

noticed the great differences of form, size, and regularity of arrangement between the ambulacral plates of the arms and pinnules respectively. But he pointed out that the covering plates of the disk-ambulacra rest upon other plates which he called "side plates," and that both are distinguished from the general anambulacral plating of the disk by the absence of water-pores.¹ It is difficult to individualise these plates when looking at the disk from above, as they are so irregularly arranged (Pl. XVII. fig. 6; Pl. XXXIX. fig. 2; Pl. XLIII. fig. 3; Pl. L. fig. 2); but they are more easily distinguished in a cross section of an ambulacrum (Pl. LIV. fig. 11; Pl. LVII. fig. 3, *sp.*).

Müller further mentioned a series of median subambulacral plates as lying beneath the food-groove and water-vessel, which he believed to rest in a furrow along their upper surface;² and he described a series of ambulacral pores between the median row and the side plates, which might be related to the tentacles, and possibly served for the passage of vessels connecting these organs with ampullæ. He had previously figured some plates as underlying the sides of the food-groove, with pores in or between them, which he spoke of as "Oeffnungen des Tentakelcanals in die Tentakeln der Tentakelrinne."³ But it is difficult to make out whether they are identical with those which he subsequently described and figured as ambulacral pores.⁴

In reality, however, there are no pores of this kind beneath the ambulacra of the disk; and there are no large ampullæ connected with the tentacles as there are with the tube-feet of the Stellerids. But there is often a large amount of calcareous tissue beneath the water-vessels of both disk and arms, which takes the form of more or less regular plates (Pl. LIV. fig. 11; Pl. LVII. fig. 4, *sub*; Pl. LXII.). They have no definite arrangement, however, and are practically only a portion of the general limestone plating beneath the upper surface of the disk. Although therefore, owing to their subambulacral position, they are generally equivalent to the rotulæ of the Urchins, the lancet-plates of the Blastoids, and the radial pieces in the oral ring of Holothurians, I do not think that they quite deserve the morphological importance which was attributed to them by Müller. It is possible that the series of plates which were discovered by Prof. Huxley and described by Billings⁵ as forming an elongated arch beneath the subtegmental ambulacra of *Actinocrinus rugosus* may be true subambulacral plates. But from the descriptions of them which are given by Meek and Worthen,⁶ and also by Wachsmuth and Springer,⁷ I am rather inclined to think that they may be the adambulacral or side plates (Pl. LVII. fig. 3, *sp.*).

Besides going somewhat fully into the nature of the ambulacral skeleton in *Pentacrinus asteria*, Müller drew attention, as his predecessors had done, to the plates on the

¹ Bau der Echinodermen, p. 58.

² *Ibid.*, pp. 57, 58, Taf. vi. figs. 7, 9, *d.*

³ Bau des Pentacrinus, p. 70, Taf. ii. fig. 14.

⁴ Bau der Echinodermen, pp. 58, 63, Taf. vi. fig. 7, *e.*

⁵ On the Cystidæ of the Lower Silurian Rocks of Canada, Geol. Surv. of Canada, Decade iii. p. 27.

⁶ Notes on the Structure and Habits of the Palæozoic Crinoidea, Palæontology of Illinois, vol. v. p. 331.

⁷ Revision, pt. ii. p. 28.