

respond to the lateral parts of the embryonic pedal disc, and are comparable to the whole lateral portion of the foot of the Gastropoda.

De Blainville and Boas have pointed out that it is the Bulloidea among the Tectibranchiata that the Thecosomata approach the most nearly, and we shall see that this view is quite justified. These authors, however, confine themselves to this mere statement without attacking the question whether the Thecosomata are descended from the Bulloidea or *vice versa*, and without trying to ascertain by what course the passage has been made.

Further, Boas is unable to point out for which group of the Opisthobranchia the Gymnosomata have the greatest affinity.

We must then enquire what are the special affinities of the Gymnosomata, and whether the Pteropoda are a primitive or a derived group as regards the Tectibranchia; and, further, according to the answer obtained we must endeavour to show for each group of Pteropods (Thecosomata and Gymnosomata) to which group of Tectibranchs it is most nearly related, and how the passage from the one to the other has been brought about.

A. THECOSOMATA.

If it were necessary to investigate the relationships of the Thecosomata by reference only to the organisation of the Cavoliniidæ, the task would present great difficulties, for, as we have seen, these animals have undergone an anomalous transformation, which quite masks the aspect they would otherwise present, and renders them very different from animals to which they are very closely related.

This is the cause which has led to the affinities of the Pteropoda having been for so long misunderstood:—the Cavoliniidæ have been taken as types of the Pteropoda, and as they could not be classed along with other Mollusca, they have been erected into an independent group.

Fortunately the Limacinidæ still exist in our seas, and we have been able to show that they are the most primitive Thecosomata, whilst the Cavoliniidæ have been derived from them by a process which we have indicated above. It is then upon the Limacinidæ and not upon the Cavoliniidæ that we must rely in endeavouring to trace out the affinities of the Thecosomata.

Considering for a moment the *operculum* of the Limacinidæ, we see that *Actæon*, one of the Bulloidea, is the only operculate Tectibranch, and that its operculum is precisely similar to that of *Limacina*—elongated, semi-lunar, and with few coils. The reversed coiling of its spire arises from the reverse coiling of the animal and of the shell; *Actæon* is coiled in the direct (right-handed) way, and has an operculum with a sinistral spire; *Limacina*, which is coiled in a retrograde direction, has an operculum with a dextral spire.

Mantle.—At the place where the "shield" of the Thecosomata is situated, the roof of