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UNDESCRIBED FOSSIL INSECTS FROM
THE UPPER PERMIAN OF
BELMONT, NEW SOUTH WALES
(With an Appendix Listing the Described Species)

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Plate 45. Figures 1-5.

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SUMMARY

Five unusual or problematic fossil insects from the Upper Permian of Australia are described and illustrated.

The Upper Permian strata at Belmont has yielded a rich and varied insect fauna. Those orders which constitute the dominant elements of the fauna have been studied and the species described in a number of papers by Tillyard (1918, 1919, 1921, 1922, 1924, 1926a, 1926b, 1929, 1935a, 1935b, 1935c), Evans (1943a, 1943b, 1947, 1950, 1956, 1958, 1963), Davis (1942, 1943), Riek (1953), and Kukalova (1966).

Although most of the fossil insect specimens have been studied, there remains unrecorded a small number of unusual and very interesting species. In some cases the affinities of these fossils are obscure while in other cases the remains are rather fragmentary and, although for these reasons one refrains from naming them, they are worthy of discussion even if only to indicate the presence of certain archaic orders of insects which have not previously been recorded from the Australian Permian. As extensive collecting of this horizon is unlikely to be undertaken in the near future, it is considered appropriate that the remaining components of the fauna should be recorded.

Only five specimens are considered worthy of discussion, though there are several interesting fragments that defy classification at present. These are mostly small fragments of relatively large wings. Only one of the five specimens discussed below is formally named.

Specimen F.40701 Australian Museum

(Plate 45, figure 1; Figure 1)

This specimen is considered to be a nymph in which fore and hindwing rudiments and portion of the body are preserved. The impression of the rudiments of the venation preserved on the nymphal wing sheaths indicates relationship to the Plecoptera or Paraplecoptera. Paraplecoptera have not been recorded from this horizon (a fragment described below is referred to the order) but there is a single described species of the Plecoptera. It is suggested that this nymph should be referred to the Plecoptera and considered as being most probably a nymph of *Stenoperlidium permianum* Tillyard, 1935. A comparison between the nymphal venation and that of the adult shows some differences but these are limited to the terminal branches of the veins.

Specimen F.40700 Australian Museum

(Figure 2)

This is the impression of a complete wing very similar to described species of *Permosialis*. This genus has been placed in the Megaloptera but some doubt is expressed here as to its affinities. This wing is well preserved, so the species is named.

***Permosialis belmontensis* sp. nov.**

Length of wing 13.5 mm; width 5.7 mm. Details of the venation are shown in the accompanying illustration.

Type: Holotype, F.40700, in the Australian Museum.

Type locality and horizon: Upper Permian insect beds, Belmont, Australia.

Specimen F.40038 Australian Museum

(Figure 3)

This specimen is not well preserved but there seems little doubt that it is a representative of the Megasecoptera, suborder Eumegasecoptera.

Specimen F.43142 Australian Museum and counterpart F.43141

(Plate 45, figure 2; Figure 4)

These two impressions preserve the extreme apical portion of a very large wing that can be compared with species of Liadotypidae (order Meganisoptera).

Specimen F.41067 Australian Museum

(Figure 5)

This fragment could be referred to the Paraplecoptera and compared with representatives of the Lemmatophoridae, but the very fragmentary nature of the wing makes any placement doubtful. It represents portion of a relatively large wing, with a less distinct underlying wing (? hindwing) and with the apical portion of each wing folded back on itself.

THE DESCRIBED AUSTRALIAN FOSSIL INSECTS FROM THE UPPER PERMIAN OF BELMONT

Odonata	<i>Polytaxineura stanleyi</i> Till., 1935b: 376
Plecoptera	<i>Stenoperlidium permianum</i> Till., 1935c: 387 [<i>Antitaxineura anomala</i> Till., 1935b: 383]
Glosselytrodea	<i>Permoberothella perplexa</i> Riek, 1953: 80
Psocoptera	<i>Austrocypha abrupta</i> Till., 1935a: 278 <i>A. baretti</i> Till., 1935a: 278 <i>Austropsocidium pincombei</i> Till., 1935a: 268 <i>A. stigmaticum</i> Till., 1935a: 268 <i>Lophiocypha permiana</i> Till., 1935a: 275 <i>L. stanleyi</i> Till., 1935a: 276 <i>L. thysanella</i> Till., 1935a: 276

