

## NEW OR LITTLE-KNOWN CRANE-FLIES FROM FORMOSA (TIPULIDÆ, DIPTERA).

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During the past eight years, numerous important collections of crane-flies have been made in various parts of the island of Formosa so that now we have an excellent foundation for future work on this fauna. A large and valuable collection of Tipulidæ and Ptychopteridæ has recently been received from Dr. T. Shiraki, Chief of the Division of Entomology of the Agricultural Experiment Station of Formosa. Several species that are undescribed and a number of others that are still insufficiently known were contained in this material so that the collection amply merits a special report. The writer wishes to express his sincere thanks to Dr. Shiraki and his assistant entomologists for the privilege of studying this material. The types are preserved in the writer's collection.

The following altitudes of stations included in this paper were supplied by Dr. Shiraki: Arisan, about 8,000 feet; Funkiko, about 6,000 feet; Kanshiree, about 1,000 feet; Koshun, about 300 to 500 feet; Musha, about 3,700 feet; Noko, about 10,000 feet; Shinchiku (a prefecture; collecting done at 500 to 1,000 feet); Shishito, about 1,000 feet; Taito (a prefecture; collecting done at about 500 feet); Tappan, about 3,000 feet.

The high mountains of Formosa support a rich endemic crane-fly fauna, this including a curious union of Oriental and Holarctic genera. Besides the numerous endemic forms, a considerable number of additional species described from adjoining countries have been taken in Formosa. These include species described from Japan (Alexander), the Philippine

Islands (Bezzi), Sumatra and Java (Edwards, de Meijere and Alexander) and British India (Brunetti). The more important papers dealing with the crane-fly fauna of the island are the following:

- Edwards, F. W. A Revision of the Tipulid Genus *Styringomyia*, Lw.; Trans. Ent. Soc. London, 1914, Part I, pp. 206-227, pl. 19-25, 1914.  
Edwards, F. W. New and little-known Tipulidæ, chiefly from Formosa. Ann. Mag. Nat. Hist., ser. 8, vol. 18, pp. 245-269, pl. 12; September, 1916.  
Enderlein, Gunther. Studien über die Tipuliden, Limoniiden, Cylindrotomiden und Ptychopteriden; Zool. Jahrb., Syst., vol. 32, pt. 1, pp. 1-88, 1912.  
Matsumura, S. Thousand Insects of Japan. Additamenta II, pp. 185-474, pl. 16-25; July, 1916.  
Riedel, M. P. H. Sauter's Formosa-Ausbeute. Nematocera Polyneura (Dipt.); Supplementa Entomologica, No. 1, pp. 26, 27; 1912.  
Riedel, M. P. The same, part II; Entomologische Mitteilungen, vol. 2, no. 9, pp. 272-276; 1913.  
Riedel, M. P. The same, part III; Archiv für Naturgeschichte, Abt. A, vol. 5, pp. 109-116; 1916 (August, 1917).  
Riedel, M. P. The same, part IV, Liriopidae (Ptychopteridae) und Nematocera Polyneura (Dipt.); Annales Musei Nationalis Hungarici, vol. 16, p. 315-320; 1918.

So far as known, the Oriental crane-fly fauna is the richest of all the regions of the world. It is interesting to note that the known fauna of this region is even now far larger than that of either the much better known Palæarctic or Nearctic regions.

### Libnotes Westwood.

#### Libnotes regalis Edwards.

1916. *Libnotes regalis* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, p. 248.

One female, taken at Arisan, Formosa, June 22, 1917 (T. Shiraki) No. 1331.

This magnificent crane-fly has hitherto been known only from the type, a fragmentary specimen in the collection of the British Museum that from its size is judged to be a male. The female sex may now be described and additional details of color and structure indicated.

*Allotype*, ♀. Very similar to the description of the type. Rostrum and palpi dark brown. Antennæ moderately long for a member of this genus, dark brown, the apices of the flagellar segments indistinctly paler. Head greenish yellow. The supernumerary cross-veins of the wings are surrounded by conspicuous brown seams, the one in cell  $R_3$  lying just proximad of  $r$ , the one in cell  $R_5$  being almost in alignment with the outer deflection of  $M_3$ ;  $r$  at the tip of  $R_1$ . The wing-markings described by Edwards as being black are here of a medium brown. Abdomen brownish testaceous, sternites paler, especially basally; a

*Limnobia atridorsum* is a species that might be referred with almost equal propriety to either *Limnobia* or *Dicranomyia*. Its closest relative seems to be *L. japonica* (Alexander) of Japan.

#### Dicranomyia Stephens.

##### Dicranomyia puncticosta Brunetti.

1912. *Dicranomyia puncticosta* Brunetti; Fauna Brit. India, Diptera Nematocera, pp. 377, 378, pl. 7, fig. 7.

A small series of both sexes from Funkiko, Formosa, April 21-29, 1917 (T. Shiraki) No. 1339.

#### Antocha Osten Sacken.

##### Antocha javanensis Alexander.

1915. *Antocha javanensis* Alexander, Proc. U. S. Nat. Mus., vol. 49, p. 171, pl. 43, fig. 18.

A small series of both sexes taken at Shishito, Formosa, May 25-26, 1917 (T. Shiraki) No. 1345. The specimens agree well with the type of *A. javanensis*, although there are, in some specimens, three feebly-defined brownish stripes on the praescutum. This is presumably the species mentioned by Edwards from Horisha, Formosa (Ann. Mag. Nat. Hist., ser. 8, vol. 18, p. 249), although the species is very much smaller than the European *A. vitripennis* (Meigen). The male sex has not been described and one of the present specimens is hereby designated as allotype.

*Allotype*, ♂. Male hypopygium with the dorsal pleural appendage cylindrical, chitinized, the apex truncated and with a small rounded notch; ventral appendage fleshy with numerous coarse bristles.

*Male*—Length 4-4.1 mm.; wing, 4.3-4.5 mm.

Allotype, ♂, Shishito, Formosa, May 25, 1917.

#### Styringomyia Loew.

##### Styringomyia flavitarsis sp. n.

General coloration shiny black; legs black, the posterior tarsi obscure yellow; wings dark brown.

*Male*—Length, 7.8 mm.; wing, 6.1 mm.

Rostrum and palpi dark brown. Antennal scape brownish black; basal flagellar segments dark brown, the remainder brownish yellow, the segments rather elongated. Head brownish testaceous.

narrow, dark brown lateral stripe on either side. Ovipositor as in the genus, the tergal valves comparatively small and strongly upcurved, the longer sternal valves almost straight, but slender.

*Female*. Length 12.8 mm.; wing, 17.8 mm.

Allotype, ♀, Arisan, Formosa, June 22, 1917.

#### Limnobia Meigen.

##### Limnobia atridorsum sp. n.

General coloration of the mesonotum shiny black; pleura yellowish, marked with black; wings brownish yellow, the cord indistinctly seamed with darker; abdominal tergites dark brown, sternites yellow, ringed caudally with dark brown.

*Female*—Length 9 mm.; wing, 9.1 mm.

