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ON FOUR FOSSIL INSECTS FROM SINKIANG*

C. PING

The Fan Memorial Institute of Biology.

The specimens, to which the following descriptions are given, are selected from a collection from Turfan, Sinkiang Province. This collection was made by Mr. T. H. Ting of the Department of Geology at the National Peking University. It was kindly presented to me for investigation. Four genera of Jurassic fossil insects are found to be in better preservation. Having studied them carefully, I find three of the genera and each of the four species are all new to science. It is deemed necessary to have them reported before hand. I desire to thank Mr. T. H. Ting for kindly letting me have his collection, and to thank Mr. T. Y. Ku and Miss T. N. Pan for various kinds of help and Mr. C. Ho for making the drawings and measurements.

Order DERMAPTERA.

Genus Mesoforicula Ping, Gen. Nov.

There are two specimens found in the collection. Most of the principal characters are well preserved. The leathery fore wings which are shorter than the hind ones, the forceps-like cerci and the general outline of the head and other structures show this form to be of the order Dermaptera and of the family Forficulidae.

Each of the two specimens is dorsally exposed, one with its wings moderately spread, while the other with them much

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more widely separated. Some of the wings are black in the preservation. Both the fore and hind wings are narrow, and the veins of the latter are not observable. The antennae are comparatively short, the thorax and abdomen slender, each segment of the latter of almost uniform width, the cerci simple and short. All these characters distinguish it from the insects of this group on record, so the new generic named as above is given.

Genotype: *Mesoforicula sinkianensis* Ping

Horizon: From Jurassic Formation (probably upper Jurassic, according to Mr. T. H. Ting) of Maiyohkow, Turfan, Sinkiang.

Mesoforicula sinkianensis Ping, sp. nov.

Head moderate, its mouth parts only slightly shown. The posterior part of the head at the junction with the prothorax is somewhat constricted. Antennae are not perfectly preserved. They seem to be comparatively simple and short. The prothorax is short, the meso- and metathorax are dorsally exposed, they are distinct and the sutures between themselves, and between them and the first segment of abdomen not recognizable. The general contour of the wings is preserved, all are well developed, the hind pair is considerably longer than the fore, the leathery nature of the fore wings may be recognized by its smooth and thickened appearance, but the veins of the hind wings are not observable at all. The insect, as shown by the present specimens, may be of mature stage, and its hind wings

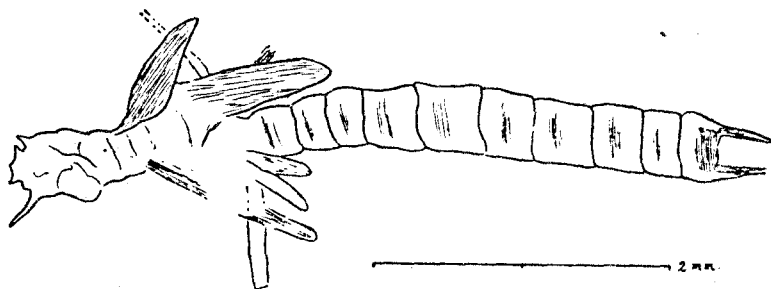


Fig. 1. *Mesoforicula sinkianensis* Ping. Dorsal view. Camera lucida drawing.

are quite well developed. The abdomen, not much narrower than the thorax, is slender, almost uniform in width and looks somewhat cylindrical. Its segments are quite distinct, each with a prominent transverse ridge in its middle. There are altogether ten segments. The cerci are very simple, slender and gently curved. They are well preserved in one of the specimens.

The legs of the insect are not well preserved in either of the specimens. Only the femora and tibiae are partly seen, while the other segments are not possible to observe.

Total length 5 mm., head less than 1 mm., thorax 1.2 mm., abdomen 3 mm., greatest width (thorax) about 1 mm.

Total length of another specimen 6.3 mm., head about .6 mm., thorax about 1.7 mm., abdomen about 4 mm., greatest width (thorax) about 1 mm.

Horizon and locality: Jurassic: Maiyohkow, Turfan, Sinkiang Province, Coll. Mr. T. H. Ting.

Order PLECOPTERA

Genus Ephemeroptera Eichwald

Two specimens of this genus are found in this collection. They are the abdomens of the insect. In one of them eight segments are preserved and in the other, nine. They are quite distinct, each of the anterior segments about 2 or more times as broad as long and of the posterior only slightly broader than long, the last segment free from tracheal gills, and much smaller than any of the others. Each of the abdominal gills is considerably broad at its base, but much reduced toward its tip. The three caudal appendages are long and well developed, with their distal portion not well preserved. The main features of this form agree with those of the genus, *Ephemeroptera*, of Eichwald.*

Ephemeroptera tingi Ping, sp. nov.

