

NOTES ON THE EUMASTACINÆ
(ORTHOPTERA, ACRIDIDÆ) FROM CHINA
WITH THE DESCRIPTION OF ONE NEW
GENUS AND TWO NEW SPECIES

BY

K. S. FRANCIS CHANG, M. SC., PH. D.

Our knowledge of the acridid subfamily *Eumastacinæ* is as yet very meagre and incomplete. We have so far records of only four genera and species from China. They are very poorly represented in most of our collections. These acridids are mainly denizens of the warmer south; only a minority of them have encroached upon the borders of the palearctic and Himalayan regions. Adding to these four genera and species already known to occur in China, a new genus is here described, including in it two hitherto unknown species. This new genus proves to be one of very special interest. Though isolated in its taxonomic position, it shows certain affinities to an equally interesting Central Asian genus *Gomphomastax*. In this respect, the present new genus may have considerable importance in zoogeographical and phylogenetic interpretations.

WU records two other genera and species from China proper in his *Catalogus insectorum sinensium* (1935), namely *Gomphomastax clavatus* (Ostr.) from Soochow and *Erucius magnificus* Rehn from Foochow and Canton (Lofau Shan). The first record is due to misdetermination; the authenticity of the second species is also open to question. The value of this useful reference on Chinese entomology referred to above would have been greatly enhanced if some indication was given to indicate the source of information of the records included.

In the following pages, brief notes on the synonymy, literature and records of the already known species may be included along with the description of a new genus and species.

1. *Butania lugubris* (Brunner).

1898. *Erianthus lugubris*, Brunner, Abhandl. Senckenb. Ges., 24: 222, 225, n. 6.
 1903. *Bennia oberthuri*, I. Bolivar, Bol. Soc. Espan., 3: 303.
 1930. *Butania lugubris*, C. Bolivar, Trab. Mus. Nac. cienc. Nat., ser. Zool., no. 46, p. 123.
 1935. *Butania lugubris*, Wu, Cat. Ins. Sin., 1: 126.

BRUNNER was not certain as to whether China was actually the correct locality of his type or not. It seems not improbable that this species may occur in our southwestern provinces as Yunnan, Tibet and the neighbouring Himalayan regions since there are subsequent records of the same species from Butan Ingles and Sikkhim. The species *Bennia oberthuri* I. Bolivar (1903), synonymized under the present species, was collected from Butan Ingles: Maria Basti. Dr. C. BOLIVAR in his monograph (1903) recognizes two subspecies, namely *B. lugubris lugubris* and *B. lugubris major*. The former is supposed to be a Chinese form and the latter Sikkimese. They are differentiated by size only.

2. *Bennia innotata* (Walker).

1871. *Mastax innotata*, Walker, Cat. Derm. Salt. B. M., 5 (Suppl.): 88.
 1930. *Benia innotata*, C. Bolivar, l. c., p. 145.
 1935. *Bennia innotata*, Wu, Cat. Ins. Sin., 1: 126.

Since the discovery of this species from Yunnan, collected by Dr. ANDERSON, there has been no subsequent record. So far as I am aware, it has not been found outside of China. It is perhaps endemic to Yunnan. Its rediscovery is awaited with great interest.

3. *Erianthus versicolor* Brunner.

1898. *Erianthus versicolor*, Brunner, l. c., 24: 222, 224, n. 4, pl. 17, 30.
1903. *Erianthus flavipes*, Saussure, Rev. Suisse Zool., pp. 78, 79, n. 2, pl. 3, 10.
1914. *Erianthus tonkinensis*, C. Bolivar, Trab. mus. Nac. cienc. Nat., Madrid, no. 16, p. 9.
1914. *Erianthus Dohrni*, C. Bolivar, l. c., p. 7-8.
1930. *Erianthus versicolor*, C. Bolivar, l. c., p. 123-129.
1935. *Butania versicolor*, Wu, l. c., 1: 126.
1935. *Erianthus guttatus*, (nec Westwood!), Tinkham, Lingn. Sc. J., 14: 482.

