

with what we know of their origin; and it likewise fails to account for their relations in the adult Crinoid. If this fibrillar tissue were limited to the skeleton, there might be some reason in Ludwig's suggestion. But it gives no rational explanation whatever for the extension of branches from the axial cords of the skeleton through the perisome of the disk and arms, up to the bases of the tentacles at the sides of the food-groove (Figs. 4-7, *a'*. Fig. 8; Pl. LIX. figs. 2-4, 6, 7; Pl. LX. fig. 2—*ad*; Pl. LX. fig. 6, *a'*), and even as asserted by Perrier, into the tactile hairs borne by these tentacles.<sup>1</sup>

Ludwig's theory too entirely fails to account for the elaborate arrangement of commissures which one finds in *Comatula* and *Pentacrinus* (Pl. XXIV. figs. 7-9; Pl. LVIII. figs. 1-3), and in a less degree in *Bathycrinus* (Pl. VIIb. fig. 4, *cco*), *Rhizocrinus* (Pl. VIIIa. fig. 6, *cco*, *ico*), and *Encrinus*. Why should the first radials and the axillaries be in such special need of nutrition that the former should possess both interradial and intraradial commissures, and the latter no less than four cords, to say nothing of the transverse commissure? Five radial cords starting directly from the envelope of the chambered organ would surely serve all the necessary purposes of nutrition. As it is, however, each ray and indeed each arm is supplied by fibres from two of the primary interradial trunks. This complex arrangement receives no explanation whatever on Ludwig's theory, though it is easily understood if we suppose that the axial cords are the means by which co-ordinated impulses reach the muscles from a governing centre.

Their anatomical structure also favours this view. In a paper which was published some years before the discovery of ambulacral nerves in the Crinoids, Baudelot quoted Müller's description of the so-called arm-nerve (*i.e.*, the genital cord), and apparently adopted it as correct.<sup>2</sup> But he also stated that he could not help being struck with the resemblance "qui existe entre la structure du cordon fibreux central des bras et la cordon nerveux des autres Échinodermes." He described its relations pretty accurately, and then proceeded to say "Ainsi donc chez les Comatules il existe des parties qui évidemment n'appartiennent point au système nerveux, et qui dans leur disposition aussi bien que leur structure offrent une analogie presque complète avec les cordons nerveux des autres Échinodermes."

I do not know what reason Baudelot may have had for his conviction that the axial cords are evidently not of a nervous nature, unless he had implicitly accepted Müller's account of the nervous system of a Crinoid. A very little trouble, however, would have convinced him that this was totally incorrect. In fact Dr. Carpenter had referred to Müller's error four years before the publication of Baudelot's observations, and had also mentioned that he had reasons for regarding the branching fibres proceeding from the axial cords to the muscles as probably having the function of nerves. Had Baudelot

<sup>1</sup> *Comptus rendus*, t. xcvi. p. 188.

<sup>2</sup> Contribution à l'histoire du système nerveux des Échinodermes, *Archives d. Zool. expér.*, t. i. p. 211.