

to resemble the ordinary dorsal lamina, with greatly exaggerated marginal projections. In other cases there is no membrane, and the languets are quite disconnected.

In Compound Ascidians and in *Pyrosoma*, languets are present, forming a series along the dorsal edge of the sac, as in *Ciona*; while in *Salpa* there is a single very large languet near the anterior end in the dorsal region. Behind this there is a membranous band (the "gill") representing the remainder of the dorsal lamina, and extending posteriorly and ventrally to join the posterior end of the endostyle, and thus separate the branchial sac from the cloaca.

*The Peribranchial Cavity* (The Respiratory Chamber, the Atrium, the Cloaca).

The peribranchial cavity or atrium is the space surrounding the branchial sac and communicating with the exterior by the atrial aperture, which is usually placed on the dorsal surface not far from the anterior end, but may move backwards so as to lie at a considerable distance from the branchial aperture, or even at the posterior end of the body, as in *Pyrosoma*, *Salpa*, *Doliolum*, *Botryllus*, *Culeolus*, &c. This atrial or exhalent aperture terminates a short tubular process of the mantle, just as in the case of the branchial aperture; and this atrial siphon is also provided with a sphincter muscle, a lining prolongation from the test, and sometimes a partial diaphragm at its lower end, but there is no tentacular circlet.

The peribranchial cavity is formed in the embryo by two lateral epiblastic involutions, which unite dorsally, and surround the branchial sac, except along its ventral edge, where the two lateral halves of the peribranchial cavity are separated by the union of the endostyle to the mantle (fig. 9, p. 40). The epithelium which lines the two atrial involutions forms in the adult Ascidian the "lining membrane" of the atrium, or the "third tunic" of Milne-Edwards, and is divided into the parietal layer lining the mantle (fig. 9 *mt.e.*) and forming the outer walls of the cavity, and the visceral layer covering the branchial sac and constituting the inner wall. The cavity is crossed by blood-vessels connecting the branchial sac with the sinuses in the mantle (fig. 9 *con.*). Besides these, called "connectives" by Hancock, the branchial sac is united to the mantle by the œsophagus, along the entire length of the endostyle, round the anterior end at the peripharyngeal bands, and along the first portion of the dorsal lamina.

The peribranchial cavity is in free communication with the interior of the branchial sac through the stigmata, and is traversed by the water in its course to the atrial aperture. The anus and the genital ducts open into the peribranchial cavity in the dorsal median region, often called the cloaca. Consequently the epithelium of the peribranchial cavity (the "lining membrane") is continuous with the endoderm of the branchial sac at the stigmata and of the rectum at the anus, and also with the epithelium lining the genital ducts.