

The free astropodia, which pass outwards from the sarcodictyum into the water, are in most PHÆODARIA very numerous (Pl. 101, fig. 10). Since, however, only a few species of this great legion have been observed in a living state, their pseudopodia require further accurate examination.

#### CHAPTER IV.—THE SKELETON.

(§§ 101–140).

101. *The Significance of the Skeleton.*—The skeleton of the Radiolaria is developed in such exceedingly manifold and various shapes, and exhibits at the same time such wonderful regularity and delicacy in its adjustments, that in both these respects the present group of Protista excels all other classes of the organic world. For, in spite of the fact that the Radiolarian organism always remains merely a single cell, it shows the potentiality of the highest complexity to which the process of skeleton formation can be brought by a single cell. All that has been brought to pass in this direction by single tissue-cells of animals and plants does not attain the extremely high stage of development of the Radiolaria. Only very few Rhizopoda of this very rich and varied class fail to exhibit the power of forming this firm supporting and protecting organ—indeed, only ten of the seven hundred and thirty-nine genera which are enrolled in the list of the Challenger collection, namely, six genera of SPUMELLARIA (five Thalassicollida, *Actissa*, *Thalassolampe*, *Thalassopila*, *Thalassicolla*, *Thalassophysa*, Pl. 1, and one genus of Collozoida, *Collozoum*, Pl. 3), and in addition two genera of NASSELLARIA (the Nassellida, *Cystidium* and *Nassella*, Pl. 91, fig. 1), and two genera of PHÆODARIA (the Phæodinida, *Phæocolla* and *Phæodina*, Pl. 101, figs. 1. 2). These skeletonless forms of Radiolaria are, however, of extreme interest, since they include the original stem-forms of the whole class as well as of its four legions. All Radiolaria which form skeletons have originated from soft and skeletonless stem-forms by adaptation, and that polyphyletically, for the skeletal types of the four legions have been developed independently of each other (§ 108).

102. *The Chemical Peculiarities of the Skeleton.*—The chemical composition of the skeleton shows very marked variations in the different legions of the Radiolaria. The two legions SPUMELLARIA and NASSELLARIA (united formerly as “Polycystina”) form their skeleton of pure silica (see note A, below); the legion PHÆODARIA of a silicate of carbon (see note B), and the ACANTHARIA of a peculiar organic substance—acanthin (see note C). This explains the well-known fact that the deposits of fossil Radiolaria (or Polycystine marls) are composed exclusively of the skeletons of SPUMELLARIA and NASSELLARIA, those of the ACANTHARIA and PHÆODARIA being entirely absent (in the case of the last group, however, exception must be made in favour of the Dictyochida, or those PHÆODARIA