

contraction of the central capsule is probably brought about by the myophanes, which arise by differentiation of the endoplasm and hence may assume different forms in the four legions. In the SPUMELLARIA, where numerous radial fibrillæ run from the central nucleus to the capsule membrane (§ 77), the endoplasm is probably driven out evenly through all the pores of the capsule membrane by their simultaneous contraction, and hence the volume of the capsule is diminished in all directions. The ACANTHARIA probably behave similarly, but are different, inasmuch as the number of their contractile radial fibrillæ is less, and special axial threads (§ 78) are already differentiated. In the NASSELLARIA it is probable that owing to the contraction of the divergent myophane fibrillæ in the podoconus the vertical axis of the latter is shortened, the opercular rods of the porochora are lifted, and the endoplasm driven out of its pores, so that the volume of the monaxon central capsule is diminished (§ 79). In the PHÆODARIA the same result is probably brought about by the contraction of the cortical myophane fibrillæ, which run meridionally along the inside of the capsule membrane from the apical to the basal pole of the vertical main axis, where they are inserted into the periphery of the astropyle; since the volume of the capsule is diminished by their contraction (their spheroidal figure becoming more nearly spherical) the endoplasm will be driven out through the proboscis of the astropyle. Whilst these contractions of the central capsule are largely due to differentiated muscle-like threads of endoplasm (myophanes), this appears to be but rarely the case with the contractions of the extracapsulum (*e.g.*, the myophrises of the *Acanthometra*, § 96). Most of the phenomena of contraction which can be observed in the calymma and pseudopodia depend upon exoplasmatic currents (§ 209).

222. *Protection.*—Of the utmost importance, both for the physiology and for the morphology of the Radiolaria are their manifold protective functions, which we now consider under the heading “protection.” From the physiological point of view the consideration of the exposed situation in which the delicate, free-swimming Radiolarian organism lives, and the numerous dangers which beset it in the struggle for existence, would lead *a priori* to the expectation, that many special protective adaptations would be developed by natural selection. On the other hand, morphological experience shows us that this latter has been in action for immeasurable periods, and has gradually produced an abundance of the most remarkable protective modifications. Examples of these may be found in the formation of the voluminous calymma, as a gelatinous protective covering for the central capsule, and further, the formation of the capsule membrane itself, which separates the generative contents of the central capsule from the nutritive exoplasm. The phosphorescence of the central capsule, too (§ 223), may be regarded as a useful protective arrangement; as also the radiating of the numerous pseudopodia in all directions from the surface of the calymma; for they are of great significance to the