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A FOSSIL MECOPTERON FROM THE TRIASSIC BEDS AT BROOKVALE, N.S.W.

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(Plate xviii and Figures 1–4.)

The shale beds at Brookvale have yielded beautifully preserved insect fossils, some of which have been described by Tillyard (1925) and McKeown (1937). In many cases the wing pigmentation pattern has been preserved, as it is in the Mecopterous wings described here. The lithology and horizon of this fossil bed have been outlined in earlier papers, so it is sufficient to restate that they occur in a lens of shale in the Hawkesbury Sandstone Series of Triassic age.

Although there are eleven fossil specimens of Mecoptera, they are all of the one species, representing both forewings and hindwings and portion of the body structure. The only parts not known are the apex of the abdomen and most of the legs. One specimen shows clearly a side view of the head with antennae, and the thorax with portions of the wings. The fossil resembles some of the Liassic Orthophlebiidae very closely but retains a distinct cubito-median Y-vein. It is described in this family as a new genus, *Choristopanorpa*, having characters of both the recent *Chorista* and *Panorpa*, but possibly more closely allied to the latter genus. It is very near *Mesopanorpa* Handlirsch as emended by Martynov, 1927.

Family ORTHOPHLEBIIDAE Handlirsch.

Mesozoic Mecoptera, forewing with a five-branched media similar to that of recent Choristidae; R_s variable, tending to pectination, but R_{4+5} only two-branched; Sc long, almost as long as R_1. Hindwing (based on *Choristopanorpa*) with cubito-median Y-vein absent and M with only four branches; CuP and A_1 fused for part of their length.

Choristopanorpa differs from normal panorpids mainly in the typically five-branched M of the forewing. On rare occasions M is five-branched in recent panorpids.

Genus CHORISTOPANORPA nov.

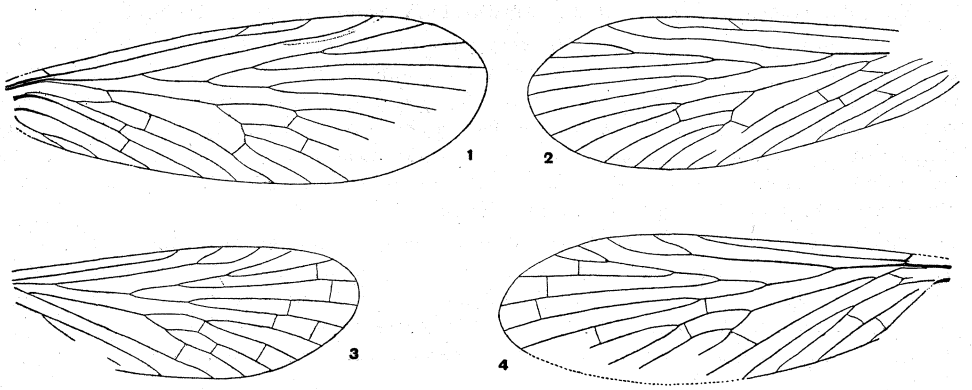
Genotype, *Choristopanorpa bifasciata*, sp. nov.

Forewing with Sc long, reaching into the pterostigma; Rs five-branched, extra fork on R_2, R_{2+3} forking before R_{4+5}; M arising close to base, five-branched, the extra branch on M_4; cubito-median Y-vein well developed; three anal veins, A_3 forked in the genotype. Hindwing with Sc long, simple; R_1 forked near apex, R_s typically five-branched but occasionally six-branched; M four-branched; cubito-median Y-vein absent; CuP and A_1 fused for part of their length. The hindwing is very similar to that of recent panorpids.

Choristopanorpa bifasciata, sp. nov.