This species is not uncommonly met. I have specimens collected from Fukien (Foochow, Yenping), Chekiang, Kwangtung and Kwangsi provinces. The form recorded by TINKHAM (1935) as *Erianthus guttatus* belongs to here. The latter species is Indo-Malayan in distribution, known to occur in Sumatra, Malay Peninsula, Penang and Birmania, and not as far north as China.

Among records in foreign museums, the museum of Paris has one male from Kiangsi, collected by A. David; the British Museum has two males labelled "China".

4. *China mantispoides* (Walker).

1870. *Mastax mantispoides*, Walker, Cat. Derm. Salt. B. M., 4: 792, n. 8.
1930. *China mantispoides*, C. Bolivar, l. c., no. 46, p. 377-380.
1935. *China mantispoides*, Wu, l. c., 1: 127.

WALKER'S record does not bear any specific locality. I have before me a series of males and one female collected by Father PIEL from Ihing in Kiangsu province in the month of August, 1933. TINKHAM told me that he has unpublished record of the same species from Kwangtung province. So far as I am aware, these are the only records subsequent to that of WALKER.

It is interesting to note that the female sex of this species is rare. The Musée Heude female specimen is the only record that I know of. The type in the British Museum is a male, and this museum has another specimen collected from Laskio in Birma, also a male. The museum of Oxford has one specimen from Siam which is again a male. The female is here for the first time described.

Allotype, female: Ihing, Kiangsu, VIII, 8, 1933. (Coll. O. PIEL).

Size medium. *Head* elevated considerably above the plane of the pronotum. *Antennæ* short, with 11 segments, shorter than the anterior femora. *Eyes* oblong, convex and bulging, longer than the infra-orbital distance, *inter-orbital distance* on dorsum of head narrow, about as broad as the frontal costa between the antennæ. *Fastigium* grooved, slightly projecting beyond the compound eyes, margins distinct, apex truncate. Median carinula on dorsum of head subobliterate. Face moderately retreating. *Frontal costa* with the portion above the lateral ocelli deeply sulcate with very distinct and subparallel lateral margins, seen in profile with this portion concave; constricted at the lateral ocelli, where the side margins are practically contiguous, below this point widened again with broad obtuse side borders, deeply grooved medially just below the constriction mentioned above, below the median ocellus, the frontal costa becomes gently narrower and somewhat constricted again, very slightly dilating further below, suddenly widening out at near the clypeus. Face rather flat.

Disc of pronotum with distinct median carina traversed by a furrow slightly before the middle; anterior margin truncate and somewhat curved upwards; posterior margin obtuse-angular, rounded at the tip. *Lateral lobes* with anterior border slightly convex below, otherwise straight, posterior border straight and vertical, anterior-ventral angle broadly rounded, posterior-ventral angle right-angular, ventral border slightly sinuate.

Anterior femora stout with the dorsal posterior keel somewhat more elevated than the anterior dorsal ridge, posterior inferior keel crenulate (when magnified), forming an obtuse step at the apex. *Anterior tibiæ* narrow apically, posterior inferior keel bearing eight spines of equal length on apical half, and anterior inferior keel also bearing eight spines of the same length on the apical half. *Intermediate femora* and *tibiæ* same as those of the fore leg. Unlike the male, the female intermediate *tibiæ* do not bear the broad lamellate lobes on the outer surface of their apical half. *Hind femora* not reaching to tip of elytra, the dorsal keel serrated, ventral keels smooth. *Hind tibia* bearing 22 spines on the outer lower keel and 19 spines on inner lower keel, the inner ones considerably larger than the outer ones, neither of them showing alternating sizes. *Hind metatarsus* with dorsal keel smooth, the outer keel bearing a distinct end-tooth.

Elytra extending beyond hind femora and abdomen, transparent, tip obliquely truncate with a slight cloudy touch; veins yellowish brown, the narrow linear field between the scapular and the first radial veins opaque and infumate except near the tip. Hind wing when folded as long as elytra, transparent, with some irredescent reflection, veins darker brown than those of the elytra, anterior border with a narrow linear and elongate infumate stigma, tip of the first and second lobes slightly darkened.

