

A RE-EXAMINATION OF THE UPPER TERTIARY MAYFLIES DESCRIBED BY ETHERIDGE AND OLLIFF FROM THE VEGETABLE CREEK TIN-FIELD

By E. F. RIEK.

Commonwealth Scientific and Industrial Research Organization—Division of Entomology, Canberra, A.C.T.

(Plate x.)

Etheridge fil. and Olliff described under the name *Ephemera culleni* a series of fossil mayfly nymphs from the youngest Tertiary stanniferous lead of the Vegetable Creek Tin-field near Emmaville, New England District of New South Wales. The beds are generally considered to be of Pliocene age. There was no designated holotype and they figured nine specimens in their plate. The specimen considered as an adult with a partly preserved wing and described first in the description of the species is best considered as the holotype of *culleni*. This specimen, Figure 5 of the plate, bearing the numbers D112 and F1323, is not an adult but only a nymph. Lying close to it is fragmentary plant tissue showing cellular structure which was considered as the wing of the specimen. Figure 9 of the plate shows a quite different type of nymph of which there are further unfigured specimens.

The two species present in the material are very different, even to the extent of being placed in different families, the Leptophlebiidae and the Baetidae.

From the very good state of preservation, with the nymphs mainly lying flat and undistorted, it would seem that they were living on the mud in which they are now preserved. This would indicate very slow flowing water or more probably standing water. If the water was only of a semi-permanent nature the nymphs would die as the mud dried up, the Leptophlebiidae crawling around and dying outstretched, the Baetidae, with their shrimp-like springing, tending to be slightly curved and lying on the side in some cases.

Family LEPTOPHLEBIIDAE.

Genus *Atalophlebia* Eaton, 1881.

Genotype, *Ephemera australis* Walker, 1853.

This is one of the common Australian genera of the family. The nymphs can be found in fast-flowing streams or sluggish to even standing waters. There are only one or two species which can survive in water which stops flowing for some part of the year. Amongst these is *A. costalis* Burmeister, a species very common along the east coast.

The nymphs of this family found in these beds are of the *costalis* type, and I consider there can be little doubt that they belong to the genus *Atalophlebia*, s.s.

Atalophlebia culleni (Eth. fil. and Olliff), 1890.

(Plate x, figures 1-5.)

Ephemera culleni Etheridge Junr. and Olliff 1890, *Mem. Geol. Surv. N.S.W.*, Pal. 7:8.

Nymph.—The complete structure, excluding the abdominal gills, is known. The description is based largely on four of the specimens figured by Etheridge and Olliff and three additional specimens, one of a juvenile specimen and the others of complete nymphs, one showing clearly the caudal setae.

Nymph of the depressed type with widely flattened femora. Head rectangular, dorso-ventrally depressed, eyes small, situated postero-laterally, protruding slightly at the margin, well separated in the mid-line. Anterior border of clypeus slightly emarginate medianly. Thorax slightly wider than head, insertions of fore legs rather close together, middle and hind well separated, almost at the margin; femora of all legs strongly flattened, only about three times as long as wide, tibiae not strongly flattened, not quite as long as femora, tarsi considerably shorter than tibiae. Wing sheath large in mature nymph, extending to the third segment of the abdomen, mesonotum somewhat convex. Segments of abdomen gradually increasing in length but narrowing in width, so that the ninth is almost as long as wide. Postero-lateral pleural margin of segments produced into a spine, increasing in size over the posterior segments. Three long, fine, caudal cerci, the median, at least, slightly longer than the abdomen.

Length of mature nymph, excluding cerci, about 11 mm.

Type.—Holotype nymph, here designated, D112 (Figure 5 of Etheridge and Olliff) in the Australian Museum. Paratypes D108, D143, D113 + three others, not numbered.

Type Locality and Horizon.—Fox and Partridge's Claim, Red Hill, near Emma-ville, New England. Youngest Tertiary Stanniferous lead of the Vegetable Creek Tin-field, Pliocene?

Family BAETIDAE.

Genus *Cloeon* Leach, 1815.

The small shrimp-like nymphs from these beds are referred provisionally to this genus. The head of the fossil is very small and the cerci quite short.

Cloeon emmavillensis, sp. nov.

(Plate x, figures 6-7.)

Nymph.—Length excluding cerci about 7.5 mm. Head very small, triangular in lateral view, more or less rhomb-shaped from above. Antenna partly preserved, very thin, longer than head in lateral view. Thorax large and humped with large mesonotum and wing-sheath. Legs rather long, very thin, femora only slightly wider than tibiae, longer than tibiae. Segments of abdomen of more or less even size, decreasing in width rather rapidly posteriorly, postero-lateral pleural margins not produced into spines. Cerci three, short, only half the length of the abdomen. Abdominal gills not preserved.

Type.—Holotype nymph, lateral view, D52 (Figure 9 of Etheridge and Olliff) in the Australian Museum. Paratype nymph D115 gives the dorsal view.

Type Locality and Horizon.—Fox and Partridge's Claim, Red Hill, near Emma-ville, New England. Youngest Tertiary Stanniferous lead of the Vegetable Creek Tin-field, Pliocene?

REFERENCE.

Etheridge, R., Junr. and A. S. Olliff, 1890.—The Mesozoic and Tertiary Insects of New South Wales. *Mem. Geol. Surv. N.S.W.* Pal. 7.

