On the other hand, we have seen that each group has different affinities—those of the Theocosomata being with the Bulloidea, those of the Gymnosomata with the Aplysioidea. We must conclude therefore that the Pteropoda are polyphyletic in origin.

We shall now endeavour to show in the case of each group what has been the line of descent.

A. Origin of the Thecosomata.

Hitherto those authors who have believed that the affinities of the Pteropoda are with the Tectibranchia (de Blainville and Boas) have contented themselves with indicating the proximity of the Thecosomata to the Bulloidea, but without going further and trying to ascertain whether the Thecosomata are phylogenetically derived from these latter, and in what way this descent may have taken place.

It may be most confidently affirmed that the Thecosomata are descended from ancestors resembling the Bulloidea, and that the cause of the modifications which they have undergone is to be found in the increase of natatory habits and the adaptation to pelagic life.

If now we try to ascertain by what process the passage from one group to another has taken place, and by what successive modifications a Bulloid has become a Thecosomatous Pteropod, we are met at first by an apparent difficulty, in the fact that the most primitive Thecosomata, the Limacinidæ, are sinistrorsal, whilst all the existing Bulloidea are dextrorsal. But is this a real difficulty? Is there in fact a great morphological difference between a dextrorsal and a sinistrorsal animal?

Of what importance is the direction of the spiral? It is of scarcely any value, for we see among the species of a single genus (*Neptunea*, *Pyrula*, *Vertigo*, &c.), or among the genera of a single family (*Lanistes* and *Ampullaria*), forms coiled in opposite directions.[1] If this be the case with forms so nearly related, there is *a fortiori* no reason for astonishment that the same thing should happen in the case of the Bulloidea and Limacinidæ.

The examples just quoted show that it is very natural and simple that among the Bulloidea there should have arisen in course of time sinistrorsal forms, which, however, have preserved the dextrorsal asymmetry of their internal organisation; that is to say, that in these animals the "sinistrorsity" has only affected the coiling of the visceral sac and the shell, and these sinistral forms would bear to some of the Bulloidea the same relation that *Lanistes* bears to *Ampullaria*. (Bouvier[2] has shown that *Lanistes* is not sinistral as regards its organisation, and that it differs from *Ampullaria* only by the contrary twisting of its visceral sac.)

These forms, which are still unknown to us, are the extinct ancestry of the Lima-

[1] In the Pyramidellidæ we have a case in which in the same specimen the first coils are sinistral and the subsequent ones dextral.

[2] Sur le système nerveux typique des Prosobranches dextres ou sénestres, *Comptes rendus*, t. ciii. p. 1276.