

plates were more massive than in recent Crinoids, just as the former were in the Cyathocrinidæ; and I do not think therefore that there was anything within the vault of Platycrinidæ like the tubular skeleton and the network of anambulacral plates that occur in *Actinocrinus*. The greater part of the above argument appears to me to be a mere logical deduction from Wachsmuth's very suggestive remark¹ that the alternate plates in the dome of Platycrinidæ are represented in the recent Crinoids "by the 'Saumplättchen,' which, however, instead of forming a part of a solid vault, are movable, and line the lateral margins of the tentacle furrows."

Although believing that the vault of a Platycrinoid corresponds collectively to the orals, interradials, ambulacral, and anambulacral plates of Neocrinoids, I do not wish to assert that the Platycrinidæ either had an external mouth or open ambulacra on the disk. For I imagine that both were closed as in *Cyathocrinus*, the whole system of plates being much more substantial than in Neocrinoids, and forming part of a solid covering, but not a true vault or *tegmen calycis*.

In the Actinocrinidæ, on the other hand, not only the food-grooves themselves, but also their skeleton of alternating plates, were subtegminal, together of course, with the plated interpalmar areas of the disk. The oral or actinal system of plates does not consist merely of an orocentral with one or two rings of plates round it, which cover in the peristome and the origins of the ambulacra from it. It is so greatly developed as to cover in and conceal the whole ventral surface of the body, *i.e.*, the disk proper. The subtegminal food-grooves passed outwards from the peristome over this upper surface of the disk, and were continued on to the arms through the ambulacral openings round the dome. A primary dome-radial is always present beyond the orals, and may be followed by secondary, tertiary plates, &c. *Stelidiocrinus* has very few dome-radials, but in other types the number becomes very large, in correspondence with the development of different orders of radials in the calyx. Sooner or later, however, the subtegminal food-grooves reached the arm-openings, and the minute plates protecting them were continuous with the skeleton of the brachial ambulacra.

There is one form which is placed by Wachsmuth and Springer among the Actinocrinidæ, but has a vault of very different construction from that of the other members of this family. In fact it somewhat resembles that of *Marsupiocrinus*. I mean *Carpocrinus ornatus* (*Habrocrinus, Angelin*). Wachsmuth describes its radial portions as "covered by two rows of low transversed pieces; interpalmar fields paved by somewhat larger and elongate plates."² As pointed out above, the word "interpalmar" denotes the areas between the radiating food-grooves; and its use by Wachsmuth is therefore significant. I cannot resist the suspicion that the double row of low transversed pieces indicates the position of a food-groove; and that the covering plates may have been permanently closed down so as to convert the grooves into tunnels, without the additional

¹ Revision, part ii. p. 30.

² *Ibid.*, part ii. p. 106.