Hemiptera

- L. maxima* Davis, 1942: 121
Lophioneura ustulata Till., 1921: 420
L. angusta Till., 1935a: 278
L. (?) conjuncta Till., 1926a: 29
Megapsocidium australe Till., 1935a: 269
Stenopsocidium elongatum Till., 1935a: 270.
Zoropsocus delicatulus Till., 1935a: 273
Z. stanleyi Davis, 1942: 119
Zygopsocus permianus Till., 1935a: 271
Actinoscytina belmontensis Till., 1926a: 18
Anomaloscytina metapteryx Davis, 1942: 113
A. incompleta Evans, 1943a: 189
Austroprosbole maculata Evans, 1943a: 182
Austroscytina imperfecta Evans, 1943a: 180
Beaconiella fennahi Evans, 1963: 21
B. multivenata Evans, 1963: 22
Bekkerscytina primitiva Evans, 1958: 112
Belmontocarta perfecta Evans, 1958: 113
Belysilla reticulata Evans, 1943: 193
Clavopsyllidium minutum Davis, 1942: 117
Elliptoscarta ovalis Till., 1926a: 17
Eochiliocyclus angusta Davis, 1942: 114
Eopsyllidium delicatulum Davis, 1942: 115
Eoscytina migdisovae Evans, 1958: 110
E. incompleta Evans, 1958: 111
Eupincombea postica Davis, 1942: 114
Homaloscytina plana Till., 1926a: 16
Mitchelloneura permiana Till., 1921: 416
Orthoscytina mitchelli Till., 1926a: 10
O. quinquemedia Till., 1926a: 11
O. indistincta Till., 1926a: 11
O. subcostalis Till., 1926a: 11
O. irregularis Till., 1926a: 12
O. belmontensis Till., 1926a: 13
O. obliqua Till., 1926a: 13
O. pincombei Till., 1926a: 14
O. tetraneura Till., 1926a: 15
Palaeoviccia incerta Evans, 1943a: 189
Paraknightia magnifica Evans, 1943a: 180
Permagra distincta Evans, 1943b: 7
Permobrachus magnus Evans, 1943a: 183
P. dubia (Till.), 1926a: 24
Permocentrus trivenulata (Till.), 1926a: 20
Permodiphthera robusta Till., 1926a: 24
Permoglyphis belmontensis Till., 1926a: 22

- Permojassus australis* Till., 1926a: 8
P. dubius Till., 1926a: 8
Permopsyllidium mitchelli Till., 1926a: 28
P. affine Till., 1926a: 28
Permopsyllidops stanleyi Davis, 1942: 117
Permopsylloides insolita Evans, 1943a: 193
Permoscarta mitchelli Till., 1918a: 728
Permothea latipennis Till., 1926a: 28
Permotheëlla scytinopteroides Davis, 1942: 116
Permovicia obscura Evans, 1943a: 189
Pincombea mirabilis Till., 1922: 282
Protopincombea obscura Evans, 1943a: 193
Protopsyllidium australe Till., 1926a: 26
P. sinatum Davis, 1942: 117
Protopsyllops minuta Evans, 1943a: 192
Psocopsyllidium media Davis, 1942: 116
Psocoscytina bifida Davis, 1942: 112
Psyllidella magna Evans, 1943a: 192
Psyllidiana davisia Evans, 1943a: 192
Stanleyana pulchra Evans, 1943a: 188
Stenoglyphis kimblensis Evans, 1947: 43
Stenoscytina australiensis Till., 1926a: 16
Stenovicia angustata Evans, 1943a: 189
Triassodoecus chinai Evans, 1963: 23
Tripsyllidium wadei Evans, 1956: 238
Tychticoloides belmontensis Evans, 1963: 21
Agetochoristella adscita Riek, 1953: 68
 [Aphryganoneura anomala Till., 1926: 276]
Belmontia mitchelli Till., 1919: 234
 syn. *Parabelmontia permiana* Till., 1922: 286
Mesochorista australica (Till.), 1918: 733
 syn. *Permochorista mitchelli* Till., 1918: 734
 P. sinuata Till., 1922: 287
 P. affinis Till., 1922: 288
 P. collinsi Till., 1926b: 269
 P. pincombei Till., 1926b: 269
 P. angustipennis Till., 1926b: 270
 P. osbornei Till., 1926b: 271
 P. inaequalis Till., 1926b: 272
M. jucunda (Till.), 1926b: 268
M. dubia Riek, 1953: 63
M. phipa Riek, 1953: 63
Mesopanorpodes belmontensis Riek, 1953: 70
M. robustus Riek, 1953: 71
Nannochoristella reducta Riek, 1953: 74