Rostrum black, moderately elongated; palpi black. Antennae of moderate length, the first scapal segment brownish black; second segment pyriform, yellowish; first flagellar segment obscure yellow basally, remainder of the flagellum black; flagellar segments cylindrical, with long, black verticils. Head strongly narrowed behind the eyes, shiny brownish black, the front and anterior part of the vertex gray pruinose; a median furrow on the occiput and posterior part of the vertex.

Pronotum black medially. Mesonotal praescutum shiny black, the humeral region conspicuously obscure yellowish; remainder of the mesonotum shiny black. Propleura orange-yellow; mesepisternum and mesosternum black; remainder of the pleura greenish yellow, with a rounded dark brown spot on the lateral sclerites of the postnotum immediately before the root of the halter. Halteres pale brown, the knobs dark brown. Legs with the fore coxae and trochanters orange-yellow; remaining coxae and the trochanters greenish yellow; rest of the legs broken. Wings brownish yellow; stigma dark brown; cord and outer end of cell *1st M*<sub>2</sub> narrowly and indistinctly seamed with brown; wing-tip indistinctly darkened; veins dark brown. Venation: *Sc* long, *Sc*<sub>2</sub> at the tip of *Sc*<sub>1</sub> and at least four times as long as *Sc*<sub>1</sub> alone, about equal to *r*; *Rs* moderately long, angulated and slightly spurred at origin; *r* removed from the tip of *R*<sub>1</sub> to a distance between one and one-half to two times its own length; cell *1st M*<sub>2</sub> closed, basal deflection of *Cu*<sub>1</sub> just beyond the fork of *M*; the costa continues around the wing-margin as a delicate vein.

Abdominal tergites dark brown; sternites yellow, the posterior margins of the segments narrowly ringed with dark brown, these bands increasing in size to the apical segments, on the sub-terminal segments including the entire sternite. Ovipositor with the tergal valves long, straight, acute; sternal valves shorter.

*Habitat*: Formosa. Holotype, ♀, Funkiko, April 25, 1917 (T. Shiraki) No. 1335.

Thoracic dorsum entirely shiny black. Pleura dark brown. Halteres brownish black. Legs with the coxæ black; trochanters obscure yellow; femora black, obscure yellow basally, this marking most extensive on the fore legs, almost obliterated on the posterior femora; tibiæ entirely black; tarsi of the fore legs black, the metatarsi slightly paler basally; posterior tarsi dull yellow, only the last segment blackened. Wings with a strong, dark brown tinge; a faintly darker cloud on *r-m*; veins brownish black. Venation: 2nd Anal vein not angulated or spurred.

Abdomen black.

*Habitat*: Formosa. Holotype, ♂, Funkiko, April 27, 1917 (T. Shiraki) No. 1351.

The only species with which this large, vigorous *Styringomyia* may be confused is *S. solocipennis* (Enderlein) of Madagascar, a much smaller fly with the legs entirely dark brown.

***Styringomyia flava* Brunetti.**

1911. *Styringomyia flava* Brunetti, Rec. Indian Mus., vol. 6, p. 301.

Three ♂ ♀'s, Funkiko, Formosa, April 21-27, 1917 (T. Shiraki) No. 1329.

**Paratropeza Schiner.**

***Paratropeza (Gymnastes) hyalipennis* sp. n.**

Generally similar to *P. ornatipennis* (de Meijere); wings hyaline, without dark crossbands.

*Male*—Length 4.8 mm.; wing, 5.6 mm.

Rostrum and palpi brownish black. Antennæ brownish black, the scapal segments a little brighter. Head broad, shiny blue-black.

Mesonotum deep black, the praescutum and scutum with bluish reflections, the postnotum with faint purplish reflections. Pleura black, the mesopleura faintly grey pruinose; dorso-pleural membrane dull yellow. Halteres black, the apices of the knobs pale yellow. Legs with the coxæ brownish black; trochanters yellowish brown; only the posterior pair of legs remain; femora obscure brownish yellow, the swollen tips broadly dark brown, immediately before the brown tips a narrow yellowish ring; tibiæ yellow, the tips broadly blackened; metatarsi with the basal half yellow, the distal half and the remaining tarsal segments black. Wings hyaline, only the small, rounded stigma brown; veins dark brown. Venation almost as in *P. ornatipennis*; *r* on  $R_2$  near the middle of its length; basal deflection of  $Cu_1$  at or immediately before the fork of *M*.

Abdomen blue-black.

*Habitat*: Formosa. Holotype, ♂, Funkiko, April 25, 1917 (T. Shiraki) No. 1354.

***Paratropeza (Gymnastes) ornatipennis* (de Meijere).**

1911. *Gnophomyia ornatipennis* de Meijere; Tijdschr. v. Ent., vol. 54, pp. 47, 48, pl. 3, fig. 34.

Three ♂ ♀, Funkiko, Formosa, April 21-29, 1917 (T. Shiraki) No. 1338.

***Paratropeza (Gymnastes) shirakii* sp. n.**

Black, the front and vertex white; halteres with the knobs white; femora and tibiæ black, each with two narrow white rings; metatarsi white basally; wings brown, the base and two narrow crossbands whitish hyaline; *r-m* connecting with *Rs* before its fork.

*Male*—Length, 4.2-4.3 mm.; wing, 5 mm.

*Female*—Length, 5 mm.; wing, 5 mm.

Rostrum and palpi brown. Antennæ with the first segment whitish, remainder of the antennæ dark brownish black. Front and anterior part of the vertex snowy white, the latter slightly protuberant; remainder of the head black, sparsely gray pruinose.

Thorax black. Halteres dark brown, the knobs and extreme ends of the stem whitish. Legs with the coxæ and trochanters black; femora black, a narrow ring beyond mid-length and the narrow tip white; tibiæ black, a narrow ring immediately beyond the base and a subequal ring beyond midlength white; metatarsi with the basal half white; remainder of the tarsi black; posterior femora clavate as in this group of species. Wings dark brown, the base up to the arculus, a very narrow crossband before the cord and a subequal similar band at the outer end of cell 1st  $M_2$  whitish hyaline; the first of these bands does not include cells *C* and *Sc*, but the outer band extends from margin to margin. Venation: *r* not with the apparent fork, as in *ornatipennis*, inserted on  $R_{2+3}$  about its own length beyond the fork; *r-m* connecting with *Rs* before its fork; basal deflection of  $Cu_1$  at the base of the very narrow cell 1st  $M_2$ .

Abdomen blue-black; in the female, the valves of the ovipositor are light horn-colored.

*Habitat*: Formosa. Holotype, ♂, Funkiko, April 21, 1917 (T. Shiraki). Collectors No. 1354. Allotopotype, ♀. Paratopotype, ♂.

This exquisite little fly is dedicated to its collector, Dr. T. Shiraki. It is most nearly related to *P. bistratiipennis* (Brunetti) of South-western India, differing in the uniformly black thorax and the very different leg-pattern.

**Atarba Osten Sacken.**

***Atarba pallidicornis* Edwards.**

1916. *Atarba pallidicornis* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, pp. 249, 250.

