

NEW OR LITTLE-KNOWN TIPULIDÆ FROM EASTERN
ASIA (DIPTERA), XIV¹

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THREE PLATES

The majority of the species described herewith were taken by the Reverend David C. Graham on the border between western China and Tibet, the types being contained in the United States National Museum. A smaller number of Japanese crane flies were captured by Messrs. Esaki and co-workers at the Kiushiu Imperial University, and by Messrs. Imanishi, Machida, Nakamura, Sakaguchi, and Yasumatsu. The material sent by Messrs. Esaki and Yasumatsu is preserved in the entomological collection of the Kiushiu Imperial University; that sent by Messrs. Imanishi, Machida, Nakamura, and Sakaguchi is contained in my collection, through the kindly interest and coöperation of the entomologists in question. I wish to express my deep thanks to all of the above-mentioned gentlemen, and to Dr. John M. Aldrich, of the United States National Museum, through whose intervention I have been able to study the very valuable Graham material.

The crane flies from the China-Tibet border are of unusual interest in that they include certain specimens that were taken at the highest altitude ever reported for these flies; namely, 17,000 feet. The highest previous station was at Phusi-La, Tibet, altitude, 16,500 feet, recorded by Edwards.²

TIPULINÆ

TIPULA (SCHUMMELIA) ESAKIANA sp. nov. Plate 1, fig. 1; Plate 2, fig. 23.

Belongs to the *variicornis* group; antennæ (male) elongate, bicolourous; mesonotal præscutum light brown, with three darker brown stripes, the median one further divided by a capillary darker median vitta; fore femora dark brown, remaining femora

¹ Contribution from the entomological laboratory, Massachusetts State College.

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more brownish yellow, with the tips narrowly dark brown; tibiae and tarsi black; wings with a faint brown tinge, the outer portion of cell R_2 strongly infumed; m-cu connecting with M_{3+4} at about one-third its length; male hypopygium with the median lobe of the tergite relatively small, densely setiferous.

Male.—Length, about 9 millimeters; wing, 8.5; antenna, about 5.

Frontal prolongation of head testaceous-brown; nasus distinct; palpi with basal segments pale brown, the outer segments brownish black. Antennæ (male) elongate, as shown by the measurements; basal three segments yellow; succeeding segments bicolorous, the basal enlargement black, the elongate apical portion light yellow, on outer segments somewhat obscured. Head brown, with a narrow median darker vitta on vertex.

Mesonotal præscutum light brown, with three darker brown stripes, the median one paler at anterior end, divided by a capillary darker median vitta; scutal lobes light brown, each with two darker brown areas; scutellum and mediotergite darker brown, sparsely pruinose. Pleura obscure yellow, variegated with brown on anepisternum, ventral sternopleurite, dorsal pteropleurite, and on pleurotergite. Halteres yellow, the base of knob infuscated. Legs with the coxæ and trochanters yellowish testaceous; fore femora dark brown, paler at bases; middle and hind femora more obscure brownish yellow, the tips narrowly dark brown; tibiae and tarsi black. Wings (Plate 1, fig. 1) with a faint brownish tinge, the outer three-fourths of cell R_2 strongly infumed; cell C pale brown, cell Sc yellow; very narrow brown seams along veins Cu, m-cu, and anterior cord; whitish areas before and beyond stigma and across cell 1st M_2 ; veins brown, white in the oblitative areas. Venation: m-cu connecting with M_{3+4} at about one-third its length.

Abdominal tergites obscure brownish yellow, narrowly margined laterally and caudally with blackish; basal sternites more yellowish, the outer ones darkened. Male hypopygium (Plate 2, fig. 23) with the ninth tergite, $9t$, produced medially into a spatulate lobe that is narrower and smaller than in *insulicola*, the entire surface covered with conspicuous erect setulæ, not transversely furrowed and nearly glabrous, as in *insulicola*. Inner dististyle, *id*, with the beak not in alignment with the margin of the blade, but with a slight but distinct emargination at the point of union of the two.

Habitat.—Japan (Kiushiu).

Holotype, male, Sobosan, Bungo, July 13, 1931 (*Esaki and Fujino*).

Tipula (*Schummelia*) *esakiana* is named in honor of my dear friend and colleague, Professor Teiso Esaki, to whom I am particularly indebted for coöperation in making known the rich tipulid fauna of Japan. In its small size and general appearance, it much resembles *T. (S.) acifera* Alexander (Japan: Shikoku), which, however, has the male hypopygium entirely different in structure, the median lobe of the tergite being nearly cylindrical or slightly narrowed outwardly.

TIPULA (SCHUMMELIA) HONORIFICA sp. nov. Plate 1, fig. 2; Plate 2, fig. 24.

Belongs to the *continuata* group; mesonotal præscutum obscure yellow, with three conspicuous brown stripes that are narrowly bordered by still darker brown, the midline of præscutum thus with a double line of the latter color; antennal flagellum black; head orange, anterior vertex with a capillary black vitta; pleura variegated dark brown and obscure yellow; femora obscure yellow, with a nearly terminal dark brown ring; wings cream-yellow, the costal border brighter yellow, the disk with a heavy dark pattern; Rs about one-half longer than m-cu; male hypopygium with the inner dististyle extended into an acute blackened beak.

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

Frontal prolongation of head orange, brown on sides; nasus lacking; palpi brown, the first segment paler. Antennæ with scape and pedicel yellow; flagellum black; flagellar segments with basal enlargement small, verticils unilaterally arranged. Head deep orange, the anterior vertex with a capillary black median line.

