

becoming spherical and by fine pseudopodia protruding all round instead of a single flagellum; the nucleus at the same time assuming a central position.

144. *The Sphærastrum-Stage.*—The *Actinophrys*-stage of the young Radiolaria, which proceeds immediately from the flagellate zoospore, is probably connected with the *Actissa*-stage by an intermediate form, which may be regarded as a simple skeletonless *Heliozoon* with a jelly-veil; a well-known example of such a form is *Sphærastrum* (in the solitary, not the social condition) and *Heterophrys*. This important intermediate form has arisen from the simple *Actinophrys*-stage by the excretion of an external structureless jelly-veil, such as is formed in many other Protista (*e.g.*, in the encystation of many Infusoria). The young Radiolarian in this second *Heliozoon*-stage becomes a simple cell with pseudopodia radiating on all sides; its body consists of three concentric spheres, the central nucleus, the protoplasmic body proper, and the surrounding calymma or jelly-veil. When a firm membrane is developed between the last two spheres this *Sphærastrum*-stage passes over into the *Actissa*.

The gap in our empirical knowledge which still exists between the flagellate stage (§ 142) and the simplest Radiolarian stage (*Actissa*, § 145), can be filled hypothetically only by the assumption of several *Heliozoon*-stages following one upon another. It is possible also that the capsule-membrane is not formed between the endoplasm and exoplasm (as here supposed), but that the membrane was formed first outside the cell and the extracapsulum subsequently secreted around it.

145. *The Actissa-Stage.*—The first SPUMELLARIAN genus, *Actissa*, is not only the simplest form actually observed among the Radiolaria, and the true prototype of the whole class, but also the simplest form under which the Radiolarian organisation can be conceived. It is therefore extremely probable that *Actissa* not only forms the common stem-form of the whole class in a phylogenetic sense, but is also its common ontogenetic or germinal form. Probably in all Radiolaria the *Sphærastrum*-stage develops immediately into the typical *Actissa*-stage, by the formation of a firm membrane between the protoplasmic body of the spherical Heliozoan cell and its jelly-veil. Thus arises the characteristic central capsule, which is wanting in the nearly related Heliozoa. It is further probable that all Radiolaria in their early stage will so far conform to the state of things in *Actissa* as to have the capsule-membrane of the spherical skeletonless cell perforated everywhere by fine pores. This structure is retained in all SPUMELLARIA, whilst in the other three legions those structural relations of the capsule which are characteristic of each develop from the *Actissa*-stage.

146. *The Ontogeny of the Spumellaria.*—In the simplest case the individual development in the SPUMELLARIA ceases with the *Actissa*-stage. In all other genera of this legion diverging forms proceed from this; of which the different growth of the three dimensive