Six males and females, Funkiko, Formosa, April 21-27, 1917 (T. Shiraki) No. 1342. Only the female sex has been described. Edwards is entirely right in stating that the tibial spurs in this and the following species are lacking. This is a very strange condition, though entirely duplicated in the genus *Polymera* and in *Lecteria* (if we consider *Psaronius* Enderlein as being a spurred form of this genus). The new subgeneric name, *Atarbodes*, may be applied to the group of species with spurless tibiae, the type of the subgenus being the present form.

*Allotype*, ♂. Very similar to the female. Antennae short, with long, conspicuous verticils, longest on the basal segments of the flagellum. Abdomen with a barely indicated subterminal brown ring. Hypopygium with the outer pleural appendage, densely set with appressed blackened spines; inner appendage a little longer, flattened, pale, at the apex with a few hyaline setae.

*Male*.—Length 4.5-4.8 mm.; wing, 5.8-6 mm.

*Allotype*, ♂, Funkiko, Formosa, April 27, 1917.

#### *Atarba fuscicornis* Edwards.

1916. *Atarba fuscicornis* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, p. 250.

One female, Funkiko, Formosa, April 21, 1917 (T. Shiraki) No. 1349.

#### Erioptera Meigen.

##### *Erioptera alboguttata* Edwards.

1916. *Erioptera (Erioptera) alboguttata* Edwards; Ann. Mag. Nat. Hist., ser. 8, vol. 18, p. 252, pl. 12, fig. 4.

One male from Funkiko, Formosa, April 29, 1917 (T. Shiraki) No. 1356. As pointed out by its describer, this interesting crane-fly bears a striking resemblance to species of the subgenus *Mesocyphona*, especially *E. (M.) dulcis* and *E. (M.) needhami*, but is a true member of *Erioptera* in the restricted sense.

##### *Erioptera (Empeda) nigroapicalis* sp. n.

Size moderately large (wing over 4 mm.); head gray; femora yellow, the tips broadly and conspicuously brownish black; wings subhyaline, veins brown; male hypopygium with the outer pleural appendage heavily chitinized, blackened.

*Male*.—Length 3.2 mm.; wing, 4.5 mm.

*Female*.—Length 4 mm.; wing, 4.7 mm.

Rostrum and palpi reddish. Antennae with the first scapal segment grayish pruinose; second segment enlarged, black; first flagellar segment

enlarged, subequal to the second scapal segment in size, black; remainder of the flagellum reddish brown; verticils of moderate length only. Head light bluish-gray.

Mesonotal praescutum obscure yellowish-brown, with three broad black stripes, the lateral stripes continued caudad onto the scutal lobes, the median stripe best indicated anteriorly; remainder of scutum dark gray pruinose; scutellum and the posterior margins of the scutal lobes obscure yellow; postnotum black, sparsely gray pruinose. Pleura yellowish, the mesopleura and lateral sclerites of the postnotum darker and faintly grayish pruinose. Halteres bright yellow. Legs with the coxae and trochanters yellow; femora yellow, the tips broadly and conspicuously brownish black; tibiae and metatarsi dull yellow, the tips narrowly dark brown; remainder of the tarsi dark brown; tibiae and first two tarsal segments each with two powerful bristles close to the tip on the ventral face. Wings nearly hyaline; veins brown. Venation: *Sc* short, ending a short distance beyond the origin of *Rs*; *r* more than its own length beyond the fork of *Rs*; *R*<sub>2</sub> rather short, oblique; cell *1st M*<sub>2</sub> open by the atrophy of *m*.

Abdomen reddish brown. Male hypopygium with the pleurites produced into a small fleshy lobe; pleural appendages two in number, the outer appendage bifid, heavily blackened, the two arms almost straight, approximately subequal in length, but one much stouter than the other; inner pleural appendage a pale arm that is slightly expanded distally. Ovipositor with the tergal valves considerably longer than the sternal valves, slightly upcurved.

*Habitat*: Formosa. Holotype, ♂, Funkiko, April 29, 1917 (T. Shiraki) No. 1353. Allotopotype, ♀, April 21, 1917. Paratopotypes, 3 ♂'s, 1 ♀, April 21-29, 1917.

##### *Erioptera (Empeda) minuscula* sp. n.

Size very small (wing under 3.5 mm.); head gray; femora yellowish, the tips rather broadly infuscated; wings subhyaline; veins pale brown; male hypopygium with the pleural appendages not blackened.

*Male*.—Length 2.2 mm.; wing, 3 mm.

*Female*.—Length 2.8 mm.; wing, 3.3 mm.

Rostrum and palpi dark brown. Antennae dark brown, the verticils in the male elongate. Head light gray.

Mesonotum reddish brown to dark liver-brown, deepest on the anterior part of the praescutum; lateral margins of the praescutum narrowly yellowish. Pleura reddish, sparsely gray pruinose. Halteres yellow. Legs with the coxae reddish yellow; trochanters brownish yellow; femora obscure yellow, the tips rather broadly infuscated; tibiae and metatarsi obscure yellow, the tips weakly infuscated; remainder of tarsi dark brown; two conspicuous bristles before the tips of the tibiae and first two tarsal segments. Wings subhyaline; veins pale brown; stigma lacking. Venation: *R*<sub>2</sub> not conspicuously oblique; *Sc* ending about opposite one-fifth the length of *Rs*; cell *1st M*<sub>2</sub> open by the atrophy of *m*.

Abdomen reddish brown. Male hypopygium with the pleural appendages not blackened as in *E. nigroapicalis*, the outer appendage bifid, the caudal arm acute, the cephalic arm shorter, shaped as a flattened blade; inner pleural appendage slender, cylindrical. Ovipositor with the valves long and slender, pale, the tergal valves moderately upcurved.

*Habitat:* Formosa. Holotype, ♂, Shishito, May 25, 1917 (T. Shiraki) No. 1357. Allotopotype, ♀. Paratopotypes, 2 ♂'s, 1 ♀.

#### *Molophilus* Curtis.

##### *Molophilus costalis* Edwards.

1916. *Molophilus costalis* Edwards; Ann. Mag. Nat. Hist., ser. 8, vol. 18, p. 251.

One ♂, one ♀, Funkiko, Formosa, April 25-27, 1917 (T. Shiraki) No. 1355.

*Allotype* ♂. Very similar to the type female. Antennæ of moderate length only. Hypopygium with four conspicuous blackened spinous appendages that are almost straight; dorsal spines at their base on the inner side with a smaller, straight spine of approximately one-half the length of the larger. The ventral appendages are longer and more slender, the tips acute, the inner face before the tip with microscopic teeth.

*Male*—Length 3.2 mm.; wing, 4 mm.

Allotype, ♂, Funkiko, Formosa, April 27, 1917.

#### *Gonomyia* Meigen.

##### *Gonomyia (Gonomyia) pruinosa* sp. n.

General coloration of the head and thorax dark, heavily light gray pruinose; antennæ dark brown, the scapal segments pale whitish yellow; legs brownish yellow, metatarsi short; wings nearly hyaline, the stigma and small dots at the origin of *Rs* and the fork of *Cu* dark brown; cell *1st M*<sub>2</sub> open; basal deflection of *Cu*<sub>1</sub> far before the fork of *M*; abdomen brownish black, the tergites narrowly ringed with light yellow.