Both specimens are ventrally exposed. The abdomen is much reduced caudally. The suture between each two segments

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

is distinct. The segment is clearly marked as a rectangular piece, whose width is greatest in the case of the first one. The width is reduced toward the caudal end, but the length is only slightly increased. The tracheal gills of each segment, except the last one, which is free from gills, are well developed and very much thickened and broadened at their bases on both sides of the abdomen. The distal portion of each gill is narrow and slender with a pointed end. The gills are doubled in each pair, but they are one overlapping the other, so that the doubling is very difficult to be seen. It is only in one or two segments of the specimens we can see two distal filaments, which serve as an indication of such a doubling condition of the gills. The tracheal gills are gradually reduced in size toward the caudal end of the abdomen. The caudal appendages are not very slender. They must be considerably long, although their entire length is not preserved. The segmented feature of these appendages is only very faintly recognizable. It is impossible to make out whether the middle one is longer or shorter than the lateral.

This species differs from *Ephemeropsis trisetales* Eichwald 1864 in many respects. First of all, it is much smaller in size. The tracheal gills of the abdomen are much thicker basally and the proportion between the width and length of the abdominal segments differs from that of the latter species.

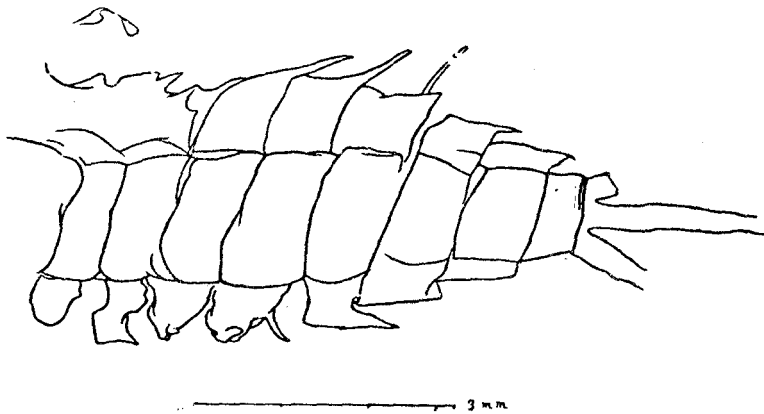


Fig. 2. *Ephemeropsis tingi* Ping. Dorsal view. Camera lucida drawing.

Furthermore, instead of two, only the very last one of the abdominal segments is free from gills.

As I have found it does not agree with any of the formerly described species, it is considered to be a new one. I take great pleasure to have it named after Mr. T. H. Ting, the collector of the specimens.

Length of abdomen excluding the caudal appendages 7 mm., its greatest width 2+ mm., smallest width 1 mm.,

Horizon and locality: Jurassic: Maijohkow, Turfan, Sinkiang Province. Coll. Mr. T. H. Ting.

Genus *Sinoephemera* Ping, Gen. nov.

The specimen is not completely preserved, with its last few abdominal segments missing. The insect is somewhat laterodorsally exposed, with most of its essential features recognizable. Its head, from the laterodorsal aspect, is ovoid, and the antennae comparatively long and well developed. Its eyes are not recognizable. The thorax is almost covered up by the wing pads with only a portion of its posterior part exposed. As the wing pads are fairly large and elongated and broadly leaf-shaped, the insect is considered to be of an advanced nymph stage. The legs appear to be thick in both femoral and tibial segments, its tarsal portions are short. The abdomen is slender and long, each segment bearing a tracheal gill on its side, and each gill is somewhat oval in outline. The main characters of this form do not fit into any genus of Plectoptera on record, therefore the above new generic name is proposed.

Genotype: *Sinoephemera kingi* Ping.

Horizon: At present only species from the Jurassic formation of Sinkiang.

Sinoephemera kingi Ping, sp. nov.

Head laterally exposed, the eyes and the mouth parts not well shown. Antennae with their distal portions not preserved. They appear to be fairly long and slender. Thorax covered with the wing pads, which are considerably long, broadly lanceolate. Only a small portion of the posterior part of the

matathorax exposed. Legs are comparatively well preserved. Both femur and tibia of each of them considerably thick, tarsus short and slender, more or less curved. Abdomen slender and long, with its last few segments not preserved. There are only eight segments observable, each with a tracheal gill of oval outline on its side. Each segment is narrow and thin, so that the abdomen appears to be considerably slender. Each two consecutive segments are more or less disarticulated or stretched, to have the conjunctiva exposed.

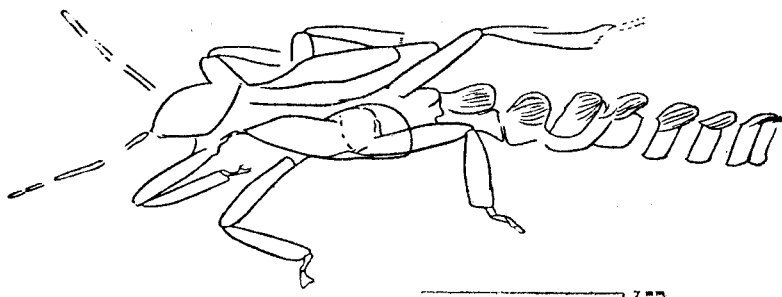


Fig. 3. *Sinoephemera kingi* Ping. Dorsolateral view. Camera lucida drawing.

Total length of the specimen 21.4+mm., length of head 2.8 mm., width 1 mm., length of thorax 5.4 mm., length of femur of middle leg 3.6 mm., length of tibia 3.2 mm., length of femur of hind leg 4.6 mm., length of tibia 3.9 mm., width of abdomen 1.4 mm.

