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## ON A FALSE AND A GENUINE CADDIS-FLY FROM BURMESE AMBER (INSECTA : TRICHOPTERA, HOMOPTERA)

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### ABSTRACT

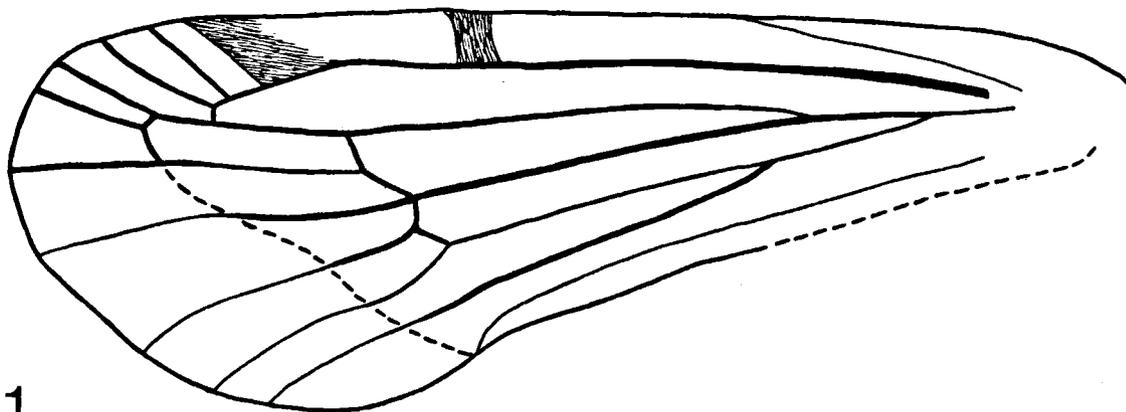
Two specimens of fossil insects in amber from Burma (burmite), belonging to the B.M.(N.H.), London, were studied. The first one, described by Cockerell (1917) as a new genus and species of Trichoptera (*Plecophlebus nebulosus*) belongs, in fact, to the Homoptera Auchenorrhyncha. The second one is the first caddis-fly (Trichoptera) known from Burmese amber; it is here described under the name of *Burminoptila bemeneha* g.n., sp.n.; this hydroptilid seems to be the most primitive known representative of the subfamily Hydroptilinae, and is in some respects closer to the primitive subfamily Ptilocolepinae. These are the first records concerning the extinct caddis-fly faunas of the Oriental Region.

Burmese amber, or burmite, from northern Burma, is certainly far less celebrated as a purveyor of fossil insects than Baltic, or even Dominican amber, but is nevertheless very important as a source of information on the ancestors of Oriental insects. Schlee & Glöckner (1978: 31-32) have very usefully summarized the scanty data on Burmese amber and its fossil insects. This amber was estimated by different authors to be of Miocene, or Paleogene, Oligocene, post-Eocene, Eocene, or even late Cretaceous age ! The reason of these discrepancies lies in

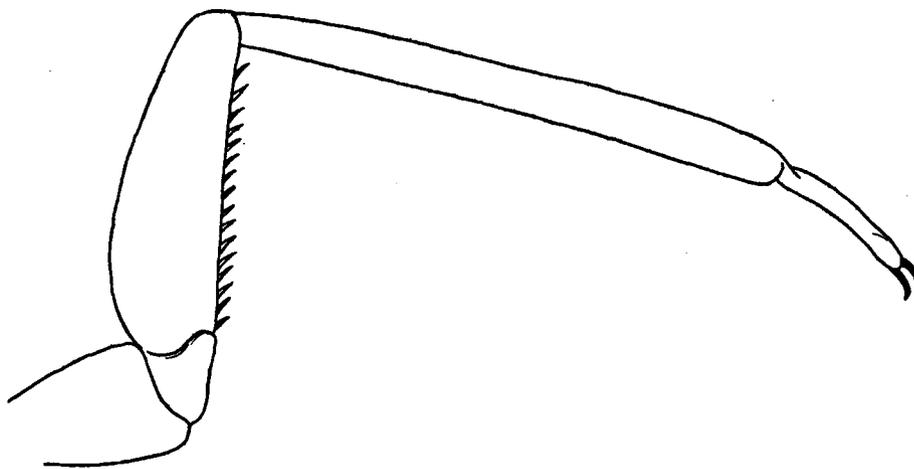
the fact that the (Miocene ?) clay beds where burmite occurs are not the original deposit, the amber being apparently washed in from older levels. We are, of course, not in a position to contribute to the solution of this very important problem.

