

NEW OR LITTLE-KNOWN TIPULIDÆ FROM EASTERN ASIA (DIPTERA), X¹

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THREE PLATES

The Chinese Tipulidæ discussed at this time were chiefly contained in extensive collections made in Szechwan by Mr. Franck and received through the kind interest of Mr. Herbert S. Parish. One additional Chinese species was collected by Prof. Claude R. Kellogg, now at the Massachusetts State College. The more numerous Japanese crane flies discussed herewith were included in extensive collections made by Messrs. Imanishi, Inomata, Hibi, Kamiya, Machida, Sakaguchi, and Tokunaga. I am very greatly indebted to all of the above-mentioned entomologists for their continued interest in making known the Tipulidæ of China and Japan, and for the privilege of retaining the types in my collection.

TIPULINÆ

DOLICHOPEZA (NESOPEZA) FRANCKI sp. nov. Plate 1, fig. 1; Plate 2, fig. 23.

General coloration of mesonotal præscutum brown, with four brownish black stripes; antennæ relatively short; legs pale brown, the tips of femora, and more narrowly of tibiæ, darkened; tarsi white; wings with a grayish tinge; stigma dark brown, preceded and followed by conspicuous whitish areas; abdominal tergites weakly bicolorous, of the sternites more conspicuously so, the incisures blackened; male hypopygium with the lateral angles of the tergite black, the median ventral point small; inner dististyle heavily blackened.

Male.—Length, about 9 to 9.5 millimeters; wing, 9.5 to 10.

Female.—Length, about 11 to 11.5 millimeters; wing, 10.5 to 11.

Frontal prolongation of head and palpi dark brown. Antennæ with the scape and pedicel light yellow; flagellum dark brown; antennæ relatively short, if bent backward extending to

¹ Contribution from the entomological laboratory, Massachusetts State College.

shortly beyond wing root. Front and anterior vertex light yellow; remainder of head dark brown, in cases with the pale coloration of the anterior vertex continued caudad onto the central portion of the posterior vertex.

Mesonotum with the ground color brown, with four brownish black stripes, the intermediate pair more polished, the lateral pair more obscure; remainder of mesonotum blackish, the post-notal mediotergite dusted with gray. Pleura brownish testaceous, the ventral anepisternum, meron, and ventral sternopleurite blackened, more or less pruinose. Halteres pale, the knobs dark brown. Legs with the coxæ brown; trochanters yellow; femora pale basally, passing into brown, the tips brownish black; tibiæ pale testaceous, the tips narrowly darkened; tarsi snowy white, the proximal ends of basitarsi a trifle more obscure. Wings (Plate 1, fig. 1) with a gray suffusion, the prearcular and costal regions somewhat paler; stigma conspicuous, dark brown, preceded and followed by whitish areas, oblitative area crossing the fork of M more restricted in amount; veins brown. Venation: Rs longer than m-cu; forks of medial field relatively shallow; cell 2d A of moderate width.

Abdominal tergites weakly bicolorous, the bases of the individual segments darkest, the remainder of each paler, with the exception of a narrow caudal darkening; sternites more conspicuously bicolorous, the incisures black, the intermediate portions yellow, the basal darkening more extensive than the narrow apex. Male hypopygium (Plate 2, fig. 23) with the lateral angles of the tergite, 9t, heavily blackened, the median region produced caudad into a small ventral point. Outer dististyle, *od*, relatively long. Inner dististyle, *id*, heavily blackened.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 4,500 feet, August 4, 1930 (*Franck*). Allotopotype, female. Paratopotypes, 3 males and females, July 24 to August 20, 1930.

Dolichopeza (*Nesopeza*) *francki* is respectfully dedicated to the collector, to whom I am greatly indebted for many rare Tipulidæ from western China. It is allied to *D. (N.) albitibia* (Alexander), of Japan, differing in the coloration of the body, legs, and wings, and the details of structure of the male hypopygium, especially of the tergite and inner dististyle.

TIPULA SETICELLULA sp. nov. Plate 1, fig. 2; Plate 2, figs. 24 to 28.

General coloration of thorax black, the abdomen yellow, the outer segments blackened; wings with the outer radial and

medial cells with abundant macrotrichia; r-m connecting with Rs at or shortly before its fork; male hypopygium with the ninth tergite tridentate; eighth sternite with a broad median depressed setiferous lobe.

Male.—Length, about 13 millimeters; wing, 15.

Described from an alcoholic specimen.

Frontal prolongation of head yellowish brown; nasus long and slender; palpi black, the terminal segment paling to yellowish white. Antennæ (male) relatively long, if bent backward extending about to the base of abdomen; scape, pedicel, and first flagellar segment yellow; remaining segments of flagellum weakly bicolorous, the base of each dark brown, the remainder light brown. Head dark, probably with a bloom in dry specimens.

Mesonotum chiefly blackened, the præscutum chiefly covered by the three confluent black stripes; scutal lobes similarly blackened; scutellum obscure yellow, the parascutella dark; postnotum dark. Pleura chiefly dark, the pteropleurite paler; dorsopleural region pale. Halteres pale. Legs with the coxæ yellow, the extreme bases weakly darkened; trochanters yellow; femora yellow, the tips narrowly brownish black, a trifle more extensively so on the forelegs; tibiæ yellowish brown, the tips darkened; tarsi brownish black. Wings (Plate 1, fig. 2) cream-colored, the prearcular and costal regions bright yellow; distal two-thirds of wings gradually darkened, the tip most deeply so; restricted darker areas at origin of Rs and along cord, the latter confluent with the conspicuous stigma; an oblique band of the ground color beyond the stigma, extending from cell R_2 to R_5 ; less distinct ground areas before stigma and in outer end of cell M; veins brown, flavous in the pale areas. Outer cells of wing with numerous, conspicuous macrotrichia, most extensive in cells R_3 to M_1 , with fewer trichia in extreme outer ends of cells 2d M_2 to Cu_1 , inclusive. Venation: R_{1+2} entire; Rs long; r-m connecting with Rs at or before the fork of latter; cell 1st M_2 small, pentagonal.

Abdomen yellow, the basal tergites very narrowly trivittate with brown; terminal four segments blackened. Male hypopygium (Plate 2, fig. 24) relatively large, the sutures between tergite, sternite, and basistyle distinct. Ninth tergite (Plate 2, fig. 25) large, not heavily sclerotized, the outer half narrowed, the caudal margin with three lobes, the median lobe smaller and more slender than the laterals, with a sharp median keel on

ventral surface; viewed laterally, the outer lobes are deeper and weakly emarginate. Inner and outer dististyles as shown (Plate 2, fig. 26), the former with a glabrous fingerlike lobe on outer margin at base, the latter cylindrical, with long conspicuous setæ. Gonapophyses (Plate 2, fig. 27) bispinous. Eighth sternite (Plate 2, fig. 28) projecting, the margin broadly notched, bearing a broad, depressed-triangular, median lobe that is densely setiferous; lateral portions of emargination, on either side of median lobe, with a small tuft of five or six stouter setæ.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Saga, Kyoto Prefecture, altitude 490 feet, August 5, 1928 (*Tokunaga*).

Tipula seticellula is very different from the other Japanese species of *Tipula* having macrotrichia in the outer cells of the wing, differing especially in venation and the structure of the hypopygium. I am uncertain as to the subgeneric position of the present fly. The recent attempt by Edwards to divide the vast genus *Tipula* into subgeneric groups² forms a most important contribution to our knowledge of the subject. However, in any extensive treatment of members of this genus, there will long remain species whose strict assignment in subgenera will be uncertain and which must therefore be left unassigned. A similar case exists in *Limnophila* and other large and involved genera. In the past, certain workers have placed such uncertain forms in the typical subgenus, but such a course should be strictly avoided.

TIPULA (TIPULA) OKINAWENSIS sp. nov. Plate 1, fig. 3; Plate 2, fig. 29.

Allied to *yamata*; mesonotum fulvous-orange; wings yellowish brown, the base and costal region more saturated; Rs short, less than m-cu; male hypopygium with the lobes of the tergite obliquely truncated at tips; outer dististyle conspicuously dilated and bearing numerous setæ on lower margin at near midlength; inner dististyle cultriform.

Male.—Length, about 13 millimeters; wing, 16.5.

Frontal prolongation of head light brown; palpi pale brown. Antennæ brown, the basal enlargements of the individual segments darker; flagellar verticils very long. Front light cream-colored; posterior sclerites of head dark brown.

Mesonotal region fulvous-orange. Pleura pale yellow, variegated with light brown on the dorsopleural region; pteropleurite, ventral sternopleurite, and ventral meron slightly darkened.

² Ann. & Mag. Nat. Hist. X 8 (1931) 73–82.

Halteres with the stem yellow, the knobs dark brown. Legs with the coxæ and trochanters yellow; femora brownish yellow, the tips narrowly darkened; tibiæ and tarsi brown; hind tibia with two very unequal spurs, the longer being twice the shorter. Wings (Plate 1, fig. 3) with a yellowish brown tinge, the base and costal region more saturated; stigma light brown. A few scattered macrotrichia on vein R_4 . Venation: Rs short, about four-fifths m-cu; R_{1+2} unusually short, pale, but entire, gently sinuous; petiole of cell M_1 less than one-half m; cell 2d A very narrow, as in the group.

Abdominal tergites brown, the caudal margins of the individual segments narrowly pale; sternites light yellow. Male hypopygium (Plate 2, fig. 29) with the tergite, 9t, bearing two submedian, blackened lobes that are narrowly separated by a linear notch, the tips of the lobes obliquely truncated, provided with small black spines and numerous setæ. Outer dististyle, *od*, with a conspicuous dilation on ventral margin at near mid-length, this provided with abundant setæ; beyond the dilation, the style narrows rapidly to a slender point. Inner dististyle, *id*, cultriform, bearing a blackened lobe near base. Lobes of ninth sternite with numerous conspicuous setæ.

Habitat.—Japan (Riukiu Islands).

Holotype, male, Kunjan, Okinawa, altitude 1,000 feet (S. Sakaguchi).