Mecoptera

- Neoageta elongata* Riek, 1953: 67
Neochoristella optata Riek, 1953: 74
Neopetromantis australis Riek, 1953: 67
Parachorista pincombeae Till., 1926b: 273
 syn. *P. warnerensis* Till., 1926b: 273
P. splendida Till., 1926b: 274
P. (?) bairdae Till., 1922: 284
Permomerope australis Till., 1926b: 275
P. nanus Riek, 1953: 57
Permotipula patricia Till., 1929: 779
Phipoides elegans Riek, 1953: 66
Prochoristella megaloprepia Riek, 1953: 71
P. anagaura Riek, 1953: 72
P. exilis Riek, 1953: 72
P. pusilla Riek, 1953: 73
P. belli (Till.), 1926: 272
P. concinna Riek, 1953: 73
Robinjohnia tillyardi Martynova, 1948: 42
Xenochorista splendida Riek, 1953: 69
X. sobrina Riek, 1953: 69
- Neuroptera
- Archeosmylus pectinatus* Riek, 1953: 86
Permithone belmontensis Till., 1922: 290
 syn. *Permosmylus pincombeae* Till., 1926b: 281
P. oliarcoides Till., 1926b: 278
P. neoxenus Riek, 1953: 82
Permpsychops belmontensis Till., 1926b: 281
 syn. *Permithone venosa* Davis, 1943: 11
Permorapisma biserialis Till., 1926b: 279
 syn. *P. triserialis* Till., 1926b: 279
- Trichoptera
- Diptera
- Cladochorista belmontensis* Till., 1926b: 273
- Coleoptera
- Permotanyderus ableptus* Riek, 1953: 75
Choristotanyderus nanus Riek, 1953: 76
Permosyne belmontensis Till., 1924: 433
P. affinis Till., 1924: 433
P. mitchelli Till., 1924: 433
P. pincombeae Till., 1924: 433
- Protelytroptera
- Austrelytron tillyardi* Kukalova, 1966: 98
Chanoselytron gingiva Kukalova, 1966: 109
Dermelytron conservativum Kukalova, 1966: 106
D. pigmentatum Kukalova, 1966: 108
Elytrathrix hirsuta Kukalova, 1966: 102
Permofulgor belmontensis Till., 1918a: 731
 (syn. *P. indistinctus* Till., 1922: 280)*
Permophilus pincombei Till., 1924: 430

* The holotype of *Permofulgor indistinctus* is a counterpart of the holotype of *Permo-fulgor belmontensis*.

- P. (?) minor* Till., 1924: 431
P. hirtus Kukalova, 1966: 100
P. capulus Kukalova, 1966: 100
Phyllelytron folium Kukalova, 1966: 94
P. petalon Kukalova, 1966: 95
P. granulatum Kukalova, 1966: 95
P. melinum Kukalova, 1966: 95
Protocoleus mitchelli Till., 1924: 434
Psychelytron progressivum Kukalova, 1966: 108
Stenelytron enervatum Kukalova, 1966: 104
Xenelytron ligula Kukalova, 1966: 105
 incertae sedis *Antitaxineura anomala* Till., 1935b: 383
Aphryganoneura anomala Till., 1926b: 276
Permocephalus knighti Evans, 1943b: 8
Permocephalus globulus Evans, 1943a: 194

