

be derived easily from such a tripod; but the groups A, C, and E only by means of the hypothesis that the original tripod may be completely reduced and finally lost. This hypothesis was employed in 1881 in my *Prodromus*, since I had convinced myself that the "triradial structure" is prevalent in the great majority of NASSELLARIA, and is perhaps more important than the sagittal ring.

3. Monophyletic hypothesis, deriving all NASSELLARIA from a latticed cephalis, a simple ovate or subspherical fenestrated shell without ring and tripod (*Cyrtocalpis*, *Archicapsa*, &c.). The groups C, E, F, and G may be derived easily from such a cephalis, but the groups A, B, and D only by means of the hypothesis that the sagittal ring as well as the basal tripod may remain as the last remnants of a reduced cephalis. This hypothesis was given in 1862 in my *Monograph*, where I constructed the first pedigree of Radiolaria (p. 234). I there derived all the Cyrtida from the Sphæroidea (*Cyrtidosphæra*), supposing that *Cyrtocalpis* and some other Monocyrtida may form a direct phylogenetical passage from the Sphæroidea to the Cyrtoidæa.

4. Polyphyletic hypotheses, deriving the different groups of NASSELLARIA from different skeletonless Nassellida, by development of simple siliceous skeletons in different ways. Among the numerous polyphyletic hypotheses which are possible, one of the simplest would be the supposition that three different fundamental forms of skeleton may have arisen independently one from another: (1) a simple sagittal ring as original form of the Stephoidea and Spyroidea (A); (2) a simple basal tripod as original form of the Plectoidea (B); (3) a simple latticed cephalis as original form of the Botryodea and Cyrtoidæa (C). This triphyletic hypothesis is supported by R. Hertwig (1879, *loc. cit.*, p. 136); he assumes that the original skeletonless Nassellida (*Cystidium*) have produced three different branches, his "Acanthodesmida" (=Stephoidea and Spyroidea) with a primary ring, his "Plagiacanthida" (=Plectoidea) with a primary tripod, and his Cyrtida (=Botryodea and Cyrtoidæa) with a primary cephalis. This hypothesis seems rather probable on the first view; but it meets with the greatest difficulties in view of the fact that these three original elements of the skeleton are more or less evidently combined in the great majority of NASSELLARIA. The greatest difficulty arises from the fact that often among very similar and closely allied forms the first exhibits all three elements (A, B, C) combined, whilst the second has a combination of A and B, the third of B and C, the fourth of A and C; and there are other forms, very similar to the former, in which one element only is recognisable. Another difficulty arises from the fact that the intimate structure of the cephalis in the majority of Cyrtellaria is not perfectly known, and often exhibits structures which are difficult to explain with regard to the three elements A, B, C. Under these circumstances further researches on the numerous imperfectly known NASSELLARIA are required, and chiefly accurate observations on their more minute structure and on their important ontogeny.