

熱河省産昆蟲幼蟲化石

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第一次滿蒙學術調查研究團ハ昭和八年八月、熱河省朝陽附近ノ下部白堊紀含化石層ヨリ昆蟲幼蟲ノ化石ヲ採集セリ。コノ化石ハ EICHWALD ガ 1864 年シベリ
お Nertchinsk 附近ヨリ得ラレタル材料ニ基イテ記載セル、*Ephemeropsis trisetalis*
ニシテ蜉蟬目 (Ephemera) ニ屬ス。COCKERELL ハ 1924 年ニ蒙古ノ Ondai-
Sair Formation ヨリ得タル者ヲ同種トセリ。熱河省ヨリハ北票炭坑附近ノ者ヲ既
ニ秉志 (PING, 1928) ニヨリ記録セラレタリ。又 1930 年ニハ S. A. LEBEDEVA
嬢ハ中央蒙古ノ Urga ノ南ノ Nalaih Formation ヨリ得タル標品ヲ多分同種ナ
ラムト記載セリ。同種カ又ハ極メテ酷似セル種カニ屬スルト思ハルル標品ハ
Transbaical 地方ニテモ發見セラレタリト云フ (MARTYNOV 1932)。

本報告ヲ草スルニ當リ、余ハ上記化石ノ研究ヲ委託サレ且文献ニ閱覽ニ多大ノ
便宜ヲ與ヘラレタル、團長徳永重康博士ニ謹ンデ感謝ノ意ヲ表ス。

Ephemeropsis trisetalis EICHWALD

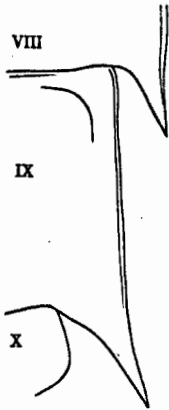
(挿圖 1; 圖版 I—III)

1864. *Ephemeropsis trisetalis* EICHWALD, Bull. Geol. France, (2), **21**, 21.
1868. *E. orientalis* EICHWALD (cf. HANDLIRSCH, Fossilen Insekten, 1908, p.
603).
1908. *E. trisetalis*, HANDLIRSCH, loc. cit., p. 603.
1908. *E. Middendorffi*, HANDLIRSCH, loc. cit., p. 603.
1924. *E. trisetalis*, COCKERELL, Bull. Amer. Mus. Nat. Hist., **51**, 6: 136—139.

1928. *E. trisetalis*, C. PING, Palæontol. Sinica, Ser. B, 13, fasc. 1, 38—39.

概形現世ノふたをかげろふ科 (Siphonuridae) ノ幼蟲ニ彷彿タル大形ノ幼蟲ニシテ、頭端ヨリ腹部後端迄ノ長サ 31—48 mm, 中ニハ約 23 mm 位ノ小形ノモノモアリ。體ノ後端ニ三本ノ尾ヲ具ヘ、ソノ兩外方ノモノハ體長ノ半バヨリ僅カニ長ク、例ヘバ體長 48 mm ノ個體ニ於テハ 26 mm 許アリ。中央ノモノハ兩外方ノモノヨリ短シ。

頭部ノ完全ニ保存セラレタルモノナク、ソノ形態ヲ知ルコトヲ得ザルモ、前胸部ヨリ遙カニ幅狭クシテ小形ナルガ如ク、觸角ノ基部ト考ヘラルル部分ノミハ明瞭ニ指摘シ得ルモノアリ。胸部ハ長サ約 8.5 mm, 前胸部ハ最モ短ク僅カニ 1.5 mm, 中胸部ハ幅最モ大ナリ。翅鞘ノ可成大形ニ發達セルモノアルモ、翅脈ハ僅カニ徑分脈ヲ認メ得タルノミ。腹部ハ 10 個ノ腹節ヨリナリ、ソノ中第四及ビ第五腹節最モ幅廣ク 9.5 mm, ソレヨリ後方ノ腹節ハ漸次ニ狭ク、第九腹節ハソノ



Ephemeroopsis trisetalis
EICHWALD.
第八乃至第十腹節
ノ側縁ヲ示ス。
(Lateral margins
of the abdominal
segments VIII-X.)

