

Shortly before his death Sir Wyville Thomson placed in my hands a portion of the ray represented in Pl. Vb., with the request that I would cut it into sections for him. I found this to be an exceedingly difficult task, partly because of the rolled-up condition of the arms, and partly because the calcareous substance of the skeleton is so much denser than that of other Crinoids; so that the organic basis which is interpenetrated by it and remains behind after decalcification, has nothing like the consistency that we meet with in the corresponding parts of the Comatulæ or of *Bathycrinus*. The presence of large bundles of muscles and ligaments without any helping syzygies also increases the difficulty of all attempts to obtain thin sections. But although I was not so successful as I could have wished, I was able to determine satisfactorily that the anatomy of a *Holopus*-arm is similar in all essential respects to that of an ordinary Crinoid (Pl. Vb. fig. 1; Pl. Vc. figs. 1, 2). The axial cord traversing the central canal of the skeleton gives off its pinnule branches in the usual way, *i.e.*, alternately on opposite sides. These branches have a long distance to go before they reach the pinnules, owing to the attachment of the latter on the upper edges of the large muscle-plates. As long as the branch remains in the substance of the arm-joint it does not take a straight course as is the case in the other Crinoids, but is thrown into a series of loops in a dorsoventral direction (Pl. Vc. fig. 2, *a*), and after it enters the pinnule its course is still somewhat sinuous (Pl. Vc. fig. 3, *a*).

These branches, like the main arm-trunk, are relatively of very small size, which is perhaps to be accounted for by the fixed position of the animal. No swimming movements are of course possible, but only those of flexion and extension are performed by the arms. All the ambulacral structures of the *Holopus*-arm are lodged in the deep median groove of its skeleton, and are usually small in comparison with the great transverse diameter of the joints. The cœliac canal is situated, as usual, between the two large muscular bundles, with a small genital canal separating it from the single subtentacular canal above (Pl. Vb. fig. 1).

The epithelial lining is very much the same in character in all these canals, consisting of low flattened cells. According to Ludwig¹ this is also the case in *Antedon eschrichti*, but this statement is not borne out by his figures. In one figure² he represents a well marked cellular lining to the cœliac canal and subtentacular canal, but leaves the genital canal without any; though in a more magnified representation³ the wall of the genital canal bears an excessively delicate layer of much flattened cells, which consist of little more than nuclei. This is more in accordance with my own observations, for I have always found that the epithelial cells in the genital canal are much flatter and less easy to see than those in the cœliac and subtentacular canals. In *Holopus*, however, the difference is much less marked. The genital cord is of essentially the same nature as in other Crinoids; though it is of a much less branching character in the axillary radial

¹ Crinoiden, *loc. cit.*, p. 29.

² *Ibid.*, pl. xii. fig. 8.

³ *Ibid.*, pl. xiii. fig. 13.