

the interradial angles but not in the others. They are, however, very well developed in many of the fossil Neocrinoids, *e.g.*, *Marsupites*, *Apiocrinus*, and *Extracrinus*; and they often have a very solid and substantial appearance. Like the anal plate they are most important in their palæontological relations; as is also the single calyx-interradial of *Thaumatocrinus* (Pl. LVI. figs. 1-5), which has been already described (*ante*, pp. 39-41).

The margins of the ambulacra of the disk, arms, and pinnules, and the interpalmar areas of the disk, are rarely, if ever, perfectly free from any traces of calcareous structures. Those of the ambulacra may take the form of simple short spicules which are almost entirely limited to the marginal leaflets; or they may be forked and branching spicules, or rounded cribriform plates of variable size, which are movable and can either be erected or closed down over the grooves. They are well developed in *Hyocrinus*, *Bathycrinus*, and *Rhizocrinus* (Pl. Vc. figs. 8-10, *cp*; Pl. VI. figs. 1, 6; Pl. VII. fig. 7; Pl. VIII. figs. 3, 5; Pl. VIIIa. fig. 1; Pl. IX. fig. 4; Pl. X. fig. 20). In the first named genus they are sometimes separated from the dorsal skeleton by other plates which will be noticed later (Pl. Vc. figs. 9, 10, *sp*); and the same is often the case in the Pentacrinidæ and Comatulidæ (Pl. XXXIII. fig. 1; Pl. XLVII. figs. 11, 13; Pl. XLIX. figs. 6, 7; Pl. LI. figs. 11, 12; Pl. LII. figs. 5, 6; Pl. LIV. figs. 4, 6-9).

These covering plates of the ambulacra of *Pentacrinus* were termed "Saumplättchen" by Müller, to distinguish them from the uncalcified marginal leaflets of the ambulacra or "Saumläppchen," which correspond to them in most Comatulæ;¹ while Sars,² doubting the mobility of these parts in *Pentacrinus* and *Comatula*, gave the name "lamelles du sillon" to the large, oval, and movable plates which border the ambulacra of *Rhizocrinus*. All three structures, however, are of essentially the same nature. The covering plates of the stalked Crinoids are abundantly represented in many of the Comatulæ, always, however, resting upon a more or less developed "side plate" as in the Pentacrinidæ; and the fact that they are merely an extensive development of the limestone rods and networks in the perisome bordering the ambulacra is evident when all the intermediate stages are examined. All the Pentacrinidæ have plated ambulacra; but this is by no means the case in the Comatulæ, especially in *Actinometra*; though individual species of *Antedon* have a relatively larger and more substantial ambulacral skeleton than any *Pentacrinus* or *Metacrinus* (compare Pl. XXVII. figs. 4, 11, 12; Pl. XXXIII. fig. 1; Pl. XLVII. figs. 11, 13; Pl. LI. figs. 11, 12; Pl. LII. figs. 5, 6; Pl. LIV. figs. 4, 6-9).

The covering plates which border the ambulacra on the arms and pinnules of *Pentacrinus asteria* were briefly mentioned by Müller.³ But he described them as resting upon the joints of the skeleton, which is not always the case; and in fact, two pages further on he spoke of the plates which are situated on the perisome at the sides of the arms and pinnules, just as on that of the disk; while he does not seem to have

¹ Ueber den Bau der Echinodermen, *Abhandl. d. Berlin Akad.*, Jahrg. 1853, p. 57 (of separate copy).

² Crinoïdes vivants, p. 24.

³ Bau des Pentacrinus, p. 46.