Anterior pronotum brown, narrowly yellow on median line; posterior pronotum broadly sulphur-yellow medially. Mesonotal præscutum obscure yellow, with three, conspicuous, dark brown stripes that are narrowly bordered by still darker brown, the mesal borders of the intermediate stripes forming two delicate parallel vittæ that lie so close as to appear almost single; scutal lobes dark brown, the medial region paler; scutellum and mediotergite brown, obscurely paler on median portion. Pleura chiefly dark brown, variegated by obscure yellow on dorsal anepisternum and sternopleurite; meron chiefly yellow; ventral pleurotergite conspicuously light yellow. Halteres elongate, the stem dirty yellow, the knobs clear light yellow. Legs with the coxæ brownish yellow; trochanters obscure yellow; femora ob-

scure yellow, near tips narrowly dark brown, the extreme tips pale; tibiæ and tarsi black, the extreme bases of former somewhat paler. Wings (Plate 1, fig. 2) with the ground color cream-yellow, cells C and Sc brighter yellow; stigma dark brown; an unusually heavy, paler brown, clouded pattern in most cells, restricting the ground to include most of cell M_1 , small areas before and beyond stigma, a small spot at origin of Rs, across fork of M and with areas in cells M, Cu, 1st A, and 2d A; cord, outer medial veins, and vein 2d A narrowly seamed with still darker brown; the brown clouds in cell M with triangular, more grayish centers. Venation: Rs relatively long for this subgenus, about one-half longer than m-cu; R_{1+2} entire, the distal half pale, without trichia.

Abdomen with the basal segments obscure yellow, variegated laterally with brown; segments six to nine black. Male hypopygium (Plate 2, fig. 24) with the caudal margin of tergite, *9t*, deeply notched medially, the lateral lobes broadly rounded; notch relatively narrow, the margin heavily blackened; viewed from the side, the lateral lobes project ventrad into a small acute tooth; viewed from beneath and caudally, the whole outer margin of the tergite on ventral side is produced as an intensely blackened flange, *9t*. Outer dististyle, *od*, long, cylindrical, with conspicuous setæ. Inner dististyle, *id*, small and simple, roughly triangular in outline, extended into an acute blackened spine, the entire cephalic border similarly blackened. Eighth sternite, *8s*, with dense, long, yellow setæ on either side of a narrow, nearly glabrous, median area.

Habitat.—China-Tibet border.

Holotype, male, Yin-Kuan-Tsai, altitude 13,000 to 15,000 feet, July 25, 1930 (*Graham*).

The nearest regional ally of the present fly is the smaller *Tipula* (*Schummelia*) *chumbiensis* Edwards (Tibet), which differs in the short Rs, weakly patterned wings, differently colored femora, and details of structure of the male hypopygium.

TIPULA (ACUTIPULA) INCORRUPTA sp. nov. Plate 2, fig. 25.

General coloration of thorax yellowish gray, the præscutum with four brown stripes; antennæ with basal three segments yellow, the succeeding segments weakly bicolorous, the basal enlargement dark brown, the remainder paler brown, the outer segments more uniformly darkened; wings pale brown, with an oblique whitish band before cord; cells beyond cord not variegated with pale areas; a dark spot in cell Cu before mid-

length; abdomen with basal four segments yellowish, the outer segments blackened; apical lobe of tergite simple, spiculate; eighth sternite unarmed.

Male.—Length, 15 to 16 millimeters; wing, 18 to 19.

Frontal prolongation of head light yellow dorsally, the sides broadly infuscated; nasus conspicuous, yellow; palpi dark brown. Antennæ (male) with the basal three segments yellow, the succeeding segments weakly bicolorous, brown, the basal enlargements dark brown; outer segments more uniformly dark brown; terminal segment reduced to a mere thimble; verticils a little shorter than the segments. Head yellowish gray.

Pronotum obscure yellow medially, darker laterally. Mesonotal præscutum yellowish gray, with four brown stripes, the intermediate pair widely separated; posterior sclerites of mesonotum chiefly yellowish gray. Pleura yellowish gray. Legs with the coxæ yellowish gray; trochanters yellow, femora chiefly brown, the bases restrictedly light yellow, the tips narrowly still darker brown; tibiæ and tarsi rather light brown. Wings with a nearly uniform pale brown tinge; prearcular and costal regions light yellow; an oblique whitish band before cord, extending into base of cell M_3 ; a less distinct pale spot in outer third of cell M , adjoining vein Cu ; cell Cu pale, with a dark spot before midlength; cells beyond cord uniformly darkened; veins brown, paler in the obliterative areas. Venation: Petiole of cell M_1 longer than m .

Abdomen with basal four segments orange-yellow, the tergites narrowly darkened sublaterally; segments five to nine, including hypopygium, black, the outer dististyle of the latter conspicuously whitened. Male hypopygium (Plate 2, fig. 25) with the apical lobe of the ninth tergite, $9t$, simple, spiculate. Inner dististyle, id , as shown, the spinulose setæ at apex relatively sparse. Eighth sternite, $8s$, with the caudal margin rounded, not at all produced, the median region with a roughly triangular area of setæ.

Habitat.—China-Tibet border.

Holotype, male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*). Paratopotypes, 3 males. Paratype, 1 male, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930 (*Graham*).

The present fly rather closely resembles *Tipula* (*Acutipula*) *yunnanica* Edwards in coloration, differing in the details of pattern of antennæ, thoracic notum, and wings, and in the structure of the male hypopygium, notably in the conformation of the

eighth sternite. There are evidently several other allied species of this particular group of flies in the high mountains of central Asia.

