

primary interradials of *Thaumatocrinus* all end simply in a free rounded edge at the margin of the disk (Pl. LVI. figs. 1-3, 5), which is doubtless partly due to the simplicity of the arms. For these become free at once, and are not connected laterally by perisome, in which higher orders of radials could be supported. The interradial of the anal side, however, bears a small tapering appendage of four or five gradually decreasing joints, which terminates in a blunt point without any connection whatever with the anal tube near it (Pl. LVI. figs. 2, 4, 5). It appears to me to be of the same nature as the so-called proboscis of *Taxocrinus*, *Gnorimocrinus*, *Onychocrinus*, &c. The anal plates of these genera do not support a huge "ventral sac," such as occurs in the Cyathocrinidæ, but are of an altogether different nature. Good figures of them are given by Schultze,¹ Angelin,² and by Meek and Worthen.³ They may be advantageously compared with figs. 2 and 4 on Pl. LVI.

According to Wachsmuth and Springer⁴ the first anal plate of *Taxocrinus* "has a truncated upper side, and is succeeded by from two to six similar, narrow, quadrangular plates, longitudinally arranged. The plates diminish in size upwards, and form the dorsal side of a short and slender lateral proboscis, whose ventral parts, as well as the wall supporting them, have never been found preserved, and evidently consisted of more fragile material." A few pages farther on they describe *Onychocrinus* as follows:—"In the anal area there is a series of from three to five very narrow, quadrangular plates, which rests upon the truncated or slightly excavated upper side of the basal, and forms a small lateral proboscis as in *Taxocrinus*. Interradials three to twenty, perhaps more in some species; the first one large, resting between the first and second radials, the succeeding ones smaller, rapidly decreasing in size and thickness upward, and having an inward curvature. They are followed by very minute irregular polygonal plates, which form the interradial portion of the vault." Meek and Worthen⁵ described this anal series as resting upon the larger truncated basal, "much as the arms of *Platycrinus* rest upon the first radials, and really looking very much like a diminutive arm rising from the anal area. This arm-like range of small pieces seems never to consist of more than from four to six or seven pieces, which are so small and narrow as to leave a wide open space between them and the posterior rays on each side." Subsequently, however, they met with a specimen showing "the space between the little arm-like range of anal pieces, and the radials and vault to be occupied by very numerous minute pieces."⁶ These last occur in each interradius, and are directly continuous with those forming the so-called "vault" or ventral disk, just in the same way as the perisomic plates between the rays of recent Crinoids (Pl. XIII. fig. 1; Pl. XXXIV. figs. 1, 2; Pl. L. figs. 1, 2), of *Extracrinus*, and

¹ Monographie der Echinodermen des Eifler Kalkes, *Denkschr. d. k. Akad. d. Wiss. Wien.*, Bd. xxvi., 1866, Taf. iv. figs. 2, 2b, 3, 4b.

² *Iconographia Crinoideorum*, Stockholm, 1878, Tab. xvii. fig. 8; Tab. xx. figs. 9, 13, 16; Tab. xxiii. fig. 5.

³ *Palæontology of Illinois*, vol. v. pl. xiv. fig. 4.

⁴ *Revision*, part ii. p. 46.

⁵ *Palæontology of Illinois*, vol. ii. p. 243.

⁶ *Ibid.*, vol. iii. p. 494.