The *8th abdominal segment* long. The *9th* and *10th terga* are fused, only one-third the length of the *8th*. *Supra-anal plate* triangular, the sides flexed downwards, apex rounded. *Podical plate* reaching slightly beyond the supra-anal plate, triangular in outline, shallowly grooved to receive the cerci. *Cerci* not extending beyond either the podical plate or supra-anal plate, conical, acuminate. *Valves of the ovipositor* well exerted, moderately long; outer borders crenulate with broad gross blunt teeth. *Subgenital plate* long, apically triangularly produced.

General coloration yellowish brown. Dorsum of head darkish. Hind femora and tibia with dark transverse bands. Elytra hyaline with grey veins.

Length of body, 22.7 mm., length of pronotum, 3 mm., length of elytra 17.8 mm., length of hind wings, 17.5 mm., broadest width of hind wing, 8 mm., length of hind femora, 11.8 mm.

Father PIEL gives me an interesting account of his field observation of this rare species. The series of males and one female were collected from the trunks of pine trees (presumably *Pinus massoniana* Lamb.). They were not too easily seen on account of their slender size and their coloration which matches the back ground.

Pielomastax * Gen. nov.

Completely apterous. *Antennæ* short, shorter than the fore femora, filiform, 9-segmented; basal segment rather thick, about one and half times longer than broad; the second segment slightly shorter than the first segment; the third the longest of all the segments, almost as long as the first and second together; the preapical segment bearing a minute internal spine near its apical margin; the apical segment triangular, not dilated at all. *Eyes in males* subroundish, strongly bulging sidewise, its vertical height only a little greater than the infra-orbital distance, inter-orbital distance on dorsum of head very broad, about equal to the horizontal width of the eye in males. *Eyes in females* comparatively smaller and more oblong, its vertical height slightly less than the infra-orbital distance, inter-orbital distance above very broad, even slightly greater than the vertical height of the eye, broader than the horizontal width of the same. *Dorsum of head* gently and smoothly sloping from between the eyes backwards, moderately convex;

* Name given in honour of Father OCTAVE PIEL who has contributed much to chinese entomology.

median carinula subobliterate. *Fastigium* very broad, convex, seen in profile very slightly raised above the level of the eyes, not projecting, anteriorly smoothly curving over joining the frons with which it is merged, its anterior margin being present only on each side. Face receding. *Frontal costa* not narrow, sulcate throughout except the dorsal extremity which is slightly convex and bearing a fine median vertical carinula; side margins from above downwards: parallel at the dorsal extremity, laterally convexly bulged right below the lateral ocelli, concave at the median ocellus, suddenly and strongly diverging near the clypeus. The median ocellus situated below the mid-length of the frontal costa. Face and cheeks smooth.

Pronotum with *disc* somewhat tectiform; anterior margin truncate, posterior margin biconvex, neither of them curled upwards; *median carina* fine but distinct, no transverse sulcus on disc; *lateral carinae* present, weak or subobliterate, subparallel to each other in males, broadly and slightly convex towards the outside in females. *Lateral lobes* longer than high, with a vertical sulcus near the middle, the anterior and posterior margins slightly convex or straight, ventral margin obliquely straight or slightly concave in the middle, both anterior and posterior ventral angles obtusely rounded. The mesothoracic spiracle very large and exposed, not entirely hidden by the pronotum!!

Mesosternal lobes transverse, interspace broad with side margins widely divergent. *Metasternal lobes* separated by the two fossæ which are obliquely placed.

Anterior femora with two dorsal keels equally developed, each ending apically in a short tooth, space between the keels flat; lower keels also equally developed, the posterior one without a step-like formation near the apex. *Anterior tibia* rectangular in cross-section, inferior keels serrated on distal half or a little more with 12-14 anterior and 10-11 posterior teeth, including the apical ones. *Median tibia* very much the same as the anterior. *Hind femora*

comparatively thick, not reaching tip of abdomen, all of the dorsal keels serrated, the superior median one bearing 6-12 teeth, the apex of each dorsal keel bearing a minute tooth; outer knee lobes with ventral margin practically straight, apex blunt, bearing a short minute tooth at its upper angle; inner knee lobe with inferior margins practically straight, apex triangular, with short pointed tip. *Hind tibiæ* almost as long as the hind femora, inner series of spines with the four apical ones close together, more or less of equal length; the fifth apical tooth large, larger than any of those distad of it, and above this spine, the rest are of alternative length except the proximal ones; inner pair of claws unequal in length and much larger than the outer pair. Posterior metatarsus as long as the segment beyond, upper keels bearing 3-5 spines.

