

the great majority of PHÆODARIA the spheroidal central capsule also possesses a pair of parapylæ near the opposite apical pole of the main axis (Triplylea), and these determine (as the right and left secondary openings) an isopolar frontal axis. Hence, strictly speaking, in most PHÆODARIA the central capsule has the geometrical ground-form of the amphithec pyramid (as in the Ctenophora), with an allopolar vertical main axis, and two unequal, but isopolar, horizontal transverse axes. In many PHÆODARIA the skeleton also has this amphithec pyramidal ground-form, *e.g.*, the bivalved Phæoconchia and part of the Phæogromia. On the contrary, in the rest of the PHÆODARIA the skeleton exhibits very various geometrical ground-forms, independent of that of the central capsule. In the Phæosphæria it forms preferably spheres or endospherical polyhedra, as also in the Castanellida and Circoporida among the Phæogromia; among the Circoporida there are also seen with remarkable distinctness the regular polyhedra (especially the dodecahedron and icosahedron). Isopolar monaxonia are found among the Aulosphærida (*Aulatractus*) and Orosphærida; allopolar monaxonia among the Challengerida (*Lithogromia*). The Medusettida and Tuscarorida show various forms of regular pyramids (allopolar stauraxonia); and finally, the Challengerida are for the most part centroplanar or bilateral. Thus the PHÆODARIA present a great wealth of different geometrical ground-forms in the development of their skeleton, not in that of their central capsule.

CHAPTER II.—THE CENTRAL CAPSULE.

51. *Components of the Central Capsule.*—In all Radiolaria without exception, at some period of life or other, the central portion of the soft body is separated from the peripheral portion by an independent, anatomically recognisable membrane; this membrane with all its contents is designated the central capsule, and is the peculiar central organ of the unicellular body, which distinguishes the Radiolaria most clearly from the other Rhizopoda. In the great majority of the Radiolaria the volume of the central capsule is less than that of the surrounding peripheral soft body which we place in opposition to it as “extracapsulum.” The “capsule-membrane,” which separates these two constituents, arises very early in most Radiolaria, and persists throughout their whole life. In some species, however, the membrane only appears later, immediately before the formation of the spores, and hence is absent for a considerable period. Regarded as a whole, then, the capsule consists of the following parts:—(1) the capsule-membrane; (2) the enclosed endoplasm, or intracapsular protoplasm; (3) the nucleus. But in addition, many other non-essential structures may be enclosed in the central capsule, especially hyaline spheres (vacuoles), fatty spheres, pigment granules, crystals, &c.

The central capsule was first described in my Monograph in 1862 (pp. 69–82) as the most characteristic component of the Radiolarian organism, and distinguished from the whole extracapsular