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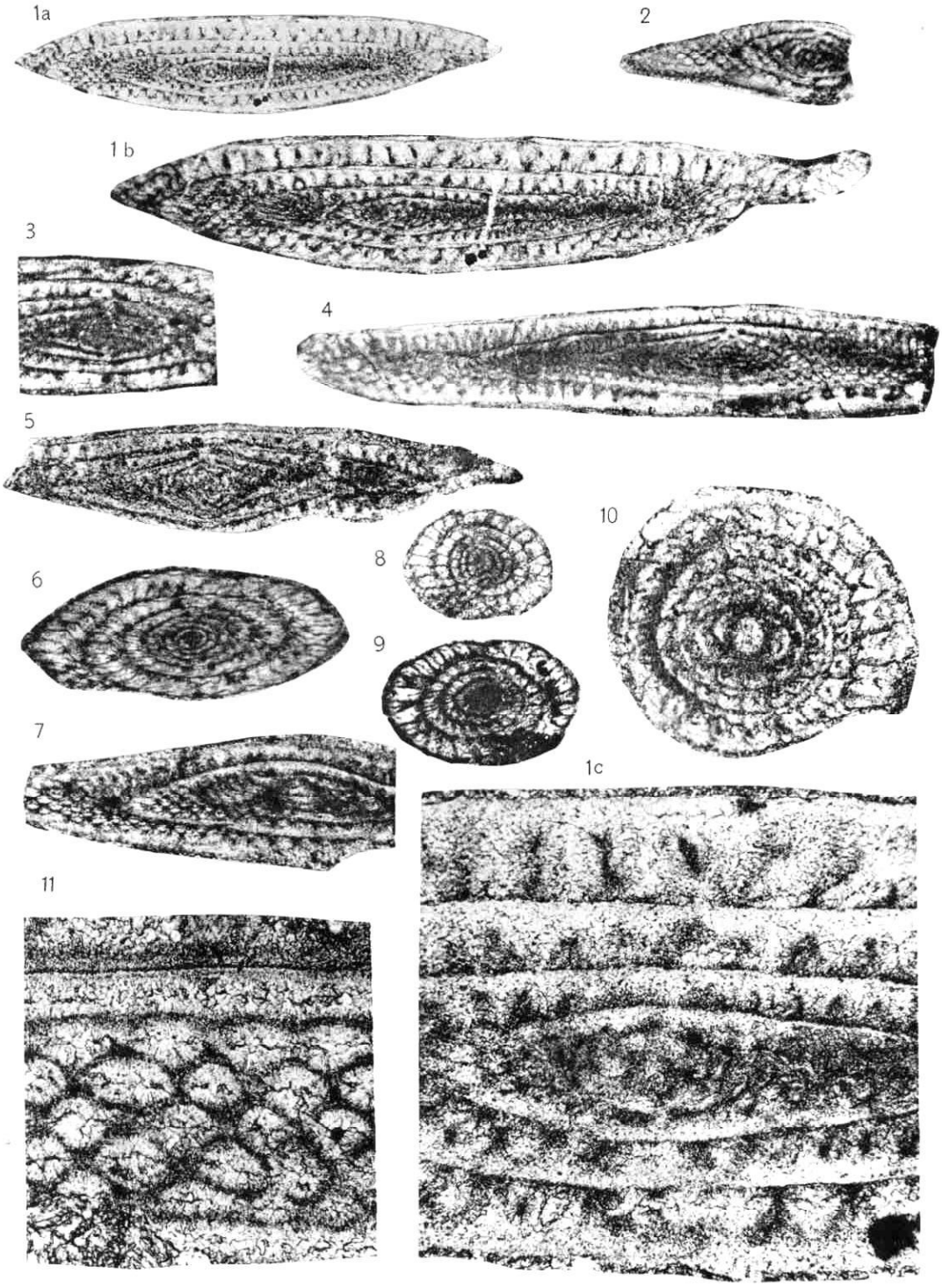
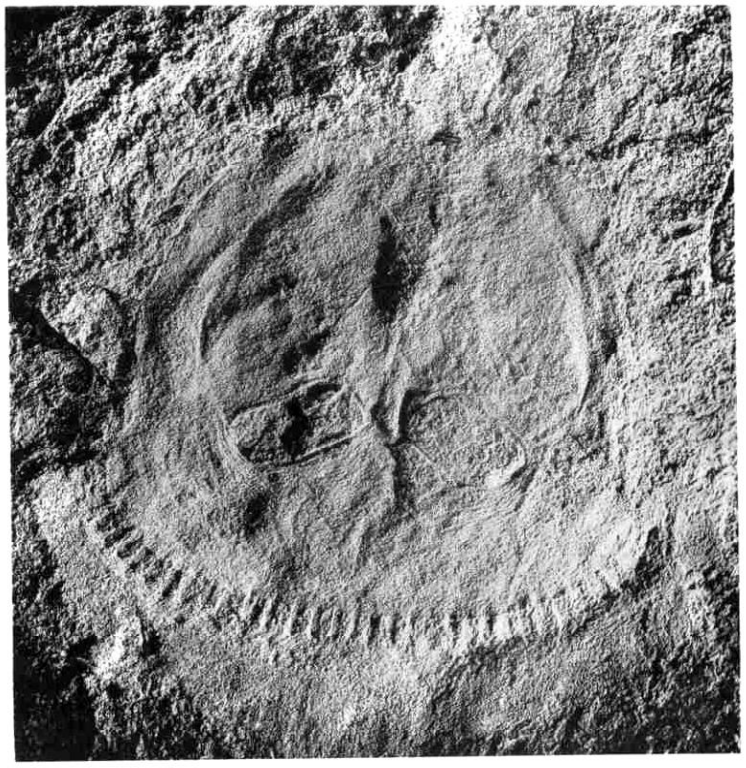