The subgenus *Acutipula* Alexander, as modified by Edwards, is represented by numerous species in the eastern Palæartic region. Among these may be listed from the higher Himalayas, western China, and Tibet, the following species: *Tipula atuntzensis* Edwards, *biramosa* sp. nov., *brunnirostris* Edwards, *cinctoterminalis* Brunetti, *fumicosta* Brunetti, *fumifascipennis* Brunetti, *graphiptera* sp. nov., *incorrupta* sp. nov., *intacta* Alexander, *interrupta* Brunetti, *megaleuca* sp. nov., *munda* Brunetti (*vicaria* Walker, preoccupied), *princeps* Brunetti (including *fuscinervis* Brunetti), *quadrinotata* Brunetti, *robusta* Brunetti, *tenuipes* Brunetti (includes *walkeri* Brunetti, a re-naming of *fulvipennis* Walker, nec De Geer), *subturbida* Alexander, and *yunnanica* Edwards. *Tipula brunnicosta* Brunetti is more doubtfully a member of the subgenus. Additional species from eastern Siberia, Japan, Formosa, and Malaysia, include *bipenicillata* Alexander, *bubo* Alexander, *cockerelliana* Alexander, *de meijerei* Edwards, *kuzuensis* Alexander, *saitamae* Alexander, *shirakii* Edwards, *tokionis* Alexander, and *turbida* Alexander.

TIPULA (ACUTIPULA) GRAPHIPTERA sp. nov.

Allied to *bubo*; general coloration gray, the præscutum with four darker gray stripes that are narrowly bordered by darker; antennæ bicolorous; femora yellow, the tips conspicuously blackened; wings brown, variegated with white, forming longitudinal areas that are narrowly connected across cell 1st M_2 ; abdominal tergites reddish brown, darker sublaterally and with a capillary median vitta.

Female.—Length, about 25 millimeters; wing, 21 to 22.

Frontal prolongation of head dark reddish brown, the dorso-median portion and nasus dark brown; palpi black. Antennæ with the scape and pedicel obscure yellow; flagellum obscurely bicolorous, the basal enlargement of each segment black, the remainder brownish yellow, the bicolorous effect persisting to the end of organ; verticils long and conspicuous. Head gray, the posterior vertex with vague indications of a capillary darker line.

Pronotum ochreous. Mesonotal præscutum yellowish gray, with four darker gray stripes that are vaguely and insensibly bordered by brown, most evident along the mesal edge of the

lateral stripe; scutum light gray, each lobe with a darker gray area that is bordered by brown; median line of scutum with a brown area; scutellum and mediotergite gray. Pleura gray, somewhat darker on the anepisternum and ventral sternopleurite; ventral pleurotergite more yellowish; dorsopleural membrane ochereous. Halteres with stem reddish brown, the knobs darker. Legs with the coxæ gray pruinose; trochanters yellow; femora yellow, the tips conspicuously blackened; tibiæ obscure yellow, the tips narrowly dark brown; tarsal segments passing into brown. Wings brown, conspicuously variegated by white areas, forming narrow longitudinal streaks, as follows: Bases of cells Cu, 1st A, and 2d A, the apices of these cells extensively darkened; a square brown spot before midlength of cell Cu; a large whitish area before cord, occupying cell R₁, outer half of R, and at near midlength of M; a narrow outer white stripe includes the narrow bases of cells M₁ to M₄, inclusive, together with the outer half of cell R₅, the two white fasciæ last described being connected across basal half of cell 1st M₂; veins brown, somewhat paler in the white areas; prearcular region brownish yellow.

Abdominal tergites reddish brown, with a very narrow but almost continuous capillary, brown, median vitta, and much broader sublateral stripes that are brown internally and more reddish brown externally; lateral borders of tergites buffy; sternites chiefly yellow. Ovipositor with the cerci long and straight.

Habitat.—China-Tibet border.

Holotype, female, Yu-Long-Si, altitude 15,600 feet, July 23, 1930 (*Graham*). Paratypes, 1 female, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930; 1 female, Tatsienlu, altitude 8,000 to 9,000 feet, August 16, 1930.

Tipula (*Acutipula*) *graphiptera* is most similar to *T. (A.) bubo* Alexander, differing most evidently in the distribution of the white wing areas, the ones in cells R and M being broadly connected, whereas in *bubo* they are broadly interrupted and separated across the outer ends of cells R and M.

TIPULA (ACUTIPULA) MEGALEUCA sp. nov.

Allied to *bubo*; general coloration gray, the præscutum with four darker gray stripes; antennal flagellum bicolorous; legs yellow; wings brown, with an unusually wide, white, longitudinal stripe extending the entire length; abdominal tergites buffy, with a broad blackish sublateral stripe on either side and a narrow, broken, median brown vitta.

Female.—Length, about 25 millimeters; wing, 23.

Frontal prolongation of head brown, sparsely pruinose; nasus elongate; palpi brownish black. Antennæ with scape and pedicel yellow; flagellum bicolorous, the basal enlargement of each segment brown, the remainder of the segment obscure yellow, on outer segments passing into brownish yellow; verticils much longer than the segments. Head gray.