Forewing.—Wing rather large, costal space not greatly expanded, apex evenly rounded; Sc long, rather close to the costal margin, ending on the margin within the petrostigma and with a weak branch to the margin from towards its apex; R decidedly curved before the origin of R_s, R_1 curved within the pterostigma; pterostigma well developed, lower margin sharply defined by a distinct pterostigmatic groove almost equidistant from R_1 and R_s; R_s arising in the basal third, R_{2+3} forking slightly before R_{4+5} with R_2 forking again at a level of about the middle of the pterostigma; M arising

from R before the humeral cross-vein, forking just after the first forking of R_s, with M_{3+4} forking rather early and then M_4 forking almost immediately, the lower branch of the fork being deflected near its base, where it is connected to CuA by a distinct cross-vein; cubito-median Y-vein very distinct, both arms well developed but that from Cu the longer; CuA with a slight sigmoid curvature towards the wing margin; CuP weak, straight, parallel to CuA over its basal portion. connected to CuA by a cross-vein at about the middle of their lengths; A_1 and A_2 straight except at base, parallel, A_3 forked about its middle, its lower branch short; wing with two cross-bands of dark pigment, the basad one extending over the whole length of the stem of R_s, the distad one from the base of the pterostigma to the apex of the wing, darker over the anterior half. There may be scattered small areas of pigment in between these two distinct bands. The extra fork on R_2 may occur nearer the wing margin than in the type and the cross-vein from M to CuA may pass from the stem of M_4 and not from the lower fork of M_4.



Figures 1-4. *Choristopanorpa bifasciata*, sp. nov.
1, Holotype forewing (F.30959). 2, Forewing (F.39196). 3, Typical hindwing (F.39195). 4, Hindwing F.30964).

Hindwing.—Similar in size and shape to the forewing, but the costal margin is almost straight; Sc long, simple, not quite reaching the pterostigma; R_1 almost straight for most of its length, basal stem of R not curved, apex of R_1 forked within the pterostigma, upper branch shorter and sigmoidally curved, lower branch longer and with a simple, marked curve; R_s arising closer to the wing base than in the forewing, but the branching very similar; M. appears to arise from CuA, no cubito-median Y-vein, only four-branched, forking just after the first forking of R_s, with M_{3+4} forking again rather rapidly; a distinct cross-vein from M_4 to CuA; CuA straight for most of its length, with only a very gentle curve at apex; base of CuP not preserved, fused for some distance with A_1, but the apical two-thirds free, almost parallel to CuA; other anal veins not preserved. The wing pigmentation is similar to that of the forewing, but the middle light area is almost divided transversely by a narrow dark band (also seen to some extent in the forewing).

In a second specimen of the hindwing R_s is six-branched, the extra fork being an end-twigging on R_{2a}; M as in the typical specimen; Cu and anals better preserved; M arises from R at the level of the humeral cross-vein, is fused to CuA for a short distance, and then appears to arise as a branch from CuA; CuA simple; CuP arising from CuA close to the wing base and quickly fusing to A_1 for about a quarter of its length and then continuing as a simple vein to the wing margin; A_1 also simple, A_2 arising from base, simple, A_3 arising from base, only partly preserved, probably forked at about its basal quarter.

The thorax, though crushed, shows a form similar to that of recent *Chorista*, but the face is a little more elongated.

Types.—Holotype forewing F.30959 and paratypes F.30956, a large forewing perfect except for extreme base; F.39196 and counterpart F.39186, a perfect forewing showing variation in the forking of R_2 and M_4; F.30967, a large forewing perfect except for the anals; F.39197 shows a lateral view of the head and thorax with antennae and mouth parts and portions of the legs and wings; F.38258 forewings and hindwings partly overlapping and indefinite body remains; F.38263 and counterpart F.35879 with the two wings of each side overlapping and portion of the abdomen showing segmentation; F.30062 a poorly preserved complete wing with a six-branched R_s; F.39181 imperfect overlapping wings with portion of the abdomen; F.39195, the typical hindwing, lacking the extreme base and most of the anals, and F.30964 an almost perfect hindwing with a six-branched R_s.

Type Locality.—Beacon Hill, Brookvale, near Manly, New South Wales.

Horizon.—Lenticular shale in the Hawkesbury Sandstone Series, Middle Triassic.

The hindwing of this species is very similar to that of *Parachorista* from the Upper Permian of Belmont, New South Wales, and would have been placed in that genus had the forewing not been found. The costal space is narrower and the cross-vein from the long Sc to R_1 is not obvious, as it is in *Parachorista*. R_s shows a branching similar in the two, but in *Chrostopanorpa* R_{2+3} forks clearly before R_{4+5}. The origin and branching of M and Cu are similar, but the amount of fusion between CuP and A_1 differs as, too, does the shape of the anal veins.

