

I suspect that these tunnels lodged not only the food-grooves, but also the nerves, blood-vessels, and water-vessels; for no recent Crinoid has any calcareous structure between the epithelium of the food-groove and the under surface of the water-vessel. But there is often a tolerably definite plating which extends inwards from the side plates toward the median line of the ambulacrum, beneath the water-vessel (Pl. LIV. fig 11; Pl. LVII. fig. 4, *sub*; Pl. LXII.); and I suspect therefore that the lower row of plates flooring the ambulacral tunnels may be of this nature. Possibly, however, they should be regarded as subambulacral plates better defined in character than those of recent Crinoids, though I am inclined to doubt this, owing to their alternate arrangement. Wachsmuth has discovered that the proximal ends of these ambulacral tunnels are connected by a circular vessel which encloses more or less of the upper part of the convoluted digestive organ. The lower part of this structure, with its floor of minute interlocking plates, was obviously the water-vascular ring; and the five interradial openings in its floor were referred to by myself in 1879<sup>1</sup> as indicating the position of the water-tubes which depend from the water-vascular ring into the coelom, and serve to admit water into the ambulacral system, a view which has been adopted by Zittel. *Rhizocrinus lofotensis* has only one water-tube in each interradius, which seems also to be the case in *Actinocrinus verneuillianus*.

Besides the ambulacral skeleton, we also find in the Palæocrinoids representatives of the anambulacral plates of *Pentacrinus* and *Comatula*. In describing some natural casts of the visceral mass of *Actinocrinus*, Messrs. Wachsmuth and Springer<sup>2</sup> say "the interpalmar fields are composed of a soft skin, but although this is more or less encrusted with limestone particles, which sometimes almost look like vault pieces, they have no affinities with the plates of the vault;" while in some specimens of the Actinocrinidæ<sup>3</sup> "almost the entire test is lined with a delicate calcareous plexus or network. This lining is not in contact with the test directly, but connected with it by small partitions, producing innumerable little chambers, which communicate with each other and with the visceral cavity. . . . The structure extends but little below the region of the second radials, leaves passages at the arm-openings, and toward the vault "reaches to a place near the median portion of the ray, leaving at the centre an open space in the test which is occupied by the central vault piece." This open space, lying beneath the central one of the apical dome plates and uniting the five ambulacra, was evidently the peristomial area like that of recent Crinoids (Pl. XVII. fig. 10; Pl. XXVI. figs. 1, 2; Pl. XXXIX. fig. 2; Pl. L. fig. 2; Pl. LV.); while the calcareous network within the vault is divided by the ambulacra into five interpalmar fields. It corresponds to the limestone particles on the surface of the internal casts, and represents the anambulacral plates developed in the perisome of recent Crinoids.

These important observations go to show the complete resemblance between the

<sup>1</sup> *Quart. Journ. Micr. Sci.*, 1879, vol. xix., N. S., p. 185.

<sup>2</sup> Revision, part ii. p. 31.

<sup>3</sup> Revision, part ii. p. 26.