

New Zealand Fossil Asterozoa

3. *Odontaster priscus* sp. nov. from the Jurassic

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[Read before Wellington Branch, April 28, 1954; received by Editor, March 29, 1954]

Abstract

Odontaster priscus sp. nov. is described from a Temaikan horizon (Bajocian-Bathonian) near Onewhero, South Auckland. The generic determination is based on ambulacral peculiarities which are considered to be diagnostic of *Odontaster sensu lato*.

Order PHANEROZONIA

Family ODONTASTERIDAE

Genus ODONTASTER Verrill 1880

Type species *Odontaster hispidus* Verrill

Odontaster priscus sp. nov.

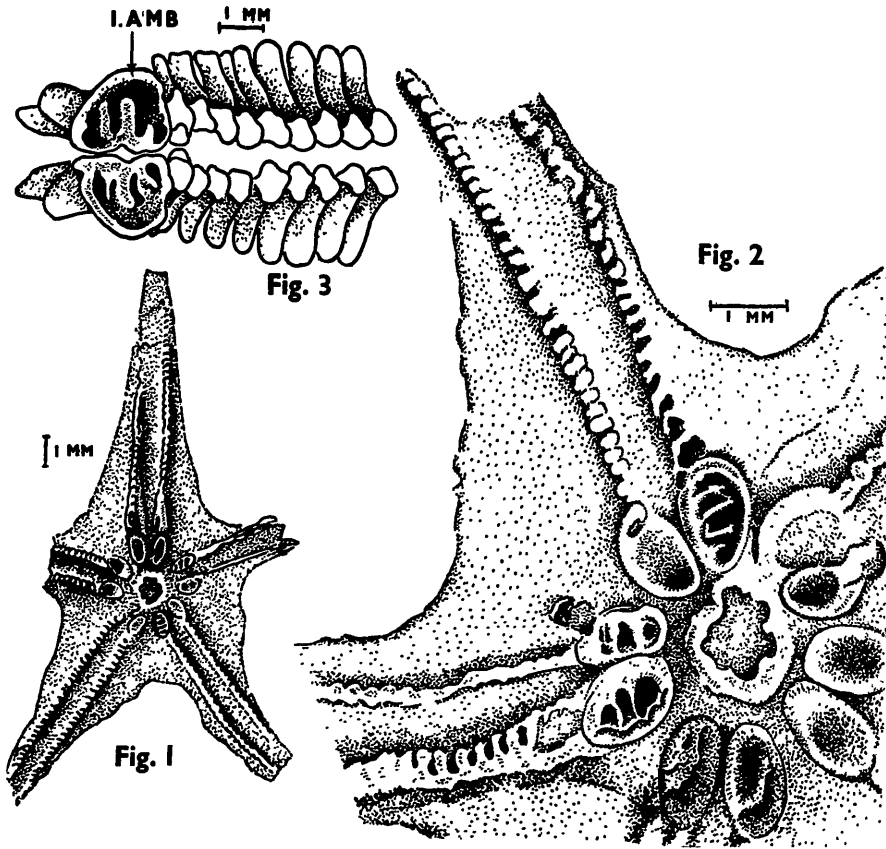
Holotype (Figs. 1 and 2)—an internal negative mould in medium sandstone of the coelomic surface of the adoral body-wall. It was collected by Miss Helen McKenzie from Moewaka Quarry, Opuatia Stream, Onewhero Survey District, Geological Survey locality G.S. 5037, and through the courtesy of Dr. C. R. Laws is now in the N.Z. Geological Survey collection, specimen EC. 184. Marwick (1953, p. 126) considers the horizon to be Temaikan, about Bajocian or Bathonian.

Of small size, R estimated to be 11.0 mm, r about 3.5 mm. Disc evidently stellate, tapering evenly into the arms. Distal parts of arms lacking, but apparently acuminate.