Fujimoto and Kanuma, fusulinid *Minojapanella*



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Caster and Waering, Silurian eurypterid

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MELBOURNOPTERUS, A NEW SILURIAN EURYPTERID FROM AUSTRALIA

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EURYPTERIDA are known from all continents, but are best known from Northern Hemisphere materials. In contrast to the relatively great amounts of specimens from the north, Southern Hemisphere materials have so far proven very sparse, and the species comparably so. Thus the Australian discovery of material adequate for the establishment of a new eurypterid genus, herein reported, is of special interest.

McCoy's (1899, p. 13) description of *Pterygotus australis* from the Australian Silurian was the first account of Eurypterida in the Southern Hemisphere. This was based on a fragment of a body segment, possibly part of an abdominal plate, from the Upper Silurian (Melbournian) of Victoria. E. D. Gill (1951) has recorded more eurypterid fragments from possibly the same horizon in New South Wales which were determined as *Hughmilleria* sp. In our opinion, the fragment of the tergite is possibly the pretelson of a *Pterygotus*, whereas, the other fragments are insufficient for generic determination.

The only other austral eurypterids so far known are integumental scraps from Brazil and South Africa. The first of these to be encountered was mistaken (D. White, 1908, p. 589) for vegetable fragments associated with the Gondwana flora of the interglacials in the Brazilian Upper Carboniferous: *Hastimima whitei*. The following year Seward (1909) spotted the Brazilian fragments as parts of a telson, legs and tergites of a large eurypterid. Woodward (1909) concurred in this identification and Clarke and Ruedemann (1912) confirmed with documentation this change of kingdom. Recently Caster (1947) reported integument of the *Hastimima* sort abundantly present in a narrow zone of the Picos Lower Devonian in the State of Piaui, Brazil. Unfortunately none of this material warrants description. This is especially sad, for the only other record of *Hastimima* from the austral Devonian is a fragment of a body segment from the South African Witteberg series described as *Hastimima* by Seward (1909, p. 484). At that time the Witteberg terrane was considered to be Carboniferous. Kjellesvig-Waering (1948, p. 6) has questioned the assignment of the Witteberg fragment to the Brazilian Carboniferous genus. It is against such scant knowledge of the austral Eurypterida that the following Australian material is presented.

Family STYLONURIDAE Diener
Genus MELBOURNOPTERUS
Caster and Kjellesvig-Waering, n. gen.

The grouping of the compound eyes and ocelli, which are placed posteriorly on the prosoma, as well as the outline of the elongated prosoma and the type of inflated cheeks suggests reference to the Stylonuridae.