幅僅カニ 5.5 mm アルニ過ギズ。第十腹節ハ極メテ小形ニシテソノ幅第九腹節ノ半バヨリ僅カニ廣ク、長サハ第九腹節ノ半バニ及バズ。最モ幅廣キ腹節 (第四, 第五) ノ長サハ幅ノ約二分ノ一ナリ。第八及ビ第九腹節ノ後縁ハ兩側ニ於テ後方ニ突出スル鋭ク尖レル突起トナリ、第九腹節ノモノハ特ニ長クシテ第十腹節ヨリモ後方ニ達ス (挿圖)。第一乃至第七腹節ハ夫々各側ノ後端ニ内外二片ヨリナル鰓ヲ具フ。各鰓片ハ披針形ニシテ先端尖リ長サ 5—6 mm, 外縁ニ近ク一個ノ稜線ヲ有シ、内片ハ外片ヨリ幾分細シ。各鰓片邊緣ノ形態ハ明瞭ヲ缺ク。尾ハ三本、何レモ 1 mm 内外ノ幅ヲ有シ、多數ノ小節ヨリナリ (圖版 II, 2), 兩外側ノモノハ内側ノミニ、中央ノモノハ左右兩側ニ長キ細毛ヲ密生ス。尾ノ正確ナル長サハ尾端明瞭ナラザルタメ確定シ難キモ、中央ノモノハ兩外方ノモノ

ヨリ短シ。肢ハ一個體ニ於テ後肢ノ一部ヲ認メ得タルノミ。

本幼蟲ガ現世ノふたをかげろふ科ノ幼蟲ニ酷似セルコトハ、ソノ尾ノ中央ノモノハ兩側ニ、兩外方ノモノハ内側ノミニ細毛ヲ生ゼルコト、竝ニ體ノ後端ニ近キ

二三腹節ノ後側隅ガ鋭キ後向ノ突起ニ延伸セルコトニヨリテ知ラル。然レドモノノ鰓片ノ形態竝ニ配列ハ現世ノモノト頗ル異レリ。即チ現世ノふたをかげろふ科幼蟲ノ中、おほふたをかげろふ屬 *Siphonurus* EATON ニ於テハ、七對ノ鰓葉ノ中最初ノ二對ノミガ内外二枚ノ複葉ヨリナリ、他ノ五對ハスベテ單葉ナリ。又現世ノちらかげろふ *Isonychia* EATON 及ビひめふたをかげろふ *Ametetus* EATON ノ兩屬ニ於テハ、各對何レモ單葉ナリ。⁽¹⁾ 現世ノふたをかげろふ科中各對ノ鰓ガ何レモ複葉ナルハ、唯一屬 *Siphurella* BENGTSOON⁽²⁾ アルノミ。シカモ此等ノ諸屬ノ各鰓片ハ何レモ卵形廣卵形或ハ橢圓形ニシテ、*Ephemeropsis* ニ見ル如キ刀狀ヲナセルモノアルコトナシ。COCKERELL⁽³⁾ ハ *Ephemeropsis* ノ鰓ノ最後ノ二對ノミハ單葉ナランカトノ疑ヲ抱ケルガ、余ノ材料ニ於テハ第七腹節ノモノモ明カニ内外二葉ヨリナレルヲ認メタリ。

從來ノ記載ニ據レバ *Ephemeropsis trisetalis* ノ鰓ハ、第一乃至第八腹節ニ都合八對アルコトナレルガ、余ノ材料ニ於テハ第八腹節以後ニハ全ク鰓ヲ缺キ、全部ニテ七對ナルヲ認メタリ。元來蜉蝣類ノ鰓片ハ極メテ脫離シ易キモノナレバ、第八腹節ノモノガ脫落セル場合モ考ヘラルルガ、第一乃至第七腹節ノモノガ全部附着セルニモ拘ハラズ、最後ノモノノミ脫離シ去リタリトハ考ヘラレズ。PING⁽⁴⁾ ハ鰓ノ配置ニ就テハ何等記スル所ナキガ、ソノ圖 (p. 39, Fig. 17) ニヨツテ看ルニ明カニ七對ノ鰓片ヲ具フルコトヲ示セリ、但シ同氏ハ第十腹節ヲ見落セルガ如ク、"..., the hind margin of the last two abdominal segments latero-posteriorly produced..." (p. 38) ト記セリ。從來 *Ephemeropsis trisetalis* ノ鰓ハ八對ナリトセルコトニ就テハ、尙疑問ヲ殘スベキ餘地アルガ如シ。

