

small group *Actineliida*) radial spines are centrifugally developed. The three other legions, on the contrary, possess on the whole a *perigenous* skeleton, which *originally* develops outside the central capsule and never in its middle. In the *NASSELLARIA* and *PHÆODARIA* the skeleton retains this extracapsular position, as also in the *Beloidea* and part of the *Sphærellaria* among the *SPUMELLARIA*; in the great majority of the latter, however, the primary perigenous skeleton is subsequently enveloped by the growing central capsule, so that it lies partially within it (§ 109).

108. *Polyphyletic Origin of the Skeleton.*—The skeleton of the Radiolaria has undoubtedly originated polyphyletically, for it is impossible to derive its manifold varieties from a single ground-form, or to regard them as modifications of one type. It is much more probable that the different skeletonless Radiolaria have entered upon different ways of skeleton formation quite independently of each other. At the outset it is quite clear that the skeletons of the *four legions have originated independently of each other*. Further, it is certain that within the legion of the *SPUMELLARIA* the *Beloid* skeletons of the *Collodaria* are not connected with the *Sphæroid* skeletons of the *Sphærellaria* and the forms derived from them (see § 109). In the same way the skeletons of the *PHÆODARIA* are polyphyletic; probably in this legion the *Beloid*, *Sphæroid*, *Cyrtoid*, and *Conchoid* skeletons have been developed quite independently (see § 112). In the *NASSELLARIA*, on the other hand, it is possible that all the skeletal forms are to be derived monophyletically from a single simple primitive form (either the sagittal ring or basal tripod?) (see § 111). Still more probable is it that the *ACANTHARIA* have arisen monophyletically, for all the forms of their acanthin skeleton may be derived without violence from *Actinelius* (see § 110).

109. *The Skeleton of the Spumellaria.*—The skeletons of the *SPUMELLARIA* or *PERIPYLEA* consist of silica, and are very different and of independent origin in the two orders of this legion. The first order, *Collodaria*, have either no skeleton whatever (*Collodea*, p. 10, Pls. 1, 3), or their skeleton is *Beloid*, a loose extracapsular envelope of spicules, consisting of numerous unconnected portions; the separate parts are usually disposed tangentially, either as simple or compound siliceous spicules (*Beloidea*, p. 28, Pls. 2, 4). The second order of *SPUMELLARIA*, on the other hand (*Sphærellaria*, p. 49), develops a siliceous lattice-shell, which consists of a single piece, and is remarkable for the extraordinary variety of its forms (pp. 50–715, Pls. 5–50). To this order belong not less than three hundred genera and seventeen hundred species of the Challenger Radiolaria (that is, about two-fifths of all the genera and species). In spite of this extreme richness in different forms, this large group must be regarded as *monophyletic*, since all its forms may be quite naturally derived from a common stem-form, a *simple lattice-sphere* (*Cenosphæra*, p. 61, Pl. 2). The twenty-eight families of *Sphærellaria* may be distributed in four suborders, among which the *Sphæroidea* constitute the