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Cretaceous Fossil Insects of China

BY

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CONTENTS

STUDY OF THE CRETACEOUS FOSSIL INSECTS OF CHINA

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INTRODUCTION

The Cretaceous insects of China are very little known. To study their taxonomy and distribution involves a threefold interest: First, during the Mesozoic era the Asiatic continent was larger than it is today according to the geologists, so the part of the continent, where China is today, may be expected to have a very rich insect fauna; secondly, as few fossil insects of the Mesozoic era described by former workers were from other regions of Eastern Asia than from China proper, namely Siberia, and Turkestan, it is interesting to note how much relationship existed among these insects distributed in the different regions on this part of the continent; thirdly, Mesozoic insects as a whole have not been so much studied as those of other eras, any so addition to such knowledge is considered to be of interest.

Former authors like Brauer, Redtenbacher and Ganglbauer have described a number of fossil insects belonging to the Middle Jurassic period from the Ust Balei Basin in the Irkutsk region: of Orthoptera, *Parapleurites gracilis, Pesudohumbertiella grandis*; of Blattoidea, *Ophismoblatta sibirica, O. maculata*; of Coleoptera, *Trinarchopais czekanowskii, Carabocera prisca*; of Perlaria, *Mesonemoura maaki, Mesoleutra gracilis. Platyperia platypoda*; of Odonata, *Palæophlebia synlestoides, Samarura gigantia, S. minor, S. pulla, S. augustata, S. roundata*; of Plectoptera, *Mesobaetis sibirica, Mesoneta antiqua* (both of nymph stage); of Panorpatae, *Mesopanorpa hartungi*; of Diptera, *Mesopsychoda dasyptera, Nematocera*. From the same region Handlirsch described three Coleopterous insects: *Dogeria sibirica, Memptus braueri, M. redtenbacheri*; and Oppenheim described two: *Phragmatoecites damesi* and *Palæcossus jurassicus*.

Martynov in a recent paper described thirteen beetles discovered in Jurassic slates in Eastern Karatau, Turkestan; *Carabopteron punctato-lineatum, Carabopteron punctatum, Mesocupes primitivus, Mesodascilla jakobsoni, Semenoviola obliquo-truncata, Tersus crassicornis, Lithostoma expansum, Nitidulina eclavata, Necromera baekmanni, Parandrekis parvula, Archæorrhynchus tenuicornis, Eumolpites jurassicus.*

