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ON SOME REMARKABLE ANNELID REMAINS FROM ARTHUR RIVER, N.W. TASMANIA.

By

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Plate I.

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GENERAL REMARKS.

Some little while ago the Government Geologist of Tasmania, Mr. P. B. Nye, M.Sc., B.M.E., forwarded to me at the National Museum, Melbourne, for determination, a specimen of slaty shale with fossil impressions.

The remains and impressions in this Tasmanian rock are much sharper and clearer than anything of the same nature I had seen described from such old rocks, excepting those remarkable examples by Dr. C. D. Walcott from the Middle Cambrian of Burgess County, British Columbia. And here it may be apposite to note that from similarly ancient Tasmanian rocks Sir T. W. Edgeworth David not so long since discovered the interesting phyllocarid genus, *Hurdia*, which was also previously found by Walcott in British Columbia.

Although at the present time I feel competent to give only a preliminary note on this interesting find, it is so important that it will be a fitting opportunity to present it now.

NATURE OF THE ROCK.

The fossil impressions are seen on both faces of a thin slab of greenish to grey shaley slate, which, fortunately for the fossils, splits in the plane of bedding. The rock must have originally been of the nature of a fine, slimy, or plastic mud, for the impressions are very well preserved. The slab, in its thickest part, measures only 7 mm. across; yet there are included in it no less than eleven definite layers of variously coloured sediments, ranging from pale olive green to dark bluish green and even to black. The layers are perfectly parallel and indicate an area of quiet deposition, where fine sandy and muddy silt was brought down, probably by a sluggish river, and gently deposited on the estuary or mud-flat.

GENERAL DESCRIPTION OF THE FOSSILS.

The fossil impressions on one face of the rock slab consist of three definite series and run nearly parallel with one another, with more indistinct impressions lying beneath the rock surface as though covered with a thin layer of sediment. The other face, which I take to be the lower in actual position, shows similar impressions, three of which cross one another at acute angles, whilst there are several obscure traces of others in the rock layers above.

It is from the uppermost surface of the slab that we obtain the more definite evidence of the nature of these fossil impressions, for there they seem to be in the nature of positive imprints or partial remains. On the lower side they appear as negative infillings of another layer, with worms of the impressed surface from which the slab was removed.

These fossil remains consist of a double and parallel series of closely set, sharply pointed, bispinose and serrated elements (parapodial) with evidence, in several places, of brushes of setæ, and disposed nearly at right angles to the length of the body. The cleavage of this shale has also exposed what appears to be the impression of the enteric or alimentary canal.

One of the strongest pieces of evidence that we are here dealing with the actual worm impressions and not tracks, is the presence of fine longitudinal striæ along the back of

the parallel body. In one instance the worm-like body shows some fragmentary attached pieces of the superposed shale, as though there had been prominences on the dorsum of the worm which, protruding into the next succeeding layer of mud, caused the adhesion of that layer when clearing the shale, whilst longitudinal grooves indicate the position of the alimentary canal.

The longest fossil impression seen on the slab measures 123 mm., or nearly 5 inches, and its width averages 10 mm., including the parapodial area.

The line of disposition in these fossil worms is a gentle curve to nearly straight. A row of strong bristles ranges along each side of the body of the worm, and these are normally double, giving the pair a bifid character. They are often joined closely at the base, but sometimes more or less free for their greater length. The bristles are curved in most cases and one usually seems longer and stronger than the other. The structure of these bristles was distinctly chitinous, for they have left an extremely strong impression on the shale as compared with the rest of the body.

The larger bristles have a length of 3 mm., the shorter being about 2 mm. or less. A number of the bristles show a decided serrate character. In one small area over one of the fossil impressions there is a bundle of setæ visible, situate just below the strong spear-like spines, and under a strong magnification there are indications of many others.

Magnification of the surface of the shale, in the vicinity of the impressions, shows very distinct, scattered, hair-like bristles, evidently due to the partial disturbance and decomposition of these delicate organisms. Some groups of fine radial striæ adjacent to the organisms may possibly indicate impressions of the branchiæ.

On what I take to be the lower surface of the slab there occurs a delicate impression of an ovoid form with two lateral and forwardly projecting processes. This may possibly represent the head of the worm; and further it agrees in the average dimensions of what we might expect that part of the organism to measure, namely about 5 mm. in diameter.

RELATIONSHIPS.

From the characters of simple and serrated bifid bristles, and the delicate, setose parapodia, as well as the numerous and short segments one may infer a probable relationship with the Family *Amphinomiidæ*, of which the genus *Eurythoe*, amongst others, has a long and slender body. It is instructive, for example, to compare the "Challenger" examples of *Eurythoe pacifica* which that Expedition dredged between tide-marks at Bermuda (1). This living species, which has also been found in the Red Sea, off Nicobar Islands, Tahiti, the Seychelles, and Japan, is described by Prof. W. C. McIntosh as follows (in abbreviation):—

"The body is somewhat flattened and rectangular in "section, slightly pointed in front, and gradually diminished "posteriorly. The specimens are comparatively small, the "longest measuring about 65 mm. with a breadth of 7 mm. "One had 105 body segments. In the living form the "branchiæ commence on the second body segment, each as a "tuft of two processes. The dorsal bristles are either simple "and curved, others with slightly bifid tips, and others again "with serrations. The ventral bristles are bifid with gen-"erally serrations on the inner margin."