The *meso-* and *meta-thoracic segments* and the *abdominal terga* with a median longitudinal keel, tectiform, but the segments near the tip of the abdomen are more cylindrical, and curled upwards.

Male: The 7th and 8th *abdominal terga* normal, the 8th shorter than the 7th dorsally. The 9th and 10th *terga* are dorso-medially absent, being on the first hand very deeply excavated and on the second hand covered by the overlapping 8th; laterally they form trapezoidal lobes. *Supra-anal plate* broad, membranous basally, tip a triangular lobe. *Cerci* rather elongate, somewhat laterally compressed, directed and arched meso-dorsally. *Subgenital plate* short, and blunt at tip.

Female: The 9th and 10th *abdominal segments* completely fused, narrow dorsally, one-third the width of the preceding segment, triangularly excised dorso-medially. *Supra-anal plate* triangular, grooved medially, with a transverse ridge before the middle. *Cerci* short, not reaching the hind margin of the podical plate, conical, slender, tapering to a subacuminate tip. *Podical plates* very broad. *Subgenital plate* very long, its hind margin deeply cleft

medially, and the lobes on each side of the cleft rounded at the tip. *Valves of the ovipositor* generally retracted; the upper valves with small short teeth; the ventral valves with a few strong teeth on the outer inferior border, inner inferior border with a short small basal tooth.

Genotype: *Pielomastax octavii*, nov. sp.

The present genus is one of extremely great interest and may eventually prove to be of considerable significance in the consideration of the relationship and distribution of the montane and most northern representatives of the Eumastacids. It is rather isolated in position. A careful analysis shows that its closest relatives are the genera *Gomphomastax* and *Pædomastax*. The last two genera belong to the fauna peculiar to the high mountains of Central Asia from the Himalayas to the Russian Turkestan, similar in range as such Catantopid genus *Conophyma*. These forms have penetrated into the Palaearctic regions. It will not be surprising to find them in our Tibetan regions. As a matter of fact, UVAROV did record a species of *Gomphomastax* which he could not determine with certainty from Ruksh, Tscho-Morari (Tibetan Frontier), represented by one female (1925). Among the known Eumastacids in a broad sense, the new genus is perhaps unquestionably the nearest relatives of the two genera mentioned above.

Some of the characters which differentiate *Pielomastax* from the *Gomphomastoids* may here be mentioned. (1). The *Gomphomastax* complex have the antennæ generally longer than or at least as long as the anterior femora and clubbed at the tip. *Pielomastax* has the same structure distinctly shorter than the anterior femora, and not in the least clubbed. (2). The details of the fastigium and frons. In the *Gomphomastoids*, the fastigium seen dorsally are more angularly bent downwards. In *Pielomastax* the same is distinctly more rounded and curved downwards to meet and merge with the frons. In the *Gomphomastoids* the

dorsal portion of the frontal costa above the lateral ocelli are broader and more evenly sulcate, strongly constricted at the lateral ocelli. (3). Pronotum with the hind margin of disc straight in the *Gomphomastoids*, the same is medially excised in *Pielomastax*. (4). The meso- and metathoracic terga broad and moderately tectiform in the *Gomphomastoids*; they are strongly tectiform in *Pielomastax*. (5). The female subgenital plate of the *Gomphomastoids* not deeply split terminally into two lobes. (6). There is no trace of the organs of flight in *Pielomastax*, but they are represented by minute rudiments in *Gomphomastoids*. (7). The peculiar lower position of the first thoracic spiracles of *Pielomastax*.

On the other hand the new genus is also distantly related to the Nearctic genera, *Psychomastax*, *Morsea*, etc., from which it is well differentiated. It seems to me that *Pielomastax* is somewhat intermediate between the *Gomphomastoids* from the Himalayas and Turkestan on the one hand and the *Psychomastoids* of the Nearctic region on the other, and this assumption is based on the ground that *Pielomastax* in its present isolated and distinctive position among the Eumastacids is certainly most closely related to the genera mentioned. It seems to give one a horizontal distribution of very ancient times.

