

and the coiled Thecosomata (Limacinidæ) are not rendered any the less easy of explanation, in consequence of the fundamental difference existing between the two groups: namely, that the pallial cavity is dorsal in the coiled and ventral in the straight forms, and that the anus is on the right side in the former and on the left side in the latter.

Souleyet¹ and Grobben² have endeavoured to explain these differences by the coiling of the Limacinidæ, but this explanation is insufficient, for if one imagine a *Clio* of the subgenus *Creseis* coiled in the same manner as a *Limacina*, the relative position of the dorsal surface of the head and the pallial cavity cannot change.

Huxley³ foresaw that the difference is not so great as it appears, when he said, "I cannot think that any real variation will be found to occur among closely allied forms, in a matter so fundamentally connected with their whole structure and mode of development." He had not, however, quite grasped the real cause, for he thought that the displacement of the pallial cavity to the dorsal surface in the Limacinidæ is only a continuation of the process which carries the anus to the left in the Cavoliniidæ.

Boas⁴ was the first to give a clear and simple explanation of this apparently deep-seated difference. His explanation may be summarised as follows:—

The anterior or cephalic part (including the buccal mass, central nervous system, genital aperture, and copulatory organ) is so disposed to the other part in one of these great groups that it would require to be twisted through 180 degrees in order to assume the position found in the other.

By this means all the differences which exist between the straight and the coiled Thecosomata are readily explicable, and the two groups themselves may be referred to a common type.

In favour of this hypothesis of "partial rotation" several arguments have been adduced by Boas, and I am able to add others which render the explanation still more satisfactory. Indeed, the sum total of these arguments allows us to demonstrate with almost mathematical certainty the above-mentioned rotation.

In fact we may see (Pl. III. fig. 6) that—

1. The pallial cavity, which is dorsal in the Limacinidæ, is on the opposite aspect, that is to say, is exactly ventral, in the straight Thecosomata.

2. The lobe of the mantle-margin, which is at the right side in the Limacinidæ, is on the left in those straight Thecosomata which possess it.

3. The osphradium (olfactory organ of Spengel) is situated on the right in the straight Thecosomata and on the left in the Limacinidæ.

4. The retractor (columellar) muscle, which is dorsal in the straight Thecosomata,

¹ Voyage de la Bonite, Zoologie, t. ii. pp. 208-210.

² Morphologische Studien über den Harn- und Geschlechtsapparat sowie die Leibeshöhle der Cephalopoden, *Arch. Zool. Inst. Wien*, t. v. p. 63.

³ On the Morphology of the Cephalous Mollusca, *Phil. Trans.*, 1853, p. 43.

⁴ *Spolia atlantica*, p. 184.