

remarkable aperture. In the case of many and perhaps of all PHÆODARIA the endoplasm is differentiated into a granular medullary and a thin fibrillar cortical layer, the former of which usually encloses numerous small vacuoles, while the latter contains muscular fibrillæ. In the voluminous central capsule of large PHÆODARIA the whole cortical layer of the endoplasm, which lies immediately below the delicate inner capsule-membrane, sometimes appears delicately and regularly striated, and most distinctly so under the apertures, towards the centre of each of which the dark striæ are radially directed (see note A, below). These striæ are probably contractile muscular fibrillæ or "myophanes," by whose contraction the openings are voluntarily widened. In the Tripylea this fibrillar star is much more strongly developed under the astropyle (the main opening) than under the parapylæ (or accessory openings); and probably the peculiar radial structure of the operculum of the former is due to the stronger development of these radial fibrils (being their impression). In many PHÆODARIA, indeed, the fine myophane fibrils are only visible under the apertures, whilst in others they form a continuous fibrillar cortical layer on the whole inner surface of the inner capsule-membrane; the fine fibrillæ run meridionally from one pole of the main axis to the other; perhaps the whole central capsule may change its form in consequence of their contractions. The medullary portion of the endoplasm, which lies below this thin cortical layer, is usually finely granular in the PHÆODARIA, and permeated by numerous spherical vacuoles, which are noteworthy from their equal size and regular distribution. Each clear vacuole usually contains a dark shining fat-granule, more rarely a group of such granules (see note B). Compare § 60, and Pl. 101, figs. 1-3; Pl. 104, figs. 1, 2; Pl. 111, fig. 2; Pl. 128, fig. 2, &c.

A. The fine fibrillæ in the cortical layer of the endoplasm were first described by Hertwig in 1879 (L. N. 33, p. 98, Taf. x. figs. 6-10). He found them, however, only below the three openings in the capsule of the Tripylea, where they form three stellate groups of fibrils. I find them very clearly shown, and with especial distinctness, under the astropyle in most PHÆODARIA, of which I have had the opportunity of examining well-stained and preserved central capsules. In many cases, also, the striation is not confined to the apertures, but spreads over the whole cortical layer. Perhaps this constitutes in all PHÆODARIA a thin myophane-sheet, whose contractile fibrils run from one pole of the main axis to the other and cause by their contraction changes in the form of the spheroidal central capsule.

B. The granular medullary portion of the endoplasm of the PHÆODARIA, with its numerous clear spherical vacuoles, was first described in my Monograph (1862), in the case of *Aulacantha* (p. 263), *Aulosphæra* (p. 359), and *Cœlodendrum* (p. 361) as a "finely granular, mucous substance (intracapsular sarcodæ), packed more or less closely with clear spherical vesicles from 0.005 to 0.015 mm. in diameter, each of which contains one or two, rarely three, dark shining granules." That these clear spheres are true vacuoles was first clearly proved by Hertwig (L. N. 33, p. 98). As a rule all the vacuoles of the same central capsule are of equal size (generally from 0.008 to 0.012 mm. in diameter), and are distributed at equal intervals throughout the finely granular endoplasm.