"Kunjan-gun, in the northern part of Okinawa; collections made at between 500 and 1,000 feet. The woods are dense and very humid, and along the streams were found very favorable situations for Tipulidae."—S. Sakaguchi.

Tipula okinawensis is allied to *T. yamata* Alexander (Japan) and *T. suenisoni* Alexander (eastern China), agreeing in the general coloration and narrow cell 2d A of the wings. In the present species, Rs is unusually short, being less than m-cu in length, while the details of the male hypopygium, especially of the tergite and dististyles, are quite distinct. The members of this restricted group have nearly a score of powerful flattened pale setæ arranged in a comblike series along the dorsal margin of the inner dististyle.

TIPULA (VESTIPLEX) DIVISOTERGATA sp. nov. Plate 2, fig. 30.

Belongs to the *arctica* group; *himalayensis* subgroup; allied to *avicularia*; male hypopygium with the ninth tergite completely divided by pale membrane; a small foot-shaped appendage projecting from beneath each lobe of tergite.

Male.—Length, about 11 to 12 millimeters; wing, 12.5 to 14.

Frontal prolongation of head brownish yellow above, narrowly dark brown on sides; nasus long and conspicuous. Antennæ with the flagellar segments weakly bicolorous, the basal enlargement of each dark brown, the remainder more yellowish brown.

Mesonotal præscutum with a golden-yellow pollen, the three brown stripes narrowly bordered by darker brown, this especially evident on the median vitta. Pleura chiefly yellow or brownish yellow, the ventral sternopleurite a little more darkened. Halteres with the knobs dark brown, their apices conspicuously yellow. Legs with the femora brown, the tips conspicuously blackened, preceded by an obscure yellow ring of approximately equal width. Wings with the pattern about as in *himalayensis*, brown, variegated with creamy areas, especially on the basal half of wing; prearcular and costal regions more yellowish, especially the former.

Abdominal tergites yellow, narrowly trivittate with dark brown, the subterminal segments more uniformly darkened. Male hypopygium (Plate 2, fig. 30) with the tergite, 9t, narrowly divided medially by membrane into two halves; caudal margin of tergite with a rounded emargination, the apices of the lobes darker brown, strongly delimited; beneath each lobe on ventral face with a small bilobed structure, more or less foot-shaped, as shown. Outer dististyle, *od*, long and slender, pale throughout. Inner dististyle, *id*, with the blackened margin of the blade smooth. What seems to represent a gonapophysis is a slender, straight rod, weakly expanded at apex into a small head. Ninth sternite, 9s, at dorsal outer angle with a small, oval, setiferous lobule. Eighth sternite unarmed.

Habitat.—China (Szechwan).

Holotype, male, Mount Omei, altitude 4,500 feet, July 17, 1929 (*Franck*). Paratopotype, male, July 23, 1929.

Tipula divisotergata seems to find its closest ally among the described species in *T. avicularia* Edwards (Tibet to Sikkim), differing most evidently in the structure of the hypopygium.

CYLINDROTOMINÆ

LIOGMA BREVIPECTEN sp. nov. Plate 1, fig. 4; Plate 2, fig. 31.

Antennal pectinations (male) unusually short and blunt; wings yellowish gray, the wing tip and seams at origin of Rs, along cord and outer end of cell 1st M₂ slightly darker; male hypopygium with the gonapophyses expanded at tips into large, entirely smooth, blades.

Male.—Length, about 13 millimeters; wing, 10.3.

Antennæ (Plate 2, fig. 31) with the scape dark brown, the pedicel and basal two or three flagellar segments passing into obscure yellow; outer flagellar segments brown; flagellar segments with the pectinations unusually short and blunt. Head black, sparsely pruinose.

Mesonotum and pleura black, the dorsopleural region yellow. Halteres pale. Legs with the coxæ brown basally, paler at tips; trochanters yellow; femora yellow, the distal sixth black. Wings (Plate 1, fig. 4) yellowish gray, the prearcular and costal regions more yellowish; stigma small, brown; wing tip and seams at origin of Rs, along cord and outer end of cell 1st M_2 somewhat darker; veins brown, the prearcular and costal veins clearer yellow.

Abdomen black, the outer sternites obscure yellow at base, the margins narrowly blackened. Male hypopygium with the gonapophyses dilated at tips into broadly expanded, entirely smooth blades.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Ohdai, Yamata, altitude 3,250 feet, June 5, 1930 (*S. Sakaguchi*).

The present fly is readily told by the diagnostic features listed above, notably the short antennal pectinations and smooth gonapophyses.

LIOGMA FUSCIPENNIS sp. nov. Plate 1, fig. 5; Plate 2, fig. 32.

Male.—Length, about 13 to 14 millimeters; wing, 10 to 11.5.

Generally similar to *Liogma serraticornis* Alexander (Japan) in most features, differing most evidently in the strongly darkened wings.

Serrations of the flagellum conspicuous (Plate 2, fig. 32). Dorsopleural membrane infuscated; in *serraticornis*, light ochreous. Wings (Plate 1, fig. 5) strongly infuscated, the oval stigma dark brown; cell C still more darkened. Venation: Rs shorter; r-m lost by fusion of R_{4+5} on M_{1+2} , this character constant in all specimens of the type series. In *serraticornis* the wings are conspicuously yellowish, the prearcular and costal regions, together with the stigma, more saturated.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Daisen, Tottori, altitude 3,900 feet, June 7, 1930 (*Hibi*); received through Professor Inomata. Paratopotypes, 2 males, altitude 3,900 to 4,550 feet, June 7, 1930 (*Hibi*).

The relationship of the present fly to *Liogma serraticornis* may perhaps be indicated by a trinomial.

LIMONIINÆ

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LIMONIA (DICRANOMYIA) TRIFILAMENTOSA sp. nov. Plate 1, fig. 6; Plate 2, fig. 33.

Limonia (*Dicranomyia*) sp. TOKUNAGA, Mem. Coll. Agr. Kyoto Imp. Univ. 10 (1930) 73, 74, 75.

General coloration brownish yellow; antennæ with the basal flagellar segments short-oval; mesonotal præscutum with three darker brown stripes; pleura yellow, longitudinally striped with brown; fore femora with a nearly terminal dark brown ring; wings tinged with brownish yellow; Sc₂ lacking; cell M₂ open by the atrophy of m; male hypopygium with the rostral spines very unequal in length and size, the outer one long and powerful.

Male.—Length, 5.5 to 6 millimeters; wing, 5.5 to 6.

Female.—Length, about 6 to 7 millimeters; wing, 5.5 to 6.

Described from alcoholic specimens.

Rostrum brownish yellow; palpi short, dark brown. Antennæ brown; basal flagellar segments short-oval, the outer segments more elongate-oval; setæ of segments of normal length and size. Head brownish yellow, the center of the vertex darker.

Mesonotal præscutum brownish yellow, with three darker brown stripes, the median stripe narrowly divided by a capillary pale line, most distinct behind; scutal lobes darkened; median region of scutum, and sometimes of scutellum and postnotal mediotergite, restrictedly pale, in other specimens more uniformly darkened. Pleura yellow, striped longitudinally with brown, the dorsal sternopleurite pale. Halteres pale. Legs with the coxæ and trochanters pale; fore femora obscure yellow, with a broad, nearly terminal, dark brown ring; other femora not or only slightly darkened apically; tibiæ and tarsi brownish yellow, the latter only slightly darkened outwardly; claws with five or six teeth, only the outermost of large size. Wings (Plate 1, fig. 6) with a strong brownish yellow tinge, without markings; veins brown. Venation: Sc₁ ending opposite the origin of Rs, Sc₂ lacking; a supernumerary crossvein in cell Sc at near midlength of R; cell M₂ open by atrophy of m, closed only in aberrant individuals; m-cu at or, more usually, a short distance before the fork of M.

Abdomen brown, the sternites somewhat paler. Male hypopygium (Plate 2, fig. 33) with the ninth tergite, 9t, transverse, the caudal margin convexly rounded, the median region restrictedly transverse or even feebly concave. Basistyle, *b*, relatively small. Ventral dististyle, *vd*, fleshy, the rostral prolongation weakly chitinized, with two very unequal and widely separated spines. Dorsal dististyle a curved sickle, widest just beyond midlength. Gonapophyses, *g*, with the mesal-apical lobe elongate, a little expanded at tip and with the margin microscopically serrulate.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Seto, Wakayama-ken, April 15, 1928 (*M. Tokunaga*); marine. Allotopotype, female. Paratopotypes, of both sexes.

In 1928, Dr. Masaaki Tokunaga, while working at the Seto Marine Biological Laboratory, discovered no fewer than three species of marine crane flies, all of which proved to be undescribed. Through the kindness of the collector, two of these species are defined in this report, as *Limonia* (*Dicranomyia*) *trifilamentosa* sp. nov. and *Limonia* (*Idioglochina*) *tokunagai* sp. nov. The third species, *Limonia* (*Dicranomyia*) *monostromia* Tokunaga, has been described in all stages in a beautiful monographic study by the author of the species.³ The pupa of the present species is most remarkable in the genus *Limonia* in having three-branched breathing horns, whence the specific name, *trifilamentosa*. The discovery of this fly serves to bridge the gap existing between the crane flies of the subtribe Antocharia, having many-branched pronotal breathing horns, and the remaining members of the family, in which this structure is simple. The only other Japanese *Dicranomyia* having cell *M*₂ open by the atrophy of *m* is the very different *L. (D.) immodestoides* (Alexander) with an entirely distinct male hypopygium.

LIMONIA (IDIOGLOCHINA) TOKUNAGAI sp. nov. Plate 1, fig. 7; Plate 2, fig. 34.

? *Gonomyia*, sp. TOKUNAGA, Mem. Coll. Agr. Kyoto Imp. Univ. 10 (1930) 73, 74, 75.

General coloration dark brown to brownish black, probably pruinose in dry specimens; flagellar segments strongly produced; a supernumerary crossvein in cell *Sc*; male hypopygium

³ Mem. Coll. Agr. Kyoto Imp. Univ. 10 (1930) 1-127, 17 pls.

with the ventral dististyle a subglobular structure, the rostral prolongation very short and stout, provided with two unequal spines.

