

anteriorly to the base where the œsophagus opens posteriorly, with the exception of a narrow band along the dorsal and ventral edges, where the dorsal lamina and endostyle are placed. They are arranged in horizontal (transverse to the antero-posterior axis) rows, and are separated by transverse and longitudinal vessels (Pl. VI. fig. 10, *tr.* and *l.v.*). There are about five such rows and about twenty stigmata in each row in the adult animal. In shape they are elongated slits with parallel sides and rounded ends (Pl. VI. figs. 10, 11, 17).

The vessels or blood channels of the branchial sac are divided according to their direction into two groups, the transverse and the longitudinal. The transverse vessels are the largest. They run round the sac horizontally, forming arcs of circles springing at the two ends from the great dorsal and ventral thoracic trunks, which communicate more or less directly with the heart, and giving off anteriorly and posteriorly the slender longitudinal vessels which separate the stigmata. These longitudinal vessels forming the second group, besides being smaller in calibre, are much shorter than the transverse, and merely form short connecting ducts between these latter.

The walls of the longitudinal vessels show externally a single layer of flat cells like those on the inner surface of the mantle, but more easily made out (Pl. VI. figs. 12, 13). The cells are often rhomboidal or pentagonal in shape, and have large nuclei which are distinctly seen after staining with nitrate of silver. The walls of the larger transverse vessels show the same structure with the addition of a few muscle fibres running along their length. What seems from the interior or exterior of the sac a single row of ciliated epithelial cells surrounds each of the stigmata (Pl. VI. figs. 11, 12, 13), that is, rests on the outer wall of the longitudinal vessels, along the sides of the stigma, and for a very short distance on the transverse vessels at the two ends. When, however, a transverse section of one of the small longitudinal vessels (Pl. VI. fig. 15), or a view of the vessel from the stigma (Pl. VI. fig. 14) is obtained, it is seen that each apparent cell is in reality three or four narrow cells placed side by side so as to form a longitudinal band of ciliated epithelium extending down the side of the vessel. These ciliated cells vary somewhat in shape, being found in all intermediate degrees between barrel-shaped and mitriform or shortly conical (Pl. VI. figs. 12, 13); the free ciliated edge is always the more convex one. The most common form is nearly semicircular (Pl. VI. fig. 11), the flat face being next the vessel and the curved one next the stigma. These cells have strongly marked outlines, granular contents, and distinct nuclei placed rather below the middle (the non-ciliated side being the base). The nuclei vary in shape according to that of the cell. When the latter is barrel-shaped they are elongated (Pl. VI. fig. 12), while in the semicircular and conical forms they are circular in outline (Pl. VI. fig. 13). The cilia are long and delicate. There are from five to ten on each cell, attached to the more or less convex outer edge, and when fully extended they are about twice the height of the cells (Pl. VI. figs. 11, 12, 13).