MORTENSEN'S CIDAROIDEA

THE great work by Dr. Mortensen, "A Monograph of the Echinoidea, I. Cidaroidea" (Copenhagen, London, 1928), is mainly systematic, and, as this is his special interest, it is doubtless a very valuable contribution to our knowledge of the group. While the morphological portion is a subordinate part of the work, it is reasonable to expect that it should be treated with the care and correctness worthy of the subject and of such a monumental publication. There are, however, certain points that are open to criticism.

Dr. Mortensen thinks (p. 6), as set forth in his paper "Bothriocidaris and the Origin of the Echinoids" (Vid. Med. Dansk Naturh. Foren., Bd. 86, 1928), that Bothriocidaris can not be considered an Echinoid. His view is based largely on the radial position of the "teeth" and the madreporite in that genus. He, however, claims, as I believe is correct, that the supposed "teeth" are not teeth but plates. This being Dr. Mortensen's opinion, it is a peculiar argument that the radial position of parts (teeth) that he himself says are not present should be considered evidence against the Echinoid nature of Bothriocidaris. Madreporic pores, while typically interradial (in genital 2), often extend to radial (ocular) plates in recent Echini.

The characters of the Aristotle's lantern, with associated parts, in Echini, are of much interest and important for their bearing on classification. A correct understanding of these parts is essential to a student of the group. Dr. Mortensen says (p. 35): "The apophyses to which the lantern muscles are attached are interradial, while in all other Echinoids they are radial in position." This is not correct. In the Perischoechinoida no perignathic girdle was developed, as far as known. The evidence, based on young Goniocidaris (Lovén, "Echinologica," 1892), is that in Paleozoic forms the compass, protractor and retractor muscles were inserted interradially directly on the basicoronal interambulacral plates. In the Cidaroida apophyses are developed as outgrowths of the basicoronal interambulacral plates and on them, interradially, are inserted the compass, protractor and retractor muscles. In the Centrechinoida apophyses (interradial) are more or less developed, and on them are inserted the compass and protractor muscles, as in the Cidaroida. In the Centrechinoida, however, the new feature of auricles is introduced, as two plates joined by suture with the basicoronal ambulacral plates. On these auricles (radially) the retractor muscles are inserted. In the Clypeastrina the apophyses have disappeared, auricles alone are retained, and there are other changes that need not be considered here. This all is recorded by Lovén, 1892, or myself (Boston Soc. Nat. Hist., 1912, pp. 177–198). Lovén, in his study, first put the knowledge of the structure of the lantern and associated parts of Cidarids and other Echini on a firm foundation. Yet his work is not even mentioned by Dr. Mortensen.

Dr. Mortensen suggests (p. 35) that small "apophyses" on the interior of ambulacral plates of Cidarids may be considered the morphological equivalent of auricles in other Echinoids. It is unfortunate that he should use the term "apophyses" in two quite different senses. The spinose processes to which he refers are direct outgrowths of the ambulacral plates in Cidarids, have no sutures and extend well up in the interior of the test. On the other hand, auricles are separate parts joined by suture with the basicoronal ambulacral plates only. Auricles are unknown in the Cidaroida and first appear in the Centrechinoida. Dr. Mortensen, in his somewhat earlier paper on Bothriocidaris, suggested that these same ambulacral processes in the Cidaroida might be homologized with the ambulacral plates of starfishes.

In Dr. Mortensen's consideration of postembryonal development of Cidarids (pp. 39–40), he records his own work, also that of Döderlein and Grieg. He quite overlooks the work of Lovén (1892) on Goniocidaris, which is the most comprehensive and far-reaching work on the later development of Cidarids that has yet been published.

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IN an article: "The Creation of Matter," in SCIENCE for April 5, Dr. Walter S. Adams is quoted as asking, "Is it possible that radiation is finally reflected back from the boundaries of a limited space?" It would seem as if for the moment Dr. Adams's mind had lapsed from Einsteinian to Euclidean geometry, for, according to relativity, space, though limited in extent, has no boundaries.

The assumption that only a small part of the radiation of the stars can be absorbed by the nebulae is based on this idea of a restricted universe. If we conceive space to be infinite and everywhere peopled, as our great telescopes begin to show that it is, with systems of stars, which doubtless contain like our own vast tracts of nebulae both bright and dark, then all radiated energy must eventually be gathered up and set to work again on the unending round of evolution. How dark nebulae may originate in the dissolution of bodies that have sunk to the zero of temperature,