Male.—Length, about 5.5 to 7.5 millimeters; wing, 6.2 to 9.

Female.—Length, about 7.5 to 10 millimeters; wing, 6.5 to 10.5.

Described from alcoholic specimens.

Rostrum and palpi brown. Antennæ brownish black throughout; intermediate ten flagellar segments very strongly produced. Head dark brown.

Mesothorax chiefly dark brown, probably pruinose in fresh specimens; scutellum brightened, especially on posterior half. Halteres pale, especially the knobs. Wings (Plate 1, fig. 7) with a strong dusky suffusion, the stigma and vague seams along the cord somewhat darker; veins dark brown. Venation: A supernumerary crossvein in cell Sc at near midlength of vein R; veins of radial field not greatly distorted; cell 1st M_2 closed, as long as or longer than vein M_{1+2} beyond it; m-cu at or before fork of M.

Abdominal tergites black, the sternites somewhat brighter, their caudal margins narrowly darkened; hypopygium black. Male hypopygium (Plate 2, fig. 34) with the tergite, 9t, extensive, the caudal margin with a deep and narrow median incision. Basistyle, *b*, elongate, the ventromesal lobe low. Ventral dististyle, *vd*, a subglobular, fleshy structure, the dorsal face deeply incised for the reception of the dorsal dististyle; rostral prolongation very short and obtuse, with two spines, the outer one larger and more powerful than the inner. Gonapophyses narrow, the apical lobe very elongate, obtuse at tip, set with numerous depressed areas.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Seto, Wakayama-ken, April 15, 1928 (*M. Tokunaga*). Allotopotype, female. Paratopotypes, of both sexes; additional paratopotypes of the smaller summer form, August 15, 1928 (*M. Tokunaga*).

Limonia (*Idioglochina*) *tokunagai* is named after the collector, Dr. Masaaki Tokunaga, student of the marine Diptera of Japan. It is one of three marine crane flies belonging to the genus *Limonia* taken by the collector on the Kii Peninsula in 1928.⁴ The present species is very different from the only other described regional *Idioglochina*, *L. (I.) kotoshoensis* (Alexander),

⁴Op. cit.

in the nature of serration of the antennal flagellum. It seems highly probable that the larval stage of all of the various species of this subgenus in the Australasian, Oriental, and eastern Palearctic Regions will be found to occur in a marine habitat. The various members of the group have possibly been derived from some ancestral marine *Dicranomyia* of the general type of *L. (D.) signipennis* (Coquillett) or *L. (D.) monostromia* Tokunaga. With the recent discovery⁵ by Dr. L. G. Saunders of the marine habitat of *Limonia (Geranomyia) unicolor* (Hali-day), a third subgenus of *Limonia* is thus shown to have marine representatives. The seasonal dimorphism in the present species as briefly noted by Tokunaga⁶ is very curious, both sexes of the vernal form being fully one-half larger than the corresponding summer form.

PROANTOCHA QUADRIVITTATA sp. nov. Plate 1, fig. 8.

Male.—Length, about 9 millimeters; wing, 9.

Described from an alcoholic specimen.

Most closely related to *P. spinifer* (Alexander) and *P. serricauda* (Alexander) in the general nature of the vestiture of the legs, differing especially in the thoracic pattern.

Mesonotal præscutum with four distinct brown stripes, the intermediate pair closely approximated for most of their length but well-separated behind; lateral stripes not reaching the suture; scutal lobes each with two dark areas, the more-posterior one larger; postnotal mediotergite with two large, brown, confluent, circular areas on posterior margin. Pleura pale, distinctly marked with brown on the anepisternum and ventral sternopleurite. Fore and middle legs with long abundant delicate setæ; of posterior legs shorter and more reduced, but not spinous; posterior tibiæ with long setæ from enlarged bases, where the setæ are broken, leaving spinous points. Wings as illustrated (Plate 1, fig. 8).

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Saga, Kyoto Prefecture, altitude 490 feet, August 10, 1929 (*Tokunaga*).

Proantocha quadrivittata is intermediate in size between *P. spinifer* and *P. serricauda*, differing from both in the nature of the thoracic pattern. *Proantocha ūyei* Alexander is a very different species, with the vestiture of all legs greatly reduced to spines and short spinous setæ.

⁵ Ent. Mo. Mag. 66 (1930) 185–187, figs.

⁶ Op. cit. 73.

ANTOCHA SAGANA sp. nov. Plate 1, fig. 9; Plate 2, fig. 35.

General coloration pale, the mesonotal præscutum with a dark brown median stripe; ventral sternopleurite darkened; wings grayish, unmarked; male hypopygium with the ninth tergite evenly covered with microscopic setulæ, its caudal margin gently trilobed; a small setiferous lobule on mesal face of basistyle; both dististyles of nearly equal size and length, weakly expanded into a blade at outer end.

Male.—Length, about 4.2 millimeters; wing, 4.5.

Described from an alcoholic specimen.

Rostrum pale yellow; palpi brown. Antennæ with the space pale, the pedicel and flagellum dark brown; flagellar segments oval, the outer segments becoming more elongate. Head dark brown, the front pale yellow.

Pronotum and mesonotum yellow, with a dark brown median stripe that narrows behind on the præscutum, becoming obsolete some distance before the suture; lateral præscutal stripes lacking; cephalic portions of scutal lobes darkened; posterior half of postnotal mediotergite darkened. Pleura pale, the ventral sternopleurite extensively infuscated. Halteres pale, the outer portion of the stem slightly more infuscated. Legs with the coxæ pale, the fore coxæ more infuscated; trochanters pale; remainder of legs light brown. Wings (Plate 1, fig. 9) with a grayish tinge, the base more whitish; stigma lacking; veins very pale. Macrotrichia on distal two-thirds of last section of R_{4+5} and of M_{1+2} . Venation: Sc relatively short, Sc_1 ending about opposite three-fourths the long Rs ; $m-cu$ about one-third its length before the fork of M .

Abdomen pale, the tergal incisures restrictedly darkened. Male hypopygium (Plate 2, fig. 35) with the tergite, $9t$, extensive, its caudal margin gently trilobed, the surface entirely covered by small delicate setulæ. Basistyle, b , with a small setiferous lobule on mesal face at base. Both dististyles relatively elongate, of generally equal size and shape, being slightly arcuate, the distal ends weakly expanded into a blade; outer style, od , glabrous, the inner style, id , with long, coarse, chiefly marginal setæ.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Saga, Kyoto Prefecture, altitude 490 feet, April 15, 1928 (Tokunaga).

Antocha sagana is readily told from all other regional species of the genus by the structure of the male hypopygium, especially of the dististyles.

DICRANOPTYCHA MACHIDANA sp. nov. Plate 1, fig. 10; Plate 3, fig. 36.

General coloration dark brown, including the abdomen; halteres yellow; legs yellow, the tips of femora narrowly but abruptly blackened; extreme base and tip of tibia more narrowly blackened; wings brownish yellow, the veins dark brown, those in the costal and prearcular areas more yellowish; male hypopygium with the lateral lobes of the tergite appearing as pale spatulate blades; inner dististyle terminating in a yellow apical point.

Male.—Length, about 8.5 millimeters; wing, 10.5.

Rostrum and palpi dark brown. Antennæ with the scape dark brown above, paler beneath; pedicel blackened, paler apically; flagellum broken. Head dark brown, crushed in the type.

Thorax chiefly dark brown, badly crushed in the type, the pleural sclerites surrounding the wing root paler. Halteres yellow. Legs with the coxæ and trochanters yellow, the fore coxæ darker; femora yellow, the tips narrowly but conspicuously blackened; tibiæ yellow, the extreme base very narrowly, the tip a trifle more broadly blackened; basitarsi yellow, the tips and remainder of tarsi brownish black. Wings (Plate 1, fig. 10) brownish yellow, the costal and prearcular regions clearer yellow; veins dark brown, C, Sc, R, and the prearcular veins more yellowish. Venation: Rs long, fully three times the basal section of R_{4+5} .

Abdomen brownish black, the hypopygium a little paler. Male hypopygium (Plate 3, fig. 36) with the lateral lobes of tergite, 9t, appearing as pale, spatulate blades, their apices evenly rounded. Outer dististyle, *od*, slender, the distal third blackened and set with appressed to suberect spines. Inner dististyle, *id*, elongate, narrowed outwardly and terminating in a chitinized yellow apical point.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Hakutai, Chichibu, August 25, 1930 (*J. Machida*).

I take great pleasure in naming this distinct fly after the collector, my friend Dr. Jiro Machida, to whom I am very greatly indebted for many interesting Japanese Tipulidæ. The species is most similar in its general features to *Dicranoptycha geniculata* Alexander (Formosa), the pattern of the legs being very similar in the two flies. It differs very conspicuously in the wing markings, venation, and structure of the male hypopygium. The present species is very different from the other members of the genus known from the major islands of Japan.

HELIUS (HELIUS) PLUTO sp. nov. Plate 1, fig. 11; Plate 3, fig. 37.

Allied to *H. (H.) tenuirostris*; general coloration of thorax brownish black; legs brownish black; wings with a faint brown tinge, the base and costal region light yellow; male hypopygium with the lateral lobe of tergite terminating in a slender acute spine; apex of inner dististyle long and slender.

Male.—Length, excluding rostrum, about 8 millimeters; wing, 8; rostrum, 2.7.

Female.—Length, excluding rostrum, about 9 millimeters; wing, 8; rostrum, 2.8.

Rostrum black, elongate, as shown by the measurements, being approximately as long as the combined head and thorax; palpi black. Antennæ black throughout. Head dark gray; anterior vertex relatively narrow, approximately as wide as the diameter of the base of rostrum, provided with numerous erect black setæ; ommatidia fine.

