

are fully developed delicate and rather distantly placed bands, occasionally forking, are to be seen. Near the neck in some pouches the bands become stronger and more numerous.

The epithelial elements of the mantle are represented by, (1) the ectoderm externally separating the test from the mantle and covering the latter in its entire extent. Over the incubatory pouch and in some other parts the ectoderm cells are provided with long, pointed, hook-like processes which extend outwards into the test, bolting the two tissues together (Pl. VI. figs. 7, 8); and (2) a single layer of tessellated epithelium is placed on the inner aspect and clothes the surface of the connective tissue. It is of extreme tenuity and delicacy, being only visible under the most favourable circumstances. Here and there, when looked for carefully, the outlines of small groups of cells may be distinguished in the unstained tissue; usually, however, nothing is to be seen. By using nitrate of silver or osmic acid the outlines are rendered much more distinct, and, in most cases, the nuclei are also displayed (Pl. VI. fig. 9). The cells are polygonal (four-, five-, and six-angled), form a continuous layer, and seem perfectly transparent. The nuclei are of moderate size, circular in outline, placed near the centre of the cell, and seem finely granular in texture. This layer of epithelium is the "parietal layer of the atrial membrane" of Huxley, the "lining membrane" of Hancock, or the "third tunic" of Milne-Edwards. It forms the bounding wall of the peribranchial cavity or atrium, and is directly continuous with the outer of the two membranes which enter into the formation of the wall of the branchial sac.

*Branchial Sac.*—This organ occupies the greater part of the thorax, almost entirely filling the peribranchial cavity. It is composed fundamentally of two delicate membranes, the outer being the visceral layer of Huxley's atrial membrane, and the inner the endoderm of the anterior portion of the alimentary canal. These during the course of development are approximated, through the enlargement of the pharynx, come into close contact at different points, and fuse together. These places gradually grow thinner, and finally become perforated, thus forming stigmata, while the tracts over which the membranes do not unite remain as hollow canals, the blood-vessels of the branchial sac:

The organ in this species is a flat sac shaped somewhat like the letter B (Pl. V. fig. 13), having an indentation near the middle of its ventral edge. Besides the stigmata, which communicate with the peribranchial space, it has two orifices, one at the anterior end, the branchial aperture or mouth, by which water and food enter the organism, and the other near the posterior end, the œsophageal aperture, by which food enters the alimentary canal.

The endostyle (Pl. V. fig. 13, *en.*) runs along the ventral, and the dorsal lamina along the dorsal edge of the branchial sac, while the circlet of tentacles, the dorsal tubercle, and the peripharyngeal band are situated at its anterior extremity. All these organs will be described further on.

The stigmata occur over the whole interior of the sac, from the peripharyngeal band