

for all the remaining forms of the MONOPYLEA; the great difficulty in their phylogenetic derivation lies in the facts that, on the one hand, any one of the three elements may alone constitute the skeleton, and on the other hand, in the great majority of the legion, two or three are united together (compare §§ 182–185).

112. *The Skeleton of the Phæodaria.*—The skeleton of the PHÆODARIA or CANNOPYLEA is always extracapsular, usually consists of a silicate of carbon (more rarely of pure silica), and in the majority of the legion is composed of hollow cylindrical tubes, whose siliceous wall is very thin, and whose lumen is filled with gelatinous material (§ 127). The manifold and remarkable skeletal forms occurring in this legion are not monophyletic, since they cannot be derived from a common stem-form; they are, on the contrary, polyphyletic, various skeletonless PHÆODARIA (Phæodinida) have independently acquired skeletons of different form and composition. The legion PHÆODARIA can be subdivided into four orders, the skeletons of which present the following important distinctions:—(1) The Phæocystina possess only incomplete Beloid skeletons (§ 115), composed of many separate pieces, sometimes tangentially (Cannorhaphida, Pl. 101), sometimes radially arranged (Aulacanthida, Pls. 102–105). (2) The Phæosphæria form Sphæroid skeletons (§ 116), usually only a simple lattice-shell without special aperture (Pls. 106–111); two concentric shells united by radial bars occur only in the Cannosphærida (Pl. 112). (3) The Phæogromia are distinguished by the formation of a simple Cyrtoid skeleton (§ 123) resembling that of the Monocyrtida; the monothalamus lattice-shell is usually ovoid or helmet-shaped, more rarely polyhedral or almost spherical; a vertical main axis can always be distinguished, at the basal pole of which is an aperture usually armed with teeth or spines (Pls. 99, 100, 113–120). (4) The Phæoconchia are distinguished from all other Radiolaria by the possession of a bivalved shell like that of the Conchifera; the two valves of this Conchoid skeleton must be distinguished as dorsal and ventral, as in the Brachiopoda (Pls. 121–128). The fifteen families of PHÆODARIA which are arranged in the four orders just mentioned, present such great differences among themselves, that the skeleton must be regarded as probably polyphyletic even within the limits of each order.

113. *Types of Skeletal Formation.*—No less than twelve different principal forms may be distinguished as morphological types of the formation of the skeleton in the Radiolaria; some of these are peculiar to a single legion or even to a smaller group; but sometimes the same form occurs in several legions. Some types occur only in an isolated manner, independently of the others, but most exist in various combinations with other types. Of the twelve described below the Conchoid and Cannoid occur only in the PHÆODARIA; the Plectoid and Cirroid only in the NASSELLARIA; the Astroid only in the ACANTHARIA; the remaining seven types are found in several legions in the same form and hence are polyphyletic.