The colonial Radiolaria were described as early as the year 1834 by Meyen, the first investigator of the class, under the name *Sphærozoum*, and, as *Palmellaria*, compared with the gelatinous colonies of the Nostochineæ. The first accurate observations upon their structure were, however, made in 1851 by Huxley, who described examples of all three families under the name *Thalassicolla punctata*. More extended, however, were the investigations of Johannes Müller, who in his fundamental work (1858) divided the whole class Radiolaria into *Solitaria* and *Polyzoa*. The *Radiolaria solitaria* he divided into Thalassicolla, Polycystina and Acanthometra, the *Radiolaria polyzoa* into Sphærozoa (without a shell) and Collosphæra (with a shell). The most accurate delineation of the Polycyttaria was given by Hertwig in his beautiful memoir, Zur Histologie der Radiolarien (1876). Quite recently, however (1886), since the completion of my manuscript upon the Challenger Radiolaria, a very complete Monograph of the Polycyttaria has appeared by Karl Brandt, Die colonie-bildenden Radiolarien (Sphærozoen) des Golfes von Neapel und der angrenzenden Meeres-Abschnitte (276 pp., 8 pls., Berlin). It contains in particular most valuable contributions to the physiology and histology.

15. *The Central Capsule and Extracapsulum.*—The special peculiarity of the unicellular Radiolarian organism, by which it is clearly distinguished from all other Rhizopoda (and indeed from most other Protista), is its differentiation into two separate chief constituents, the central capsule and extracapsulum, and the formation of a special membrane which separates them. This, the capsule-membrane, is not to be compared with an ordinary cell-membrane, as an external layer, but rather to be regarded as an internal differentiated product. The extracapsulum or external (cortical) portion of the body is in most Radiolaria more voluminous than the central capsule or inner (medullary) portion. The exoplasm of the former (the cortical or extracapsular protoplasm) is emphatically different from the endoplasm of the latter (the medullary or intracapsular protoplasm). Besides the most important vital processes are distributed by division of labour so completely between them that they appear most distinctly co-ordinated. The central capsule is on the one hand the general central organ of the "cell-soul" for the discharge of its sensory and motor functions (comparable to a ganglion-cell), on the other hand the special organ of reproduction (sporangium). The extracapsulum, also, is not less significant, since on the one hand its calymma acts as a protecting envelope to the central capsule, as a support to the pseudopodia, and a foundation for the skeleton or a matrix for the development of the shell, and on the other hand its pseudopodia are of the utmost importance as peripheral organs of movement and sensation as well as of nutrition and respiration. The *central capsule* and the *extracapsulum* are therefore to be regarded both morphologically and physiologically as the two *characteristic co-ordinated principal parts* of the unicellular Radiolarian organism.

In most of the more modern delineations of the Radiolaria the central capsule is regarded as the "cell proper" and its membrane as the "cell-wall." The following facts are opposed to the correctness of this interpretation:—1. In most Radiolaria the exoplasm is clearly different from