Key to the species of *Pielomastax*

- A. Posterior metatarsus with 3 (rarely 4) spines on outer superior keel and 4 (sometimes 3) spines on the inner superior keel. Male cerci with apex obliquely truncate.....*P. octavii* nov. sp.
- AA. Posterior metatarsus with 4 (sometimes 5) spines on outer superior keel and 5 (sometimes 4) spines on inner keel. Male cerci with tip bifurcate.....*P. soochowensis* nov. sp.

Pielomastax octavii, nov. sp.

Size median. Organs of flight altogether absent. Posterior metatarsus with the superior outer keel bearing 3 (rarely 4) spines and the superior inner keel bearing 4 (sometimes 3) spines.

Type, male: Kuling mountains, VII, 11, 1935 (Coll. O. PIEL). abdomen generally curled up. Cerci slender, somewhat laterally compressed and directed and arched inwards, apex obliquely truncate. Subgenital plate convex, viewed externally with tip blunt, posteriorly keeled, dorsally deeply and narrowly cleft.

Allotype, female: same locality as type. Dorsal valves of ovipositor with short and blunt serrations on both the inner and outer edges; the lower valves with the outer edge bearing two gross triangular teeth excluding the tip and sometimes one or two minor teeth; the inner edge bearing a basal tooth.

General coloration dull brown, each side of body with a continuous dark band from behind the eyes to the tip of the abdomen in males, in females more diffused and less distinct.

Length of the body, male 15.7—18.2 mm., female 20.8—23 mm. Length of pronotum, male 2.2—2.25 mm., female 3 mm.. Length of hind femora, male 9.25—10 mm., female 10.8—12 mm.

The types, and a long series of paratypes (47 females and 36 males) have been collected from the Kuling mountains in Kiangsi Province by Rev. Father PIEL in the months of July and August in 1934 and 1935. The types are kept in the Musée Heude collection of insects.

These grasshoppers were collected among short grass and grass about one to two feet high. They were rather sluggish and did not jump far, and were collected with ease.

***Pielomastax soochowensis* sp. nov.**

1935. *Gomphomastax clavata*, (nec Ostr.), Wu, Cat. Ins. Sin., 1: 127.

Very close to the former species, in habit and general facies, only slightly larger in size, but morphologically they are very well differentiated. Posterior metatarsus with the

outer superior keel bearing 4-5 spines and the inner dorsal keel bearing 5 spines.

Type, male: Tienpinshan, Soochow, VIII, 15, 1935 (Coll. K. S. Chang). Abdomen generally curled up. Cerci long, bowed inwards, tip bifurcate, the upper lobe very broad and bluntly rounded at the tip, pointing upwards, the ventral lobe represented by a fine and rather long sharp tooth directed downwards.

Allotype, female: Same locality as type. Ventral valves of ovipositor with the external ventral edge bearing 2-3 gross teeth, often with a few minor serrations.

Length of body, male 18—20 mm., female 22.5—26 mm. Length of pronotum, male 2.5—2.5 mm., female 3—3 mm. Length of hind femora, male 10—11 mm., female 12—14.2 mm.