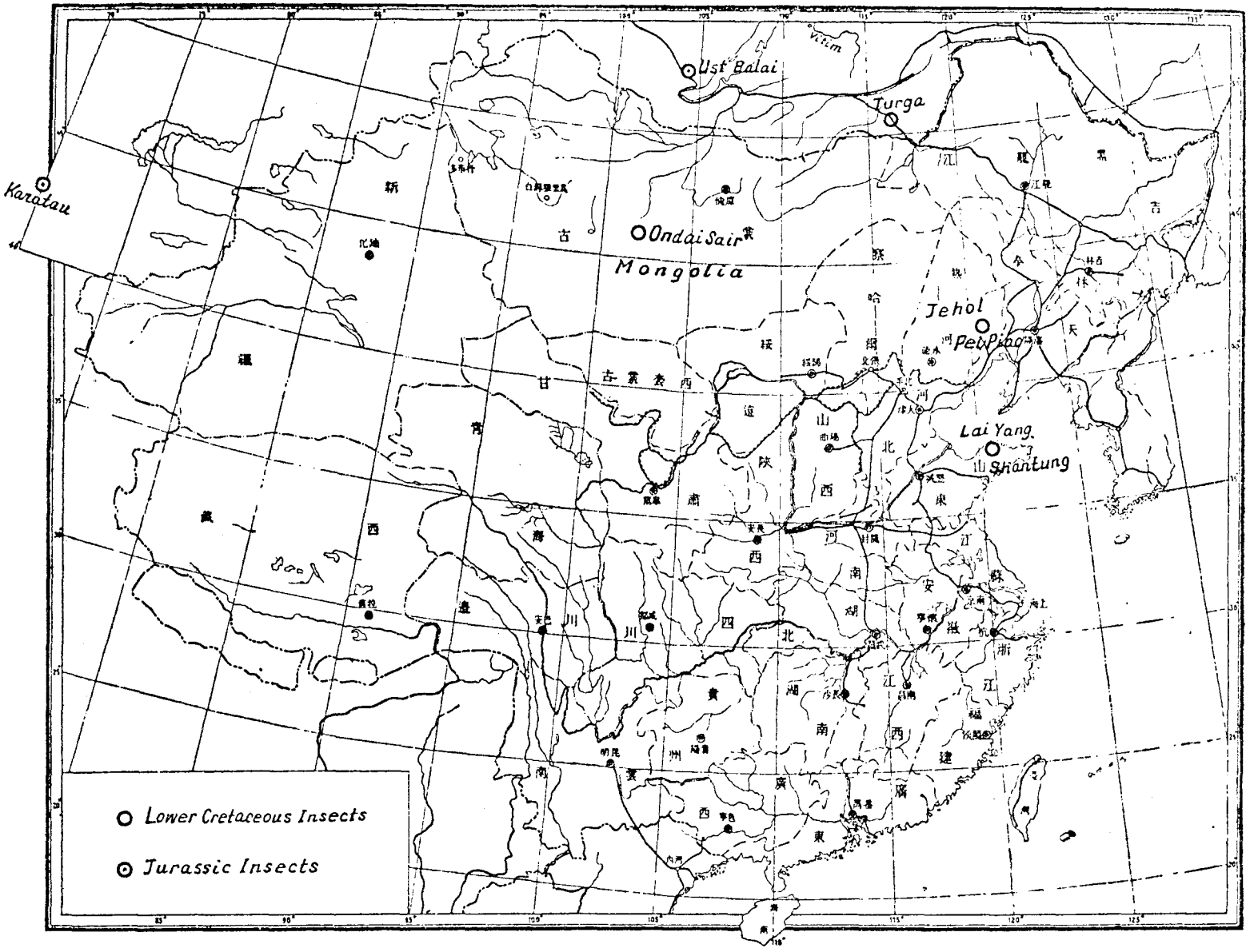
From probably Lower Cretaceous beds in different localities of Eastern Siberia a few insects have been recorded by Reis. These are: *Ephemeropsis orientalis* Eichward and *Phacelobranchus braueri* Handl. from Turga; *E. trisetalis* Eichw. from Towega River, Nertschink; *E. orientalis* Eichw, from Konduyewskaya on the Turga in Nertschink; *E. middendorfi* Handl. from Byrka; *Carabid* (gen. & sp. ?), *Phryganid* (gen. & sp. ?), *Libellulid* (gen. & sp. ?), from the deposits on the Witim River. In addition to the above, Heer records *Elateroides sibiricus* Heer. Cockerell is of the opinion that the above mentioned four species of fossil Mayflies described by Eichwald and Handlirsch are all synonymous.

Very recently the Lower Cretaceous insects of China have been studied by Grabau and Cockerell. The former author described four species from the shales of Laiyang, Shantung, which are *Sinoblatta laiyangensis, Laiyangia paradoxiformis, Proteroscarabæus yeni,* and *Samarura gregaria,* and the latter author recorded the following insects from Mongolia: *Ephemeropsis trisetalis* Eichwald, *E. malanurus* Cockerell, (?) *Cymatophlebia mongolica* Cock., *Chironomopsis gobiensis* Corck., Coleoptera (gen & sp. 7).

The specimens which I have studied and described in this paper were collected by the Staff of the Geological Survey, Peking, from two regions in China. Those from Laiyang, Shantung, were collected by Mr. H. C. Tan and Mr. H S. Wang and those from Pei-piao, Jehol, were collected by Dr. W.H Wong and Mr. H.C. Tan, and two specimens of *Ephemeropsis* by Pere Teilhard du Chardin. These two localities as well as those from where the above enumerated insects have been described and recorded I have indicated in the following map in order to show their distribution in the Jurassic and Lower Cretaceous periods.

Opportunities for finding things new in the insect fauna of the Lower Cretaceous and in working out their relationship with the insects of other periods on the Eastern Asiatic continent are tangible. The Geological Survey under the capable administration of Dr. W. H. Wong is every year enriching its museum with collections of fossil insects as well as specimens of geology and palæontology by its excellently trained staff. There is a great hope of widening the knowledge of Chinese Mesozoic insects.

Dr. A. W. Grabau kindly suggested to me to restudy those insects from the museum of the Geological Survey which he had described several years ago. The descriptions of these species, of which I have made a few alterations, are incorporated in the present paper.



