

ring-chambers. But usually they are dilated in the middle, more or less urn-shaped, and sometimes prolonged into short prominent tubules (Pl. XLVIII. fig. 8, *pe*).

The inferior, distal or basal side of the pneumatocyst, separated by the exodermal epithelium of the pneumatosaccus from the neighbouring superior face of the centradenia, corresponds in its general form to the latter, and has therefore a more complicated shape than its superior face. It is always more or less concave, hemispherical or campanulate in the Porpalidæ, slightly concave or cap-shaped in the Porpitellidæ. Numerous radial ridges or folds are prominent from the inferior face of the float, and often these arise in the form of vertical radial lamellæ, separated by deep valleys. These latter are filled up by corresponding high radial ridges of the upper face of the centradenia. The number of the radial ridges increases rapidly towards the periphery, numerous secondary and tertiary centripetal lamellæ (which do not reach the centre) being interpolated between the centrifugal primary ones. The concave under surface of the pneumatocyst, and the convex upper surface of the centradenia, catching one into another, become very similar to a *Fungia* (Pl. XLVIII. fig. 7). From the combs of the prominent radial ridges arise the tracheæ (fig. 6, *pt*).

*Tracheæ*.—The pneumatic tubules or aëriferous filaments, which we call shortly tracheæ, are much more numerous in the Porpitidæ than in the Discalidæ and Velellidæ. Each radial ridge bears in the larger species on an average more than one hundred tracheæ, and as the number of the ridges there amounts to some hundreds, the number of the tracheæ reaches many thousands. The innermost tracheæ, nearest the main axis, arise from the eight radial chambers which surround the central chamber. The other tracheæ arise sometimes isolated, in irregular radial series, from the crest of the ridges, at other times in bunches, crowded in small groups of three to six or nine, rarely more.

The aëriferous tubules are usually simple, very rarely branch, and never anastomose. Their thin chitinous wall is cylindrical, of very different length. Their course is never straight, always more or less curved, and often serpentine. The tracheæ of all Porpitidæ are distinctly articulate, and seem to be composed of a series of short truncate conical segments; the distal or inferior end of each segment is wider (Pl. XLVI. fig. 8). Sometimes each segment seems to be separated from the other by a transverse septum; but the apparent septum is merely an annular constriction. The two ends of each ring-segment (proximal and distal) remain always open.

The *course of the tracheæ* is difficult to make out. Descending from the lower face of the pneumatocyst, they enter immediately into the centradenia, and run in sinuous curves between the canal-network of this organ. A great part finishes inside the central gland, whilst another part descends deeper and passes into the wall of the central siphon and the peripheral siphons. They end here in the exoderm of the proximal half of the siphons, and do not enter into their distal half. Usually the great majority of the tracheæ are much shorter than the vertical diameter of the centradenia; they must there-