Pronotum and cervical sclerites dark brown, the former paling to obscure yellow on sides. Mesonotum chiefly brownish black, the humeral region of præscutum vaguely brightened. Pleura chiefly brownish black, the dorsal pteropleurite paler. Halteres light brown, the base of stem paler. Legs with the fore coxæ dark brown, the remaining coxæ brownish yellow; trochanters light yellow; remainder of legs brownish black, the femoral bases obscure yellow, most extensive on posterior legs. Wings (Plate 1, fig. 11) with a faint brownish tinge, the base and costal region light yellow; stigma oval, darker brown; a dusky seam adjoining vein Cu_1 ; veins dark brown. Venation: Sc_1 ending shortly before the fork of Rs , Sc_2 at the extreme tip and more heavily sclerotized; branches of Rs gently diverging; m-cu close to fork of M .

Abdominal tergites feebly dimidiate, light brown basally, the caudal half black, the amount of the latter increasing on the outer segments. In female the tergites are more uniformly darkened. Male hypopygium (Plate 3, fig. 37) with the lateral lobes of the tergite, $9t$, terminating in a slender acute spine. Basistyle, b , with the mesal face densely set with setæ. Outer dististyle, od , a straight blackened rod, the apex very weakly bispinous. Apex of inner dististyle, id , very long and narrow.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 3,000 feet, July 25, 1930 (*Franck*). Allotopotype, female, July 23, 1930.

Helius (Helius) pluto is most nearly allied to *H. (H.) rufithorax* Alexander (Formosa) and *H. (H.) tenuirostris* Alexander

(Japan), differing from the former in the coloration of the thorax and from the latter in the larger size and general coloration. The distinctive features of the male hypopygium of the present fly lie in the shape of the lateral lobes of the tergite and the long, slender tip of the inner dististyle. It should be noted that the abdomen of the male of *tenuirostris* has the individual segments dimidiate, yellow on the basal half, the apices abruptly blackened. This character was wrongly described by the writer in the original definition of this species.

HEXATOMINI

POLYMERA PARVICORNIS sp. nov. Plate 1, fig. 12; Plate 3, fig. 38.

General coloration pale brown; antennæ short; wings tinged with brown; no stigmal area; cell M_1 present; male hypopygium with the outer dististyle a simple rod, the tip obtuse, with an acute subapical spine.

Male.—Length, about 4.5 millimeters; wing, 4.6.

Described from an alcoholic specimen.

Rostrum short, pale yellow; palpi relatively long, especially the two, slender, terminal segments, the whole about one-third longer than the head and some two-thirds as long as the antenna. Antennæ with the scape and pedicel yellow, the flagellum dark brown; antennæ (male) short and unmodified, about as long as the thorax alone; antennæ apparently only 15-segmented, the segments subcylindrical; terminal segment elongate, nearly as long as the preceding two segments combined and apparently formed by the fusion of segments. Head brown, the front and broad orbits yellowish.

Pronotum brown. Mesonotum brownish yellow, the præscutum with a double yellow area on disk, narrowly margined with delicate brown lines, the dividing mark on the median area of the sclerite; extreme cephalic-median portion of præscutum darkened; mesal edges of scutal lobes similarly dark-margined; a narrow median yellow vitta extending from the suture to mid-length of the postnotal mediotergite, more interrupted on the scutellum; pseudosutural foveæ very small, pale. Pleura yellow, the dorsal sclerites more darkened. Halteres pale, the bases of the knobs a little darker. Legs with the coxæ and trochanters yellow; remainder of legs pale brown; segments with relatively long, conspicuous setæ; claws small. Wings (Plate 1, fig. 12) tinged with brown; no stigmal area or other markings; veins pale brown, with long conspicuous black verticils on almost all longitudinal veins, lacking on basal half of first section of Cu_1 .

and 2d A. Venation: Sc_1 ending shortly before fork of Rs, Sc_2 a short distance from its tip; R_{2+3+4} longer than R_{2+3} ; R_2 faint; R_{1+2} a little longer than R_{2+3+4} ; cell M_1 present; m-cu close to fork of M; anterior arcus present.

Abdomen brown, the sternites paler. Male hypopygium (Plate 3, fig. 38) with the outer dististyle, *od*, a simple, nearly straight rod, the apex bluntly obtuse, with a small subapical appressed spine.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Kibune, Kyoto Prefecture, altitude 750 feet, at light, June 1, 1930 (*Tokunaga*).

The generic reference of this curious fly must be considered as being somewhat provisional, since the species differs so conspicuously from all hitherto-described members of the genus in the short male antennæ. I at first considered the fly to belong to *Troglophila* Brunetti, where it would be equally isolated by the brevity and structure of the antennæ. The venation and trichiation, together with the basic plan of structure of the male hypopygium, are so much as in *Polymera* that I am venturing to refer the species to this essentially Neotropical genus of Tipulidæ. It would appear that *Troglophila* Brunetti and *Polymera* Wiedemann are more closely allied than was hitherto considered. The ecological conditions at Kibune have been described and figured by Iwata, in an entomological survey of the upper Kamogawa River, with special reference to trichopterous larvæ and pupæ.⁷

LIMNOPHILA (ELÆOPHILA) SERRULATA sp. nov. Plate 1, fig. 13; Plate 3, fig. 39.

Size small (wing, male, 5 millimeters); legs yellow, the femora with a very slightly darker brown ring immediately before tips; wings (male) suddenly widest opposite end of vein 2d A; whitish, with an abundant dotted and spotted brown pattern; male hypopygium with the apex of the outer dististyle microscopically serrulate.

Male.—Length, about 4.2 millimeters; wing, 5.

Rostrum and palpi black. Antennæ with the scape and pedicel black; basal segments of flagellum pale brown, the outer segments somewhat darker; basal flagellar segments somewhat swollen on ventral face. Head blackish, the anterior vertex and narrow orbits more grayish.

⁷ Bull. Biogeograph. Soc. Japan No. 1, 2 (1930) 1–20, 5 pls.

Mesonotum yellowish gray, conspicuously variegated with dark brown stripes and dashes, including two elongate intermediate stripes that are obsolete in front and interrupted just before suture; lateral stripes bending mesad and becoming confluent at anterior ends with the intermediate stripes; extreme lateral margins of præscutum, behind the pseudosutural foveæ, dark brown; a series of three or four brown punctigerous spots on posterior interspaces; pseudosutural foveæ black; posterior sclerites of mesonotum chiefly blackened. Pleura black, sparsely interspersed with more-grayish areas. Halteres yellow, the knobs brownish black. Legs with the coxæ and trochanters blackish, the latter slightly brightened at bases; remainder of legs yellow, the femora with a slightly darker brown subterminal ring. Wings (Plate 1, fig. 13) with the ground color whitish, the prearcular region light yellow; an abundant dotted and spotted brown pattern, including about six major costal areas, the second at level of origin of Rs entirely crossing the wing as a narrow fascia; third area at end of Sc, fourth at tip of R_{1+2} , the two latter converging behind to form the largest area on disk, lying over the anterior cord; fifth and sixth costal areas at ends of veins R_3 and R_4 , respectively; wing apex as far caudad as cubital field, narrowly bordered by brown; interspaces with numerous small brown dots, mostly contiguous to the veins but with some in centers of cells; veins pale, darker in the infuscated areas. Wing (male) abruptly widest opposite end of vein 2d A. Costal fringe of moderate length only. Venation: Supernumerary crossvein in cell M lying immediately distad of level of origin of Rs.

Abdominal tergites black, the sternites paler medially. Male hypopygium (Plate 3, fig. 39) with the basistyle, *b*, produced mesally into an obtuse lobe. Outer dististyle, *od*, with the outer spine relatively blunt, placed at beyond midlength of style; apex of style microscopically serrulate. Inner dististyle relatively narrow.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 4,000 feet, July 28, 1930 (Franck).

Of the regional species in eastern Asia, *Limnophila* (*Elæophila*) *serrulata* most resembles *L. (E.) dietziana* Alexander (Japan) in its small size and abundantly spotted wings, differing conspicuously in the lack of black femoral tips and the

serrulate outer dististyle of the male hypopygium. In the latter character, the present fly likewise differs from the larger *L. (E.) suenisoni* Alexander (eastern China). There seems to be no possibility of our further refusing to use the subgeneric term *Elæophila* Rondani, in place of the more familiar and generally used *Ephelia* Schiner.

LIMNOPHILA IMANISHII sp. nov. Plate 3, fig. 40.

Subapterous, at least in the female sex; antennæ 13-segmented the flagellar segments short-oval; terminal segment elongate, evidently resulting from the fusion of two segments.

Female.—Length, about 8 millimeters; wing, 1.3.

Rostrum brown; palpi with the terminal segment considerably longer than the third. Antennæ (Plate 3, fig. 40) 13-segmented, brown throughout; pedicel not conspicuously elongate, about one-half the length of the scape; flagellar segments short-oval to subglobular; outer segments becoming more elongate, the penultimate with an apical ring of verticils in addition to the basal ring; terminal segment elongate, equal to the preceding two taken together, with an incomplete suture, indicating a fusion of segments. Head brown.

Mesonotum relatively small, brown. Halteres pale, small, about one-half the length of the wings, the club linear. Legs with the middle and hind coxæ elongate, dark brown; trochanters brown; legs relatively short and stout, brownish yellow; tibial spurs elongate, setiferous; tarsal claws smooth. Wings greatly reduced, stenopterous, uniformly yellowish brown; no clearly defined venation except beyond the cord where indicated by macrotrichia; cell M_1 present. Macrotrichia on C and R for almost their entire length, on other veins only beyond the level of the cord, on R_4 , M_1 , M_2 , M_3 , and M_4 .

Abdomen dark brown, the lateral line somewhat darker. Ovipositor with the tergal valves elongate, slender, gently up-curved; sternal valves compressed.

Habitat.—Japan (Honshiu).

Holotype, alcoholic female, Bogaya, Toyama, Japanese Alps, altitude 3,900 feet, on snow (*Imanishi*).

Limnophila imanishii is named in honor of the collector, Mr. K. Imanishi, who has taken many rare Tipulidæ in the Japanese mountains. The species cannot be associated with any of those previously described. I place the fly in *Limnophila* in the broad definition of the genus only. Nearly apterous females of hexatome and pedicine Tipulidæ are very difficult to place ac-

curately as to genus, but the reference of the present fly to the Hexatomini seems justified by the glabrous eyes.