*Plecophlebus nebulosus* Cockerell, 1917

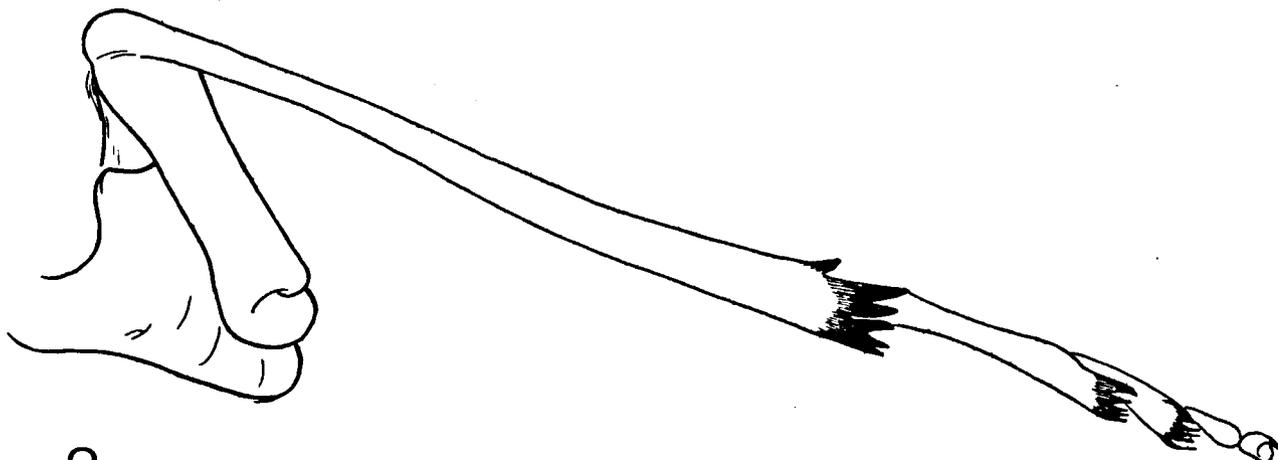
Only one insect from Burmese amber was until now considered as being a Trichopteron: Cocker-



1



2



3

Figs. 1-3. *Plecophlebus nebulosus* Cockerell, 1917, holotype. 1, left fore wing; 2, left middle leg; 3, left hind leg.

rell (1917) described it as *Plecophlebus nebulosus* n.g., n.sp., and tentatively attributed it to the Odontoceridae, after having consulted an authority on Caddis-flies, Nathan Banks. He described and figured the anterior wing, remarked that the head of the specimen was lost and that "the fragments of legs and other parts appear to present no salient characters". During a stay at the B.M.(N.H.), London, in 1981, Dr. P.C. Barnard kindly gave me for examination this specimen, which he suspected not to belong to the Trichoptera but to the Homoptera. The polished stone, about 4 cm long, which contains not only the holotype of *Plecophlebus nebulosus*, but also other insects or fragments of insects (Coleoptera, Homoptera, etc), was presented to the B.M.(N.H.) by R.C.J. Swinhoe in February 1919.

The fore wing (fig. 1) is about 5 mm long, completely devoid of hairs, and shows a metallic shine. The hind wings, being just under the fore wings and stuck to them, render the study of the venation of these last ones rather difficult; moreover, a strong "fold" (artefact! marked by a broken line in fig. 1) makes the venation in the apical part of the wing rather vague. It is, nevertheless, evident that we are dealing here with a Homopteron. Moreover, although it is true that the head is lacking, Cockerell was wrong in saying that the legs are of no help in characterizing the insect: the middle- and hind legs (figs. 2, 3) could be examined in detail, and there is no doubt that they do not belong to a caddis-fly but to a Homopteron (there is no fore leg attached to the body; there are several other - probably Homoptera - legs in close proximity to the specimen, but it cannot be asserted that they belong to it).