EXPLANATION OF PLATE X.

All figures x4 ca.

1. *Atalophlebia culleni* (Eth. fl. & Olliff), holotype nymph. 2-4. *Atalophlebia culleni*, nymphs. 5. *Atalophlebia culleni*, very juvenile nymph. 6. *Cloeon ? emmavillensis*, sp. nov., holotype nymph. 7. *Cloeon ? emmavillensis*, sp. nov. nymph.

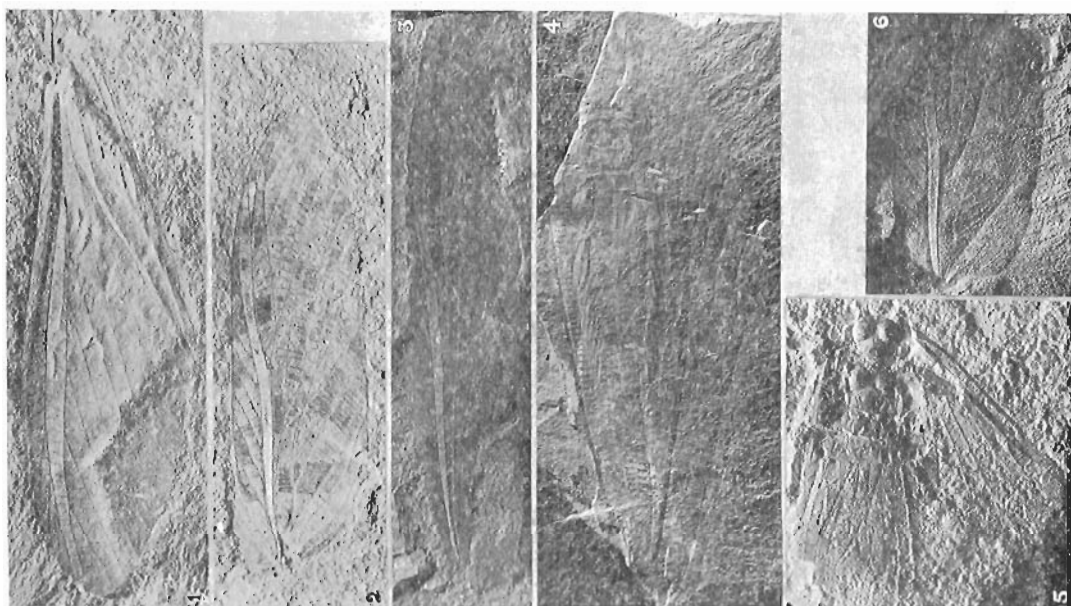


PLATE XI.

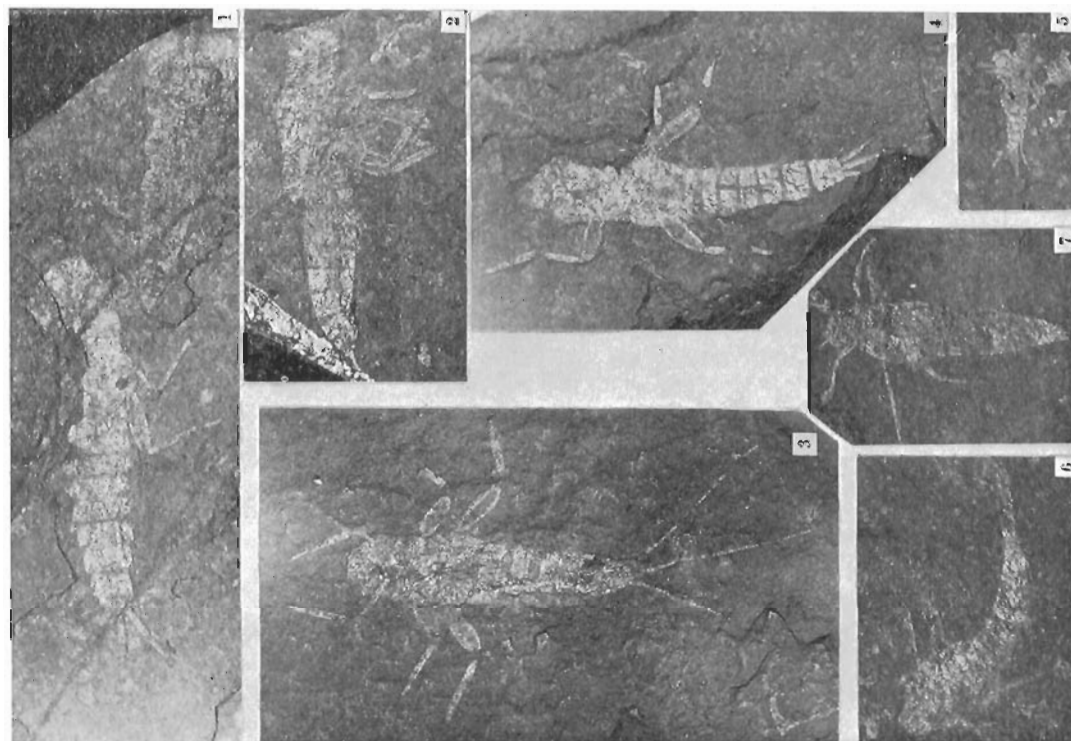


PLATE X.