*Female*—Length, 5.6 mm.; wing, 5.2-5.3 mm.

Rostrum and palpi dark brown. Antennæ with the scapal segments pale whitish yellow, the flagellar segments dark brown, oval. Head pale brown, heavily light gray pruinose.

Mesonotal praescutum with four dark brown stripes, heavily light gray pruinose, more reddish in the vicinity of the conspicuous, elongate pseudosutural foveæ. Pleura and sternum reddish yellow. Halteres elongate, pale brown, the knobs more yellowish. Legs with the coxæ and trochanters reddish yellow; femora and tibiæ brownish yellow, the tips of the latter narrowly darkened; tarsi brown. Wings nearly hyaline; stigma small, oval, dark brown; a small, dark brown spot at

the origin of *Rs* and another at the fork of *Cu*; veins dark brown, veins *C* and *Sc* yellowish. Venation: *Sc* rather short, ending just beyond the origin of *Rs*; *Rs* long, arcuated; *R*<sub>3</sub> a little shorter than *r-m*; *R*<sub>2+3</sub> shorter than *R*<sub>3</sub>; inner ends of cells *R*<sub>3</sub>, *R*<sub>5</sub> and *1st M*<sub>2</sub> in alignment; cell *1st M*<sub>2</sub> open by the atrophy of the outer deflection of *M*<sub>3</sub>; cell *2nd M*<sub>2</sub> longer than its petiole; basal deflection of *Cu*<sub>1</sub> more than its own length before the fork of *M*.

Abdomen dark brownish black, the tergites narrowly ringed caudally with light yellow, the lateral margins more broadly but obscurely yellow. Ovipositor with the tergal valves long and slender, gently upcurved.

*Habitat:* Formosa. Holotype, ♀, Shishito, May 26, 1917 (T. Shiraki) No. 1346. Paratopotype, ♀.

#### *Gnophomyia* Osten Sacken.

##### *Gnophomyia (Dasymallomyia) signata* (Brunetti).

1911. *Dasymallomyia signata* Brunetti; Rec. Indian Mus., vol. 6, p. 304.

One female, Funkiko, Formosa, April 25, 1917 (T. Shiraki) No. 1329. It is with deference to the views of Brunetti and Edwards that the name *Dasymallomyia* is here retained as a subgenus. In the opinion of the writer, the group rests on a very slim basis.

#### *Limnophila* Macquart.

##### *Limnophila (Dicranophragma) formosa* sp. n.

Close to *L. pulchripennis*; wings with a brown cross-banded pattern, including seven costal blotches, the third and fourth united into a V-shaped marking that continues caudad along the cord; a seam on *r* that continues to vein *R*<sub>3</sub>.

*Male*—Length 4.8-5 mm.; wing, 6.3 mm.

Closely related to *L. pulchripennis* (Brunetti) of India (Fauna British India, Diptera Nematocera, pp. 524, 525; 1912), but differing in the details of coloration.

Rostrum and palpi brown. Antennal scape brown; flagellum light yellow, only the distal segments more testaceous. Head gary, yellowish pollinose.

Mesonotal praescutum pale, heavily yellowish pollinose, the remainder of the mesonotum more brownish. Pleura and sternum brown, light gray pruinose. Halteres yellow. Legs with the coxæ brown; trochanters obscure yellow; remainder of the legs yellow, the terminal tarsal segments brown. Wings yellowish subhyaline, with a cross-banded brown pattern; the more conspicuous markings along costa are as follows: A broad stripe near the wing-base, attaining vein *Cu*; a similar stripe at the origin of *Rs*, reaching *M*; a V-shaped mark, the proximal arm at *Sc*<sub>2</sub>, the distal arm beyond the tip of *R*<sub>1</sub> con-

tinued proximad along  $R_{2+3}$ , uniting with the proximal arm at the fork of  $R_s$  and thence continued caudad as a broad seam along the cord; the distal arm is united along  $R_1$  with a mark that surrounds  $r$  and continues caudad to vein  $R_3$ ; a band at the level of the supernumerary cross-vein in cell  $R_2$ , extends from costa to the caudal margin of the wing at the end of vein  $M_3$ , paler and less distinct in the posterior cells; pale brown clouds at the ends of all the longitudinal veins; a brown seam along the outer end of cell  $1st M_2$ ; a distinct grayish tinge in cells  $M$  and  $Cu$  beyond the base; two or three small brown dots in cell  $2nd A$  at the wing-margin.

Abdomen obscure yellow, the tergites margined laterally and posteriorly with dark brown. Hypopygium light brown.

*Habitat:* Formosa. Holotype, ♂, Funkiko, April 21, 1917 (T. Shiraki) No. 1341. Paratopotypes, 2 ♂'s, April 21-29, 1917.

#### *Eriocera* Macquart.

##### *Eriocera sauteriana* Enderlein.

1912. *Eriocera sauteriana* Enderlein; Zool. Jahrb., Syst., vol. 32, pt. 1, pp. 42, 43, fig. Y.

One male, Kanshiree, Formosa, June 15, 1917 (T. Shiraki) No. 1319.

##### *Eriocera lygropis* sp. n.

Size large (wing of male 19 mm. or over); general coloration deep velvety black; wings dark brownish black; cell  $M_1$  present; abdomen with the bases of the segments shiny steel blue.

*Male*—Length 19 mm.; wing, 19-19.5 mm.

Rostrum and palpi dark brownish black. Antennæ short, dark brown. Head black, the front and anterior portion of the vertex sparsely gray pruinose; vertical tubercle conspicuous, directed cephalad.

Mesonotal praescutum velvety black with four shiny blackish stripes, the intermediate pair narrowly separated; lateral margins of the sclerites more brownish; remainder of the thorax deep black. Halteres short, black. Legs entirely deep black. Wings dark brownish black, more saturated along the costal margin, paler in the centers of the posterior and anal cells; veins brown. Venation:  $Sc_1$  ending opposite  $r$ ;  $Sc_1$  alone longer than  $R_{2+3}$ ;  $r$  far from the tip of  $R_1$  and at about one-third the length of  $R_2$ ;  $R_{2+3}$  a little longer than the deflection of  $R_{4+5}$ , the latter in alignment with the distal section of this vein; petiole of cell  $M_1$  but little shorter than the fork; cell  $1st M_2$  about as long as the petiole of cell  $M_1$ ; basal deflection of  $Cu_1$  near mid-length of cell  $1st M_2$ .

Abdomen deep velvety black, the base of each segment shiny steel-blue, broadest on segment two, those on the posterior segments becoming narrowed, on the sixth and seventh segments occupying the basal third of the segment or less.

*Habitat:* Formosa. Holotype, ♂, Koshun, April 25-May 25, 1918 (J. Sonan, K. Miyake, M. Yoshino). Paratopotype, ♂; homotypes, 3 specimens in the collection of the British Museum.