The forewings of these two genera differ more than do the hindwings. M is only five-branched in *Choristopanorpa*, M_2 being simple and R_s has only the same five branches as in the hindwing, while in *Parachorista* there is typically an extra fork to R_s, but the general plan is the same. Sc is either simple or at least not strongly forked near its apex in *Choristopanorpa*, but in other characters the wings are very similar.

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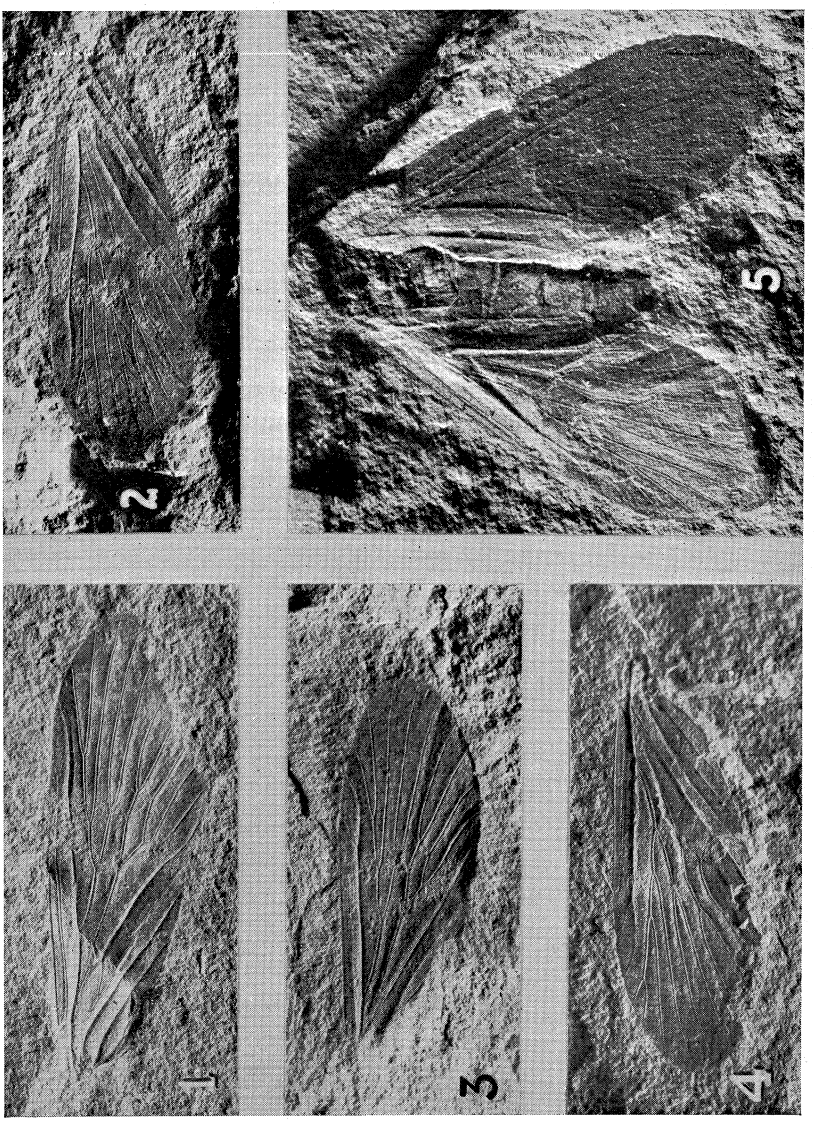
EXPLANATION OF PLATE XVIII.

Choristopanorpa bifasciata, gen. et sp. nov. × 3 diameters ca. Fig. 1. F.30959, holotype forewing. Fig. 2. F. 39196, forewing variant. Fig. 3. F.39195, typical hindwing. Fig. 4. F.30964, hindwing variant. Fig. 5. F.38263, overlapping fore- and hindwings and abdomen.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