A map showing the two localities of China where the Lower Cretaceous insects of the present investigation are distributed, and those from which Lower Cretaceous insects have previously been obtained————Ust-Balai and Karatau, the localities for Jurassic insects also added.

Order **PLECTOPTERA** Pack.

Genus **EPHEMEROPSIS** Eichward.

The specimens of the nymph stage are found on the shales of Jehol, one of which is almost complete in outline while the other has only part of its thorax and its abdomen preserved. It has an almost round head, the detail structures of the head are difficult to make out. Likewise are the wing pads in the dorsally exposed specimen and the legs in the ventrally exposed one. The segments of both the thorax and the abdomen are distinct. The abdominal segment is about twice as broad as long, the last two abdominal segments are free from tracheal gills, the prothorax is much shorter, about only half of the following segment or less, and the last abdominal segment is much smaller than any of the other body segments, the tracheal gills on both sides of the abdomen are well developed, the middle caudal appendage is shorter than either of the lateral ones. Following Cockerell, I have placed this form with the genus *Ephemeropsis*.

Ephemeropsis trisetalis Eichwald

Text figs. 17-18; Pl. II, Figs. 1,2.

1864. *Ephemeropsis trisetalis* Eichwald. Bull. Soc. Geol. Fr. (2) XXI. 21.

1908. *Ephemeropsis trisetalis* Handlirsch, Fossilen Insecten. p. 603.

1924. *Ephemeropsis trisetalis* Cockerell. Bull. Am. Mus. Nat. Hist. Vol. LI, Art. VI. pp. 137-139. Pl. I, figs. 1, 2, 4. (With further bibliography).

Head more or less rounded, first thoracic segment short, second and third slightly increasing in length, in the dorsally exposed specimens each of its wing pads preserved and more or less pushed laterally, its shape resembling a blade of a broad knife. Tracheal gills distinctly preserved, doubled in each pair, outer branch broader than the inner, abdomen gradually tapering posteriorly, the anterior margins of the first five or six abdominal segments convex anteriorly, the middle caudal appendage is smaller and shorter than the lateral ones, the hind margin of the last two abdominal segments latero-posteriorly produced in one of my specimens, but not quite so in the others, I believe this is only a minor variation or due to imperfect preservation.

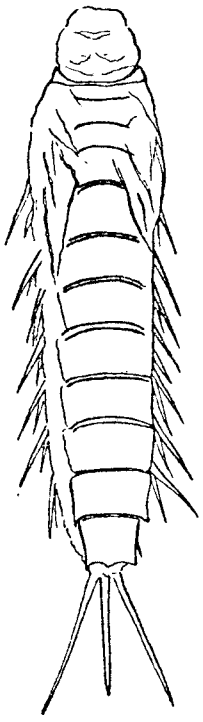


Fig. 17.
Ephemeropsis trisetalis Eichwald. Dorsal view.
Enlarged 1½ times. Cat. No. 2143.

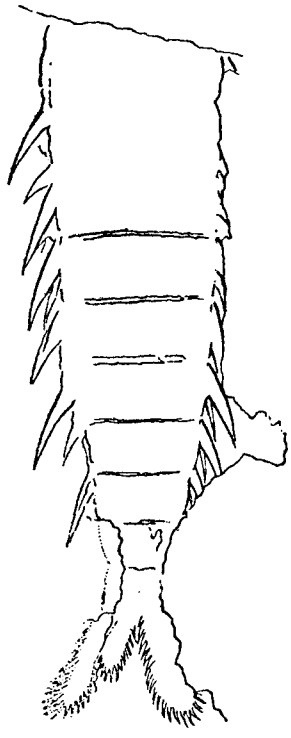


Fig. 18.
Ephemeropsis trisetalis Eichwald. Dorsal view.
Enlarged 2 times. Cat. No. 2144.

Length of this insect from head to base of caudal appendages 45 mm., length of head 6 mm., width of head 6.5 mm., average length of outer branch of tracheal gill 5 mm., length of lateral caudal appendage about 11 mm., as its distal parts are not clear in its preservation, length of middle caudal appendage about 9 mm., (In one specimen, middle one about 9 mm., lateral one about 13 mm.).

HORIZON AND LOCALITY: Lower Cretaceous, Jehol. Coll. Peres Licent and Teilhard de Chardin.

Order **MEGALOPTERA** Handlisch

Genus **COPTOCLAVA** Ping (gen. nov.)

