

II.—THE CENTRO-DORSAL AND CALYX.

The principal morphological character which distinguishes the Comatulidæ from the remaining families of Crinoids is the development of cirri upon the top stem-joint, and its separation from the remaining portion of the stem as the centro-dorsal plate. This supports the ring of united radials, and, in the recent forms at any rate, closes up below the dorsal extension of the body-cavity which is contained in their central funnel, as is well shown in Pl. III. figs. 3*a*, 3*b*, and Pl. V. fig. 2*c*.

Most recent Comatulæ are further distinguished from the Stalked Crinoids by the metamorphosis of the embryonic basals into the structure known as the "rosette," which is enclosed within the radial pentagon, and so is entirely invisible externally (Pl. I. fig. 8*c*; Pl. II. figs. 3*c*, 5*c*; Pl. IV. fig. 3*c*; Pl. V. figs. 2*c*, 5*d*). It will be well to discuss these two structures separately, though they are naturally in very close relation with one another.

A. THE CENTRO-DORSAL.

The term "centro-dorsal plate" is a very old one, and was for a long time used in various ways by different authors. In fact it was not till the remarkable developmental history of the uppermost stem-joint had been made out by the late Sir Wyville Thomson and Dr. Carpenter, that the term acquired any definite signification. Both these authors used it to denote the enlarged and cirrus-bearing top stem-joint¹ which is at first in no way different from the remaining joints of the stem below it (Pl. XIV. figs. 1, 2, 8, 9). Eventually, however, it enlarges, and five cirri, which are radially situated, are developed upon it (Pl. XIV. figs. 3–6), so that it has very much the appearance of a nodal stem-joint of *Pentacrinus*. A second series of cirri, alternating in position with the first, subsequently appears (Pl. XIV. fig. 7), and others are afterwards developed in succession, so that as was well said by Wyville Thomson,² "the centro-dorsal plate in *Antedon* does not belong to the cup. It represents a coalesced series of the nodal stem-joints in the Stalked Crinoids."

At a certain period in the development of the young *Comatula* the centro-dorsal

¹ The centro-dorsal plate of *Comatula* must not be confused with the dorsocentral plate of other Echinoderms. This name is now generally restricted to the central plate of the abactinal system in Urchins and Stellerids. I believe this to be represented in the Comatulæ by the terminal plate at the bottom of the larval stem, as explained on p. 168 of Part I. It is shown in Pl. XIV. figs. 1, 9. Comatulæ thus have both a centro-dorsal and a dorsocentral, while the latter only is present in the remaining Echinoderms. Zittel has also given the name centro-dorsal to the enlarged uppermost stem-joint of *Apiocrinus*; but this bears no cirri, and though undoubtedly homologous with the centro-dorsal of Comatulæ, should not, I think, receive a name which is now universally understood as denoting the presence of cirri.

² On the Embryogeny of *Antedon rosaceus* (Linck, *Comatula rosacea* of Lamarck), *Phil. Trans.*, 1865, p. 536.