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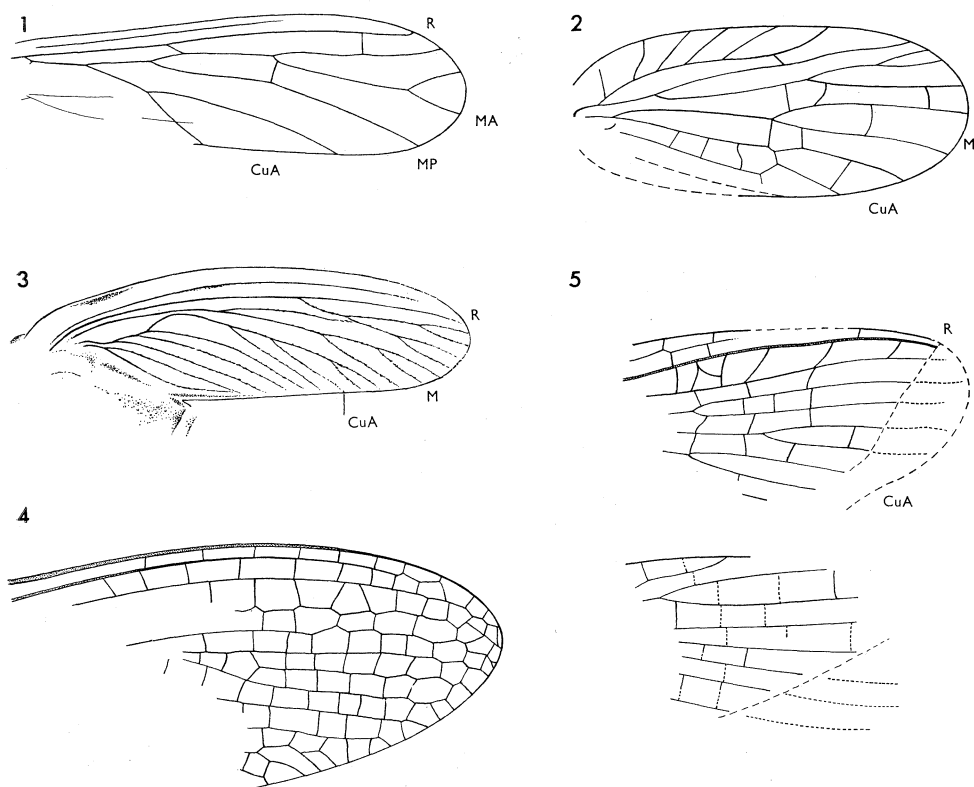


Figure 1: Forewing of nymphal insect, very probably of *Stenoperlidium permianum* Tillyard 1935. X5.
 Figure 2: Forewing of *Permosialis belmontensis* sp. nov. X4.
 Figure 3: Australian Museum F.40038. Order Megasecoptera, suborder Eumegasecoptera. X11.
 Figure 4: Australian Museum F.43142 and F.43141. Order Meganisoptera. X4.
 Figure 5: Australian Museum F.41067. Order Paraplecoptera. Separated wings. X4.

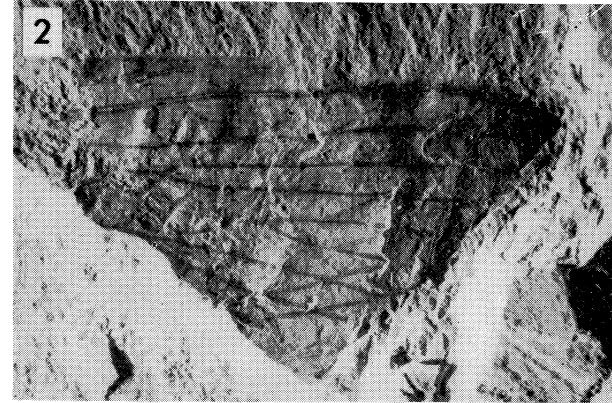
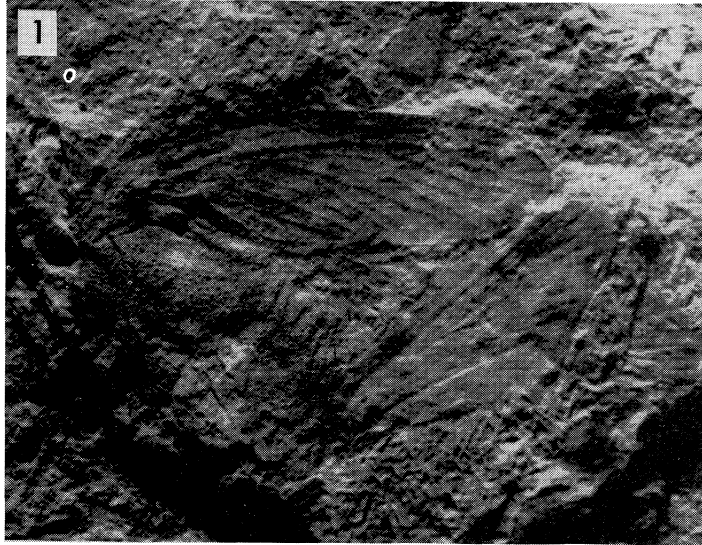


Figure 1: Australian Museum F.40701; nymphal insect, showing fore and hind wing-pads, very probably nymph of *Stenoperlidium permianum* Tillyard 1935; X5. Figure 2: Australian Museum F.41067; apical wing fragments; order Paraplecoptera; X6. Figure 3: Australian Museum F.43141; apex of wing; order Meganisoptera; X6. Figure 4: Australian Museum F.43142; counterpart of figure 3; X6