

diately surrounding the peristome and covering it more or less completely (Pl. III. fig. 2; Pl. Vc. fig. 6, *O*; Pl. VI. figs. 3, 4; Pl. X. figs. 7, 20; Pl. LVI. fig. 5). Their rudiments appear in the free-swimming larva simultaneously with those of the basals, which are developed spirally round the right peritoneal tube; while the orals appear in a similar spiral around the left one.

The skeleton is at first limited entirely to these two rings of plates, the edges of which meet around the equator of the growing cup, though they ultimately become separated by the appearance of the radials between them.

At the base of the closed pyramid formed by the oral plates is the upper portion of the larval body, in the centre of which the opening of the mouth is formed. The rest of the space above the circular lip and beneath the oral pyramid is occupied by the tentacular vestibule. This, according to Goette,<sup>1</sup> is derived from the left peritoneal tube, and contains the fifteen first formed tentacles which are borne on the water-vascular ring. At a certain period of development the five valves of this oral pyramid gradually separate so as to open the mouth to the exterior and allow of the protrusion of the tentacles; while the floor of the original tentacular vestibule, with the mouth in its centre, becomes the peristome of the growing Crinoid. Five of the tentacles correspond to the intervals between the oral valves; and a conical projection, the commencement of a ray, appears at the base of each of them. The growing rays are supported by the first radial plates, which appear in the rapidly expanding equatorial portion of the body, *i.e.*, the band of perisome between the upper edges of the basals and the lower edges of the orals. As the rays grow the second radials appear between the bases of the orals, and the equatorial band continues to increase in diameter. But the orals maintain their original position round the mouth, so that they become completely separated from the basals and radials by the equatorial perisome and are relatively carried inwards, while the second radials project somewhat outwards. The diameter of the oral circlet continually decreases in proportion to that of the disk, which enlarges rapidly as new arm-joints are added in succession. The orals are thus left as a circlet of five separate plates protecting the peristome in the centre of the upper surface of the disk; and the ambulacral grooves extend outwards between the bases of the orals, as the growing rays carry the first formed tentacles away from the water-vascular ring.

In all the Pentacrinidæ, and also in the Comatulæ, with the single exception of *Thaumatoocrinus* (Pl. LVI. fig. 5), the orals eventually undergo a process of resorption, which commences in the latter case before the young *Comatula* detaches itself from the larval stem, so that no traces of the orals are to be found in the adult. Neither are there any in the adult *Bathycrinus aldrichianus* (Pl. VII. fig. 3), nor even in the young *Bathycrinus gracilis* (Pl. VIIIa. fig. 1); though according to the observations of Danielssen and Koren they would seem to be present in *Bathycrinus carpenteri*, but in a

<sup>1</sup> Vergleichende Entwicklungsgeschichte der Comatula Mediterranea, *Archiv f. mikrosk. Anat.*, Bd. xii. p. 621.