I consulted two Homoptera specialists on the matter: Dr. J.P. Duffels and Mr. W.H. Gravestein. After examination of the specimen and of my drawings, they both assured me that the insect belongs to the Homoptera: Auchenorrhyncha: Fulgoroidea, and that it is probably a representative of the Cixiidae. I accordingly transfer *Plecophlebus nebulosus* Cockerell, 1917, from the Trichoptera to the Homoptera.

During the already mentioned visit to the B.M.(N.H.), Dr. P.E.S. Whalley and Dr. P.C. Bar-

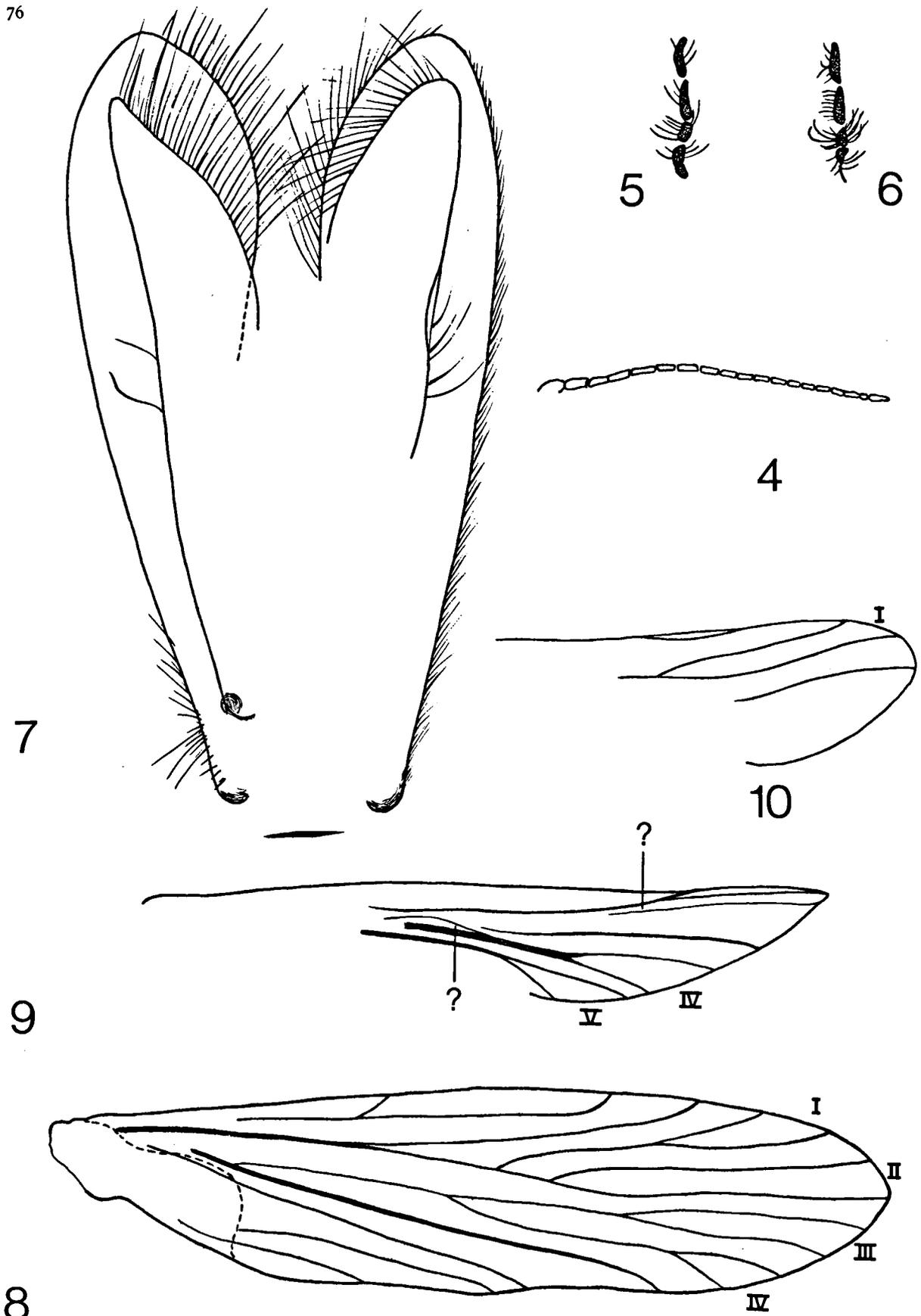
nard gave me access to the collection of insects in Burmese amber of the museum; looking through it, I was very pleased to find a specimen being apparently the first caddis-fly discovered in this amber; it belongs to the Hydroptilidae. The polished stone originally including this specimen is about 1.8 cm long, very clear, of a fine pale brown colour; from it a small piece, about 9 mm long, was cut to include the caddis-fly (together with the legs and part of the abdomen of a ? Dipteron). This enables me to describe a new genus and species of Trichoptera Hydroptilidae.