Ephemeropsis trisetalis ニ頗ル酷似セル同ジク蜉蝣目幼蟲ノ *Phacelobranthus Braueri* HANDLIRSCH⁽⁵⁾ ハ、COCKERELL⁽⁶⁾ ノ如ク *E. trisetalis* ノ異名トシテ取扱ハントスル學者アルモ、尙疑問ヲ殘スベキ點多シ。Ph. *Braueri* ノ鰓ハ何レモ複

- (1) UENO, M.: Mem. Coll. Sci. Kyoto Imp. Univ., B, 4, 1, 1928, 52—54; UENO, M.: Annot. Zool. Japon., Tokyo, 13, 3, 1931, 205—219.
- (2) BENGTSOON, S.: Lunds Univ. Årsskr., N. F., Avd. 2, 26, 3, 1930, 9—10; SCHOENEMUND, E.: Die Tierwelt Deutschlands, Teil 19, 1930, p. 87.
- (3) COCKERELL, T. D. A.: Bull. Amer. Mus Nat. Hist., 51 6, 1924. p. 137.
- (4) PING, C.: Palæontologia Sinica, Peiping, Ser. B, 13, fasc. 1, 1928.
- (5) HANDLIRSCH, A.: Die fossilen Insekten und die Phylogenie der rezenten Formen. Leipzig, 1908. Text-Bd., p. 604; Taf.-Bd., Taf. 46, Fig. 33.
- (6) COCKERELL, loc. cit., 1924, p. 137.

葉ナルコトノ他ニ、多クノ絲狀片ヲ具フルコト現世ノ *Isonychia* EATON (= *Chironetes* WALKER) ノ幼蟲ニ於ケルガ如シ。然レドモ HANDLIRSCH ノ記載簡單ニ過ギ、唯 “mit zahlreichen Fasern.....” (p. 604) ト記セルノミナルヲ以テ如何ナル種類ノ絲狀片ナルヤ、ソノ圖 (Taf. XLVI, Fig. 33) ヲ見ルモ明カナラズ。*Isonychia* ノ鰓葉ハスベテ單葉ナルヲ以テ、*Phacelobranthus* ト頗ル異レリ。ソノ他ノ *Ephemeropsis* ノ各種 (*E. orientalis*, *E. Middendorffi*) ハ COCKERELL ノ考フル如ク恐ラク *E. trisetalis* ニ合一セラルベキモノナルベシ。

Ephemeropsis trisetalis ノ分類上ノ位置ニ就テハ、COCKERELL (op. cit., p. 136) ハ亞科 Ephemeropsinae ヲ設ケ、現世屬種ヨリナル亞科 Siphonurinae ト共ニふたをかげろふ科 Siphonuridae 中ニ收メシコトヲ提唱セリ。サレド先ニ論ジタル如ク諸種ノ特徴ニヨツテコレヲ見ルニ、*Ephemeropsis* ヲ現世ノ Siphonuridae 中ニ置クコトニ就テハ、今俄カニ論斷ヲ下シ難シ。LAMEERE⁽⁷⁾ ハ *Phthartus*, *Protereisma* ノ如キ二疊紀蜉蝣類ヲ含ム PERMOPECTOPTERA, *Ephemeropsis*, *Phacelobranthus* 等ノ中生代蜉蝣類ヲ含ム MESOPECTOPTERA, 竝ニ第三紀以後ノ蜉蝣類ヲ包括スル EUPLECTOPTERA ヲ一括スル PLECTOPTERA ヲ原蜉蝣類 PROTOEPHEMERIDA ニ對セシメタリ。

(7) LAMEERE, A.: Recueil de l'Inst. zool. TORLEY-ROUSSEAU, Bruxelles, 5, fasc. 2, 1935, p. 180 ff. & 200.

