

6. The Classification of the Regular Echini.

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In his recently published report on the echini of southwestern Australia (*Die Fauna Südwest-Australiens, Ergebnisse der Hamburger südwest-australischen Forschungsreise 1905, Bd. IV, Lf. 12. Jena 1914*), Dr. Döderlein takes occasion to discuss the classification of the Recent regular echini, maintaining the correctness of Mortensen's grouping, based upon the pedicellariae, and rejecting Jackson's¹ arrangement of the families of Centrechinoida, which he calls the "alten Agassiz-Gregory'schen System". While it is true that Jackson's classification is similar to that used by Alexander Agassiz as modified by Gregory, it may be mentioned in passing, that this arrangement has so many original features and is based on such different morphological conceptions, it ought in all fairness to be called the "Jacksonian system".

Dr. Döderlein takes occasion to criticize in a most courteous and friendly spirit, the reasons which Jackson, and which I, have given for rejecting Mortensen's arrangement, and yet he does not even mention what we consider, and what we have stated, to be the fundamental reasons for our course. Indeed, neither Döderlein, nor Mortensen himself, seems to have ever grasped the points we have endeavoured to bring out and it therefore seems not only desirable but necessary to emphasize these points in a brief and isolated statement, such as this note. At present Continental zoölogists seem inclined to follow Mortensen, while those of England and America follow Jackson, and this suggests the possibility that Jackson's arguments are not clearly understood on the Continent.

The disagreements between Mortensen's and Jackson's classification of the Centrechinoida arise from the fact that the characters of the test and those of the appendages of the test (spines, pedicellariae and spicules in the tube-feet) are not perfectly correlated. Mortensen follows the guidance of the appendages (particularly the pedicellariae and the spicules) while Jackson adheres to the characteristics of the test. Jackson's first argument is that the test is more fundamental than any of its appendages and therefore it shows more deeply seated

¹ Phylogeny of the Echini, with a Revision of Palaeozoic species by Robert Tracy Jackson. Mem. Boston Soc. Nat. Hist., vol. 7, 1912.

phylogenetic characters than they. This is particularly true of the ambulacra and therefore when the characters of the ambulacra and those of the pedicellariae disagree, we should follow the former. His second argument is that neither Mortensen nor any other writer has shown, or apparently can show, that pedicellariae have any phylogenetic significance. They seem to pass them no stages of development but are the same in very young individuals as in adults. Indeed Mortensen himself points this out as one of the reasons why they are so useful in distinguishing species. Jackson argues, and with absolute correctness it seems to me, that characters which in themselves show no stages of development are of little use in tracing the phylogenetic history of a group.

Both Döderlein and Mortensen labor under the misapprehension that Jackson's and my rejection of Mortensen's classification is based on the "inconvenience" (because of their microscopic character) and variability of the pedicellariae and spicules. It is true we have each referred to these obvious objections but neither of us has suggested them as fundamental. In several papers, I have laid considerable emphasis on the variability of the pedicellariae because Mortensen gives the impression in his writings that they are less variable than the characters of the test, and I am convinced that this is not the case. But I certainly do not claim, as Döderlein seems to think I do, that the characters of the ambulacra and other parts of the test are not also variable. Unfortunately all characters in living organisms are more or less variable.

In conclusion, let me seem up thus. I reject Mortensen's classification and accept Jackson's because:

1) the characters shown by the test, I believe to be older and of more fundamental importance than are those shown by any of its appendages;

2) the characters of the test and "lantern" show distinct stages in development in the ontogeny of the individual, which stages I believe to be of definite phylogenetic significance and of fundamental importance;

3) the pedicellariae show no evident stages of development and hence seem to have no phylogenetic significance.

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