

been acquainted with these facts, the non-nervous nature of the axial cords would probably have been somewhat less "evident" to him.

According to Ludwig the axial cords consist of "feinen Fasern, zwischen welchen man, namentlich an der Peripherie der ganzen Masse, Zellen oder doch zellenähnliche Gebilde (Zellkerne?) findet."¹ As a matter of fact I can find no difference between the appearance of the fibrils forming the axial cords and those of the ambulacral nerve, either in transverse or in longitudinal section; and I wonder that Ludwig was not struck by the resemblance of the two, especially in *Antedon eschrichti*, in some specimens of which, at any rate, it is very marked. There are the same delicate fibrils with intercalated cells as in the ambulacral nerve, and in some individuals the two have exactly the same appearance in cross-section; though the axial cords more usually are somewhat of a yellowish tinge, which renders it easy to recognise their branches that extend outwards from the skeleton into the connective tissue of the general perisome (figs. 4-8; Pl. VIIb. figs. 6, 7; Pl. LIX. figs. 2-4, 6, 7; Pl. LX. figs. 2, 6).

Dr. Carpenter's theory of the nervous nature of the axial cords of the arm was originally suggested by his discovery that they give off branches which extend over the ends of the muscular bundles. This is well seen in moderately thick transverse sections of an arm which are viewed as opaque objects. But the study of thin transparent sections shows that these branches to the muscles are only portions of a largely developed network which originates in the axial cords and extends both to the dorsal and to the ventral surface of the arm or pinnule. Ludwig states that he had been unable to convince himself of the existence of the muscular branches described by Dr. Carpenter. This may well have been the case in the small arms of *Antedon rosacea*; though I have had no difficulty in finding them in this species, and Perrier has been equally successful. But I cannot comprehend his not having seen some of these lateral extensions of the axial cords in the arms and pinnules of *Antedon eschrichti*. They are not limited to the skeleton, for I have hardly a section that does not show a part of one or other of the two main trunks which extend up into the ventral perisome at the sides of the food-groove, as represented in Pl. LX. fig. 6, *a'*. Pinnule sections too may be obtained without difficulty, in which the whole course of one of these branches may be seen from its origin in the axial cord right up into the substance of one of the respiratory leaflets bordering the food-groove. In Ludwig's figures of sections through the arms and pinnules, however, the axial cord is represented as a mere dark circle without any trace of lateral extensions.

The doctrine of the nervous nature of these cords has recently received support from a quarter in which it was formerly denied; for Prof. Perrier has reinvestigated the subject and has brought forward additional evidence of much value. He has seen the branches of the axial cords in *Antedon rosacea*, and states, like Baudelot and Teuscher,

¹ Crinoideen, *loc. cit.*, p. 316.