*Burminoptila* n.g.

(figs. 4-10)

Description.-

Length of the fore wing: 2.5 mm. It is impossible to specify if ocelli are present or absent; but I am more inclined to think that they are lacking. Eyes not hairy. Very long hairs on head. Antennae (fig. 4) quite distinct, very short, reaching perhaps the level of the 1st abdominal segment, and about 2.5 times shorter than the fore wing; they have 19 articles and are very slender, all the articles being decidedly longer than wide; basal article stouter than the following ones, but without any exaggeration; last article of the common pyriform shape. Maxillary palpus (figs. 5, 6) with a minute basal article (difficult to see), articles 2 and 3 very short and of uniform length, articles 4 and 5 twice longer than 2 and 3, and also of uniform length. Unfortunately the meso- and metathorax are in a very bad condition, practically destroyed, and it is only possible to say that they are covered with very long hairs, and that the tegulae of the mesothorax are well developed and very hairy. Legs without widened articles; the spur formula is 0,2,3; one of the spurs of the middle legs is clearly longer than the other; the 3 spurs of the hind legs are subequal, and apparently all of them are widened, slightly foliaceous. The fore wings are in very good condition, hind wings less well fitted for observation; the two right wings and the two left ones largely overlap (fig. 7) which does not facilitate the observation. Their setal fringes are neither short,



Figs. 4-10. *Burminoptila bemeneha* g.n., sp.n., ♀ holotype. 4, antenna; 5-6, maxillary palpi (5, ventral; 6, lateral); 7, ventral outline of wings; 8, right fore wing; 9-10, left hind wing, distal parts, from very different angles (see text).

nor very long. Veins distinctly darker than membrane. Fore wing (fig. 8) remarkably broad for a hydroptilid, widest just in the middle, apex very regularly parabolic, no well developed "anal lobe"; it was impossible to distinguish other transverse veins than that connecting Sc to C; venation remarkably "regular", distinct, and complete; only the most important of its features will be described here; bifurcation of RS a little more apically situated than that of M; discoidal cell open, very narrow, pointed at base; furca I (R2-R3) much shorter than furca II (R4-R5); furca III (M1-M2) long - intermediate in length between I and II; there is a short but perfectly distinct furca IV (M3-M4); Cu 1 thick, not branched. The hind wings (figs. 9-10) are rather wide, with a rounded apex (fig. 9 gives a misleading idea of its shape, because of the angle under which the drawing was made) and their venation, though much less clearly discernible than that of the fore wings, seems to be rather regular and complete; there is probably no acute costal angle; it is impossible to make out with certainty the situation of Sc and R1; R2-R3 (furca 1) and R4+5 are much better shown in fig. 10; but the situation of the distal parts of the veins from the inferior region of the wing is rather well represented in fig. 9, though it is not impossible that I made some errors in my interpretation; upper branch of M unbranched, lower one branched (furca IV !); Cul also branched (furca V); the other veins not distinct. Last abdominal segments forming a simple, rather long and strong ovipositor. I could see no peculiar processes on the abdominal segments.

Derivatio nominis.-

The first part of the generic name derives from Burma (as well as from burmite, the name of the Burmese amber); the second is a suffix often used in naming Hydroptilidae.

Type-species.-

*Burminoptila bemeneha* sp.n.

*Burminoptila bemeneha* sp.n.

Material.-

Holotype ♀ from Burma (no further information about locality); in a piece of amber (bur-

mite) presented to the B.M.(N.H.) by R.C.J. Swinhoe, on 3 July 1920; preserved in the B.M.(N.H.), inv. no. 20180.