ERIOCERA NIGROTROCHANTERATA sp. nov. Plate 1, fig. 14.

Male.—Length, about 13 millimeters; wing, 16 by 5.

Belongs to the *spinosa* group; closely related to *E. issikii* Alexander (Honshiu) in the short antennæ of the male sex.

Rostrum and palpi black. Antennæ black throughout, 7-segmented; terminal segment small; first flagellar segment longer and slenderer than in *issikii*, being approximately one-third longer than the second palpal segment; in *issikii* the second palpal segment is subequal to or even a little longer than the first flagellar segment. Mesonotal præscutum with four dark stripes, the intermediate pair narrow; in *issikii*, with three such stripes, the broad median stripe being entire; scutellum black. Halteres black, only the base of stem pale. Hind legs with the black femoral tips narrow, including about the distal fourth; in *issikii* broad, including the distal half or slightly more. Wings (Plate 1, fig. 14) somewhat shorter and broader; veins of radial and medial fields with broad, conspicuous, brown seams.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Ohdai, Yamato, altitude 2,600 feet, June 5, 1930 (*Sakaguchi*).

ERIOCERA KELLOGGI sp. nov. Plate 1, fig. 15.

General coloration black, the thoracic stripes and bases of abdominal tergites more plumbeous, glabrous; femora and halteres black; wings brown, the base paler than the apical third, with a very vague, more yellowish crossband before the cord; macrotrichia of costa much reduced in size and number.

Male.—Length, about 16 millimeters; wing, 15.5.

Rostrum and palpi black. Antennæ 7-segmented; scape and pedicel dark brown; flagellum yellowish brown, the outer segments again darkened. Head black, the vertical tubercle relatively low.

Mesonotal præscutum grayish brown, with four subnitidous, plumbeous black stripes that are narrowly separated by lines of opaque black; posterior sclerites of mesonotum dull black. Pleura black. Halteres black. Legs with the coxæ and trochanters black; femora brownish black; tibiæ brown, the tips narrowly darkened; tarsi dark brown. Wings (Plate 1, fig. 15) very vaguely cross-banded, the basal two-thirds obscure brownish yellow, the apical third infuscated, preceded by a scarcely defined clearer yellow crossband before the cord, most extensive

in the radial and medial fields, more or less narrowed to a point posteriorly at m-cu; costal region more intense orange-yellow; veins yellow, somewhat darker in the infumed apical portion. Macrotrichia of veins very small and reduced, very evidently so on costa between h and the level of R_2 , the trichia becoming more abundant on costa beyond the latter point to the wing tip. Venation: Tip of Sc_1 atrophied about opposite R_2 ; cell M_1 present; m-cu at near midlength of cell 1st M_2 .

Abdominal tergites polished leaden blue-black, the caudal margins opaque black, the latter including about the apical third of the intermediate segments; sternites and hypopygium black.

Habitat.—China (Fukien).

Holotype, male, Foochow (*Kellogg*).

I take great pleasure in naming this species in honor of the collector, Prof. Claude R. Kellogg, of the Massachusetts State College. By Edwards's key to the Old World species of *Eriocera*⁸ the present fly runs to couplet 71, disagreeing in the combination of leaden basal crossbands on the abdominal tergites, in conjunction with the presence of cell M_1 of the wings. It is closely allied to *E. muiri* Alexander, of Macao,⁹ which differs in the clearly defined yellow crossband of the wing and the more-abundant macrotrichia of the veins of the radial and medial fields. The great reduction in number and size of the macrotrichia of the costa in *E. mesopyrrha* (Wiedemann), *E. praelata* Alexander, *E. muiri* Alexander, the present species, and probably still others in the Oriental and Eastern Palæarctic faunal regions is noteworthy.

ERIOCERA ARROGANS Alexander.

Eriocera arrogans ALEXANDER, Proc. U. S. Nat. Mus. 72, art. 2 (1927) 5-6.

Described from a unique female specimen taken at Mount Omei, Szechwan, China, by Rev. David C. Graham. Three additional specimens were taken at Kwanhsien, Szechwan, altitude 3,000 feet, July 18 to 24, 1930; altitude 4,000 feet, August 12, 1930 (*Franck*).

The males are much smaller than the females (length, 8 to 8.5 millimeters; wing, 9.2 to 9.8) and have the wings almost uniformly blackened, without the conspicuous pale centers to the cells found in the female sex. By Edwards's key to the

⁸ Ann. & Mag. Nat. Hist. IX 8 (1921) 70-78.

⁹ Proc. Hawaiian Ent. Soc. 5 (1923) 255.

Old World species of *Eriocera*,¹⁰ the fly runs to *E. unicolor* de Meijere,¹¹ differing in the small size and details of coloration. The specimens from Formosa referred to *unicolor* by Edwards¹² were later described as a new species, *E. lygropis* Alexander.¹³

ERIOCERA CÆSAREA Alexander.

Eriocera cæsarea ALEXANDER, Philip. Journ. Sci. 44 (1931) 358–359.

The fly was described from a unique male specimen, taken at Kwanhsien, Szechwan, China, by Rev. David C. Graham. An additional male from the type locality (altitude 2,800 feet, July 28, 1930, *Franck*) agrees closely with the type, differing in a few details only. Wings with indications of a very broad, scarcely evident, yellowish brightening before the cord. Venation: Cell 1st M_2 slightly more elongate, with m-cu at midlength of its lower face.

ERIOCERA KAMIYAI sp. nov. Plate 1, fig. 16.

General coloration velvety black, including the head, thorax, and abdomen; mesonotal præscutum with four polished black stripes; halteres entirely black; legs black, the femora chiefly yellow, the tips blackened; wings with the ground color cream-yellow, very heavily patterned with brown, including cells C and Sc and broad seams at origin of Rs, along cord and outer end of cell 1st M_2 ; vein R_{2+3+4} short.

Male.—Length, about 12 millimeters; wing, 11.3.

Rostrum and palpi black. Antennæ black throughout, the terminal segments broken. Head velvety black; vertical tubercle conspicuous.

Mesonotal præscutum velvety black, with four polished black stripes that are little evident against the ground color; remainder of mesonotum and pleura velvety black. Halteres short, black throughout. Legs with the coxæ and trochanters black; femora obscure yellow, the tips blackened, narrowest on the posterior legs; tibiæ and tarsi black. Wings (Plate 1, fig. 16) with the ground color cream-yellow but almost concealed by an extensive dark brown pattern, chiefly evident in the cells before and beyond the cord; cells C and Sc uniformly darkened; very extensive dark clouds at origin of Rs, along cord, at stigma, and outer end of cell 1st M_2 ; wing apex margined with dusky;

¹⁰ Loc. cit.

¹¹ Fauna Simalurensis—Diptera, Tijds. voor Ent. 58 (1915) 12–13.

¹² Ann. & Mag. Nat. Hist. VIII 18 (1916) 253.

¹³ Ann. Ent. Soc. Am. 13 (1920) 259–260.

anal cells more uniformly grayish brown; veins black. Venation: R_{2+3+4} short, a little more than one-half the basal section of R_5 ; R_2 less than R_{1+2} , placed shortly before midlength of the anterior branch of Rs; cell M_1 lacking; m-cu just beyond one-third the length of the long cell 1st M_2 ; distal section of Cu_1 short.

Abdomen velvety black, including the hypopygium.

Habitat.—Japan (Honshiu).

Holotype, male, Kamikochi, Shinano, Japanese Alps, July 29, 1930 (*Kamiya*); through Dr. Jiro Machida.

Eriocera kamiyai is named in honor of the collector, Mr. K. Kamiya. The species is most nearly allied to *E. fulvibasis* Alexander, *E. longifurca* Alexander, and *E. subrectangularis* Alexander, all of Japan, differing in the velvety black coloration of the body and halteres, and the unusually heavy pattern of the wings, cells C and Sc being uniformly darkened.

ATARBA (ATARBODES) BIPUNCTULATA sp. nov. Plate 1, fig. 17; Plate 3, fig. 41.

General coloration pale yellow, each side of pleura with two dark brown spots, placed on the pteropleurite and the pleurotergite; halteres and legs yellow; wings with a strong yellow tinge; Sc relatively long, Sc_1 ending opposite or beyond midlength of Rs; male hypopygium with the outer dististyle bearing spines on the distal fifth or less; gonapophyses appearing as short, macelike structures.

Male.—Length, about 4.5 millimeters; wing, 5.

Rostrum whitish yellow; palpi with the basal segment yellow, the remainder black. Antennæ with the scape and pedicel brown, the flagellum brownish black; antennæ (male) short, the segments with long conspicuous verticils that much exceed the segments. Head light yellow.

Mesonotum pale yellow, the præscutum a trifle more brownish yellow in front but otherwise immaculate; scutellum testaceous. Pleura pale yellow, with a conspicuous brownish black spot on pteropleurite, and another, slightly more elongate, paler brown area on the pleurotergite. Halteres pale yellow. Legs with the coxæ and trochanters yellow; remainder of legs yellow, without infuscation on femora or tibiæ; outer tarsal segments a little darker. Wings (Plate 1, fig. 17) with a strong yellow tinge, the veins deeper yellow, some of them very pale and indistinct; veins beyond cord with conspicuous macrotrichia. Venation: Sc relatively long, Sc_1 ending about opposite or just beyond midlength of Rs.

Abdomen yellow, the subterminal segments brown. Male hypopygium (Plate 3, fig. 41) with the basistyle, *b*, unarmed with a lobe on mesal face at apex. Outer dististyle, *od*, with the apex blackened and here provided with many subappressed spines, the latter not including more than the distal fifth of style; inner dististyle longer than the outer, more expanded at near midlength. *Ædeagus* long. Gonapophyses, *g*, appearing as short, powerful, macelike structures, the apex of each set with many short spines.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 3,000 feet, July 19, 1930 (*Franck*).