A FOSSIL INSECT NYMPH FROM JEHOI

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PLATES I—III AND FIGURE I

A very large nymphal form of insect was obtained by the First Scientific Expedition to Manchoukuo (1933) in the Chao-yang fossil-bearing series of lower Cretaceous age at the neighbourhood of Chao-yang, Jehol. This form is apparently identical with *Ephemeropsis trisetalis* EICHWALD, a siphonurid may-fly nymph that was first discovered in the shales of Nertchinsk, Siberia. PING, in 1928, recorded this species from the neighbourhood of Pei-piao coal-mine, Jehol. I wish to thank Dr. Shigeyasu TOKUNAGA, the leader of the Expedition, for having given me the opportunity of studying this interesting material.

Ephemeropsis trisetalis EICHWALD

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1908. *Ephemeropsis Middendorffi*, HANDLIRSCH, l.c., p. 603.
1924. *Ephemeropsis trisetalis*, COCKERELL, T.D.A.: Bull. Amer. Mus. Nat. Hist., **51**, 6: 136—139.
1928. *Ephemeropsis trisetalis*, C: PING, Palaeontologia Sinica, Ser. B, **13**, fasc. 1: 38—39.

Largest nearly complete specimen 48 mm long from front of head to base of caudal appendages. General form much like nymphs of modern Siphonuridæ, such as *Siphonurus*, *Ameletus*, *Isonychia*, etc. Body cylindrical, gradually

tapering posteriorly; head small, distinctly narrower than thorax; basal joint of antennæ distinct. Thorax about 8.5 mm wide; prothorax wide but very short, about 1.5 mm long. Nymphal wing-pads rather well-developed, but could not recognize the distinct venation shown by COCKERELL (1924, p. 137). Abdomen composed of ten segments, of which fourth and fifth are widest, 9.5 mm wide, then gradually tapering behind; tenth segment very small, little wider than half the preceding segment. Lateral margins of both eighth and ninth abdominal segments produced behind and sharply pointed as in nymphs of *Siphonurus* or *Isonychia*; in ninth segment such processes particularly prolonged, extending beyond tenth segment. Double gill-lobes present on abdominal segments 1—7; each lobe about 5—6 mm long, slender, of knife-blade form, pointed at tip, with narrow ridge along frontal margin. Of the three appendages, middle one shorter than outer ones, which are longer than half the body; about 26 mm long in specimen of 48 mm body length. Both outer appendages fringed with long hairs on inner sides only, while middle one has such hairs on both sides.

