

case with some of the following extinct forms," viz., Cystidea, Edriasterida, and Blastoidea.

The difference in the functions of the water-vascular system between the stalked and the unstalked Echinoderms respectively was applied by Prof. Ray Lankester for systematic purposes in his division of the Echinoderms into *Ambulacralia* and *Tentaculata*, the latter including Crinoids, Cystids, and Blastoids.¹

The name "Tentaculata" is unfortunately open to the objection that even in recent Crinoids some of the radial water-vessels may be totally unprovided with tentacles at their sides; while if, as I believe, the water-vessels of the Blastoids occupied the subambulacral canals within the lancet-pieces,² they must certainly have been non-tentaculate. To one division (class) of the group, therefore, the name "Tentaculata" would not be at all applicable. Neither do I like the extension of the term "Crinoidea" to the Blastoids and Cystids, and the consequent limitation of the brachiote forms by the name Eucrinoidea, which we owe to Zittel so far as I have been able to trace it; though it has recently been adopted by de Loriol.

In Miller's original definition of the Crinoidea³ he described them as having "a cup-like body containing the viscera, from whose upper rim proceed five articulated arms, divided into tentaculated fingers more or less numerous." The presence of these arms is essential to the idea of a "lily-shaped animal." The very characteristic appearance of the Crinoid type is lost if the arms be not attached to the calyx; while morphologically they are of the utmost importance.

On the other hand, jointed appendages of this kind, attached to the rim of the cup, and containing radial extensions of the nervous axis of the stem, as well as of all the ambulacral structures which surround the peristome, together with the genital glands, are entirely absent both in the Blastoids and in the Cystids. In the former group, it is true, there were jointed appendages at the sides of the ambulacra; but although the latter are very often spoken of as "recumbent arms," they are not composed of articulated pieces, and only a very general homology can be traced between them and the branching arms of a Crinoid. In the Cystids, however, segmented arms somewhat like those of Crinoids seem to have been occasionally present, and even grooved by the ambulacra. But they were mostly attached somewhat irregularly in the neighbourhood of the mouth, and not to the radial portions of the cup as in the Crinoids; and I much doubt whether their component segments were regularly articulated together.

Neither the Blastoids nor the Cystids, therefore, can properly be classed as Crinoidea, in the sense of Miller's definition of the group; though this has been very frequently done during the last forty years, more especially by continental naturalists. Von

¹ Notes on Embryology and Classification, *Quart. Journ. Micr. Sci.*, 1877, vol. xvii., N. S., p. 444.

² On Certain Points in the Morphology of the Blastoidea, *Ann. and Mag. Nat. Hist.*, 1881, ser. 5, vol. viii., p. 420; *Ibid.*, 1882, vol. ix. p. 218.

³ *Op. cit.*, p. 7.