Mesonotal præscutum light gray, with four darker gray stripes that are relatively ill-delimited against this ground; scutum light gray, the lobes variegated with darker gray; posterior sclerites of mesonotum gray, the caudal portion of mediotergite more yellowish. Pleura chiefly ochreous or yellow, the anepisternum and ventral sternopleurite more grayish; ventral pleurotergite immediately above root of halteres conspicuously infuscated. Halteres with the extreme base of stem and apex of knob pale, the intermediate portion dark brown. Legs with the coxæ and trochanters obscure yellow; remainder of legs pale yellow, only the outer tarsal segments darkened. Wings with the ground color brown, extensively striped longitudinally with white; prearcular region light yellow; the white longitudinal stripe includes the base of cell 2d A, all but the outer ends of cells 1st A and Cu, crosses into cell M at beyond midlength, thence to wing tip, involving the outer third of cell R, much of cell R₁ before stigma, all of 1st M₂, broad bases of cells M₁, 2d M₂, M₃, and M₄, and all but the basal-cephalic portion of cell R₅; a small brown spot before midlength of cell Cu represents the area commonly found in this subgenus; veins brown, paler in the whitish areas. Venation: R₁₊₂ persistent; m-cu longer than Rs; M longer than petiole of cell M₁.

Abdominal tergites buffy yellow, with a broad, blackish, sublateral stripe on either side; dorsomedian area of tergite with a very narrow and interrupted median brown vitta, broken on posterior fourth of each segment; lateral borders of tergite broadly and conspicuously pale; basal tergite dark brown; basal sternites chiefly pale, the outer segments more darkened. Ovipositor with the cerci long and straight, slender; hypoalvæ shorter and a little deeper.

Habitat.—China-Tibet border.

Holotype, female, Tatsienlu, altitude 8,000 to 9,000 feet, August 16, 1930 (*Graham*). Paratopotype, female.

Tipula (Acutipula) megaleuca is quite distinct from all other species that are allied to *bubo* Alexander, in the yellow legs and very conspicuous, uninterrupted, white wing stripe.

TIPULA (ACUTIPULA) BIRAMOSIA sp. nov. Plate 1, fig. 3; Plate 2, figs. 26, 27.

Allied to *munda*; mesonotum gray, the pronotum and pleura yellow; wings unmarked except for the stigma and brown costal border; male hypopygium with the inner dististyle produced caudally into two slender spines.

Male.—Length, about 22 to 24 millimeters; wings, 24 to 25.5.

Frontal prolongation of head deep orange; nasus long and slender; palpi dark brown, the incisures of the intermediate segments pale. Antennæ relatively short, slightly shorter than the palpi; basal three segments yellow, succeeding segments bicolorous, the basal enlargement black, the apical portion yellow; terminal segment small, dark-colored, subequal to the basal enlargements of the other segments; verticils very long and conspicuous, as in the group. Head gray.

Pronotum obscure orange-yellow. Mesonotum gray, the præscutum without distinct stripes. Pleura obscure yellow, the dorsopleural membrane more orange. Halteres brown. Legs with the coxæ and trochanters light yellow; femora light brown, the tips dark brown or black; tibiæ and basal three tarsal segments light brown, the tips narrowly and insensibly darkened; terminal tarsal segments black. Wings (Plate 1, fig. 3) grayish subhyaline, the stigma and costal region more infumed, especially the brown cell Sc; central portion of disk in cells M and Cu somewhat clearer, more grayish subhyaline; oblitative areas at cord restricted in area and inconspicuous; veins brown. Venation: Second section of vein M_{1+2} gently arcuated, widening cell 1st M_2 ; petiole of cell M_1 subequal to or a little shorter than m.

Basal abdominal tergites yellow, with a nearly lateral, brown, longitudinal stripe that widens on the fourth and succeeding segments to cover almost the whole sclerite, the lateral margins pale gray; basal four or five sternites yellow, the outer segments and hypopygium dark brown. Male hypopygium (Plate 2, fig. 26) with the tergite, 9t, chiefly fused with the sternite, 9s; basistyle fused with sternite, except beneath. Ninth tergite, 9t, tumid and dark-colored, with numerous setæ, the caudal margin produced medially into a slender yellow rod that is weakly bifid at apex, each half set with conspicuous black spicules. Outer dististyle (Plate 2, fig. 27, *od*) broadly obtuse, pale, with unusually sparse setæ that are chiefly marginal in distribution. Inner dististyle, *id*, with the caudal margin produced into two slender sclerotized horns. Eighth sternite,

8s, with a rounded median notch, on either side of which is a dense brush of long yellow setæ.

Habitat.—China (Szechwan).

Holotype, male, Fu-Lin, altitude 3,800 to 8,200 feet, 1928 (*Graham*). Paratopotype, male.

The nearest described ally is *Tipula* (*Acutipula*) *munda* Brunetti, which differs conspicuously in the longer, more nearly unicolorous antennæ and in the structure of the male hypopygium, notably of the inner dististyle.

TIPULA (VESTIPLEX) GRAHAMI sp. nov. Plate 1, fig. 4; Plate 2, fig. 28.

Size large (wing, over 20 millimeters); mesonotum gray, the præscutum with four more olive-gray stripes that are narrowly bordered by brown; tips of femora narrowly black; wings brown, variegated by darker brown and cream-colored areas, including a conspicuous postarcular brown area in cells R and M; male hypopygium with the tergite divided medially by pale membrane; basistyle produced dorsally into a powerful black spine.

Male.—Length, about 19 to 20 millimeters; wing, 22 to 23.

Female.—Length, about 27 to 30 millimeters; wing, 23 to 25.

Frontal prolongation of head narrowly yellow above, somewhat darker on sides; palpi dark brown. Antennæ (male) 12-segmented, relatively short, about as long as the palpus; scape and pedicel yellow; basal segment of flagellum brown, the outer segments uniformly darker brown; basal enlargements of segments weak; verticils exceeding the segments; terminal segment small. Front light yellow, posterior sclerites more brownish yellow.