By my key to the species of *Atarba* of the eastern Palæarctic Region¹⁴ the present species runs to *A. leptoxantha* Alexander (Formosa) and *A. issikiana* Alexander (Formosa). It differs very conspicuously in the structure of the male hypopygium, notably the toothing of the outer dististyle and the peculiar macelike structure of the gonapophyses.

ERIOPTERINI

CHIONEA NIPPONICA sp. nov. Plate 3, fig. 42.

Allied to *C. araneoides*; male hypopygium with the dististyle terminating in spinous setæ; gonapophyses appearing as pale flattened plates.

Male.—Length, about 5.5 millimeters.

Female.—Length, about 6 millimeters.

Closely allied to *C. araneoides* Dalman (Plate 3, fig. 43), differing especially in the structure of the male hypopygium.

Antennæ, male, 9- to 10-segmented; female, 10-segmented. Male hypopygium (Plate 3, fig. 42) with the basistyle, *b*, stout, the mesal face at proximal end with an oval area set with long erect setæ. Outer lobe of dististyle a small stout blackened structure, weakly bidentate; main arm of style long and slender, at base on inner margin with a blunt tooth; apex of style, *d*, with several spinous setæ, outer face of style with the setæ greatly reduced in number. Gonapophyses, *g*, appearing as pale flattened plates that converge toward the *ædeagus*. The paratype has the group of setæ on mesal face of basistyle less restricted in area.

Chionea araneoides (Plate 3, fig. 43) lacks a delimited setiferous area on mesal face of basistyle, *b*. Outer lobe of disti-

¹⁴ Philip. Journ. Sci. 42 (1930) 526.

style more acutely produced into a blackened tooth; main arm with only a slight convexity at base, this with conspicuous setæ; surface of style, *d*, with long conspicuous setæ, those at apex not stout and spinous. Gonapophyses, *g*, appearing as blackened toothlike structures.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Tsurugi, Toyama, Japanese Alps, altitude 8,775 feet, on snow, October 20, 1928 (*Imanishi*). Allotopotype, female, with the type; Tokunaga No. 10. Paratopotype, female, October 16, 1928; Tokunaga No. 14. Paratype, male, Seki, Niigata, altitude 2,925 feet, January 11, 1923 (*ex Tokunaga*).

Chionea nipponica is readily distinguished from the allied *C. araneoides* Dalman (Europe) by the structure of the male hypopygium. This is very probably the species recorded by Matsumura¹⁵ as *Chionea araneoides*, taken indoors during November at Sapporo, Hokkaido. The present records are the most southerly for any member of the genus *Chionea* in eastern Asia.

GONOMYIA (GONOMYIA) SUBCOGNATELLA sp. nov. Plate 1, fig. 18; Plate 3, fig. 44.

Belongs to the *cognatella* group; rostrum and palpi black; antennæ with the two basal segments yellow, the remainder black; thoracic pleura dark brown, with a broad, yellowish white, longitudinal stripe; wings with a strong brownish yellow tinge, the stigma slightly darker; R_{2+3+4} arcuated; abdominal segments dimidiate, dark brown, ringed caudally with yellow; male hypopygium with the outer dististyle a slender, setiferous rod; inner dististyle with the inner arm terminating in a very long, black spine.

Male.—Length, about 3.5 millimeters; wing, 4.2.

Female.—Length, about 4.5 millimeters; wing, 4.6.

Rostrum and palpi brownish black. Antennæ with the scape and pedicel light yellow; flagellum black; flagellar segments long-oval, clothed with a dense white pubescence. Head light yellow, the center of vertex infuscated.

Pronotum and anterior lateral pretergites light yellow. Mesonotal præscutum brownish gray; pseudosutural foveæ dark reddish; scutellum yellow, more infuscated in female. Pleura dark brown, with a broad yellowish white longitudinal stripe extending from and including the fore coxæ, occupying the dorsal sternopleurite, ventral pteropleurite, and most of the meral

¹⁵ Konchu Bunruigaku 2 (1915) 63, pl. 2, fig. 15.

region. Halteres pale, the knobs weakly darkened. Legs with the fore coxæ very pale yellow, the remaining coxæ and all trochanters brownish yellow; remainder of legs pale brown, the femoral bases paler. Wings (Plate 1, fig. 18) with a strong brownish yellow tinge, the prearcular and costal regions clear light yellow; stigma a little darker than the ground color; a scarcely indicated darkened seam along cord; veins light brown, brighter in the yellow areas. Venation: Sc_1 ending opposite or just beyond origin of Rs , Sc_2 at its extreme tip, not apparent in the type female; R_{2+3+4} rather strongly arcuated, less so in female; cell 1st M_2 open by atrophy of basal section of M_3 ; m-cu close to fork of M .

Abdominal tergites dark brown, conspicuously ringed caudally with yellow; sternites paler brown, the caudal margins yellow. Male hypopygium (Plate 3, fig. 44) with the outer dististyle, *od*, slender, simple, with numerous setæ, especially along outer face. Inner dististyle, *id*, with the inner arm, *ia*, slender, terminating in a very long, slender, black spine.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 3,000 feet, July 18, 1930 (*Franck*). Allotype, female, Chengtu, altitude 1,700 feet, May 21, 1930 (*Franck*).

The possibility exists that the female allotype may not be conspecific with the type male. *Gonomyia* (*Gonomyia*) *subcognatella* differs from *G. (G.) aperta* Brunetti (British India) in the coloration of the pleura and abdomen and in the details of venation. These are the only two members of this characteristic group of the genus known to me in Asia. Of the numerous Nearctic species of the group, the present fly has an outer dististyle that is most like that of *G. (G.) kansensis* Alexander, while the simple inner arm of the inner dististyle is somewhat like that found in *G. (G.) florens* Alexander. The unusually long spine of this arm of the dististyle is distinctive of the present species.

ORMOSIA TOKUNAGAI sp. nov. Plate 1, fig. 19; Plate 3, fig. 45.

General coloration brown; antennæ short; cell M_2 open by the atrophy of the outer section of M_3 ; male hypopygium with both dististyles small; gonapophyses appearing as slender curved blades, each terminating in a blackened spine, the apophyses subtended by a long, slender, pale, lateral spine.

Male.—Length, about 4.5 millimeters; wing, 4.4.

Described from an alcoholic specimen.

Rostrum brownish yellow; palpi light brown. Antennæ (male) short, pale throughout; flagellar segments oval. Head brown, darker medially above.

Mesonotal præscutum chiefly light brown, the posterior sclerites of the mesonotum, together with the pleura, darker brown. Halteres yellow. Legs with the coxæ brown; trochanters yellowish brown; legs chiefly yellow or brownish yellow. Wings (Plate 1, fig. 19) yellowish gray, the stigmal region somewhat darker; veins slightly darker than the ground color, rather stout. Venation: Cell M_2 open by the atrophy of basal section of M_3 ; m-cu shortly before fork of M ; vein 2d A gently sinuous on outer half.

Abdomen light brown, the caudal margins of the segments narrowly darker. Male hypopygium (Plate 3, fig. 45) with the dististyle, *d*, almost as in *O. takahashii* and *O. takeuchii*. Gonapophyses, *g*, very different, appearing as slender, curved blades, each terminating in a blackened spine; a long, slender, pale, lateral spine arising near the base of the apophysis.

Habitat.—Japan (Honshiu).

Holotype, alcoholic male, Kibune, Kyoto Prefecture, altitude 750 feet, October 2, 1929 (*Tokunaga*).

This interesting *Ormosia* is named in honor of the collector, Dr. Masaaki Tokunaga. Allied to *Ormosia takahashii* Alexander and *O. takeuchii* Alexander, both of Japan, differing conspicuously in the structure of the male hypopygium.

ERIOPTERA (ILISIA) SUBAREOLATA sp. nov. Plate 1, fig. 20; Plate 3, fig. 46.

Belongs to the *areolata* group; allied to *sachalina*; legs yellow, only the terminal tarsal segments darkened; wings brownish yellow, the outer costal region darker; veins along cord infuscated; male hypopygium with the lateral arms of gonapophyses relatively stout.

Male.—Length, about 3.5 millimeters; wing, 4.

Rostrum brown; palpi black. Antennæ broken. Head pale brown, the anterior vertex light gray.

Mesonotum light brown, sparsely dusted with gray, the præscutum not variegated; pseudosutural foveæ and tuberculate pits chestnut-brown. Pleura light grayish brown. Halteres broken. Legs with the coxæ and trochanters testaceous yellow; remainder of legs yellow, the terminal tarsal segments darker. Wings (Plate 1, fig. 20) brownish yellow, the outer costal region more saturated; veins pale brown, the cord and outer end of

cell 1st M_2 darker brown. Venation: Sc_1 ending opposite R_2 ; cell 1st M_2 small; m-cu about one-third its length before the fork of M ; veins M_3 and M_4 deflected strongly cephalad at margin, vein Cu_1 less strongly so.

Abdominal tergites brown, the caudal margins of the segments pale yellow; sternites more uniformly yellow; hypopygium yellow. Male hypopygium (Plate 3, fig. 46) with the outer arm of the outer dististyle, d , only feebly blackened; intermediate arm simple. Lateral arms of gonapophyses, g , stouter than in *sachalina*.

Habitat.—China (Szechwan).

Holotype, male, Chengtu, altitude 1,700 feet, April 17, 1930 (Franck).

Erioptera (Ilisia) subareolata is most closely allied to *E. (I.) sachalina* Alexander (Saghalien), differing especially in the pattern of the legs and the slightly different male hypopygium, notably the feebly blackened outer arm of the outer dististyle and the stout lateral arms of the gonapophyses.

MOLOPHILUS ALBIREO sp. nov. Plate 1, fig. 21; Plate 3, fig. 47.

Belongs to the *gracilis* group and subgroup; general coloration dull black; antennæ (male) short; knobs of halteres dark brown; legs brownish black; wings with a strong blackish suffusion; costal fringe (male) conspicuous; male hypopygium with the ventral lobe of basistyle well developed, the dorsal lobe small, unblackened; both dististyles small and compressed.

Male.—Length, about 3.5 millimeters; wing, 4.

