

Discoidea and Sphæroidea among the SPUMELLARIA. From these palæontological facts it is obvious that our present very incomplete acquaintance with the fossil Radiolaria is quite insufficient to warrant us in drawing any conclusions from it regarding the phylogenetic development or palæontological succession of the individual groups.

158. *Origin of the Four Legions.*—The agreement of all Radiolaria in those constant and essential characters of the unicellular body, which distinguish them from all other Protista (especially the differentiation of the malacoma into a central capsule and extracapsulum), justifies the conclusion that all members of this class have been developed from a common undifferentiated stem-form. Only the simplest form of the SPUMELLARIA, a skeletonless spherical cell with concentric spherical nucleus and calymma, can be regarded as such. The simplest form of the Thalassicollida which is now extant (*Actissa*, *Procyttarium*, p. 12), corresponds so exactly to the morphological idea of that hypothetical stem-form that it may unhesitatingly be regarded in a natural system as the common point of origin of the whole class. On the other hand, *Actissa* is so closely related to the simple Heliozoa (*Actinophrys*, *Actinosphærium*, *Heterophrys*, *Sphærastrum*, &c.) that its origin from this group of Rhizopoda is exceedingly probable. The three legions ACANTHARIA, NASSELLARIA, and PHÆODARIA are to be regarded as three main diverging branches of the genealogical tree, which have been developed in different directions and are only connected by their simplest stem-forms (*Actinelius*, *Nassella*, *Phæodina*) with the stem-form of the SPUMELLARIA, the primordial *Actissa*.

159. *Phylogeny of the Spumellaria.*—The legion SPUMELLARIA or PERIPYLEA is to be regarded as the common stem-group of the Radiolaria, and its simplest form, *Actissa*, as the primitive genus or radical form of the whole class; for it possesses in the simplest and most undifferentiated form all those characters by which the Radiolaria are distinguished from other Protista; all the other genera of the class may be derived from it by successive modifications. Considered as a legion the whole group SPUMELLARIA is undoubtedly monophyletic, for all its members possess those essential characters by which it is distinctively marked off from the other three legions, more especially a simple capsule-membrane, which is everywhere evenly perforated by innumerable small pores; the nucleus lies originally in the centre of the spherical central capsule. Furthermore, all SPUMELLARIA lack those positive characters which distinguish the three remaining legions—the centrogenous acanthin skeleton of the ACANTHARIA, the basal porochora and the monaxon podoconus of the NASSELLARIA, the astropyle and phæodium of the PHÆODARIA.

160. *Origin of the Spumellaria.*—The genus *Actissa* (p. 12, Pl. 1, fig. 1) presents the Radiolarian type in its simplest and most primitive form—a spherical central capsule, which encloses in its middle a spherical nucleus, and which is surrounded by a spherical calymma. The whole unicellular body consists, therefore, of three concentric spheres,