*Eriocera lygropis* (Greek, "gloomy") is closely allied to *E. unicolor* de Meijere, of Sumatra and was determined as such by Edwards in his report on Formosan Tipulidæ (Annals and Magazine of Natural History, ser. 8, vol. 18, p. 253; 1916). Subsequently Mr. Edwards and the writer have come to doubt that the two species are identical and specimens from the British Museum were sent to Dr. de Meijere by Mr. Edwards for comparison with the type of *unicolor*. Dr. de Meijere reports as follows: "The most conspicuous difference is that in your species there are broad shining bands on the abdomen, while in mine the abdomen is practically wholly dull black. The thorax of my species is more shining, on the part before the suture there are only three thin dull lines and also the hinder part is more shining. Your species is somewhat larger and the wings are broader, the end of  $R_s$  is nearer the wing-apex, the fork of  $R_{2+3}$  and the discoidal cell are somewhat shorter, the latter more quadrate." I would express my indebtedness to Mr. Edwards and Dr. de Meijere for thus clearing the identity of this large and conspicuous crane-fly.

#### *Tricyphona* Zetterstedt.

##### *Tricyphona formosana* sp. n.

General coloration light brown; legs pale brownish testaceous; wings subhyaline; vein  $R_2$  long, oblique in position; cell  $1st M_2$  open.

*Male*—Length about 4 mm.; wing, 5.8 mm.

Rostrum reddish brown; palpi brownish black. Antennæ comparatively short, dark brown, the first scapal segment obscure brownish yellow; flagellar segments oval. Head light brown, sparsely pruinose.

Mesonotal praescutum light brown, indistinctly transversely irrorate with short brown lines, sparsely pruinose; remainder of the mesonotum concolorous, the caudal margin of the postnotum darkened. Pleura obscure yellowish. Halteres pale brownish white. Legs with the coxæ yellow; trochanters testaceous; remainder of the legs pale brownish testaceous, the outer tarsal segments darkened. Wings subhyaline, the region of the stigma faintly darkened; veins pale brown. Venation: The free portion of  $R_2$  equal to  $R_{1+2}$ , oblique in position, somewhat resembling the condition found in *T. protea* Alex.;  $r-m$  inserted at about mid-length of  $R_{4+5}$ ; cell  $1st M_2$  open by the atrophy of  $m$ ; cell  $M_1$  present; basal deflection of  $Cu_1$  inserted on  $M_3$  about one-half its own length beyond the fork of  $M$ .

Abdomen light brown, the first tergite darker medially; segments five and six somewhat darker colored.

*Habitat:* Formosa. Holotype, ♂, Arisan, April 24, 1917 (T. Shiraki) No. 1348.

#### Dictenidia Brullé.

##### *Dictenidia formosana* sp. n.

General coloration yellow, the mesonotum shiny black; posterior legs larger than the others, the tibia with a brown ring before mid-length and with the tips broadly dark brown; wings yellowish, the apex narrowly dark brown.

*Male*—Length about 11.5 mm.; wing, 11.6 mm.

Frontal prolongation of head and palpi yellow. Antennæ with the scapal segments yellow, the flagellum brown, the segments indistinctly darker basally. Head light yellow; vertex obscure yellow with a T-shaped black mark, the arms of the T passing to the eyes, the stem continued caudad on to the occiput.

Mesonotum obscure brownish yellow, the praescutum and scutal lobes shiny black. Pleura yellow. Halteres yellow, the knobs brown. Legs with the coxæ and trochanters yellow; fore and middle legs light yellowish brown, the tarsi darker; posterior legs much longer and stouter, the tibiæ yellow with a broad, dark brown ring before mid-length and with the tips rather broadly brownish black; tarsi brownish black. Wings with a strong yellowish tinge, deepest basally and in the costal region, more grayish in the posterior and anal cells; wing-tip brown, this occupying the ends of cells  $R_2$  to  $M_1$ ; stigma rather small, sub-rectangular, dark brown; a faint dark seam along the cord, most evident on the basal deflection of  $R_{4+5}$ ,  $r-m$  and the basal deflection of  $Cu_1$ ; veins dark brown; numerous macrotrichia in the apices of cells  $R_3$  to  $M_1$ , confined to the central portions of the cells.

Abdomen obscure yellow, the tergites with an interrupted dorso-median stripe; segments eight and nine shiny black. Hypopygium cylindrical, not conspicuously enlarged.

*Habitat:* Formosa. Holotype, ♂, Funkiko, April 25, 1917 (T. Shiraki) No. 1329.

*Dictenidia formosana* is much more nearly allied to the genotype, *D. bimaculata* (Linnæus) of Europe than to *D. fasciata* Coquillett of Japan. It is readily told from *bimaculata* by the coloration of the posterior legs and the great reduction in the size of the dark band along the cord of the wing. Mr. Edwards informs me that *D. horikawæ* Matsumura is a *Pselliophora* rather than a *Dictenidia*. None of the dozen species of the former genus known to the writer possesses macrotrichia in the apical cells of the wing, a condition that is well defined in all

three species of *Dictenidia*, least extensive in *D. bimaculata*, where it is confined to cell  $R_5$ , most extensive in *D. fasciata* where macrotrichia are found in cells  $R_2$ ,  $R_3$ ,  $R_5$  and  $M_1$ .

#### Pselliophora Osten Sacken.

##### *Pselliophora ctenophorina* Riedel.

1913. *Pselliophora ctenophorina* Riedel; Entomol. Mitteilungen, vol. 2, pp. 274-276.

One male from Taito, Formosa, February 25–March 27, 1919 (S. Inamura, J. Sonan and M. Yoshino) No. 1318.

One female from the type-locality (Koshun), April 25–May 25, 1918 (J. Sonan, K. Miyake and M. Yoshino).

In the male the last segment of the palpus is yellowish white, passing into dark brown at the narrow apex; in the female, however, the terminal palpal segment is entirely black, the third black with the extreme base and apex pale. In the male, the centers of the wing-cells are but slightly paler than the obscure blackish ground-color; in the female the centers of cells  $M$ ,  $R_5$ ,  $M_1$ , 2nd  $M_2$ ,  $M_4$ ,  $Cu$ ,  $Cu_1$ , 1st  $A$  and 2nd  $A$  are whitish hyaline.

##### *Pselliophora scalator* sp. n.

Closely related to *P. taprobanes* (Walker); thoracic pleura yellow; wings yellow with dark brown markings; abdomen with a dark brown median stripe, the posterior margins of the segments narrowly blackened.

*Male*—Length 17 mm.; wing, 15.8 mm.

*Female*—Length 20 mm.; wing, 17.5 mm.

Frontal prolongation of the head very short, yellow; palpi with the basal three segments yellow, the terminal segment dark brown at either end, paler brown medially. Antennæ of the male with the first segment obscure yellow, darker above; remaining segments bicolorous, the basal two-thirds of each segment and the pectinations black, the apical third yellow. In the female, the simple antenna is almost uniformly brown throughout. Head yellow, clothed with long, black hairs.

