

become spirally coiled, and both these changes have been caused by modifications of the fine interstigmatic vessels. The most abnormal form of branchial sac is that found in the genus *Hypobythius*, where there are no internal longitudinal bars. I am inclined to believe this to be a secondary modification, since we occasionally find in species of *Ascidia*, and especially of *Corella* (Pl. XXVI. fig. 8), places where the internal longitudinal bars are irregular and partially absent.

The dorsal lamina is found in several different conditions in the Ascidiidæ. Probably the primitive state was a series of languets, which were outgrowths from the dorsal line of the sac, corresponding to the connecting ducts arising from the transverse vessels. This simple condition is found in *Ciona*, and several other genera, while in *Ascidia* and *Pachychlæna* the languets have become more or less completely united by a membrane, the dorsal lamina proper, but still show traces of their original arrangement by projecting in the form of transverse ribs and marginal teeth. The simpler condition of a series of tapering languets is found constantly amongst the lowest family of Simple Ascidiæ, the Clavelinidæ, while the more modified and probably much more efficient organ, the plain lamina, prevails in the highest and most complex family, the Molgulidæ. In the intermediate families, the Ascidiidæ and the Cynthiidæ, both conditions and all the transition stages by which the one graduates into the other are found.

Neither of the two previously known genera of the Ascidiidæ in which the test is remarkably modified, namely, *Rhodosoma* and *Chelyosoma*, were collected during the Challenger expedition, but two of the new forms show notable peculiarities in the test, *Pachychlæna* having it greatly thickened all over, while *Hypobythius calycodes*, Moseley, has a series of symmetrically placed nodular, cartilaginous thickenings in the otherwise thin and membranous test.

A few lines will suffice for the family Clavelinidæ, as I shall leave the discussion of reproduction by gemmation for the second part of this Report; and the affinities of the new Challenger genus *Ecteinascidia* have already been fully discussed in the systematic part. In this genus, and still more in *Clavelina*, all the organs are found in a simple condition, not unlike that seen in *Ciona* among the Ascidiidæ. In *Clavelina* internal longitudinal bars are totally wanting, the stomach and intestine extend beyond the branchial sac, and the dorsal lamina is in the form of languets.

Two of the species of *Ecteinascidia* (*Ecteinascidia fusca* and *Ecteinascidia turbinata*) supply us with evidence as to the homology of the languets with the connecting ducts of the branchial sac. In *Ecteinascidia fusca* the connecting ducts are broad and triangular (Pl. XXXVI. fig. 8, *c.d.*), and the languets (Pl. XXXVI. fig. 11, *l.*) are also flattened and triangular, although of course longer, while a short distance at each side of them, just at the right and left edge of the dorsal area of the sac, is a row of processes very similar in every way to the connecting ducts, but having no internal longitudinal bars attached to their apices, which hang freely, like those of the languets (Pl. XXXVI. fig. 11).