

a stigma above, and a trachea (or a bunch of tracheæ) below. This evident octo-radial structure of the central part is often lost in the peripheral part of the pneumatocyst.

The *concentric ring-chambers* which compose the latter are simple circular rings, without radial septa. Their number is very variable, in the smaller species ten to twelve, or even less, in the larger species forty to sixty, and in the largest more than a hundred. They are usually of nearly equal breadth; often, however, the chambers of the middle part are wider than the more proximal (near the centre) and the more distal chambers (near the margin). The first or innermost of the concentric ring-chambers is different from all others; it embraces the octo-radial central disc not only from the outer (abaxial) but also from the lower (basal) side (Pl. XLVI. figs. 3, 6).

*Pneumothyrae*.—It is a general opinion that the concentric circular ring-chambers of the Porpitidæ are perfectly separated one from another by solid annular septa. But this is not the case. I found in all members of this family openings of communication between them, which I shortly call pneumothyrae. The thin chitinous annular septa, which separate the ring-chambers, are concave on the axial side, convex on the abaxial side, they are usually thicker in the upper, thinner in the lower, part. Each annular septum is pierced in its basal part by at least eight pneumothyrae, ovate or roundish openings, which are about twice as broad as the stigmata of the upper surface. The pneumothyrae or ring-gates (Pl. XLVI. figs. 3, 4, *pg*) lie originally in the same radii as the stigmata (*pe*). There are, therefore, eight interradian rows of pneumothyrae. But in the larger species their number is increased, accessory pneumothyrae being interpolated between the primary ones in the outer chambers.

The superior, proximal or apical side of the pneumatocyst is usually flat in the central part, whilst the peripheral part is highly convex or campanulate in the Porpalidæ, slightly convex or even in the Porpittellidæ. Its surface is sometimes smooth, at other times rough and marked by radial stripes or ribs, and by concentric circles. It is sometimes, mainly in the central part, spiny, papillate, or armed with conical, irregularly scattered tubercles. The chitinous substance in the central part is often much thickened by apposition of secondary layers, and these may close the stigmata of that part. Those of the peripheral part remain always open.

The *stigmata*, or the pneumatic foramina on the upper face of the pneumatocyst (*pe*), are much more numerous in the Porpitidæ than in the Discalidæ and Velellidæ. Constantly there is a central stigma in the apex of the central chamber, and around this a regular corona of eight equidistant stigmata in the eight radial chambers which surround the former. The other stigmata are usually not regularly disposed, but scattered in great numbers over the upper surface. When the latter is provided with radial ribs or prominent ridges, the stigmata are placed in the height of the ridges, not in the valleys between them. The stigmata are sometimes simple openings in the upper wall of the