Pronotum yellow, the sides of the scutum narrowly margined with dark brownish black behind. Mesonotal praescutum yellow, with three conspicuous, dark brown stripes, the lateral stripes continued across the suture and re-appearing as conspicuous marks on the scutal lobes; remainder of the mesonotum yellow, the median areas of both scutellum and postnotum indistinctly darkened. Pleura yellow. Halteres brownish yellow, the knobs dark brown on the basal half. Legs with the coxæ orange-yellow; trochanters yellow; femora brownish yellow, the posterior femora narrowly tipped with black; tibiæ brown, the posterior tibiæ darker brown, with a broad, pale yellow ring just beyond the base; tarsi dark brown. Wings yellowish, variegated with dark brown; the wing-tip beyond the cord is dark brown, in the male, the centers of cells

$R_2$ ,  $R_3$ ,  $R_5$ ,  $M_1$  and 2nd  $M_2$  indistinctly paler; a broken X-shaped cross-band of brown before the cord extending from the subcostal cell to the posterior margin of the wing; the amount of yellow in cell  $R$  enclosed between the upper arms of the X is variable, more extensive in the female, very restricted in the male; the posterior arms of the X enclose a solid area in both sexes; cells 1st  $A$  and 2nd  $A$  are largely brown, this appearing as a broad seam on vein 2nd  $A$  and along the posterior margin of cell 2nd  $A$ , most intense in the extreme anal angle; in the end of cell  $R$ , the yellow ground-color is much paler, nearly hyaline; veins dark brown. Venation: Cell  $M_1$  sessile.

Abdominal tergites yellow, with a broad, conspicuous, dark brown median stripe that is narrowly interrupted at the anterior margin of each segment, at the posterior margin uniting with a narrow, black, posterior border; last segment brownish black; sternites similar, but the median stripe is reduced to a series of linear dashes. Ovipositor with the basal sclerite jet-black; valves slender, deep horn-colored.

*Habitat*: Formosa. Holotype, ♂, Taito, February 25–March 27, 1919 (S. Inamura, J. Sonan and M. Yoshino) No. 1320. Allotype, ♀, Shinchiku, July 1–30, 1918 (J. Sonan and K. Miyake).

This is presumably the species reported from the island as *Pselliophora taprobanes* (Walker) by Riedel (Arch. für Naturgeschichte, Abt. A, vol. 5, p. 115; 1917; Ann. Musei Nat. Hungarici, vol. 16, p. 320; 1918).

#### Brithura Edwards.

##### Brithura conifrons Edwards.

1916. *Brithura conifrons* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, pp. 263, 264.

One female, taken at Arisan, Formosa, October 2–23, 1918 (J. Sonan and M. Yoshino) No. 1334.

Up to the present date, only the male sex of members of this curious genus have been discovered. The female of *B. conifrons* is hereby designated as allotype and may be further discussed as follows:

*Allotype*, ♀. Very similar to the description of the male. The vertical cone is very conspicuous as in the male. The second scapal segment is conspicuously brighter-colored than the first, yellowish. Praescutal interspaces with an abundant erect pubescence. Abdomen dark brown; eighth and ninth segments rufous. Ovipositor orange-yellow, the tergal valves almost straight, acute; sternal valves shorter, straight, a little higher than the tergal valves.

*Female*—Length about 25 mm.; wing, 20 mm.; abdomen, 15.4 mm.; Fore leg, femur, 9 mm.; tibia, 10.5 mm.; metatarsus, 6.2 mm.; Middle leg, femur, 10 mm.; tibia, 9.6 mm.; metatarsus, 8 mm.; Hind leg, femur, 11.5 mm.; tibia, 12.3 mm.; metatarsus, 10 mm.

Allotype, ♀, Arisan, Formosa, October 2–23, 1918.

#### Tipula Linnaeus.

##### Tipula holoserica (Matsumura).

1916 (July). *Formotipula holoserica* Matsumura, Thousand Insects Japan, Add. 2, pp. 456, 457.

1916 (September). *Tipula rufomedia* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, pp. 259, 260.

1917. *Tipula nigrorubra* Riedel, Arch. für Naturgeschichte, Abt. A, vol. 5, pp. 115, 116.

One male from Edwards' type-locality, Horisha, 1916, No. 1332. One male, Shinchiku, Formosa, July 1–30, 1918 (J. Sonan and K. Miyake). Riedel describes the legs of his species as being "powerful," but in spite of this discrepancy, there can be no reasonable doubt of the synonymy.

##### Tipula shirakii Edwards.

1916. *Tipula shirakii* Edwards, Ann. Mag. Nat. Hist., ser. 8, vol. 18, pp. 258, 259.

Six ♂ ♀, Funkiko, Formosa, April 21–27, 1917 (T. Shiraki) No. 1327. This series of specimens agrees well with Edwards' characterization of the type. The additional details of structure of the hitherto unknown male may be given.

*Allotype*, ♂. Very similar to the female, differing only in the sexual characters. The antennæ are short. Hypopygium with the ninth tergite large, nearly quadrate, with a conspicuous, flattened median lobe that is deeply notched medially, the lateral lobules thus formed being compressed blades that are covered with abundant black spicules. Outer pleural appendage large, flattened, broad basally, gradually narrowed to the rounded apex, pale yellowish white and very conspicuous. From the ventral-caudal angle of the ninth pleurite, close to the ninth sternite, two conical appendages hang in the notch of the ninth sternite, these provided with a pencil of long, reddish bristles at their tips. Ninth sternite strongly carinate. Eighth sternite somewhat projecting, the median area unarmed, on either side of the median area with a dense fringe of moderately long silvery bristles.

*Male*—Length 17–18 mm.; wing, 20–24 mm.

Allotype, ♂, Funkiko, Formosa, April 21, 1917.



**Tipula tridentata** sp. n.

Head gray; pronotum cream-colored, with a dark brown median line; mesonotal praescutum obscure brownish black, sparsely pruinose; wings strongly brownish yellow, the anal cells slightly paler; abdomen brownish yellow, with three black longitudinal stripes; male hypopygium with the ninth tergite tridentate, with an acute median tooth and more blunt lateral lobes; eighth sternite with three tufts of yellowish setae.

*Male*—Length 11.5 mm.; wing, 14.2 mm.

Frontal prolongation of the head dark gray above, brownish yellow beneath, these two colors divided by a narrow dark brown line; palpi dark brown. Antennae moderately elongated, the long first scapal segment dark brown, indistinctly reddish at the tip; second scapal segment reddish brown; flagellum dark brownish black, with a heavy white pubescence; flagellar segments with the basal enlargement moderately prominent, verticils conspicuous. Head light gray.

Pronotum cream colored with a delicate, dark brown, median line. Mesonotal praescutum obscure brownish black, sparsely pruinose, without distinct stripes, the margins of the sclerite more brownish; scutal lobes black, sparsely pruinose; scutellum reddish brown, the median sclerite with a delicate, dark brown, median line; postnotum gray, whitish gray pruinose. Pleura pale brown, sparsely gray pruinose. Halteres rather long, light yellow, the knobs brown. Legs with the coxae light yellow, with a faint gray bloom; trochanters dull yellow; fore femora brown, more yellowish basally; posterior femora brownish yellow, with a narrow, dark brown ring before the tip; tibiae brown, the tips dark brown; tarsi dark brown. Wings with a strong, brownish yellow tinge that is slightly paler in the anal cells; stigma slightly darker brown; a small obliterative area before the stigma in cell *1st R*<sub>1</sub> and another extending from the end of cell *R* across cell *1st M*<sub>2</sub> into the base of cell *M*<sub>4</sub>; veins dark brown; three or four macrotrichiae in cell *R*<sub>5</sub> near its distal end. Venation: *Rs* about twice the length of *R*<sub>2+3</sub>; basal section of *R*<sub>2</sub> nearly perpendicular to the end of *R*<sub>2+3</sub>; cell *1st M*<sub>2</sub> small, pentagonal; petiole of cell *M*<sub>1</sub> about one-half the length of the cell; *m-cu* present.

