

between the surrounding pigment bodies, and ramify in the small spaces left between the petaloid areas that are occupied by the five interradial ligaments (Pl. XXIV. fig. 1; fig. 2, *ca'*). These extensions towards the surface of the stem eventually become so fine that I have been unable to trace them in the somewhat thick sections with which I have been obliged to content myself, owing to the large size and the toughness of the stem ligaments. But from what I have seen in the arms, and more especially in the pinnules, I have very little doubt that the ultimate subdivisions of these branches are in connection with a subepidermic plexus. I have found similar branches in the cirri.

The occurrence of this tissue around the axial vessels of the stem and cirri has been employed by Ludwig as an argument against its nervous nature on account of the absence of muscles in these organs.¹ "Wozu also ein dieselben in ihrer ganzen Länge durchziehender (motorischer) Nervenstrang?" The same argument might be employed with respect to the extension of branches from the axial cords within the calyx up into the anambulacral plates on the sides and ventral surface of the disk of *Pentacrinus decorus* (Pl. LIX. figs. 2-4, *ad*). But their presence is readily understood if we consider them as sensory nerves establishing a communication between an ectodermic plexus and the axial cords of the rays, which all commence in the envelope of the chambered organ situated within the calyx. It is however in the arms and pinnules that the lateral extensions of the axial cords are most evident (Pl. LXI. fig. 6), and the inadequacy of Ludwig's theory as to their nature is strikingly manifest.

The species in which I have found these branches best developed are *Bathycrinus aldrichianus*, *Pentacrinus decorus*, *Antedon eschrichti*, *Actinometra parvicirra*, and *Actinometra nigra*. But they may also be met with in less abundance in the small arms and pinnules of *Antedon rosacea*, and I cannot understand how they escaped the notice of Greeff, Teuscher, and Ludwig.

The lateral branches from the central fibrillar axis in the stem of *Bathycrinus aldrichianus* have been already mentioned (Pl. VIIa. fig. 1, *ca'*). The axial cords within the rays and arms have a similar extensive distribution. Numerous branches proceed outwards from them into the calcareous substance of the successive joints, as is shown in the second and axillary radials, which form an important part of the cup enclosing the visceral mass (Pl. VIIb. figs. 6, 7, *a'*). The arms become free higher up, however, and the deep median groove in the ventral surface of the skeleton receives the ambulacrum with its armature of covering plates (Pl. VII. fig. 8). The axial cord gives off a large branch on each side which proceeds upwards, subdividing freely as it goes. The ultimate branches, many of which have bipolar cells intercalated in their course, extend right up to near the top of the side-walls of the arm-groove, where they become so small that I have been unable to trace them further (Pl. VIIIa. figs. 4, 5, *a'*). I have occasionally seen a cell with three processes instead of two, but these are rare. The ambulacral nerve

¹ Crinoideen, *loc. cit.*, p. 335.