Mesonotal præscutum gray, with four more olive-gray stripes that are narrowly bordered by brown; interspaces more brownish gray; scutum yellowish gray, the lobes with olive-gray areas, the median region with a capillary dark line; scutellum yellow, with a median brown vitta; mediotergite reddish brown, with a capillary brown central line. Pleura grayish yellow, the dorso-pleural membrane yellow. Halteres yellow, the knobs dark brown, their apices pale. Legs with the coxæ yellowish gray; trochanters yellow; femora pale brown, the tips narrowly black, the amount about equal on all legs; tibiæ and tarsi brown. Wings (Plate 1, fig. 4) with the ground color brown, variegated by darker brown and cream-colored areas; the darkest area is the stigma; paler brown spots in bases of cells R and M, at origin of Rs, in cell R₁ just before the stigma, and along

anterior cord; the creamy areas include a poststigmatal fascia extending from C to cell R_5 but not connecting with the more whitish oblitative streak across cell 1st M_2 ; other large creamy areas in cell R_1 beyond origin of R_s , subbasally in cells R and M, a large area before outer end of cell M, most of cell Cu and as conspicuous markings at base and near outer end of the anal cells; veins brown. Venation: Petiole of cell M_1 short, less than m, usually about one-half the length; m-cu on M_4 a short distance beyond origin.

Basal four abdominal segments orange-yellow, the tergites narrowly trivittate with dark brown, the lateral areas broadly interrupted; remaining abdominal segments, including hypopygium, black. Male hypopygium (Plate 2, fig. 28) with the suture between tergite, 9t, and sternite, 9s, poorly indicated; basistyle entirely cut off by a suture. Ninth tergite, 9t, completely divided on midline by pale membrane, each half with an outer triangular brown lobe and a conspicuous blackened lobe nearer the midline; mesal region of cephalic portions of tergite densely setiferous. Basistyle, b, produced dorsad and slightly caudad into a stout black spine. Outer dististyle, od, dusky, clavate in outline, with abundant small setæ. Inner dististyle, id, as shown. Eighth sternite, 8s, with the median region broadly pale and membranous, giving the erroneous impression of being marginate on caudal border.

Habitat.—China-Tibet border.

Holotype, male, Tatsienlu, altitude 8,000 to 9,000 feet, August 16, 1930 (*Graham*). Allotopotype, female. Paratopotypes, 1 female; paratypes, 1 male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930; 5 females, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930.

Tipula (*Vestiplex*) *grahami* is named in honor of the collector, the Reverend David C. Graham, who has added very materially to our hitherto scanty knowledge of this prolific region. The species is readily told from other regional members of the subgenus by the combination of large size, darkened area near arculus of wings, and the structure of the male hypopygium, as the divided ninth tergite and produced basistyle. The latter feature is found in several other smaller members of the group, as *himalayensis*, *nigroapicalis*, *pleuracantha*, *serricauda*, *serridens*, *styligera*, *subtincta*, and probably others.

The subgenus *Vestiplex* Bezzi, as redefined by Edwards to include the *arctica* and *himalayensis* groups of the genus, is

well-defined in the female sex by the somewhat remarkable ovipositor, with powerful serrulate cerci and greatly reduced hypovalvæ. The group is greatly developed in the eastern Palæarctic region. Among the species known from the higher Himalayas, western China and eastern Tibet, are the following: *avicularia* Edwards, *divisotergata* Alexander, *edentata* Alexander, *grahami* sp. nov., *himalayensis* Brunetti, *inaequidentata* Alexander, *nigroapicalis* Brunetti, *nigrotibialis* Brunetti, *pleuracantha* Edwards, *quasimarmoratipennis* Brunetti, *reposita* Walker (including *brevis* Brunetti), *scandens* Edwards, *styligera* Alexander, *subscripta* Edwards, *subtincta* Brunetti and *tardigrada* Edwards. Additional species from eastern Siberia, eastern China, Japan, and Formosa include *asio* Alexander, *biserra* Edwards, *kuwayamai* Alexander, *nokonis* Alexander, *serricauda* Alexander, *serridens* Alexander, *subapterogyne* Alexander, *subcentralis* Alexander, *teshionis* Alexander, and *verecunda* Alexander. Species with marbled wings that closely simulate members of this subgenus but do not belong to *Vestiplex* include *bodpa* Edwards, *marmoratipennis* Brunetti, *tesselatipennis* Brunetti, *trilobata* Edwards, and members of the *thibetana* group, as *gregoryi* Edwards, *griseipennis* Brunetti, *hobsoni* Edwards, *thibetana* de Meijere, *waltoni* Edwards, and *wardi* Edwards.

TIPULA (LUNATIPULA) TRANSFIXA sp. nov. Plate 1, fig. 5; Plate 2, fig. 29.

General coloration of thorax buffy to gray, the præscutum with four ill-defined brown stripes; antennæ (male) elongate, if bent backward extending to the second abdominal segment, chiefly yellow; femora and tibiæ yellow, the tips narrowly brownish black; wings with a strong yellow tinge, the stigma darker; small cream-colored areas before and beyond stigma, in cell 1st M₂ and in outer end of cell M; abdomen yellow, the subterminal segment more or less darkened; male hypopygium with a pair of pale spatulate blades and another pair of decurved hooks jutting caudad from the notch of the ninth sternite.

Male.—Length, 14 to 17 millimeters; wing, 15 to 17.

Female.—Length, 17 to 22 millimeters; wing, 14 to 17.

