

Spyroidea, on the contrary, and the majority of the Cyrtoidea, the central capsule forms at its basis rounded lobes, which protrude and hang down from the meshes of the cortinar plate; and since this latter has usually three or four large pores, the capsule similarly develops three or four processes (Pl. 53, fig. 19; Pl. 55, figs. 4-11; Pl. 59, figs. 4-13; Pl. 60, figs. 3-7; Pl. 65, fig. 1).

56. *The Membrane of the Central Capsule.*—The capsule-membrane or envelope of the central capsule is both morphologically and physiologically one of the most important parts of the Radiolarian body, for it separates its two main constituents, the capsule with its nucleus and endoplasm and the extracapsulum with the calymma and exoplasm. The capsule-membrane is invariably present at some time or other during the life of the organism, even though in a few species it may persist only for a short time. It is characterised in general by its power of resistance to chemical and physical reagents, and appears to be related to the elastic tissues or perhaps even more to the chitinous substances. Its thickness is usually less than 0.0001, though in certain groups it ranges between 0.001 and 0.002, and in many of the larger Radiolaria (such as Collida and PHÆODARIA) it may attain a thickness of 0.003 to 0.006 or more. In the three legions SPUMELLARIA, ACANTHARIA, and NASSELLARIA the capsule-membrane is single, while in the PHÆODARIA it is always double, being composed of a firm outer and a delicate inner membrane, which are in contact at only few points. Usually it is quite structureless, except for its apertures; the thicker membrane showing occasionally a fine concentric lamination. In certain large Colloidea (e.g., *Thalassicolla*, Pl. 1, fig. 5b) the membrane is covered on the inner surface by a network of polygonal ridges, and in some large PHÆODARIA with remarkable small curved rods (Pl. 114, fig. 13). In all Radiolaria the membrane is perforated by definite openings or pores, through which the intracapsular and extracapsular protoplasm are in direct communication. These openings (or "pylae") show very characteristic and constant differences in the four legions, which have given rise to the names—PERIPYLEA, ACTIPYLEA, MONOPYLEA, CANNOPYLEA.

The capsule-membrane was first indicated as the most important and absolutely constant component of all Radiolaria, and as the differential character of the class, in my Monograph (1862, pp. 69-71). The careful investigations of R. Hertwig have confirmed this view and at the same time have yielded the most important conclusions regarding the nature and systematic significance of the openings in the capsule (*op. cit.*, 1879, pp. 105-107). On the contrary, Karl Brandt has recently propounded the theory that the capsule-membrane is by no means a constant part of the Radiolarian organism, but is lacking in certain species of *Collozoum* and *Sphaerouzoum* (1881, p. 392). This contradiction is explained by the fact that in some Collodaria and *Acanthometra* the formation of the central capsule takes place much later than in the other Radiolaria, in some