

44. *Principal Axes*.—From the foregoing consideration of the statical conditions and their direct causal connection with the geometrical ground-forms of the Radiolaria, the great mechanical significance of the differentiation of definite axes in these unicellular free-swimming organisms will be manifest. The most important of these is the primary main axis (axis principalis, or protaxon), which in all cases has a vertical direction. It is wanting in the Centrostigma (spheres and endospherical polyhedra), and in the Anaxonia (acentra). It is isopolar in the phacotypic forms (Monaxonia isopola), and in the double pyramids (Stauraxonia isopola). It is allopolar in all monastatic ground-forms, in the conotypic forms (Monaxonia allopola), pyramids (Stauraxonia allopola), and the Centroplana (or bilateral forms).

45. *Secondary or Transverse Axes*.—In contrast to the vertical main axis all the other constant axes differentiated in the body may be called “secondary axes,” or “transverse axes,” since they cross the former at definite points. All ground-forms whose vertical axis is crossed by a fixed number of such axes at definite angles may be called “Stauraxonia.” They are divided into two groups, double pyramids and single pyramids; in the former the two poles of the main axis (or the two halves of the body separated by the equatorial plane) are similar (Stauraxonia homopola), in the latter dissimilar (Stauraxonia heteropola). If all the secondary axes be equal, the stauraxon ground-form is regularly radial. If some of them be unequal they are arranged in certain relations towards two primary transverse axes, perpendicular to each other, to which all the other secondary axes are subsidiary; the ground-forms are then either amphitect or bilateral. The two primary transverse axes, which may also be designated “ideal transverse axes” (euthyni), divide the vertical main axis in its centre; one of them is the sagittal, the other the frontal. These three dimensionive axes give the factors which accurately determine the ground-form and the dimensions in most Radiolaria; the vertical main axis determines the length (principal axis); one horizontal transverse axis determines the thickness (sagittal axis), and the other the breadth (frontal axis). Those ground-forms in which the transverse axes are isopolar are termed “amphitect,” and those in which the one (frontal or lateral) is isopolar and the other (sagittal or dorso-ventral) is allopolar, are termed “bilateral,” or better “zeugitic.”

46. *Primary and Secondary Ground-Forms*.—The geometrical sphere must be regarded as the original ground-form of the Radiolaria; it being understood that its monophyletic derivation from a single stem-form, *Actissa*, is correct. The simplest forms of *Actissa* (*Procyttarium*, Pl. 1, fig. 1) are in fact geometrically *perfect spheres*; indeed even the individual parts which compose their unicellular bodies (nucleolus, nucleus, central capsule and calymma) are concentric spheres. But in addition the central capsules of most other SPUMELLARIA, especially the Sphæroidea, as well as of many ACANTHARIA