Abdomen brownish yellow, the tergites with three conspicuous black longitudinal stripes; sternites and hypopygium pale brownish yellow. Male hypopygium with the ninth tergite extensive, the caudal margin produced into two, bluntly rounded, lateral lobes and an acute median tooth that is carinate on its ventral surface; margins of all three lobes heavily blackened. Ninth pleurite complete; outer pleural appendage slender, elongate, slightly flattened, broadest at about mid-length, the distal two-thirds provided with long, coarse, black setae; inner pleural appendage complex, the posterior margin at the base produced into a cylindrical lobe that tapers to the subacute apex and is clothed with long setae. Ninth sternite with a comparatively shallow notch, from between which project the small, curved, black apophyses. Eighth sternite rather projecting, the caudal margin trilobed, a rounded median lobe that bears a flattened fringe of yellow hairs and two nearly

similar lateral lobes that bear pencils of long, yellow hairs, these pencils directed across the median line so as to lie almost in a straight line or very broadly decussate.

*Habitat*: Formosa. Holotype, ♂, Musha, May 18–June 15, 1919 (T. Okuni, J. Sonan, K. Miyake and M. Yoshino).

**Tipula subapterogyne** sp. n.

Belongs to the *arctica* group; allied to *T. serricauda* Alexander; praescutal stripes brownish black, much darker than the markings on the remainder of the mesonotum; wings of the female semi-atrophied.

*Male*—Length, 15.5 mm.; wing, 21.2–21.5 mm.

*Female*—Length about 20 mm.; wing, 6.8 mm.

Frontal prolongation of the head gray; more reddish laterally; nasus very long and slender; palpi brownish black, rather short. Antennae with the basal segment reddish, gray pruinose; second segment light yellow; flagellum black; antennae of the male of moderate length. Head yellowish gray, more rufous adjoining the inner margins of the eyes; a narrow, dark brown median line.

Mesonotal praescutum light gray with three dark brownish black stripes; remainder of the mesonotum gray, each scutal lobe marked with dark brown, the scutellum and postnotum with a capillary brownish black median line. Pleura yellowish gray, indistinctly blotched with darker. Halteres light brown, the knobs with the basal half dark brown, the apical half yellowish. Legs with the coxae grayish yellow; trochanters yellow; femora brownish yellow, the tips broadly black; tibiae brown, the tips black; tarsi dark brown. Wings subhyaline, the costal and subcostal cells more yellowish; wings marmorate with dark and light brown; dark brown areas at the wing-base in cells *R* and *M*, at the origin of *Rs*, at the stigma and thence along the cord to cell *1st M*<sub>2</sub>; the light brown areas include the broad wing-apex and extensive clouds in cells *R*, *M*, most of *Cu*<sub>1</sub>, the ends of *Cu*, *1st A* and *2nd A*; the subhyaline areas appear as a broad, oblique crossband beyond the stigma, extending from cell *2nd R*<sub>1</sub> across the inner ends of cells *R*<sub>2</sub>, *R*<sub>3</sub>, *R*<sub>5</sub>, through *1st M*<sub>2</sub> into the base of cell *M*<sub>4</sub>; a large area near the bases of cells *R* and *M*; another beyond midlength of *M*; another before the stigma in cells *1st R*<sub>1</sub> and *R*; other subhyaline areas in cells *Cu* and *1st A*; cell *2nd A* largely subhyaline; veins dark brown. Venation: Cell *R*<sub>2</sub> large; vein *R*<sub>2</sub> beyond *r* longer than *R*<sub>2+3</sub>; *Rs* long, about equal to *R*<sub>3</sub>; petiole of cell *M*<sub>1</sub> shorter than *m*; *m-cu* punctiform or obliterated. In the female, the wings are considerably atrophied and the venation correspondingly distorted; the wings are dark brown, paler basally and along the costal region.

Abdominal tergites yellowish with three conspicuous dark brown stripes; segments six to nine more uniformly brownish; hypopygium indistinctly more reddish brown; sternites yellow, with a conspicuous median brown stripe. Male hypopygium relatively small. Eighth tergite reduced to a mere strip at the median line. Ninth tergite small,

not chitinized, with a broad, deep, U-shaped median notch. Ninth pleurite complete; outer pleural appendage narrow basally, expanded and darkened outwardly; inner pleural appendage large and very compressed. Ninth sternite not notched medially, the caudal margin being almost straight across, the median area provided with a small, cushion-like lobe. Eighth sternite unarmed. Ovipositor of the *arctica* type, the intermediate lateral teeth of the tergal valves moderately acute.

*Habitat:* Formosa. Holotype, ♂, Noko, May 11, 1919 (T. Shiraki) No. 1324. Allotopotype, ♀. Paratopotype, ♂.

***Tipula bicornuta* sp. n.**

Antennæ of the male moderately elongated, indistinctly bicolorous; mesonotum gray, the praescutum with four indistinct greenish brown stripes; scutellum and postnotum with a capillary brown line; wings subhyaline with a rather pale grayish marmorate pattern; abdomen yellowish, dark brown apically; male hypopygium with the pleurites produced into cylindrical, black, curved horns.

*Male*—Length, 11 mm.; wing, 13 mm.; antenna about 5.2 mm.

Frontal prolongation of the head buffy; palpi brown. Antennæ of the male rather elongated, nearly half the length of the body; scape and first flagellar segment yellow, the remaining flagellar segments black basally, dark brown distally, to produce an indistinct bicolorous appearance; verticils very long, approximately as long as the segments that bear them. Head buffy with an indistinct capillary brown median line.

Mesonotal praescutum light gray, with four obscure greenish brown stripes, the intermediate pair contiguous anteriorly, soon bent outwards to leave a linear strip of the ground color between them; remainder of the mesonotum light gray, with a capillary brown median line, the scutal lobes with greenish brown centers. Pleura yellowish, sparsely white pruinose. Halteres light brown, the knobs dark brown, slightly paler at the tips. Legs with the coxæ pale, whitish pruinose; trochanters yellowish; femora brown, the tips broadly dark brown; tibiæ and tarsi dark brown. Wings subhyaline, the base and costal region yellowish; stigma brown; a weak gray clouding in the cells, including the wing-apex; clouds near midlength of cells *R* and *M*, and in the ends of cells *Cu*, *1st A* and *2nd A*; the subhyaline areas include an oblique band beyond the stigma, passing from the outer end of cell *2nd R*<sub>1</sub> across the bases of cells *R*<sub>2</sub>, *R*<sub>3</sub> and *R*<sub>5</sub>, through *1st M*<sub>2</sub> into the base of cell *M*<sub>4</sub>; veins dark brown. Venation: Cell *R*<sub>2</sub> large, vein *R*<sub>2</sub> being longer than *R*<sub>2+3</sub>; *R*<sub>5</sub> shorter than *R*<sub>3</sub>; petiole of cell *M*<sub>1</sub> shorter than *m*; *m-cu* obliterated by the fusion of *Cu*<sub>1</sub> on *M*<sub>3+4</sub>.