Several specimens of the present form in question were collected from the Laiyang shales. Some of them have their dorsal surfaces exposed while the others their lateral, but all of them are of the larval stage. The wing venation of this insect cannot be referred to under such circumstance. The compodeoid form, the

EXPLANATION OF

PLATE II.

Errata: P. 29, for *Figs. 4, 5, 8.* read *Figs. 5, 6, 7.*

PLATE II.

CRETACEOUS FOSSIL INSECTS OF CHINA

(Photographs by K. H. Hsu)

Fig. 1. *Ephemeropsis trisetales* Eichwald.....p. 38
Dorsal view, × 1.2 (G. . China Mus. Cat. No. 2143).
Pei-piao, Jehol. (Loc. No. 2105).

Fig. 2. Same as fig. 1, Abdominal region.

Fig. 3. *Coptoclava longipoda* Ping (sp. nov.).....p. 40
Dorsal view, ×2, Cotype (G. S. China Mus. Cat. No. 2145).
Gray shale of Tuan-Wang, Laiyang Hsien, Shantung Province. (Loc. No. 228).

Fig. 4. Same as fig. 3.....p. 40
Dorsal view, × 2.
Type (G. S. China Mus. Cat. No. 2146).

Fig. 5. *Sinoperla abdominalis* Ping (sp. nov.).....p. 29
Dorsal view, × 3.5
Type (G. S. China Mus. Cat. No. 2135).
Upper coal series (sandstone and shales) Tai-Chi-Ying-Tsu, Pei-piao coal field, Jehol, (Loc. No. 2100).

Fig. 6. Same as fig. 5.....p. 29
Dorsal view, × 3.3
Cotype (G. S. China Mus. Cat. No. 2136).

Fig. 7. Same as fig. 5.....p. 29
Adult wing × 6.
Cotype (G. S. China Mus. Cat. No. 2137).

Fig. 8. *Chironomopsis gracilis* Ping (sp. nov.).....p. 37
Lateral view × 6.
Type (G. S. China Mus. Cat. No. 2142).
Gray shales of Pei-piao, Jehol. (Loc. No. 2101).

Fig. 9. *Chironomaptera melanura* Ping (sp. nov).....p. 35
Oblique dorsal view × 10.
Type (G. S. China Mus. Cat. No. 2140).
Laiyang formation, West of Tuan Wang, Laiyang Hsien, Shantung Province, (Loc. No. 228).

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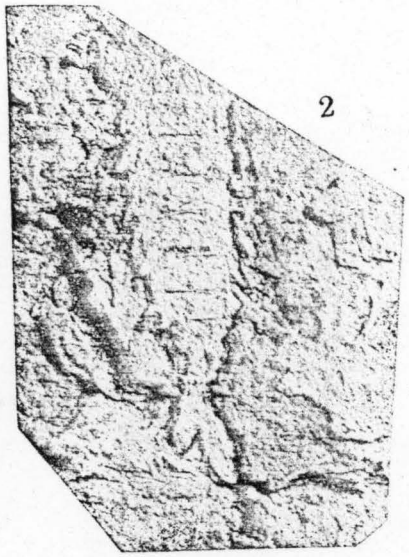

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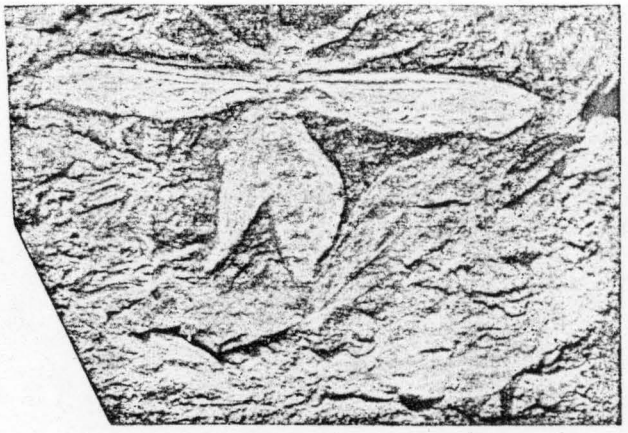

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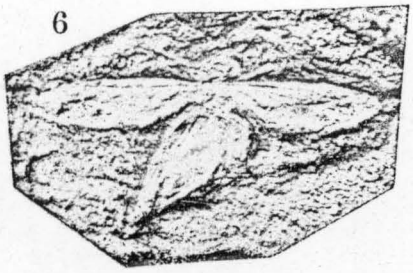

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