RADIOLARIA
IN THE YEAR 1884.

CHAPTER V.—ONTOGENY OR INDIVIDUAL DEVELOPMENT.

(§§ 141-152.)

141. *Individual Developmental Stages*.—The germinal history of the Radiolaria presents great obstacles to direct observation, and hence is very incompletely known. The fragmentary observations, however (having been made on Radiolaria of very various groups and supplemented by comparative anatomical considerations), allow us to draw a general picture of the essential developmental processes in this great class. It may probably be assumed that in all Radiolaria, after maturation, the central capsule discharges the function of a sporangium, and its contents are broken up into numerous flagellate swarm-spores (zoospores). After these flagellate swarm-spores (resembling *Astasia*) have emerged from the ruptured central capsule, they probably pass over into a *Heliozoan*-stage (*Actinophrys*) and then after the formation of a jelly-veil into the condition of *Sphærastrum*. Afterwards, when a membrane is formed between the outer jelly-veil and the inner nucleated cell-body, an *Actissa*-stage arises, which exhibits in its simplest form the differentiation of the spherical unicellular body into the central capsule and calymma. *Actissa* thus represents both ontogenetically and phylogenetically the primitive condition of the Radiolarian organism, and may thus be regarded as the point of departure of all other forms.

142. *The Astasia-Stage*.—The formation of flagellate zoospores in the mature central capsule is probably to be regarded as the common form of individual development in all Radiolaria; since the whole contents are utilised in the formation of these swarm-spores, and since the extracapsulum takes no share in the process and perishes after they are evacuated, the *central capsule* may be regarded as a *sporangium* (see note A, below). The zoospores of the Radiolaria generally arise in the following way:—the nucleus of the unicellular organism, sometimes early, sometimes late (and in several different ways, §§ 63-70) breaks up into numerous small nuclei, and each of these surrounds itself with a small portion of the endoplasm. Very often, perhaps generally, this endoplasm contains one or several fat-granules and sometimes also a small oblong crystal; from the protoplasm