Abdomen yellow basally, with an indistinct dorsal stripe; segments five to nine dark brown. Male hypopygium with the ninth tergite narrow, the caudal margin heavily chitinized and with a broad U-shaped

median notch and smaller lateral notches, separated by conspicuous blackened teeth. Ninth pleurite complete, the outer angle produced into a conspicuous, black, curved horn that is directed dorsad and slightly proximad. Ninth sternite with only a slight median notch, bearing a small lobe. Eighth sternite unarmed.

*Habitat:* Formosa. Holotype, ♂, Funkiko, April 21, 1917 (T. Shiraki), No. 1329.

***Tipula formosicola* sp. n.**

Generally similar to *Tipula nova* Walker; head brown, paler adjoining the eyes; antennæ indistinctly bicolorous; wings dark brown, more grayish posteriorly, with a hyaline cross-band beyond the stigma, extending to beyond cell *1st M*<sub>2</sub>; cell *R*<sub>5</sub> entirely clear; cell *M* hyaline with a large brown area near midlength and another at the outer end; abdomen rather long and slender; ovipositor with the valves slender, smooth.

*Female*—Length, 25 mm.; wing, 19 mm.; abdomen alone, 21 mm.

Frontal prolongation of the head and palpi dark brown. Antennæ with the first scapal segment grayish pruinose; second segment pale; flagellar segments yellowish, slightly darker basally, to produce a bicolorous effect. Head dark brown, paler on the vertical tubercle and adjoining the inner margin of the eyes.

Mesonotal praescutum buffy, with three dull brown stripes that are confluent, except behind near the suture; humeral region pale; a slightly darker, capillary median line that extends to the anterior margin of the praescutum; scutum buffy, each lobe with three brown spots; scutellum and postnotum grayish, the median area extensive, brown. Pleura grayish pruinose. Halteres comparatively long and slender, dark brown, the base of the stem abruptly and conspicuously yellowish. Legs with the coxæ light brown, light gray pruinose; trochanters yellowish, faintly gray pruinose; remainder of the legs broken. Wings dark brown, variegated with subhyaline, the anal cells light gray; the dark brown areas include the broad costal margin, extending caudad almost to *M* and reaching the still darker brown stigma which completely fills cell *2nd R*<sub>1</sub> and the outer half of *1st R*<sub>1</sub>; wing-tip in the outer half of cells *R*<sub>2</sub> and *R*<sub>3</sub> dark brown; the subhyaline areas appear as a broad, transverse band beyond the stigma, occupying the basal half of cells *R*<sub>2</sub> and *R*<sub>3</sub>, all of *R*<sub>5</sub>, *1st M*<sub>2</sub> and the bases of *M*<sub>1</sub>, *2nd M*<sub>2</sub> and *M*<sub>4</sub>; these posterior cells are pale gray, only slightly darker than their subhyaline bases, but the color deepens in the anal cells of the wing; cell *M* is subhyaline with the apex and a cloud near midlength brownish; veins dark brown, those beyond the cord narrowly seamed with dark brown. Venation: *R*<sub>5</sub> much longer than *R*<sub>2+3</sub>; *r* shorter than *R*<sub>2</sub> beyond it; petiole of cell *M*<sub>1</sub> a little longer than *m*; *m-cu* distinct.

Abdominal tergites grayish, with a brown median stripe, the caudal margins of the segments paler. Abdomen comparatively long and slender. Ovipositor with the tergal valves slender, smooth; sternal valves compressed, slightly shorter than the tergal valves.

*Habitat:* Formosa. Holotype, ♀, Koshun, April 25–May 25, 1918 (J. Sonan, K. Miyake and M. Yoshino), No. 1323.

**Tipula nova** Walker.

1848. *Tipula nova* Walker; List Diptera British Museum, Part 1, p. 71.

1911. *Tipula fumifasciata* Brunetti; Rec. Indian Museum, vol. 6, p. 250.

1916. *Yamatotipula nohiræ* Matsumura; Thousand Ins. Japan, Addit. 2, p. 461.

One male, Taito, Formosa, February 25–March 27, 1919 (S. Inamura, J. Sonan, and M. Yoshino), No. 1323. The synonymy of *T. nohiræ* with *T. nova* is due to a communication from Mr. Edwards.

**Tipula pluriguttata** sp. n.

Antennal scape yellow; head and thorax gray with a capillary brown median line extending from the vertical tubercle to the base of the abdomen; wings yellowish gray, the base and the costal region more yellowish; cell  $R_2$  small; abdomen yellow, the tergites with three dark brown stripes, the sternum with a conspicuous median stripe.

*Female*—Length, 16–17 mm.; wing, 15.5–17 mm.

Frontal prolongation of the head dark brown, more yellowish laterally; palpi dark brown. Antennæ with the basal four or five segments yellowish, the remaining segments indistinctly bicolorous; in some specimens, only the scape is yellow, the flagellar segments being almost uniformly dark. Head dull gray with a capillary brown line.

Mesonotal praescutum dull gray, more buffy laterally, the three usual stripes darker gray, the interspaces but little paler; median praescutal stripe split by a capillary brown line that broadens out at the scutum, extending thence to the abdomen; praescutal interspaces with numerous dark brown dots surrounding setigerous punctures; scutum gray, the median area brown, the lobes bilineate with brown; scutellum with the median area buffy, dark brown medially; postnotum obscure gray, the median line brown. Pleura buffy, sparsely pruinose. Halteres brownish yellow. Legs with the coxæ and trochanters buffy yellow; femora obscure yellow, with a comparatively narrow dark brown ring before the narrow tips; tibiæ obscure yellow, the tips narrowly dark brown; tarsi dark brown. Wings faintly yellowish gray, the wing-base strongly yellow, cells *C* and *Sc* yellow; stigma elongate, brown; a narrow brownish seam along *Cu*; veins dark brown. Venation: *Rs* long, straight, lying close to *R*;  $R_{2+3}$  in alignment with  $R_3$ ; cell  $R_2$  very small, the apex of vein  $R_2$  pale, subatrophied, without macrotrichia; *r* very long, much longer than  $R_2$  beyond it, provided with about thirteen

macrotrichia; cell  $1st M_2$  pentagonal; cell  $M_1$  deep, its petiole about as long as cell  $1st M_2$  and between two and three times as long as *m*; *m-cu* very short.

Abdomen yellowish, the tergites with three longitudinal stripes, the median stripe broad and very conspicuous; sternites with a conspicuous dark brown median line. Ovipositor with the tergal valves slender, almost straight; sternal valves much shorter, compressed.

*Habitat:* Formosa. Holotype, ♀, Funkiko, April 25, 1917 (T. Shiraki), No. 1326. Paratopotypes, 5 ♀'s, April 21–25, 1917.