

embedded in a punctulate cement-substance), with hollow radial spines and with a corona of simple solid teeth around the mouth; (5) Tuscarorida (Pl. 100), shell ovate or subspherical, with smooth surface, of the same peculiar porcellanous structure as the Circoporida, but with hollow, very long, tubular teeth around the mouth.

The *Phæoconchia* are the peculiar and most interesting "PHÆODARIA bivalva," differing from all other PHÆODARIA, and from all known Radiolaria in general, in the possession of a bivalved lattice-shell, composed of a dorsal and a ventral valve. They may be divided into three families: (1) Concharida (Pl. 123-125), shell with two thick and firm, regularly latticed valves, which bear no hollow tubes and no cupola or galea on their apex or sagittal pole; (2) Cœlodendrida (Pl. 121), shell with two thin and fragile, scarcely latticed valves, which bear a conical cupola or a helmet-shaped galea on their apex, and hollow branched tubes arising from it (without rhinocanna and frenula); (3) Cœlographida (Pl. 122, 126-128), shell with two thin and fragile, scarcely latticed valves, similar to those of the Cœlodendrida, but differing from them in the development of a peculiar rhinocanna or nasal tube upon each valve; this tube is connected by an odd or paired frenulum with the apex of the galea, and both together contain the phæodium.

The phylogenetic affinity of the fifteen families enumerated, and the morphological relationship based upon it, form a very difficult problem. The whole legion of PHÆODARIA is probably monophyletic, in as much as all the families may be derived from a single ancestral group, the skeletonless Phæodinida (*Phæodina* and *Phæocolla*); but at the same time polyphyletic, in as much as probably many families have been derived, independently one from another, from different branches of Phæodinida; or in other words, the characteristic malacoma of the PHÆODARIA (the cannopylean central capsule and the calymma with the phæodium) may be a monophyletic product, inherited from a single ancestral form; the manifold skeleton, however, is certainly a polyphyletic product, originating from different skeletonless Phæodinida.

Among the independent families of PHÆODARIA, derived directly from skeletonless Phæodinida by production of a peculiar skeleton, may be the following: Cannorrhaphida (Pl. 101, probably polyphyletic) Aulacanthida (Pl. 102-105), Castanellida (Pl. 113), Challengerida (Pl. 99), Concharida (Pl. 123-125), Circoporida (Pl. 114-117) and Tuscarorida (Pl. 100). The four families of *Phæosphæria* (the Orosphærida, Sagosphærida, Aulosphærida and Cannosphærida (Pl. 106-112), may be derived perhaps from the Castanellida; and the Medusettida (Pl. 118-120), have been perhaps derived from the Challengerida. The complicated affinities of these groups are however difficult to explain. The Cœlodendrida (Pl. 121) are probably derived from the Concharida, and the Cœlographida (Pl. 126-128) from the Cœlodendrida.

The geometrical fundamental form of the shell is in the majority of PHÆODARIA monaxonal, corresponding to the main axis of the enclosed central capsule; the