The generic traits would include: small size, bell-shaped prosoma which is emarginate in front, subrectangular compound eyes which are oblique and located, together with the interposed ocelli, in the posterior half of the prosoma.

Type species.—*Melbournopterus crossotus* Caster and Kjellesvig-Waering, n. sp.

EXPLANATION OF PLATE 20

FIGS. *1*, *2*—*Melbournopterus crossotus* Caster and Kjellesvig-Waering, n. sp. ×1.5; from the Silurian, Dargile Formation of Victoria, Australia. *1*, External mold of the prosoma. *2*: Impression of the interior of the prosoma.

MELBOURNOPTERUS CROSSOTUS
Caster and Kjellesvig-Waering, n. sp.
Plate 20, figures 1, 2; text-figures 1, 2

The holotype, and only known specimen, consists of a flattened dorsal shield preserved as the negative and positive of an impression of the internal part of the prosoma.

The dorsal shield is bell-shaped, broadly rounded at the posterior margin and emarginate at the anterior extremity, thus giving the shield a slightly cordate appearance. The genal angles are flaring, this being the greatest width of the prosoma, and the

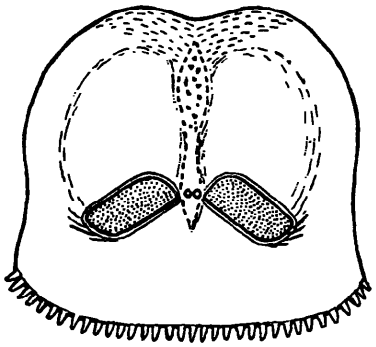

FIG. *1*—Restoration of dorsal side of the prosoma of *Melbournopterus crossotus*, ×1.

antelateral angles are rounded (see pl. 20, figs. 1 and 2). The lateral margins narrow slightly opposite the compound eyes. A very narrow marginal rim surrounds the prosoma.

The dorsal shield measures 38.8 mm. in length through the center, 40.6 mm. in length through the cordate lobes, 46.6 mm. in width at the base, 42.0 mm. in width at the narrowest part, and 44.4 mm. in greatest anterior width.

The compound eyes are a distinctive and unique characteristic of the eurypterid. They are large, roughly subrectangular, and occur along with the intervening ocelli, in the anterior part of the posterior half of the dorsal shield. The eyes are obliquely situated on the shield, diverging posteriorly to an angle of approximately 120° (see text-fig. 1). In form, the elongated eyes are rounded at the inner anterior and outer posterior angles and form right angles at the outer anterior and inner posterior angles. The compound eyes are located on the dorsal shield 11.1 mm. from the posterior margin, 11.6 mm. from the genal angles, 20.6 mm. from the frontal margin and 8.5 mm. from the lateral margin. They measure 11.3 mm. in length, 5.3 mm. in width and are 3.6 mm. apart. Ommatidia are not preserved. A strong fold surrounds the eye sockets on all sides; the integument is wrinkled in parallel folds at the posterior lateral corners of the eye sockets.

The ocelli occur at the posterior end of the glabella, between the lateral eyes (see text-fig. 1). Only one of the ocelli was present, and only faintly preserved. They measure less than 0.5 mm. in diameter and are located on the dorsal shield 16.2 mm. from the posterior margin, 21.4 mm. from the lateral margins and 22.2 mm. from the frontal margin.

Along the anterior, central part of the prosoma is a well-defined, raised, glabella which occurs from slightly behind the lateral eyes, between which it forms an elongate mound, then becomes evanescent at the front line of the eyes, only to expand as it becomes elevated again in the anterior part of the shield, where there is a pronounced glabellar prominence. The ocelli occur at the posterior end of the inter-orbital portion of the glabella.

Ornamentation of the shield is indistinctly preserved. Linear or slightly semilunar scales are crowded along the anterior part

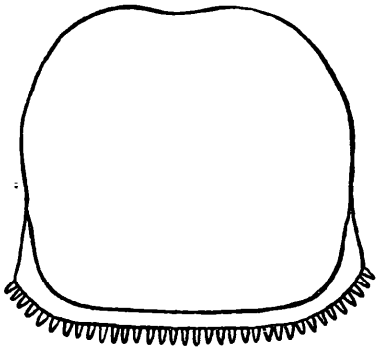

FIG. *2*—Ventral side of the prosoma of *Melbournopterus crossotus*, ×1.

of the shield. This pattern of ornamentation has been previously noted on *Tarsopterella scoticum* (Woodward). The glabella is ornamented with scattered pustules. Transverse wrinkles, perhaps due to compression, occur

at the posterior lateral angles of the compound eyes. The rest of the shield appears devoid of ornamentation, except for an occasional pustule.

