

erinus and *Symbathocrinus* had a more or less rudimentary one, consisting of an orocentral and five oral plates only, without any radial extensions.

The vault of the Actinocrinidæ is much more complex than in the Platycrinidæ and Rhodocrinidæ; but its relations to the internal organs are so much better understood than in these families that it may well be considered first. This is more especially the case, as certain parts of Wachsmuth's generalised description of the vault of these three families apply to the Actinocrinidæ only, and occasionally even to some genera only.

It has been stated above that the vault of the Actinocrinidæ formed a solid roof or dome over the oral surface of the visceral mass, which was covered with ambulacral and anambulacral plates like the disk of a *Pentacrinus*. Wachsmuth has discovered that whatever the size and extent of the vault the apical dome plates are invariably present. "They consist of a central piece, occupying a position directly above the oral centre, which in this family is quite uniformly the centre of the disk. It is surrounded by six proximal plates, interradian in position, of which four are large and equal, and two smaller. The four large plates are placed above the four regular interradian spaces respectively; the two smaller ones, which are equivalent to and take the place of one large plate, are directed posteriorly, being separated from each other by anal plates or the proboscis. . . . There are other vault pieces occupying a radial position which are either in contact with those just described, or, as is more frequently the case, separated from them by a belt of small pieces. Their number varies considerably among species, and depends upon the number of primary arms, without reference to the number of bifurcations after they become free. They increase in proportion to the number of primary arms, in the same manner and on the same principle as the plates of the calyx, each order of radials has its corresponding plates in the vault. . . . There are also interradian plates represented in the summit, occupying intermediate spaces between the radials, but their arrangement is very irregular and their number variable."¹ The number of these interradian plates depends greatly upon the age of the individual, and is therefore very uncertain; but as a general rule the number of summit plates increases regularly with that of the primary arms, just as that of the calyx plates does. The above statements, though true enough for the Actinocrinidæ, are scarcely so accurate as regards the Platycrinidæ.

This discovery of Wachsmuth's respecting the distribution of the radial dome plates in the Actinocrinidæ is of enormous importance for the proper comprehension of the true nature of the vault of a Palæocrinoid; and, taken in connection with the embryological work of Goette, throws much light on the morphology of the Crinoids, and indeed of Echinoderms generally.

By far the most interesting of these summit plates are the "apical dome plates" in the centre, which Wachsmuth says are relatively larger in young specimens. This and other considerations led him to point out their resemblance to the apical plates of the aboral

¹ Revision, part ii. pp. 14, 15.