Frontal prolongation of head yellowish; nasus long and slender; palpi brownish yellow to brown. Antennæ (male) relatively long, if bent backward extending about to the base of the second abdominal segment; in female shorter, about reaching the wing root; organ chiefly yellow, the basal enlargements of the segments small and darkened: verticils shorter than the seg-

ments (male) or a little longer than segments (female). Head dull gray, more yellowish gray in front.

Mesonotal præscutum buffy, more grayish laterally, with four brown stripes that are relatively ill-defined; scutal lobes gray, variegated with brown; posterior sclerites of mesonotum buffy with vague indications of a capillary brown line. Pleura buffy gray. Halteres yellow, the knobs infuscated. Legs with the coxæ buffy gray; trochanters yellow; femora and tibiæ yellow, the tips narrowly brownish black, somewhat broader on the former; basitarsi brownish yellow, the tips and remainder of tarsi dark brown; tibial spur formula 1-2-2; claws very small, simple. Wings (Plate 1, fig. 5) with a strong yellow to weakly brownish yellow tinge, the costal region more saturated; stigma brown; more cream-yellow areas before and beyond the stigma, across cord in cells M and 1st M_2 , and as a small spot in cell M adjoining vein Cu; veins brown. Squama with a few small setæ. Venation: R_{1+2} entire; M_{3+4} about one-half the basal section of M_3 ; m usually longer than the petiole of cell M_1 .

Abdomen yellow, in cases with segment eight (male) slightly darkened. Male hypopygium (Plate 2, fig. 29) of moderate size; tergite, 9t, and basistyle, b, cut off by sutures. Ninth tergite, 9t, transverse, the caudal margin with a broad U-shaped notch that embraces the whole caudal end of the sclerite, the median portion with a further small notch; caudal margins of tergite blackened and microscopically roughened near midline. Outer dististyle small, narrowly clavate in outline. Inner dististyle *id*, with two blackened apical points, the outer more slender. From the notch of the ninth sternite jut two pairs of appendages, 9s, consisting of an upper pair of pale spatulate blades and a more ventral pair of decurved hooks; a pendant lobe at caudal-mesal region of ninth sternite. Eighth sternite, 8s, moderately sheathing, its caudal margin straight, without armature of lobes or enlarged setæ. Ovipositor with smooth, relatively slender valves; hypovalvæ small.

Habitat.—China-Tibet border.

Holotype, male, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930 (*Graham*). Allotype, female, Tatsienlu, altitude 8,000 to 9,000 feet, August 16, 1930. Paratopotypes, 4 of both sexes; paratypes, 9 of both sexes, with allotype; 1 male, Jedo Pass, altitude 12,000 to 15,000 feet, July 17 and 18, 1930; 1 female, Yu-Long-Si, altitude 15,600 feet, July 28, 1930; 1 male, near Tang-Gu, 14,000 feet, August 3 to 6, 1930 (*Graham*).

There are rather numerous, generally similar species of *Lunaticipula* in Europe and eastern North America but I know of no regional forms that are at all similar to the present fly. The relatively elongate antennæ, the deeply saturated wings, with restricted paler pattern, and, especially, the structure of the male hypopygium, serve to define the present fly. It may be noted that the peculiar armature jutting from the notch of the ninth sternite, which does not seem to represent any phallosomic development, is often withdrawn into the body so as to be invisible in dry specimens.

TIPULA OREADA *sp. nov.* Plate 1, fig. 6; Plate 2, fig. 30.

Size large (wing, male, 24 millimeters); general coloration gray, the præscutum with a median brown stripe that is narrowly margined laterally with dark brown; lateral stripes less distinct; wings yellow, the veins narrowly seamed with dark brown, broader along cord; vein R_3 sinuous, slightly narrowing the cell on basal half; male hypopygium with the basistyle produced caudad into a long obtuse point; a single dististyle.

Male.—Length, about 20 millimeters; wing, 24.

Frontal prolongation of head of moderate length, brownish gray; nasus short and stumpy; palpi with basal segment dark brown, the remainder black. Antennæ with the scape and pedicel obscure orange; flagellum brownish black; basal enlargements of segments moderately developed, with long conspicuous verticils that are about equal in length to the segments. Head yellowish gray, the posterior vertex more infuscated laterally.

Pronotum brown laterally, more obscure yellow medially. Mesonotal præscutum light gray, with three stripes, the lateral stripes darker gray and ill-defined; median stripe more brownish gray, clearly defined by narrow dark brown borders that are broader on cephalic half of stripe; posterior sclerites of mesonotum light gray, the scutal lobes marked with vague darker gray areas; posterior portions of scutellum and mediotergite more dusky. Pleura gray, the ventral pleurotergite light yellow. Halteres dusky, the apices of both stem and knob pale. Legs with the coxæ gray; trochanters obscure yellow; femora and tibiæ dark reddish brown, the outer tarsal segments blackened; tibial spur formula 1-?-2, middle legs broken; claws small, with basal spine. Wings (Plate 1, fig. 6) relatively broad; ground color light yellow, the prearcular region deeper yellow; a much restricted dark brown pattern at origin of R_s and along cord; all longitudinal veins similarly seamed very nar-

rowly with dark brown; very pale gray clouds in centers of most cells, restricting the ground to an oblique band at cord, a post-stigmal area in cells R_2 and R_3 , bases of cells R and M, outer ends and bases of cells Cu and 1st A, and most of cell 2d A; veins dark. Squama setiferous. Venation: R_{1+2} entire; R_3 sinuous, slightly narrowing cell R_3 before midlength; petiole of cell M_1 shorter than m; m-cu at fork of M_{3+4} .