Rostrum and palpi black. Antennæ (male) short, black throughout; flagellar segments subcylindrical. Head dull black.

Anterior lateral pretergites light yellow. Mesonotum dull black, very sparsely pruinose; humeral region restrictedly brightened; pseudosutural foveæ and tuberculate pits black. Pleura dull black, sparsely pruinose, the dorsopleural membrane dark. Halteres brown, the knobs dark brown. Legs with the coxæ brownish black; trochanters brown; remainder of legs brownish black. Wings (Plate 1, fig. 21) with a strong blackish suffusion; veins and macrotrichia black. Costal fringe (male) relatively long and conspicuous, especially on distal half of wing. Venation: R_2 and r-m nearly in transverse alignment; vein 2d A ending about opposite the caudal end of m-cu.

Abdomen black. Male hypopygium (Plate 3, fig. 47) with the ventral lobe of basistyle, b , elongate, extending caudad be-

yond level of dististyle, armed with retrorse setæ; dorsal lobe small, unblackened. Dorsal dististyle, *dd*, a flattened blade; ventral dististyle, *vd*, with the inner angle prolonged.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 4,000 feet, August 16, 1930 (*Franck*).

Molophilus albireo belongs to a small aggregation of species with the lobes of the basistyle of the male hypopygium feebly developed and having no spinous points. The structure of the dististyles, together with the coloration, especially the dark halteres, readily suffice to distinguish it from *M. pegasus* Alexander, and other allied members of this group. The two dististyles of the unique type are superimposed on the slide and it is possible that their conformation is not entirely as figured.

MOLOPHILUS CYGNUS sp. nov. Plate 1, fig. 22; Plate 3, fig. 48.

Belongs to the *gracilis* group and subgroup; general coloration dark grayish brown; antennæ (male) short; halteres entirely light yellow; legs dark brown; wings with a pale brown tinge, the veins and macrotrichia dark brown; male hypopygium with the dorsal and mesal lobes of basistyle blackened, the former acute at tip; both dististyles entirely blackened, simple, the outer with four or five sharp teeth before tip.

Male.—Length, about 4 millimeters; wing, 4.5.

Rostrum testaceous brown; palpi black. Antennæ (male) short, dark brown throughout; flagellar segments subcylindrical, the terminal segment a little longer than the penultimate. Head light ochereous brown in front, more grayish behind.

Anterior lateral pretergites restrictedly yellowish. Mesonotum and pleura dark grayish brown, the latter somewhat paler on the dorsal sternopleurite. Halteres uniformly light yellow, clothed with golden-yellow setæ. Legs with the coxæ and trochanters yellow; femora brown, more yellowish brown basally; tibiæ and tarsi dark brown. Wings (Plate 1, fig. 22) with a pale brown tinge, the prearcular and costal regions, together with vein Cu, more yellowish; veins pale brown, more yellowish as above indicated; macrotrichia dark brown, more heavily grouped along cord. Costal fringe and macrotrichia of veins long and conspicuous. Venation: R_2 lying just distad of level of r-m; petiole of cell M_3 short, about one-third to one-half longer than m-cu; vein 2d A ending about opposite m-cu.

Abdomen dark brown. Male hypopygium (Plate 3, fig. 48) with the dorsal lobe of basistyle, *db*, slender, the extreme tip

acute and heavily sclerotized; remainder of lobe with coarse setæ; mesal lobe slender, heavily blackened, appearing as a nearly straight rod, the apex rounded; ventral lobe, *vb*, large, spatulate, with erect to feebly retrorse setæ. Two dististyles, both simple, entirely blackened and strongly curved or sinuous, the outer, *od*, broader and provided with four or five sharp teeth immediately before the acute tip.

Habitat.—China (Szechwan).

Holotype, male, Kwanhsien, altitude 4,500 feet, August 13, 1930 (*Franck*).

Molophilus cygnus belongs to the section of the subgroup having short antennæ in the male sex, uniformly pale halteres, with the mesal lobe of the basistyle of hypopygium slender and heavily blackened, and with the dorsal lobe of basistyle acutely pointed at apex. The nearest regional allies seem to be the Formosan *M. arisanus* Alexander and *M. issikii* Alexander, in which the conformation of the mesal lobe of the basistyle and of both dististyles is entirely distinct.

ILLUSTRATIONS

[*a*, ædeagus; *b*, basistyle; *d*, dististyle; *db*, dorsal lobe of basistyle; *g*, gonapophysis; *ia*, inner arm of inner dististyle; *id*, inner dististyle; *oa*, outer arm of inner dististyle; *od*, outer dististyle; *s*, sternite; *t*, tergite; *vb*, ventral lobe of basistyle; *vd*, ventral dististyle.]

PLATE 1

- FIG. 1. *Dolichopeza* (*Nesopeza*) *francki* sp. nov., venation.
 2. *Tipula seticellula* sp. nov., venation.
 3. *Tipula* (*Tipula*) *okinawensis* sp. nov., venation.
 4. *Liogma brevipecten* sp. nov., venation.
 5. *Liogma fuscipennis* sp. nov., venation.
 6. *Limonia* (*Dicranomyia*) *triflamentosa* sp. nov., venation.
 7. *Limonia* (*Idioglochina*) *tokunagai* sp. nov., venation.
 8. *Proantocha quadrivittata* sp. nov., venation.
 9. *Antocha sagana* sp. nov., venation.
 10. *Dicranoptycha machidana* sp. nov., venation.
 11. *Helius* (*Helius*) *pluto* sp. nov., venation.
 12. *Polymera parvicornis* sp. nov., venation.
 13. *Limnophila* (*Elæophila*) *serrulata* sp. nov., venation.
 14. *Eriocera nigrotrochanterata* sp. nov., venation.
 15. *Eriocera kelloggi* sp. nov., venation.
 16. *Eriocera kamiyai* sp. nov., venation.
 17. *Atarba* (*Atarbodes*) *bipunctulata* sp. nov., venation.
 18. *Gonomyia* (*Gonomyia*) *subcognatella* sp. nov., venation.
 19. *Ormosia tokunagai* sp. nov., venation.
 20. *Erioptera* (*Ilisia*) *subareolata* sp. nov., venation.
 21. *Molophilus albireo* sp. nov., venation.
 22. *Molophilus cygnus* sp. nov., venation.

PLATE 2

- FIG. 23. *Dolichopeza* (*Nesopeza*) *francki* sp. nov., male hypopygium.
 24. *Tipula seticellula* sp. nov., male hypopygium, lateral.
 25. *Tipula seticellula* sp. nov., male hypopygium, ninth tergite.
 26. *Tipula seticellula* sp. nov., male hypopygium, dististyles.
 27. *Tipula seticellula* sp. nov., male hypopygium, gonapophysis.
 28. *Tipula seticellula* sp. nov., male hypopygium, eighth sternite.
 29. *Tipula* (*Tipula*) *okinawensis* sp. nov., male hypopygium, details.
 30. *Tipula* (*Vestiplex*) *divisotergata* sp. nov., male hypopygium, details.
 31. *Liogma brevipecten* sp. nov., antenna, basal six flagellar segments.
 32. *Liogma fuscipennis* sp. nov., antenna, basal five flagellar segments.
 33. *Limonia* (*Dicranomyia*) *triflamentosa* sp. nov., male hypopygium.
 34. *Limonia* (*Idioglochina*) *tokunagai* sp. nov., male hypopygium.
 35. *Antocha sagana* sp. nov., male hypopygium.

PLATE 3

- FIG. 36. *Dicranoptycha machidana* sp. nov., male hypopygium.
37. *Helius* (*Helius*) *pluto* sp. nov., male hypopygium.
38. *Polymera parvicornis* sp. nov., male hypopygium.
39. *Limnophila* (*Elæophila*) *serrulata* sp. nov., male hypopygium.
40. *Limnophila imanishii* sp. nov., antenna, female.
41. *Atarba* (*Atarbodes*) *bipunctulata* sp. nov., male hypopygium.
42. *Chionea nipponica* sp. nov., male hypopygium.
43. *Chionea araneoides* Dalman, male hypopygium.
44. *Gonomyia* (*Gonomyia*) *subcognatella* sp. nov., male hypopygium.
45. *Ormosia tokunagai* sp. nov., male hypopygium.
46. *Erioptera* (*Ilisia*) *subareolata* sp. nov., male hypopygium.
47. *Molophilus albireo* sp. nov., male hypopygium.
48. *Molophilus cygnus* sp. nov., male hypopygium.

