

The clear vesicles to which this is due are either spherical, or polyhedral from mutual pressure, and like the similar ones in the central capsule may be divided into membraneless vacuoles and vesicular alveoles. The *vacuoles* are simple drops of fluid, without a special envelope, and immediately surrounded by the gelatinous substance of the calymma, in which they appear as simple cavities. The *alveoles* on the contrary are true vesicles, with a thin envelope, which encloses a drop of fluid or a globule of jelly; in the latter case its contents are different in refracting power and amount of contained water from the substance of the surrounding calymma. A sharp boundary between the membraneless vacuoles and the vesicular alveoles cannot be drawn in the case of the extracapsular hyaline spheres any more than in the intracapsular; the envelope of the alveoles is sometimes very distinct and even anatomically separable, whilst at other times it is very thin and scarcely recognisable; it may occasionally arise and disappear within a very short time (see note A). There is no doubt that in the calymma as in the central capsule the vesicular alveoles are secondary products, which have arisen from the vacuoles by the secretion of an enveloping membrane. This membrane is either a delicate sheath of exoplasm, or a firmer and more resistant skin, distinct from the exoplasm, and probably an excretion from it (*e.g.*, Pl. 4, figs. 2, 3). In many cases the outer surface even of the vacuoles is covered by a network of pseudopodia, which form a sarcoplegma similar to a fenestrated alveolar membrane. The colourless pellucid fluid in the vacuoles and alveoles is usually simple sea-water, more rarely it contains a small quantity of albumen ("albumen-spheres") or jelly ("gelatinous spheres"). The size of these spheres is very variable. Quite small vacuoles may be found in the calymma of many Radiolaria. Large vacuoles, on the other hand, producing the appearance of an alveolar structure, are confined to but few groups, to a part of the SPUMELLARIA (Colloidea, Beloidea, and a few Sphæroidea), and to the Phæocystina (PHÆODARIA with incomplete skeleton); besides they occur only rarely in individual genera, *e.g.*, *Nassella* among the skeletonless NASSELLARIA. Since the volume of the calymma is much increased by the development of vacuoles, and the power of mechanical resistance is at the same time much increased, the fact is explained that the vacuoles occur mainly in Radiolaria which have no skeleton or only an incomplete one (see note B). Among the monozootic Collo-daria the alveolar structure is especially well developed in the following genera; *Thalassicolla* (Pl. 1, figs. 4, 5), *Thalassophysa*, *Thalassoplancta*, *Lampoxanthium* (Pl. 2, figs. 1, 2); among the PHÆODARIA in most genera of the Phæodinida, Cannorrhaphida and Aulacanthida (Pls. 101-104), and probably also in other voluminous PHÆODARIA (*e.g.*, Phæosphæria). The alveoles or vacuoles in the calymma of these large Radiolaria lie usually in several layers, one above another, and increase in size from within outwards. The Polycyttaria or social Radiolaria (the three families Collozoida, Sphærozoida and Collosphærida) without exception have an alveolar structure, and the special form of