

case in *Belemnocrinus*, and has been thought to afford the only point of difference between it and the cup of the recent *Rhizocrinus*; though the structure of the stem is entirely different in the two types. More commonly, however, there is a considerable development of plates in the anal interradius, and the corresponding basal plate, together with the two radials that rest upon it, differ from their fellows in size and shape. There is, however, one Neocrinoid, the aberrant *Thaumatocrinus* (Pl. LVI. figs. 1-5), which has the symmetry of its calyx disturbed by the presence in the anal interradius of a jointed appendage, somewhat similar to that of *Reteocrinus* from the Trenton group of America, and of *Taxocrinus*, *Onychocrinus*, &c. But there is no other modification of the plates, the five basals, the lowest interradians, and the radials being all equal and similar to their fellows. Even in Palæocrinoids which have the radials closely united all round, and the general contour of the calyx perfectly regular, a want of symmetry is indicated by the inequality in the numbers of basal and radial plates. This is the case, for example, in *Eucalyptocrinus*, which has five radials but only four basals.

In all Neocrinoids (with the possible exception of the doubtful *Comaster*) the basals are pierced by interradian canals or grooves, which lodge the cords proceeding from the angles of the chambered organ. These cords fork and pass on into the radials, where they occupy the more or less double axial canals (Pl. VIIb. fig. 2, *ai*; Pl. XXIV. figs. 7-9; Pl. LVIII. figs. 1-3—*ai*, *av*). These axial canals open on the distal faces of the radials in the centre of the transverse articular ridge, and are thence continued into the rays and arms (Pl. III. figs. 1, 3-15; Pl. Vb. fig. 1, A; Pl. Vc. fig. 2, A, figs. 3, 7, 8, 10, *a*; Pl. VIIa. figs. 15-23; Pl. VIIb. figs. 1, 5-8, A; Pl. VIIIa. figs. 5, 7, 8, A; Pl. X. figs. 1-4, 6-8, 17, 18; Pls. XII., XXI., LXII.). Chapman, who has recently attempted a classification of Crinoids,¹ appears to imagine that *Marsupites* and *Uintacrinus* have imperforate radials; for he places them both in his Division 1, "Emedullata," which he characterises as follows, "Calyx and arm-plates without internal canals." I know nothing about the calyx-plates of *Uintacrinus*; but the central canal of the third brachial is shown in Schlüter's figure;² while the perforation of the radials of *Marsupites* was mentioned by Miller,³ and has been figured by many later writers.

The presence of a transverse ridge on the articular faces of the radials indicates that they were united to the second radials by muscles and ligaments, just as the successive arm-joints are. This is invariably the case in all Neocrinoids except *Guettardicrinus*, which has the plates suturally united, and possibly also in *Uintacrinus*. I have pointed out already that there was a fully developed muscular joint between the two lowest radials of many Palæocrinoids such as *Platycrinus* and some, if not all, species of *Cyathocrinus*; and though the arms of *Platycrinus* are pierced by axial canals, it is placed among the "Emedullata" by Chapman.

¹ A Classification of Crinoids, read before the Royal Society of Canada, May 26, 1882.

² *Op. cit.*, Taf. iv. fig. 4.

³ *Op. cit.*, p. 138.