

axis. The ellipses are short and nearly circular in the young *Rataria*; they become longer and sometimes slightly quadrangular in *Velella*, and completely parallelogram-shaped in *Armenista*. The number of these concentric ring-chambers is very variable in the different species, two to eight only in the smallest species (*Rataria*), twenty to thirty or more in the larger (*Velella*), and fifty to eighty or more in the largest forms (*Armenista*).

*Pneumothyræ*.—The concentric ring-chambers of the pneumatocyst are all in open communication one with another. Each annular elliptical septum between two chambers is pierced by two opposite openings or septal pores, one in the dorsal half, the other in the ventral half of the disc. All these septal pores are placed in a straight line, cutting the major axis of the disc at a very small angle, as was first shown by Kölliker.<sup>1</sup> There are, therefore, not eight radial rows of pneumothyræ as in the ancestral Porpitidæ, but only two opposite radial rows. In some species of Velellidæ, however, there seem to exist two other opposite rows, placed in a transverse line near the frontal groove.

*Stigmata*.—All Velellidæ possess a relatively small number of superficial openings on the ring-chambers, which lie at their apical or superior surface, and serve for the emission of gas. The number of these stigmata is much smaller than in the Porpitidæ. Usually only every third or fourth ring possesses a pair of opposite stigmata; sometimes rings with and without stigmata alternate regularly; rarely each ring possesses one pair. All the gas-pores or stigmata discovered by Kölliker lie in a straight line, just as do the septal pores, and the line of the former is placed between the line of the latter and the base of the vertical crest. Half the stigmata, therefore, lie in the ventral half of the disc on the right side of the crest, and the other half in the dorsal half on the left side, or *vice versa* (compare Pl. XLIII. fig. 5, *pe*). The direction of the series of stigmata in all Velellidæ is already marked by the three first stigmata of their *Ratarula*-larvæ. These, as well as the mature *Rataria* (Pl. XLIV. fig. 8), possess only three stigmata, which are placed in a line, cutting the sagittal axis of the horizontal disc at an acute angle; one of the three pores lies near the centre (*po*); the second on the left (*pe*), and the third on the right side. All the following stigmata develop in the direction of that line. In many Velellidæ the stigmata lie so near the crest-basis that they are difficult to find.

*Tracheæ*.—The number of tracheæ arising from the lower face of the pneumatocyst in the Velellidæ is also much smaller than in the Porpitidæ, but they are longer than in the latter and usually branched. In many species eight tracheæ arise from the periphery of the eight radial chambers which surround the central chamber; these are usually branched (Pl. XLIII. fig. 6; Pl. XLIV. fig. 9). A small and variable number of other tracheæ arise here and there, irregularly scattered, from other parts of the pneumatocyst.

The vertical crest of the pneumatocyst, or the sail-skeleton, wanting in *Rataria*, exhibits different degrees of development in the various species of *Velella* and *Armenista*.

<sup>1</sup> Kölliker, 4, Taf. xi. fig. 11.