The posterior margin of the dorsal shield is armed with a single row of 34 evenly spaced, stout, blunt, spines. These spines are of equal length and measure 2.2 mm. in length and 8.0 mm. in width. The interspaces between the spines are subequal to the width of the spines. Each spine of the fringe appears to be separated by a sharp suture at the inner edge of the posterior doublure. The spines therefore may articulate in sockets (see text-figs. 1 and 2).

Broad, elliptical, cheek-like elevations occur in front of the lateral eyes which in many respects resemble similar structures in *Stylonurus powriei* Page, *Ctenopterus cestrotus* (Clarke), and other Stylonuridae.

The posterior doublure binds the posterior margin of the dorsal shield and comprises a narrow band of 2.6 mm. in length and extends anteriorly past the genal angles. The doublure is considerably longer at the genal angles than along the posterior margin.

Remarks.—Although the position of the eyes, general topography and surface features of the specimen seem to indicate the Stylonuridae as the proper family assignment, comparisons with known eurypterids below this level of classification are largely meaningless. The peculiar rectangular eyes and their posterior position on the prosoma are unique. The bell-shaped outline seems also without counterpart. Although the posterior border of long, flat spines is completely new, this condition might be anticipated somewhat in the elongate scales on or near the hind margin in several stylonurids and other eurypterids. The close grouping of the eyes and ocelli, the elongate prosoma, the presence of cheeks and the scale pattern suggest the Stylonuridae.

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Association and ecologic suggestions.—The slabs containing the *Melbournopterus* imprints also carry many unidentifiable scraps of eurypterid integument intermixed with many monograptid stipes. The matrix is an ill-sorted argillaceous siltstone containing considerable mica and flattened mud-balls. The slabs show a fine bedding in alternate layers (approximately 0.25 in.) of cleaner siltstone and the ill-sorted siltstone. The cleaner of the silt surfaces appear to be rippled, and their under surfaces carry some "flow-marks," suggestive of the fillings by silt of the scourings eroded by gravity currents on the underlying muddy silts. This would be, then, a "Clino" environment of the Rich terminology (1951).

Locality.—The specimen came from 2.5 miles ESE. of the railway station at Heathcote, Victoria. The section has been described by Thomas (1937, pp. 64–67); it is Locality F 41/42 on the Geologic Map of the Parish of Heathcote (D. E. Thomas, 1940). This is in the midst of one of the most famous Silurian terranes of Australia.

Horizon.—Upper Silurian: from the graptolite beds (*Monograptus nilssoni* zone) in the middle part of the Dargile series. This is presumably the equivalent of the upper part of the Melbournian series (e.g., Gill, 1942; David and Browne, 1950, p. 188). The Dargile series comprises a clastic terrane of some 5000 feet in the Mt. Ida Range of the Heathcote district (idem, p. 187). According to several British and Australian writers, the graptolite fauna indicates an age equivalent to the Lower Ludlow of Great Britain. Despite the absence of critical graptolite indices in the North American deposits, this horizon is generally correlated with the Cayugan series of the New York-Appalachian region. The Dargile series carries the same graptolite association of the Jordan River series in the Walhalla synclinorium, where *Baragwanathia* and other elements of the oldest known terrestrial flora occur.

No plant material seems to have been reported from the Dargile series, however. It would be premature as yet definitely to label the life habitat of *Melbournopterus* as either marine or freshwater. The association would appear, however, to have been definitely *preserved* under marine conditions, just as was the Jordan River flora. The

overlying Dargile sandstone is richly fossiliferous with a marine fauna; the *Encrinurus* zone commences at its top.

Pterygotus australis McCoy, the only other named eurypterid from Australia, comes from the shelly marine facies of the Melbournian of the Melbourne area. The stylonurids of the Northern Hemisphere, just as in Australia, are on the other hand, usually preserved in sandstone.

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