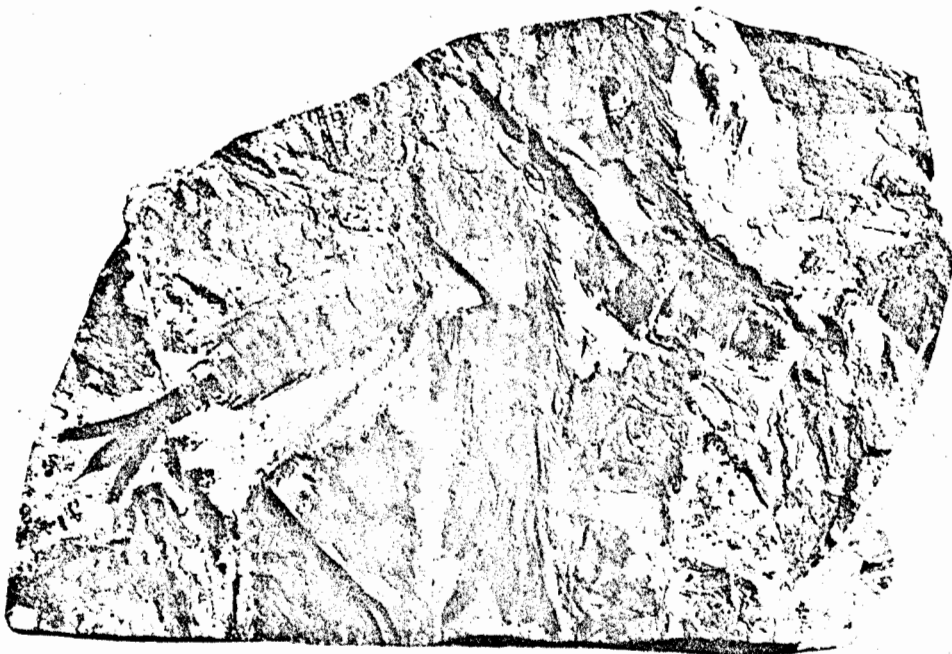
Remarks: In the features of the fringes of the caudal appendages and the lateral processes of the 2—3 last abdominal segments, *Ephemeropsis trisetalis* closely resembles the nymphs of the modern Siphonuridæ, but differs greatly from the living forms in the shape and arrangement of its gill-lobes. In the nymphs of living siphonurids, only *Siphurella* BENGTTSSON¹⁾ has seven pairs of double abdominal gills, though its gills are all broadly ovate in form and not slender and pointed as in *Ephemeropsis*. COCKERELL (l. c., p. 137) noticed that the last two pairs of gills are single, but in the specimens from Jehol all the gills are distinctly double. As far as I am able to make out from the descriptions given by other authors (HANDLIRSCH, COCKERELL, PING, etc.), the gills of *Ephemeropsis trisetalis* are present on abdominal segments 1—8, namely, eight pairs in all, which feature, however, I was unable to find in my specimens. The double gills are attached to the hind lateral parts of abdominal segments 1—7 (seven pairs in all), none being seen on the eighth segment. PING (1928, p. 38) did not give the number of gills nor their arrangement, but from his figure (l. c., p. 39, Fig. 17) there are only seven pairs.

(1) BENGTTSSON, S.: Lunds Univ. Årsscr., N. F. Avd. 2, 26, 3, 1930, p. 9—10;
SCHOENEMUND, E.: Die Tierwelt Deutschlands. Teil. 19. Jena, 1930. p. 87.



Ephemeroptis trisetalis EICHWALD. Lower Cretaceous, Chao-yang, Jehol.
About $1\frac{1}{2}$ nat. size.

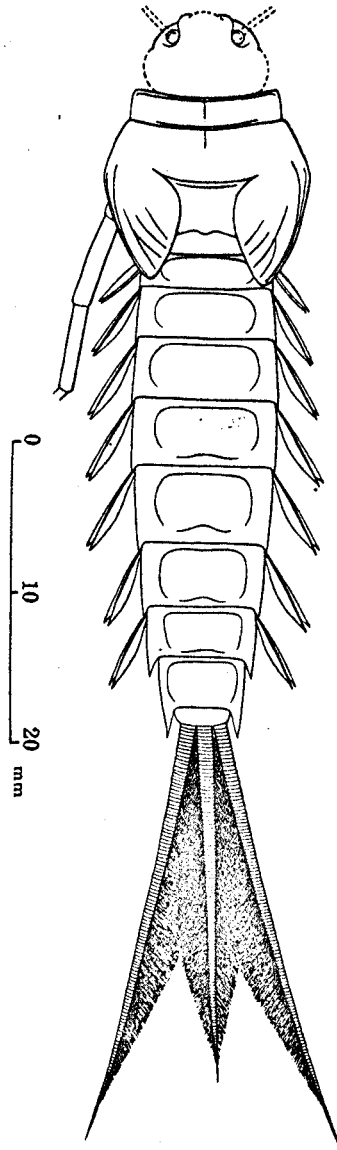
UENO photo.



Upper: *Ephemeropsis tristalis* EICHWALD. Lower Cretaceous, Chao-yang, Jehol. Small specimens. About $\times 2$.

Lower: The same; caudal setae. About $\times 12$.

UÉNO photo.



Ephemeropsis trisetalis EICHWALD. 半復舊圖. 熱河省朝陽下部白堊紀產.
Lower Cretaceous, Chao-yang, Jehol. Semi-reconstruction.

UÉNO del.