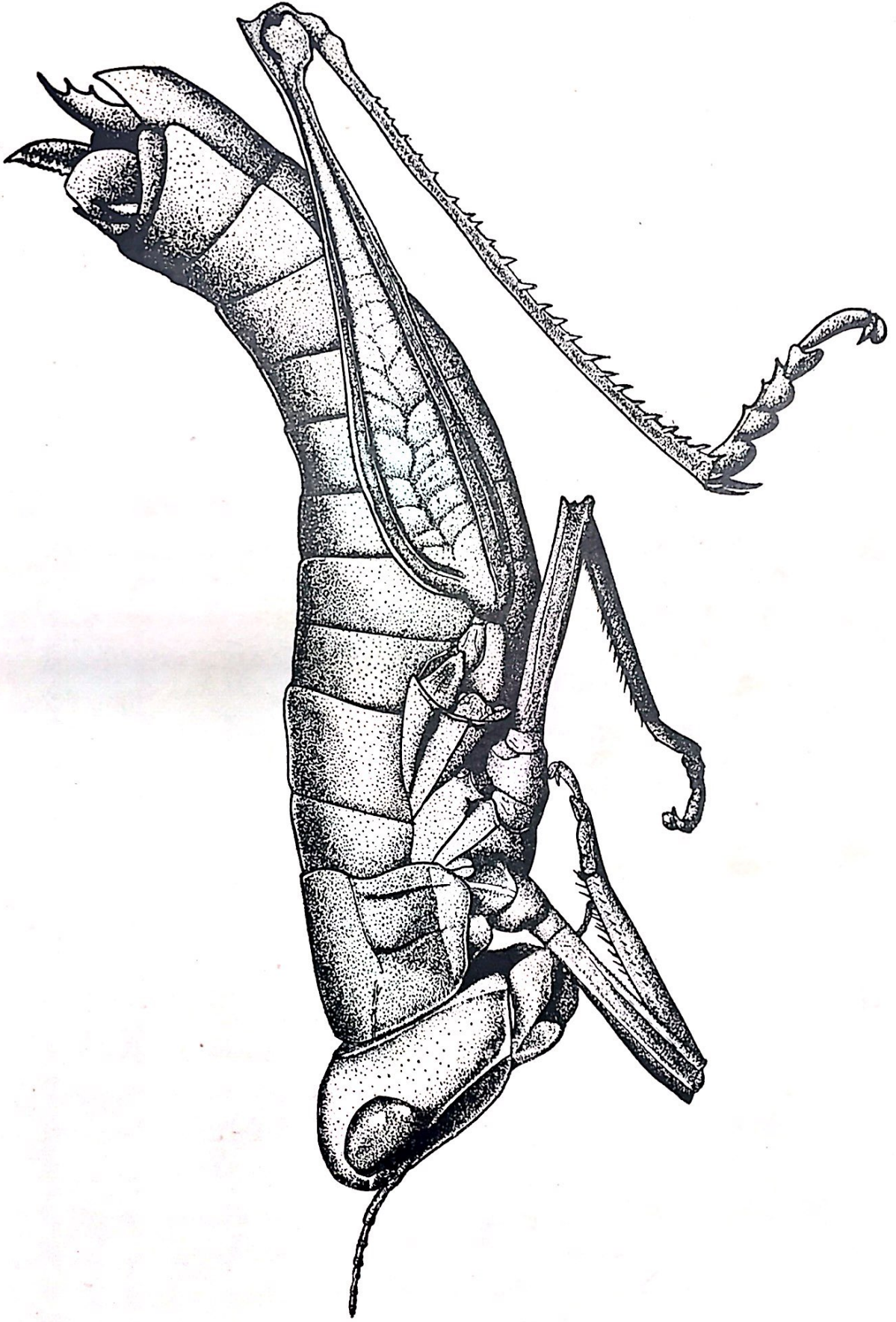
Besides the types and paratypic series of 8 males and 10 females I have collected from Tienpinshan in Soochow, Father PIEL has also collected 3 females and 6 males from Tienmushan in Chekiang. The types are placed in the Musée Heude collection of insects.

This species is not uncommon in Tienpinshan. They have not been noticed by entomologists because of their resemblance to immature forms.

I have been for some time puzzled by Dr. WU's record (1935) of *Gomphomastax clavata* OSTR. from Soochow, a species which is as far as known confined to Turkestan in Central Asia. When I discovered the present species from Soochow, I began to doubt WU's record very strongly. I found during my visit to Washington Museum that the record is due to misdertermination by CAUDELL.



Pl. I.



Lateral view of *Pielomastax octavii* nov. sp. (female).

PLATE II

- Fig. 1. Female subgenital plate of **Pielomastax octavii** nov. sp.
2. Dorsal view of head and pronotum of **P. octavii** nov. sp. (male).
 3. Caudal view of tip of abdomen of male **P. soochowensis**, nov. sp. showing subgenital plate and cerci.
 4. Same of **P. octavii**, nov. sp.
 5. Hind tibia of **P. octavii**, nov. sp.
 6. Hind tibia of **P. soochowensis**, nov. sp.