A ring of five pairs of large, elliptical skeletal plates surrounds the mouth, one pair at the proximal end of each ambulacral series. Each plate is about 1 mm in length, with the major axis directed radially, and the better preserved ones have the upper surface concavely excavate and traversed by three or four transverse ridges. The relationship of these structures to one another and to the ambulacral series and to the mouth can best be understood by reference to Fig. 2, which is to be treated as the essential diagnosis of the species.

DISCUSSION

Until the discovery in August, 1952, of this problematic fossil no Jurassic asteroid was known from New Zealand. Although identification appeared at first sight almost hopeless, the unusual character of the five pairs of radially-placed ridged plates around the mouth seemed to offer a chance of success. It was first assumed that the mould was a negative impression of the adoral lower surface, and that the grooved plates were therefore oral plates. A few genera, such as *Archaster*, have very large oral plates, but their detailed sculpture differs, and it was difficult to understand why the plates in the fossil were grouped in radial pairs instead of interradial pairs, as is universally the case. Furthermore, the lack of any impression of *inferomarginals* was puzzling, and seemed to point rather to some non-phanerozoian genus, in which case the large size of the oral plates seemed anomalous. The alternative interpretation was therefore tried, namely that the specimen is a negative impression of the internal adoral surface, such as would result from the percolation of sand and mud into the coelomic cavity after decay of the aboral surface of the disc. On this assumption the grooved plates would be some peculiar development of the ambulacral series of ossicles. This would account for their radial position and for their relatively greater distance from the mouth impression than should be the case with oral plates. It would also explain the lack of any impression of marginal plates. Since internal skeletal structures of asteroids are seldom mentioned in



Figs 1 and 2—*Odontaster priscus* sp. nov. holotype. Fig 3—ambulacral ossicles in *Odontaster meridionalis* (Smith), seen from above in a specimen of R 40 mm. 1 A.M.B., enlarged first ambulacral. Figs. 1 and 2 are drawn from positive plasticine presses made from the original negative natural mould.

systematic diagnoses, it was necessary to dissect a series of representative genera in order to discover whether skeletal plates of the type noted occur in any of them. Analogous structures were found in a specimen of *Odontaster meridionalis* (Smith), from Heard Island. In this species the first pair of ambulacral ossicles is much enlarged, and each plate carries on its upper surface several transverse grooves and ridges which traverse a concave depression; Fig. 3 illustrates the condition in a specimen of major radius 40 mm. Reference to Fisher (1911) shows that he had noted similar structures in *Odontaster crassus*. He writes (p. 157). "The enlargement of the first pair of ambulacrals with the accompanying development of the dorsal transverse muscles is undoubtedly connected with the movement of the combined mouth plates. These, being angular, almost completely close the actinostome, and the small marginal spines completely close the opening . . . The enlargement of the first pair of ambulacrals is abrupt, and so noticeable as to form a good generic character. The same enlargement occurs, but in a lesser degree, in *Asterodon singularis* (Mueller and Troschel) "

Evidently the grooved and ridged radial plates in the Onewhero fossil are similarly enlarged ambulacral plates. Dissected specimens of *Asterodon miliaris*, *A. robustus* and *A. dilatatus* were found to show a weak development of the same type but, as Fisher found in *A. singularis*, the ambulacrals are not nearly so strongly enlarged as in *Odontaster*. Both *Asterodon* and *Odontaster* are placed in the family Odontasteridae. It is therefore concluded

that some tendency towards enlarged and ridged first ambulacials is a familial character of the Odontasteridae, but is fully expressed in *Odontaster* only. Accordingly the Onewhero fossil is referred to that genus, *sensu lato*.

A second fragmentary impression of a starfish of the same size as the holotype occurs on the same slab. It is an external mould, and the impressions of marginal plates can be seen on one arm. There is no reason to doubt that it is the same species *Odontaster*, like *Asterodon*, is a southern circum-polar genus in existing seas, and is restricted to colder temperate and sub-antarctic waters. However, before *Odontaster piscus* can be utilized in zoogeographic studies one will need to know whether it exhibits the other diagnostic features of *Odontaster sensu stricto*.

REFERENCES

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