

the view, afterwards corroborated, that the yellow cells, which are to be found in the jelly round about the central capsule, do not belong to the organism itself, but are parasites or rather 'Symbiontes,' like the Gonidia of Lichens.

"The histology of the Radiolaria, which offers peculiar and difficult relationships, was first interpreted by Professor Richard Hertwig, a pupil of Haeckel. He published, in 1876,¹ the first accurate account and correct interpretation of their cell-nuclei, and demonstrated that the whole organism, in spite of very peculiar modifications, is to be regarded merely as a single cell. In his work, published in 1879,² Hertwig undertook a reformation of the whole classification of the Radiolaria, based upon important discoveries with respect to the structure of the central capsule, and divided the class into six different orders.

"Meanwhile Professor Ernst Haeckel had, in 1876, commenced the investigation of the extraordinarily rich material collected by the Challenger. The preliminary account of his investigations, and the changes which they rendered necessary in the current classification, were published by him in October 1881,³ shortly before his journey to Ceylon. He then distinguished twenty-four families, including 630 genera. In 1883 Haeckel expounded the relationship of these families, and their arrangement, on phylogenetic grounds, in four primary groups.⁴

"Professor Bütschli gave, in 1882,⁵ a good synopsis of all previous observations on the Radiolaria, as well as a number of valuable original investigations upon their siliceous skeletons. St. George Mivart had already, in 1877, given a short review of the subject in the *Journal of the Linnean Society*.⁶

"The morphology of the Radiolaria is now so thoroughly understood that we are no longer in doubt as to their relationship to the other Protozoa. It is certain that they are true Rhizopoda, distinguished from the other classes of this group (Foraminifera, Heliozoa, Lobosa) chiefly by the remarkable separation of their unicellular body into two principal constituents, namely, the inner 'central capsule' and the externally situated 'extracapsularium.'

"The important central capsule is a highly-organised cell, which is surrounded by a special membrane, and encloses one or more nuclei in its protoplasm, and sometimes other bodies in addition, such as oil-globules, crystals, pigment-granules, &c. At the time of reproduction, numerous swarmspores are developed in it, which are set free by the bursting of the capsule, and swim about by means of a flagellum.

"The extracapsularium consists of a voluminous gelatinous 'involucrum,' which encloses the central capsule, and numerous fine pseudopodia, which radiate through

¹ *Zur Histologie der Radiolarien*, Leipzig, 1876.

² *Der Organismus der Radiolarien*, *Denkschr. d. med.-nat. Gesellsch. Jena*, Bd. ii. p. 129, 1879.

³ *Jenaische Zeitschr.*, Bd. xv. pp. 418-472, 1881.

⁴ *Jenaische Sitzungsab.*, Feb. 16, 1883.

⁵ Bronn, *Klass. u. Ord. d. Thierreichs*, Bd. i. Aufl. 2, 1882.

⁶ *Journ. Linn. Soc. Lond. (Zool.)*, vol. xiv. p. 136, 1877.