The species is named after my friend, Mr. Sohtsu G. King, who has taken great interest and sincere effort to support the development of biology in this country.

Horizon and locality: Jurassis: Maiyohkow, Turfan, Sinkiang Province. Coll. Mr. T. H. Ting.

Genus *Mesonetopsis* Ping, Gen. nov.

Among the specimens the present form is found to be well preserved in its general outline. It represents the nymph stage of the insect with its wing pads in a very rudimentary stage. The head is much pressed backward over the prothorax,

and their structures are very difficult to make out. The outline of the head in such twisted condition is oval as viewed from its dorsal aspect. The antennae are short. The legs are long, and all of them have their distal parts lost. The wings, which are not perfectly preserved, are each of a long triangular outline. The thorax has its anterior part covered over by the head and the rest of it is not very distinct. The abdomen has its anterior few segments comparatively narrow and its following few broad. They are more or less stretched, leaving between each two a space in the preservation, where was originally the conjunctiva.

The essential features of this form suggest it to be near the genus *Mesoneta* (Brauer, Redtenb., Gang.),* but it should be by no means placed as the same with the latter. Hence the new generic name, *Mesonetopsis*.

Genotype: *Mesonetopsis zeni*.

Horizon: Only known species from the Jurassic of Turfan, Sinkiang.

Mesonetopsis zeni Ping, sp. nov.

Head oval in outline, antennae short and slender. Prothorax not well exposed, meso- and metathorax with some faint sutures, and partly covered with wing pads. The thorax as a whole is comparatively short. Legs seeming to be long, with comparatively broad femora and slender tibiae. The wing pads are long and very thin. No trace of veins can be observed. Their anterior portions are not very distinct, and their posterior portions cover over the anterior region of the abdomen. Abdomen consisting of ten segments, which are distinct. The eighth segment is broadest and its width twice its length. The abdomen broadens caudally, and after the eighth segment it becomes reduced toward the caudal end. There are three caudal appendages, which are all very short and tapering, of which the middle one is slightly smaller.

*Brauer, Redtenbacher, and Ganglbauer, 1886, Mem. de L'acad. Imp. des Sc. St. Peters., Soc. VII, Vol. 35, no. 15.

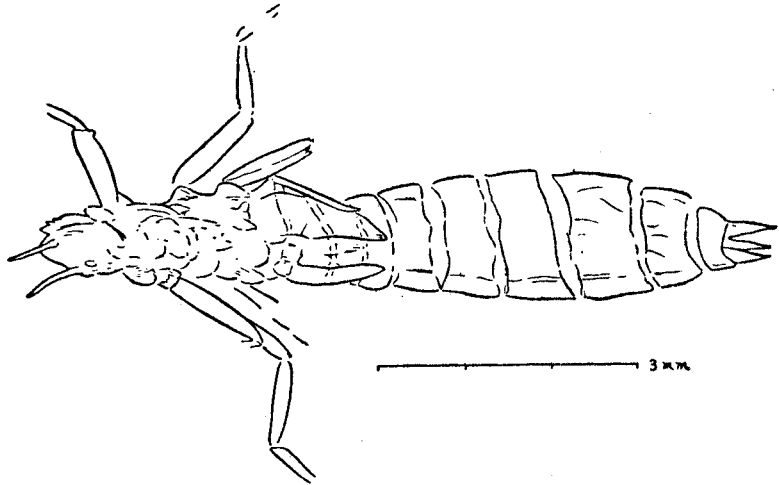


Fig. 4. *Mesonetopsis zeni* Ping. Dorsal view. Camera lucida drawing.

Total length, excluding the caudal appendages, 8.2 mm.; greatest width (8th abdominal segment) 1.6 mm.; length of head 0.9 mm.; width 0.5 + mm.; length of meso- and metathorax 1.2 mm.; width 1.0 mm.; length of abdomen 5.9 mm.; greatest width 1.6 mm.

In tracing over every available record of fossil insects, I have not been able to identify this form with any described genus and species, so I take pleasure to name it after Mr. H. C. Zen, Director of the China Foundation, for his noble effort in developing science in this country.

Horizon and Locality: Upper Jurassic: Maiyohkow, Turfan, Sinkiang Province, Coll. Mr. T. H. Ting.

新疆之四種化石昆蟲

秉 志

此篇所述之化石昆蟲，凡四屬，每屬一種。北大地質系丁道衡先生所採其產地為新疆吐魯番北之煤窩溝。據丁君報告。其地層為上侏羅紀。

此四屬之古昆蟲。(一) *Mesoforicula*。其種為 *Sinkianensis*。屬於革翅目 (*Dermaptera*)。(二) *Ephemeropsis*。其種為 *tingi*。(三) *Sinoephemera*。其種為 *kingi*。(四) *Mesonetopsis*。其種為 *zeni*。皆屬於 *Plectoptera* 目。(一),(三),(四),等屬皆新屬。所有四種,皆新種,未經前人研究。每屬每種之一切特徵,見於本篇之各圖。及英文紀錄。