Basal abdominal tergites obscure yellow, trivittate with dark brown, the lateral stripes more pruinose and interrupted on caudal portions of segments; lateral margins of tergites on outer two-thirds more grayish; outer segments and hypopygium chiefly blackened. Male hypopygium (Plate 2, fig. 30) very large; suture between tergite, $9t$, and sternite, $9s$, complete. Ninth tergite, $9t$, large, the caudal margin with a very conspicuous U-shaped notch, at base of which lie two small triangular points; lateral lobes flattened, their tips obliquely truncated. Basistyle, b , cut off by a complete suture, its outer end produced caudad into a long subcylindrical lobe that narrows gradually to the blunt tip, the dorsal surface of this lobe with scattered, long, pale setæ. Dististyle, d , single, the outer margin at base with a setiferous lobe which presumably is the homologue of the outer dististyle in those species where this is more evidently cut off from the main body of style. Phallosome, p , a small subquadrate mass. Eighth sternite, $8s$, deeply notched medially, with an additional setiferous lobe on either side, together with a dusky liguliform lobe in the notch.

Habitat.—China-Tibet border.

Holotype, male, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930 (*Graham*).

Tipula oreada may perhaps be referred to the subgenus *Nipotipula* Matsumura but differs from the general type of the group in certain regards. The reduced wing pattern and the peculiar male genitalia, especially the long-produced basistyles, should make the species readily distinguishable among the large regional species allied to *pulcherrima* Brunetti and *thibetana* de Meijere.

TIPULA VARIIPETIOLARIS sp. nov. Plate 1, fig. 7; Plate 3, fig. 31.

General coloration gray; præscutum with three darker gray stripes; halteres dark brown; legs reddish brown, the tips of femora and tibiæ narrowly blackened; wings brown, variegated with white including a central streak that extends to the apex in cell R_5 ; petiole of cell M_1 variable in length, from subequal to

m to quite lacking; male hypopygium with the outer dististyle very small.

Male.—Length, 16 to 17 millimeters; wing, 19.

Frontal prolongation of head stout, gray pruinose; nasus lacking; palpi black, the terminal segment subequal to the second and third taken together. Antennæ (male) of moderate length, if bent backward extending nearly to wing root; scape and pedicel obscure orange; flagellum black; segments with rather conspicuous basal enlargements; verticils subequal to or a little shorter than the segments. Head gray, suffused with brown, the occiput and narrow orbits clearer gray.

Mesonotal præscutum light gray, with three darker gray stripes, the median stripe narrowly margined with brown, the narrow lateral stripes more uniformly darkened; lateral borders of præscutum more or less darkened; posterior sclerites of mesonotum clearer gray, the midline of mediotergite impressed on posterior half. Pleura gray; dorsopleural membrane yellowish brown. Halteres dark brown. Legs relatively stout; coxæ pruinose; trochanters brownish yellow; femora and tibiæ reddish brown, the tips very narrowly blackened, especially of the tibiæ; tarsi black, the proximal ends of basitarsi paler; tibial spur formula 1-2-2, the spurs long and slender, setuliferous; claws small, simple. Wings (Plate 1, fig. 7) with a strong brown suffusion in cells beyond cord, the basal cells paler; prearcular and costal regions more yellowish; a whitish streak runs almost the length of the wing, following vein M to cord, thence through cells 1st M_2 and bases of M_1 , 2d M_2 , and M_3 to the apex in distal half of R_5 ; other white streaks along vein M_4 , outer third of 1st A, and in basal half of cell 1st A; the pale areas in stigmal region much reduced or lacking, most evident as a weak post-stigmal brightening; veins brown. Squama naked; macrotrichia of veins beyond cord short but relatively numerous, lacking on distal thirds of veins R_{1+2} and R_3 . Venation: Petiole of cell M_1 very variable in length, from subequal in length to m to quite lacking, in the latter case (including holotype) cell M_1 very deep and entirely sessile.

Basal abdominal tergite gray; tergites two to six orange, broadly blackish gray on sides, the midline very narrowly darkened; sternites and outer tergites, including hypopygium, darkened. Male hypopygium (Plate 3, fig. 31) with the tergite, 9t, distinct from the sternite, 9s. Basistyle, *b*, very large, entire, not produced into lobes or spines. Ninth tergite, 9t, with the caudal margin deeply notched, the median region produced

caudad into a narrow, slightly decurved point; lateral lobes of tergite with mesal flanges to appear as flattened, paddlelike blades; anterolateral portions of tergal plate produced into long arms beneath the eighth tergite. Outer dististyle, *od*, unusually small, only about one-third the length of the inner dististyle, the latter flattened, approximately parallel-sided, the outer margin at base with a small tooth. Eighth sternite, *8s*, deeply notched medially, the sides of notch with several powerful decussate setæ, the outermost a large fasciculate bristle.

Habitat.—China-Tibet border.

Holotype, male, Yin-Kuan-Tsai, altitude 13,000 to 15,000 feet, July 25, 1930 (*Graham*). Paratypes, 2 males, Yu-Long-Gong, altitude 14,000 feet, August 14, 1930; 1 male, Yu-Long-Si, altitude 15,600 feet, July 28, 1930 (*Graham*).

Tipula variipetiolearis has the wings striped longitudinally with whitish, somewhat as in certain members of *Acutipula* or the *tricolor* group, but is very distinct in its structural details, notably of the male hypopygium. No nearly allied species is known to me.

TIPULA SUBMUTILA sp. nov. Plate 1, fig. 8.

