The centro-dorsal is at first a simple ring, in no way different from the other stem-joints; but when the basals come to assume a definite shape and the calyx acquires the doubly conical form of the Cystid phase, the centro-dorsal becomes distinctly wider than the annular stem-joints below it and takes on a pentagonal shape. The basals rest against the sides of the pentagon, and its angles which fit in between them are therefore radial in position, as seen in Pl. XIV. figs. 1, 8. At this early stage the basals are only in contact with the centro-dorsal by their lower edges; but it soon begins to increase in diameter and extends itself over the bottom of the calyx in the manner described by Dr. Carpenter.[1] It increases at the same time in vertical depth, and the first cirri make their appearance. These are radial in position, and the portion of the centro-dorsal between every two sockets rapidly enlarges, so that it comes to project beneath each basal plate, and the angles of the centro-dorsal thus become interradial instead of radial. This change is very clearly seen in larvæ which have only one or two cirri, so that one part of the centro-dorsal shows the primitive radial symmetry, and another part the acquired interradial symmetry.

Thus then the centro-dorsal of *Comatula*, when it first assumes definite form, has a most distinct radial symmetry. Its angles occupy the same position with regard to the basals as do those of the enlarged top stem-joint in *Guettardicrinus* and *Apiocrinus*, which are also distinctly radial in situation. I desire to lay particular stress upon this fact, because Wachsmuth and Springer, in support of their assertion that Neocrinoids are built upon the plan of dicyclic Crinoids, have stated that the top stem-joint "is disposed interradially in the Apiocrinidæ, Pentacrinidæ, and Comatulæ, similar to dicyclic Palæocrinoids."[2] But the ridges and angles of the top stem-joint are radial in every species of *Apiocrinus*, as is seen with especial clearness in *Apiocrinus magnificus*.[3] Wachsmuth and Springer[4] say, however, that "the plate in *Apiocrinus magnificus* is not, as should be supposed from appearances, disposed radially, but interradially, as shown by comparison with species having a pentangular stem. It attained its radial angles accidentally by adapting its form to the basal concavity which is naturally angular." This is a form of teleological argument which is very easily employed but is very difficult to refute. Neither Wachsmuth nor Springer, nor any one else, is acquainted with the post-embryonic development of *Apiocrinus*, and the changes which may or may not have taken place in the symmetry of its top stem-joint; though from the positive way in which the American authors write one would imagine that they had watched the whole process of the "accidental" change of symmetry which they describe. If the basal concavity "naturally" has radial angles, it is surely a "natural" and not an "accidental" circumstance that the top stem-joint which occupies this cavity should also have radial angles. This is the case in every species of *Apiocrinus*, in the single species of

[1] Researches on the Structure, Physiology, and Development of Antedon rosaceus, *Phil. Trans.*, 1866, p. 742.
[2] Revision, pt. iii. p. 299.
[3] See de Loriol, Paléontologie Française, Terrain Jurassique, t. xi. pls. 46–49.
[4] Revision, pt. iii. p. 297.