

or nearly spherical, whilst in the Circoporida it is polyaxonian, spherical or polyhedral; the hollow radial spines are arranged in the former around the main axis, in the latter around the common central point. All *Phæocalpia* (the Tuscarorida as well as the Circoporida) are inhabitants of great depths, usually between 2000 and 3000 fathoms.

Though the number of Tuscarorida at present known is small (only three genera, with ten species), they represent a very distinct and remarkable family of PHÆODARIA, as well by their considerable size, as by the peculiar arrangement of the radial spines and the structure of the shell-wall, which in some species is more solid and thicker than in any other Radiolaria. The diameter of the shell is always more than 1 mm., usually between 1 and 2, and sometimes more than 3 mm.

The dry shell of the Tuscarorida is not hyaline and transparent as is usual in the other Radiolaria, but perfectly opaque, milk-white or yellowish-white. This opacity is caused by innumerable very fine pores, which everywhere pierce the thick, apparently solid, fundamental substance of the shell-wall. Besides those very small pores, it is also pierced by a certain number of larger pores, which are scattered at wide distances (Narr. Chall. Exp., vol. i. pl. A, fig. 15*b*). These larger pores or pore-channels have a diameter of about 0.01 mm., and pierce the shell-wall either in a perpendicular or in an oblique direction. Very numerous straight, simple, and thin needles, usually 0.1 to 0.2 mm. in length, similar to the thin tangential needles of the Aulacanthida, are everywhere scattered tangentially in the cement-like fundamental substance, which seems to be a peculiar carbonic silicate; their axis is parallel to the shell-surface.

The general form of the shell is somewhat different in the three genera of Tuscarorida; ovate or spherical in *Tuscarora* and *Tuscarusa*, which bear no caudal axial spine (Pl. 100, figs. 1-7), or sometimes three-sided pyramidal (fig. 4); it is spindle-shaped in *Tuscaridium*, which bears on the aboral pole an axial caudal spine (Pl. 100, fig. 8). In every case the main axis of the shell, determining its monaxonian fundamental form, is indicated by the mouth, which is placed in the oral pole of the main axis and prolonged into a short tube or proboscis.

The hollow apophyses, arising from the shell of the Tuscarorida, are always cylindrical, long and thin tubules, the narrow cavity of which communicates directly with the large shell-cavity. In the axis of the tubules lies a thin axial chord or funicle, composed of a few (usually three or four) siliceous threads which arise from bridges between the basal pores of the apophyses, and are twisted together like the strands of a rope. The axial funicle is connected with the thin wall of the tubular apophyses by innumerable very thin radial beams, perpendicular to the axis (Pl. 100, fig. 3*a*, 5*b*). The surface of the apophyses is almost constantly covered with numerous small bristles or spines, which are usually curved and directed towards their distal ends.

*Tuscarora* (Pl. 100, figs. 1-6) exhibits two different groups of apophyses, which may be distinguished according to their different position and direction as "circoral