

One remarkable exception to this rule is found in the forms of *Solenomya*. In these Molluscs the gills apparently retain the simple structure characteristic of *Malletia*, but the lamellæ are elongated, and one row extends towards the dorsal, and the other towards the ventral surface.

In *Nucula* (Pl. IV. fig. 10, B) the beginning of the elongation of the lamellæ may be already observed. A more advanced stage, showing the two rows of filaments (elongated lamellæ) simple and perfectly parallel, is not represented by any modern forms. *Solenomya* would approximately represent this phase, if the two series of lamellæ, instead of remaining in the same plane (turned in opposite directions), were both turned ventrally, that is to say, if the dorsal row were folded between the mantle and the ventral series. But among the other extant Pelecypoda no form retains the stage with simple filaments (Pl. IV. fig. 10, C).

In fact, in the gills which are least removed from those of *Nucula*, these filaments become recurrent. Elongated to increase their surface of hæmatisation, and not being able to extend farther in a ventral direction, the filaments are turned upon themselves in a dorsal direction, growing towards the point of origin of the axis, and exhibiting in transverse section the form of an elongated V. Such is the structure of the gill in the Arcidæ (Pl. IV. fig. 10, D). The two series of filaments then form two branchial plates. According to Dall,¹ *Arca ectomata* possesses only one of these plates; but the fact seems to me to demand corroboration.

In the Arcidæ these filaments are still entirely free and perfectly distinct from one another. But in a more advanced stage of specialisation all the filaments of one half plate or lamina (α or α' , for example, in Pl. IV. fig. 10), though not fused to one another, are nevertheless united by perpendicular bridges, while transverse bridges connect the two branches of the same filament. This is the state of affairs in *Mytilus*.

In a more elaborated union and completer fusion, the filaments come to form four laminæ, of which the two internal and the two external are united to one another by longitudinal contact, leaving between them "interbranchial" tubular spaces, and by transverse septa. In this way the gill consists of an external plate (with two laminæ) and of an internal plate (also with two laminæ).

The surface of the plates may then become folded, and exhibit the most general type of gill in the Pelecypoda (Pl. IV. fig. 10, E). This type may be further modified by enlargement or by reduction.

Thus in a large number of Pelecypoda, as, for example, in *Cardium* (Pl. IV.

¹ Report on the Mollusca, *Bull. Mus. Comp. Zool.*, xii. p. 244. According to Dall, *Dimya* (*ibid.*, p. 232) and *Amusium* (p. 210) have also only a single gill on each side; but I have shown that in the Challenger species of *Amusium* there were two normal gills on each side.