

PHYSIOLOGICAL SECTION.

CHAPTER VII.—VEGETATIVE FUNCTIONS.

(§§ 201–217.)

201. *Mechanism of the Functions.*—The vital phenomena of the Radiolaria are dependent upon the mechanical functions of their unicellular body, and like those of all other organisms, are to be referred to physical and chemical natural laws. All processes which appear in the life of the Radiolaria are, therefore, ultimately to be explained by the attraction and repulsion of the smallest particles, which compose the different portions of their unicellular body; and the sensation of pleasure or the opposite is in its turn the exciting cause of these elementary movements. Many adaptive arrangements in the Radiolarian organism may produce the appearance of being the premeditated result of causes working towards an end (“zweckthätig,” *causæ finales*), but as opposed to this deceptive appearance it must here be expressly stated that these may be recognised in accordance with the developmental theory as the necessary consequence of mechanical causes (*causæ efficientes*).

Our *physiological* acquaintance with the Radiolaria has by no means progressed so far as our *morphological*, so that the incomplete communications which are placed here for the sake of completeness must be regarded merely as preliminary fragments, not as fully elaborated results. Since my recent investigations have been mainly in the direction of morphology, I can add but little to the physiological conclusions, which I stated at length in my monograph twenty-four years ago (L. N. 16, pp. 127–165). Recently the vegetative physiology of the Radiolaria has been much advanced by the recognition of the symbiosis with the Xanthellæ (§ 205, L. N. 22, 39, 42). In addition Karl Brandt has recently (1885) published several important contributions to the physiology of the Polycyttaria or Sphaerozoëa (L. N. 52).

202. *Distribution of Functions.*—The distribution of the functions among the various parts of the unicellular organism of the Radiolaria corresponds directly to their anatomical composition, so that physiologically as well as morphologically the central capsule and the extracapsulum appear as the two coordinated main components. On the one hand the *central capsule* with its endoplasm and enclosed nucleus is the central organ of the “cell-soul” (Zellseele), the unit regulating its animal and vegetative functions, and the special organ of reproduction and inheritance. The *extracapsulum* forms, on the other hand, by its calymma the protective envelope of the central