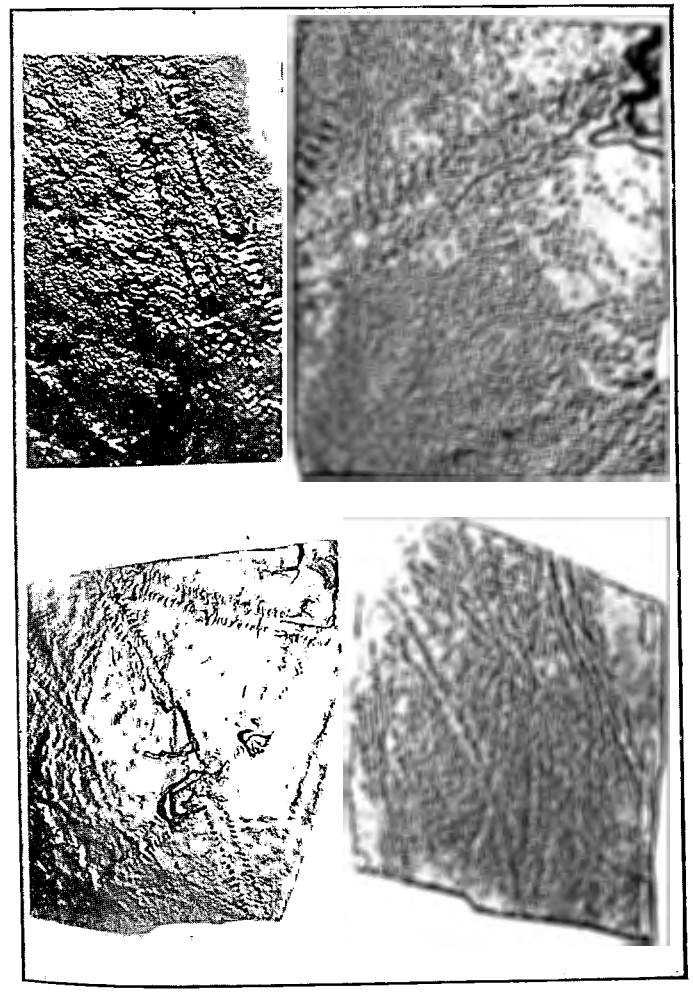
As regards undoubted fossil polychætes, these are rare. Dr. E. O. Ulrich (2), in 1879, described from the Cincinnati group (Bala or Upper Ordovician) of the neighbourhood of Cincinnati, a remarkably well preserved tufty structure in considerable numbers, which he regarded as the setæ of marine worms. To this organism, of which no body traces other than the setæ were found, Ulrich gave the new generic and trivial names, *Eotrophonia setigera*.

The nearest examples recorded, however, are those by Dr. C. D. Walcott, under the Genus *Canadia*, from the Middle Cambrian of Burgess County, New Brunswick (3). Although agreeing in characters such as the presence of bundles of setæ, the essential ones separating our specimens are the persistent, curved, and strong bristles, often serrated, and the comparatively short segments and long and slender body.

(1) Report "Challenger." Zoology, vol. XII., 1885. *On the Annelida Polychaeta*. W. C. McIntosh. p. 27, pl. II., figs. 3, 4; pl. III., fig. 3; pl. IIA., fig. 3; pl. IIIA., figs. 5-9.

(2) Journ. Cincinnati Soc. Nat. Hist., vol. I., pp. 87-91; pl. IV., figs. 1-5*a*. April, 1878, to Jan., 1879.

(3) Smithsonian Misc. Collections, vol. LVII., No. 5. Middle Cambrian Annelids. pp. 117-120; pl. XXIII., figs. 1-7.



Tasmanadia twelvetreesi (Chapman).

DESCRIPTION OF TASMANIAN SPECIMENS.

Subclass POLYCHÆTA.

Fam. TASMANADIIDÆ, *nov.*

Genus *Tasmanadia, nov.*

Generic Characters.—Polychætes with long and slender bodies, formed of numerous short segments; bearing pairs of parapodial bristles, sometimes serrated, and carrying bundles of setæ. (?) Head, comparatively small, ovoid, tapering in front.

Tasmanadia Twelvetreesi [4], *sp. nov.* Plate I.

Body long and slender, parallel-sided, gently and sinuously curved. Segments numerous, as many as 56 on the longest specimen, which has a length of 123 mm. The parapodia carry each two bristles, often serrated, whilst bunches of setæ are seen on the best preserved specimens. The transverse traces of the segments are difficult to decipher, but are seen on the crushed specimens. Indistinct traces of what appears to be the head occurs on the underside of one slab, which is apparently ovoid and tapering. Width of body, circ. 10 mm. (including parapodia). Length of bristles from the base of the body, 3.75 mm.

Horizon.—Probably Cambrian.

Locality.—Kirkup's Quarry, Arthur River, Tasmania.

Holotype in Geological Survey Museum, Hobart.

(4) Named in honour of the late Mr. W. H. Twelvetrees, F.G.S., Government Geologist of Tasmania, who presented me with a similar specimen some years ago.