

ventral or oral side by a more or less solid integument, without external food-grooves or oral aperture;" though they imply that the mouth may not have been internal in some cases.¹ In recent Crinoids, however, the mouth and food-grooves are external, though capable of being closed by plates, and the name "Stomatocrinoidea" was consequently suggested for them by Wachsmuth and Springer.

Reference has already been made to the gradual removal of the orals which surround the tentacular vestibule of the larva, from the radial plates; and also to the separation of these orals from one another so as to open the tentacular vestibule to the exterior and expose the mouth in the centre of its floor. In *Holopus*, *Hyocrinus*, and *Thaumatocrinus* the orals persist as large triangular plates which cover up and protect the peristome (Pl. III. fig. 2; Pl. VI. figs. 1-4; Pl. LVI. fig. 5). They are only removed to a short distance from the radials, scarcely at all in fact, in *Holopus*. In *Rhizocrinus* they are relatively much smaller; while they disappear altogether in the Pentacrinidæ and remaining Comatulæ (except *Thaumatocrinus*), so that the mouth is directly exposed to the exterior (Pl. LV.).

In all the recent Crinoids the food-grooves of the disk are perfectly open, like those of the arms, *i.e.*, they are never closed in any other way than by the folding down over them of the plates at their sides (Pl. XVII. fig. 6; Pl. XXVI. figs. 1, 2; Pl. XXX. fig. 2; Pl. XXXIX. fig. 2; Pl. LV.). But in many Palæocrinoids such as *Actinocrinus*, these food-grooves themselves were concealed beneath a vault or dome of rigid heavy plates; so that the mouth towards which they converged was truly subtegmental. The nature of this dome is a point of very considerable importance with reference to the relationship of the Neocrinoids and Palæocrinoids.

Wachsmuth² thinks that it "cannot in the remotest degree be homologised" with the ventral side of the Neocrinoids. "The solid dome forms, as I think I have proved, a continuation of the radial and interradial series of the dorsal side, and serves merely as a covering and protection for the organs underneath. It is in every sense of the word aboral, and forms a part of the abactinal system³ [while the actinal system], which being already reduced in the Pentacrinidæ and Comatulæ to a narrow tentacle furrow, recedes in Palæozoic Crinoids one step farther and disappears within the solid walls of the body. The actinal system here consists externally only of the arm furrows, whence it continues underneath the vault. These Crinoids, therefore, are evidently of lower development and belong to an inferior type. . . . The Palæozoic Crinoids, embracing therein all true Crinoids in which the actinal side is closed, represent the young stage of growth of the living types." Elsewhere Wachsmuth⁴ speaks of the ventral covering of *Actinocrinus*

¹ Revision, part i. p. 6.

² *Amer. Journ. Sci. and Arts*, vol. xiv. p. 190.

³ The words enclosed in brackets were unfortunately omitted in the original, thereby confusing the author's meaning not a little.

⁴ Revision, part ii. p. 14.