

partly homogeneous nuclei. Most recent investigators, Bütschli in particular (1882, L. N. 41), have pointed out and rightly criticised this confusion. The criticism might, however, have been more justly expressed by stating that, in the preparation of my Monograph (1859–1862), I did not make use of modern methods of demonstrating the nucleus by staining fluids, which were quite unknown at the time, and only discovered a decade later. In fact, without the aid of such reagents, it is quite impossible to distinguish between the various "spherical transparent vesicles," of which those found in the central capsule of the PHÆODARIA and many monozootic Collodaria are simple vacuoles lying in the endoplasm, whilst, on the other hand, those of the Polycyttaria and many other Radiolaria are true homogeneous nuclei. For not only are the general appearance of the small clear spheres, their refractive power, and regular distribution in the endoplasm quite similar, but they are also of much the same size, for the diameter ranges from 0.005 to 0.015 mm., being generally between 0.008 and 0.012 mm. In addition to this there is generally in each hyaline sphere a dark brightly shining granule, which, in the case of the vacuole, is simply a fat-granule, whilst in the case of the nucleus, it is a true nucleolus. The small hyaline spheres in the young uninucleate capsules of the Polycyttaria are simple vacuoles (Pl. 3, fig. 12), whilst in the ripe multinucleate capsules they are true nuclei (Pl. 3, figs 3, 8, 9), and it is quite impossible to discriminate between these two conditions without the use of reagents. This has been expressly recognised by R. Hertwig, who has the merit of having been the first to clearly distinguish, by the aid of staining fluids, between these two different constituents (1879, L. N. 33, p. 108).

B. The "*albumen spheres*," which were first observed by A. Schneider in 1858 in the common cosmopolitan *Thalassicolla nucleata* (L. N. 13, p. 40), and which appear to occur in only a few other Thalassicollida, are distinguished from the ordinary hyaline spheres of about the same size by their higher refractive power and by certain albuminoid reactions, especially the coagulation of a membranous envelope under the influence of certain reagents (see my Monograph, p. 250, and Hertwig, L. N. 26, 1876, p. 46). They often enclose various formed contents, and require further investigation.

C. The *gelatinous spheres* of various sizes, found in the endoplasm of the Radiolaria, agree in their reactions (especially in staining by certain reagents) with the common extracapsular jelly of the calymma, and are hence distinguishable both from the true (coagulable) "albumen sphere," and from the ordinary watery vacuoles.

D. The *alveoles*, which are only accurately known in the case of certain large monozootic Collodaria, but which also seem to occur in the central capsule of other remarkably large Radiolaria, were described in my Monograph in the case of *Thalassolampe margarodes* and *Physematium mülleri*, under the name "intracapsular alveolar cells" (1862, pp. 77, 254, 257). They are not, however, true nucleated cells, and the body described as a nucleus is not such in reality. Nevertheless these large hyaline spheres do possess a special envelope, as I have recently convinced myself by the examination of ruptured central capsules of *Thalassolampe maxima*, *Thalassopila cladococcus*, and *Physematium atlanticum* (Pl. 1, figs 2, 3). The central capsule of these Collodaria becomes distended to most unusual dimensions (2 to 12 mm. in diameter) by the great development of these large hyaline vesicles, each of which measures from 0.1 to 0.5 mm. in diameter.

73. The Intracapsular Fat-Globules.—Fat is present in the central capsule of all Radiolaria in larger or smaller quantities, and generally appears in the form of very