Description.-

With the characters enumerated above for the genus.

Derivatio nominis.-

The specific name is coined after B.M.(N.H.), and it is a pleasure for me to dedicate it to the British Museum (Natural History) on the occasion of its centenary.

Affinities and general discussion.-

This specimen is the first known fossil caddis-fly from the Oriental Region, and, as could be expected, it is a highly interesting one, despite the limitations generated by the unsatisfactory state of preservation of its head and thorax, and by the fact that it is a female. For comparisons of all kinds, see especially Marshall (1979) where the problems of relationships and affinities within the family are repeatedly evoked. *Burminoptila bemeneha* g.n., sp.n. is without any doubt a very primitive hydroptilid, as is demonstrated especially by the wide wings with parabolic apex and with a very regular and complete venation; the venation of the fore wing is almost as complete as that of the Ptilocolepinae, the small primitive subfamily, containing likewise a fossil species from Baltic amber: *Palaeagapetus rotundatus* Ulmer, but the open discoidal cell, the lack of a bifurcated Cul (and the almost complete lack of transverse veins) prevent us from considering it as such (moreover, the wings are certainly not so broad as in the Ptilocolepinae). Very peculiar characters of the new genus are also the presence of a "furca IV" (at least apparently formed by M3-M4) in the hind wings, the antennae of only 19 slender articles, and the maxillary palpi, with three very small basal articles followed by two longer ones - all these characters very seldom if ever found in Hydroptilidae, and being possibly also signs of primitiveness, as well as the long and narrow discoidal cell and the thick Cu 1 in the fore wing. The spur formula (0,2,3) is less significant, being also found in a few genera of Hydroptilinae having little in common phylogenetically: the Oriental *Plethus* Hagen, the Cen-

tral American *Alisotrichia* Flint, the Nearctic and Neotropical *Neotrichia* Morton.

Five hydroptilid species are known from Baltic Amber, all of them very well described (Ulmer, 1912). One of these species is a Ptilocolepinae (*Palaeagapetus* Ulmer, also with a few recent Nearctic species), the four remaining being typical Hydroptilinae, belonging to the two recent genera *Agraylea* Curtis and *Allo-trichia* MacLachlan, and to the extinct genus *Electrotrichia* Ulmer. Comparison with these as well as with the recent hydroptilids, enables us to draw the following conclusion: *Burminoptila bemeneha* g.n., sp.n., is the most primitive known representative of the subfamily Hydroptilinae; to say that it is a "connecting link" between the two subfamilies of Hydroptilidae, would be of little use. Any subsequent attempt to reconstruct the phylogeny of the family, would have to take into account the information supplied by the species here described.

The only extra-european fossil caddis described as being a hydroptilid is *Hydroptila phileos* Cockerell, from the Eocene of Colorado; but from the very poor description of this badly preserved insect, it is not even possible to infer that it belongs to the Hydroptilidae!

#### ACKNOWLEDGEMENTS

I am grateful to Dr. P.E.S. Whalley and to Dr. P.C. Barnard (B.M.(N.H.)), Dept. of Entomology for their help during my stay there, and for entrusting to me the two specimens. I thank Dr. J.P. Duffels and Mr. W.H. Gravesteyn (Zoological Museum Amsterdam, Dept. of Entomology)

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for valuable advice concerning the true nature of *Plecophlebus nebulosus* Cockerell.

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#### RÉSUMÉ

Etude de deux exemplaires d'insectes fossiles dans l'ambre de la Birmanie, conservés dans le B.M.(N.H.). Le premier, décrit par Cockerell (1917) comme g.n., sp.n. de Trichoptère, sous le nom de *Plecophlebus nebulosus*, s'avère être en réalité un Homoptère. L'autre est apparemment le premier Trichoptère connu de l'ambre birmain; il est décrit ici comme *Burminoptila bemeneha* g.n., sp.n.; cet hydroptilide se montre être le représentant le plus primitif connu de la sous-famille des Hydroptilinae, et par certains caractères il se rapproche de la sous-famille primitive des Ptilocolepinae. Il s'agit ici des tout premiers documents concernant les Trichoptères fossiles de la Région Orientale.

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