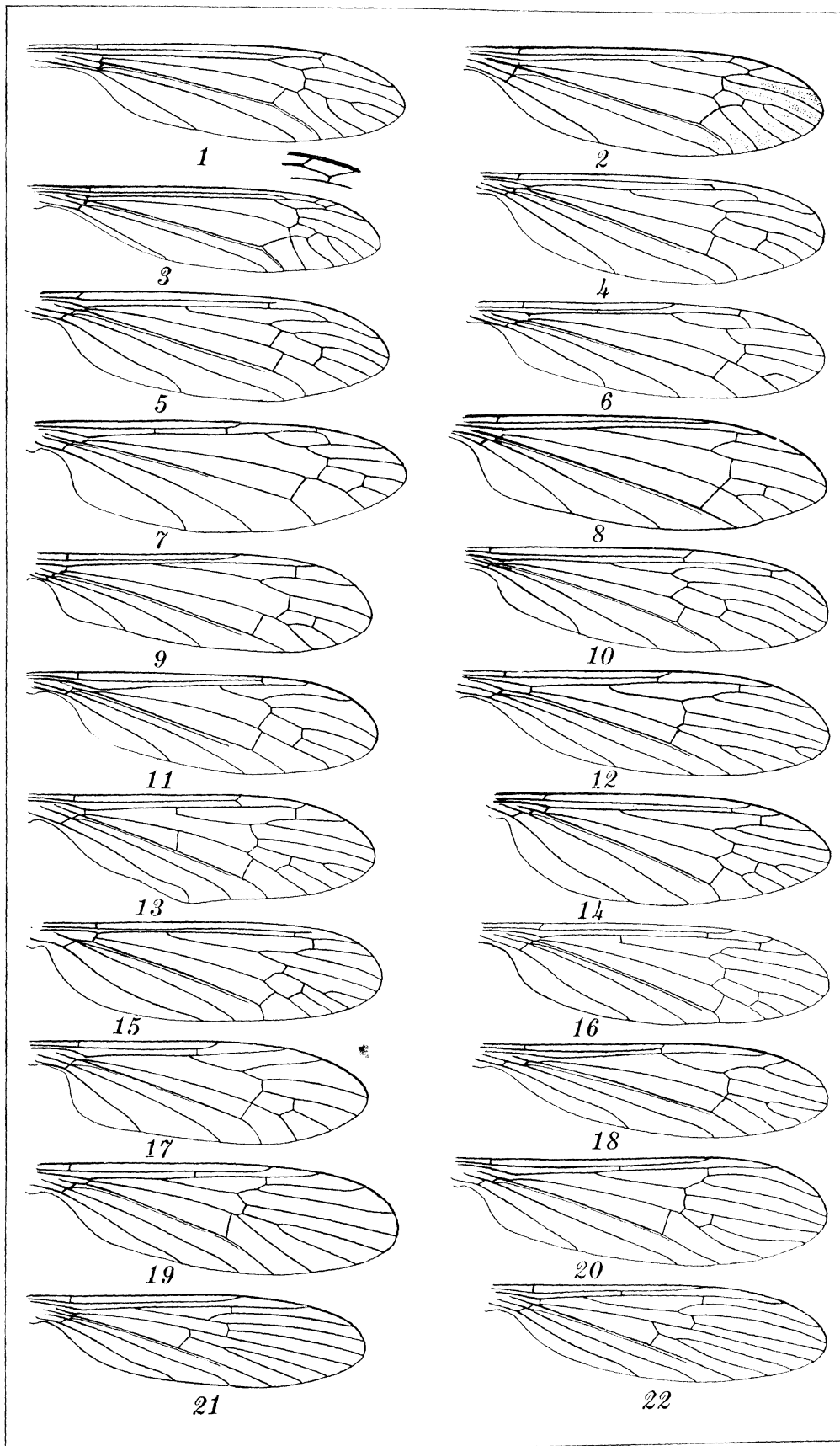


PLATE 1.



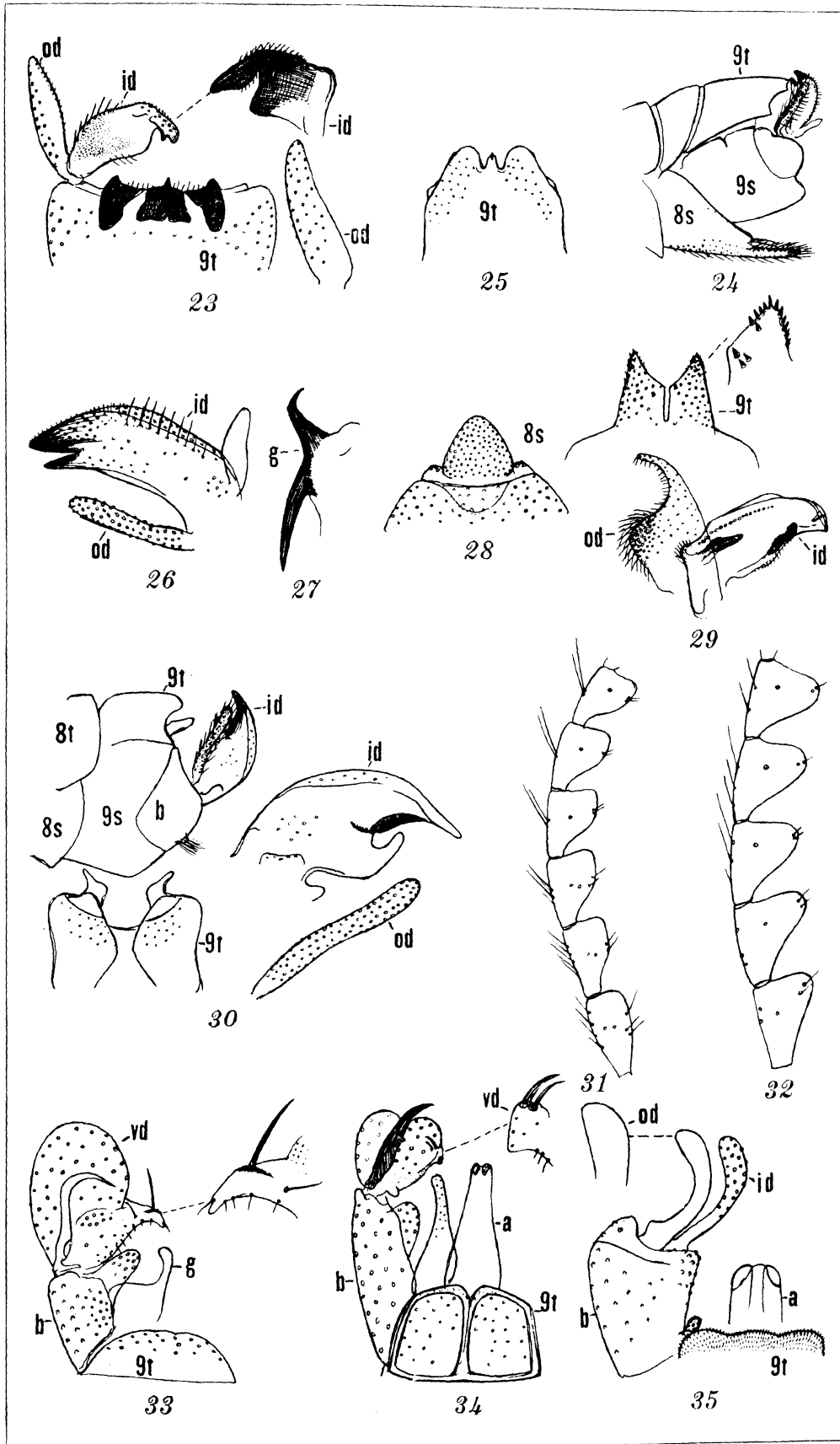


PLATE 2.

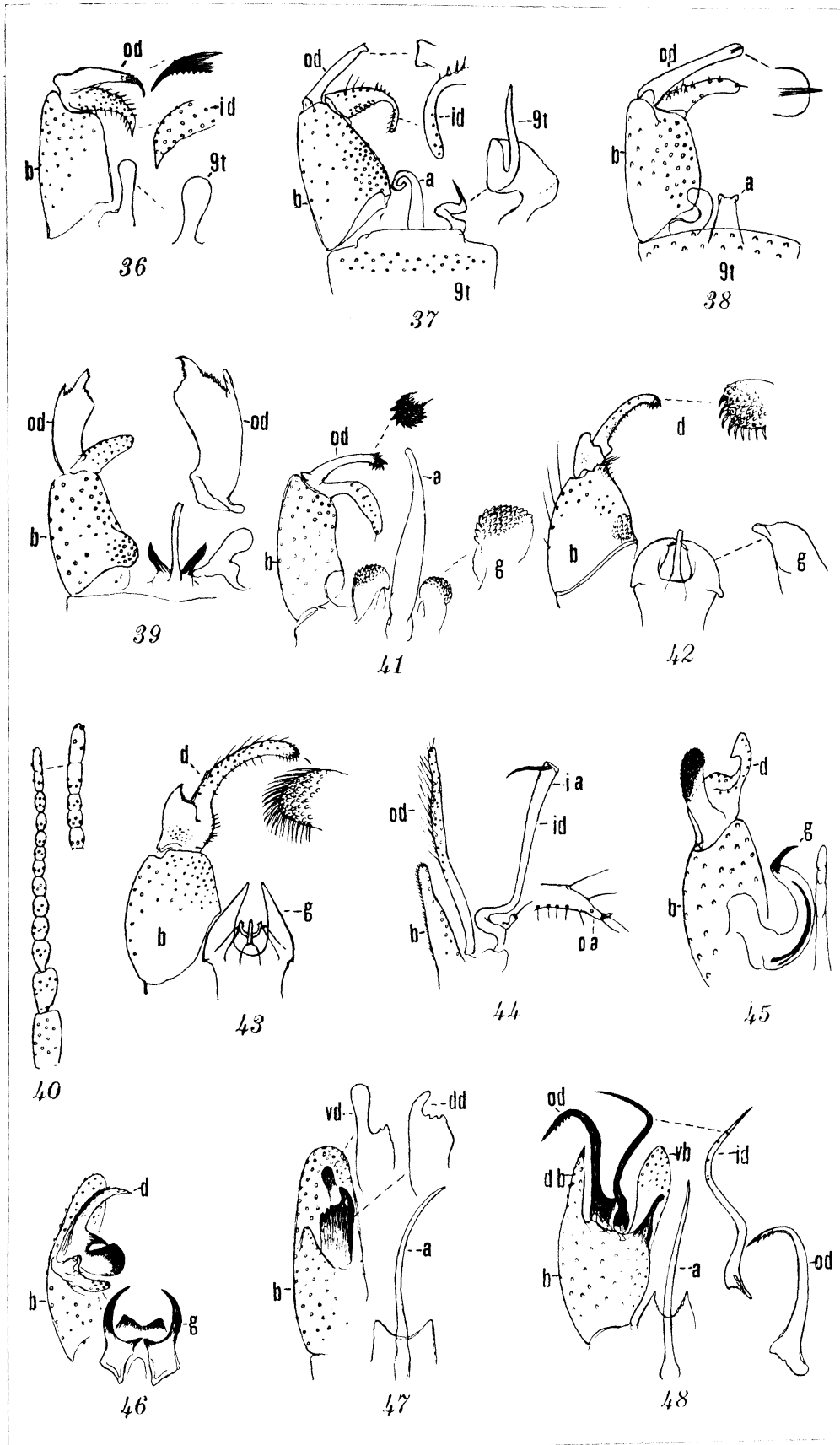


PLATE 3.