

# MEROSTOMOIDEA (ARTHROPODA, TRILOBITOMORPHA) FROM THE AUSTRALIAN MIDDLE TRIASSIC

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Plate 35. Figs. 1 and 2.

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## SUMMARY

A monotypic genus of a new family of Merostomoidea is described from the Middle Triassic of Brookvale, New South Wales, Australia. The known range of the subclass, previously recorded from the Middle Cambrian, is extended considerably by this record.

Three well preserved non-insect arthropod specimens, apart from the xiphosuron, *Austrolimulus fletcheri* Riek, (1955), have been collected from the Middle Triassic freshwater sediments at Brookvale, New South Wales. These sediments also contain abundant insects and fish. These three specimens bear a considerable resemblance in body shape to both the Synziphosurina (Merostomata) and the Merostomoidea (Trilobitomorpha). The post-cephalic portion of the body is divided into two distinct regions and ends in a long caudal style. Although appendages are not clearly preserved, their general structure can be distinguished below the crumpled pleural regions in one of the specimens and their bases distinguished in another. These numerous pairs of similar appendages are of trilobitomorph form.

Trilobitomorpha, which are first recorded from the Lower Cambrian, are not known from strata younger than the Middle Permian and almost all the species occurring since the Cambrian are referred to the well-known trilobites (Class Trilobita). The Class Trilobitoidea is, however, recorded from the Devonian as well as from the Cambrian. If these Middle Triassic specimens do belong to the Trilobitoidea they extend the known range of the class very considerably. There seems little doubt from a study of the insect remains that the sediments in which these specimens occur are of Triassic, very probably Middle Triassic, age.

Trilobitoidea have not previously been recorded from Australia though the Trilobita are well represented. The only Synziphosurina (Merostomata) known from Australia is *Hemiaspis tunnecliffei* Chapman (1932) from the Silurian at Studley Park, Victoria. This specimen is so poorly preserved that its affinities are obscure.

Because of the considerable time interval between the Middle Triassic and the previous records of Trilobitoidea (Moore, 1959) doubts were originally entertained that these specimens could be representatives of this class of Trilobitomorpha. The specimens were therefore compared with other arthropod groups. There is a superficial resemblance between one specimen and the aquatic larvae of some Coleoptera (Insecta). This resemblance is due mainly to distortion of the fossil which was apparently brought about during the death struggles of the specimen. It would appear that the specimen was trapped in drying mud and that as it tried to move

forward the thin pleural regions became wrinkled and partly swept back along the sides of the body. This gives the specimen the appearance of possessing abundant lateral abdominal gills whereas one is actually seeing a rough outline of the serially arranged trilobitomorph legs through the wrinkled pleural lobes. The stylate telson can be compared with the apically produced abdomen of some water-beetle larvae (Coleoptera, Dytiscidae). In other specimens which are not distorted, the subdivision of the body into two very different regions gives it an appearance more like that of certain branchiopod Crustacea.

The most distinctive feature of the species is the development of a partly fused dorsal shield covering most of the trunk segments. The sessile eyes are well developed and the antenna was apparently formed of a number of large flattened segments.

Subphylum **TRILOBITOMORPHA**

Class **Trilobitoidea**

Subclass **Merostomoidea**

Family **Synaustridae** fam. nov.

Trilobitomorpha with elongate, trilobed body, styliform telson and all appendages, apart from the antenna, apparently of a simple trilobitic type. The post-cephalic portion of the body is differentiated into a broad anterior region with well developed pleura and a narrow posterior region without obvious pleura and without appendages. A partly fused dorsal shield is developed on the anterior trunk segments.

The family is recorded from the Middle Triassic of Australia.

**Synaustrus** gen. nov.

Type species **Synaustrus brookvalensis** sp. nov.

Cephalon rounded anteriorly and with the genal spine not strongly produced. Glabella large and with the suggestion of transverse segmentation which may, however, be due to segmentation on the ventral surface. Eye large, situated at the lateral margin. Trunk appearing to consist of nine segments but the first five segments each of a composite nature, consisting of 1,2,3,3,2 segments respectively, with the possibility of the first portion consisting of two segments. This dorsal shield may be ankylosed but the well developed junctions would seem to indicate some freedom of movement. The posterior four trunk segments free, without obvious pleura. Body ending in a long caudal style. Trunk appendages (absent from the posterior four segments) not extending beyond the pleural margins of the anterior segments.

This genus can be compared with *Molaria* Walcott from the Middle Cambrian, from which it differs in the development of a partly fused dorsal shield from the anterior trunk segments and apparently in possessing a larger number of trunk segments.

**Synaustrus brookvalensis** sp. nov.

Holotype specimen, F.30953, entire except for apex of telson but with the pleural regions of the trunk distorted. Length, excluding terminal style, 40 mm. Cephalon with genal spine produced to only a small blunt spine, grooved above. "Free cheek" narrowing only slightly anteriorly. Glabella, though ill-defined, somewhat longer