Allied to *mutiloides*; general coloration brownish gray, the præscutum with four narrow brown stripes; frontal prolongation of head abruptly light yellow on dorsal surface; nasus distinct; antennæ with basal four segments yellow, the outer segments dark brown; femora yellowish brown, the tips dark brown; ground color of wings brown, with an incomplete pale crossband beyond cord and three more or less confluent pale areas in cells R and M surrounding the origin of Rs; R_{1+2} atrophied.

Female.—Length, about 12 millimeters; wing, 11.

Frontal prolongation of head conspicuously and abruptly light yellow on dorsal portion, the sides dark brown; nasus distinct; palpi dark brown. Antennæ with the basal four segments yellow, the succeeding segments dark brown; verticils about as long as the segment; terminal segment only a little shorter than the twelfth. Head gray laterally, broadly more infuscated on central portion.

Mesonotum obscure brownish gray, the præscutum with four narrow brown stripes, the median interspace more or less suffused; median region of scutum gray, the lobes marked with dark brown; posterior sclerites grayish brown. Pleura gray. Halteres pale, the stem yellow, the base of knob light brown, the apex more whitish. Legs with the fore coxæ gray, the

other coxæ more yellowish; trochanters light yellow; femora yellowish brown, brighter yellow basally, the tips passing to dark brown; tibiæ and basitarsi brown, the outer tarsal segments dark brown; tibial spur formula 1-2-2; claws (female) small, simple. Wings (Plate 1, fig. 8) almost as in *mutiloides*; ground color brown; three nearly equal major whitish areas in cells R and M, in the former cell lying before and beyond the origin of Rs, in the latter cell immediately beneath this origin, these areas more or less confluent and very evident; white crossband beyond cord incomplete, scarcely attaining costa, entering the base of cell M₃; a distinct pale area in outer end of cell 1st A adjoining vein 2d A. Venation: R₁₊₂ atrophied; cell 1st M₂ a little longer than in *mutiloides*, cell M₁ shorter and wider.

Abdomen with ground color yellow, the tergites with a median brown stripe; sides of both tergites and sternites weakly pruinose. Ovipositor with the cerci slender, very gently up-curved, the tips subacute; hypovalvæ compressed, narrowed to the pale acute tips.

Habitat.—China-Tibet border.

Holotype, female, Yu-Long-Si, altitude 15,600 feet, August 7, 1930 (*Graham*).

Tipula submutila is most generally similar and allied to *T. mutiloides* Alexander (western China), differing in the diagnostic features above listed, especially the pattern of the præscutum, the pale dorsum of the frontal prolongation of head, yellowish brown femora, and other characters.

TIPULA JEDOENSIS sp. nov. Plate 1, fig. 9.

General coloration gray, the præscutum with four narrow brown stripes, the interspaces with conspicuous black setigerous punctures; antennæ black, the basal two segments yellow; femora with tips blackened, very broadly so on forelegs; wings whitish and brown, with a broad complete white fascia beyond cord; R₁₊₂ chiefly atrophied; abdomen yellow, the tergites trivittate with dark brown, the dark areas more extensive on outer segments; ovipositor with cerci long and straight.

Female.—Length, about 14 to 15 millimeters; wing, 13 to 15.

Frontal prolongation of head black, light gray pruinose dorsally; nasus long; palpi black. Antennæ with the scape and pedicel yellow; basal portion of first flagellar segment yellow, the remainder brown; succeeding flagellar segments black; ver-

ticils not exceeding segments; terminal segment about one-third the length of the penultimate. Head brownish gray, the front and anterior orbits clearer gray; a capillary dusky line on vertex.

Mesonotum light gray, the præscutum with four narrow brown stripes, the interspaces, including the midline, with conspicuous brown setigerous punctures; median region of scutum broadly gray, the lobes marked with brown. Pleura light gray, the dorsopleural region more buffy gray. Halteres pale, the knobs dark brown. Legs with the coxæ light gray; trochanters obscure yellow; femora obscure yellow, the tips blackened, more broadly so on the forelegs where about the distal two-thirds are darkened, narrower on the other legs where only the narrow tips are blackened; tibiæ and tarsi black. Wings (Plate 1, fig. 9) with the ground color extensively whitish, variegated by light and dark brown; prearcular and costal regions yellow; a broad complete white crossband beyond cord; similar white bands before cord in outer ends of cells R and M and near wing base in cells R to 2d A, inclusive; stigma brown, confluent with a major dark area on anterior cord; other paler brown areas include the wing tip, a broad band across wing from R to margin in cell 1st A, in cases interrupted in cell Cu; veins brown, yellowish in the pale areas. Squama naked. Venation: R_{1+2} chiefly atrophied, the base more or less persistent as a weak spur without trichia; cell 1st M_2 pentagonal.

Abdomen with basal tergite gray; succeeding segments yellow with a broad, median, brown stripe and somewhat narrower lateral stripes, the dark areas more extensive and more pruinose on outer segments, restricting the ground color to small, obscure, sublateral, yellow portions. Ovipositor with cerci long, slender, and nearly straight, the margins smooth; hypovalvæ shorter and more compressed.

Habitat.—China-Tibet border.

Holotype, female, Jedo Pass, altitude 12,000 to 15,000 feet, July 17 and 18, 1930 (*Graham*). Paratopotype, 1 female; paratype, 1 female, Tatsienlu, altitude 8,000 to 9,000 feet, August 16, 1930.

The only other, approximately similar, regional species is *Tipula submutila* sp. nov., which differs in the pattern of the wings, body, and appendages. The dark setigerous punctures on the præscutal interspaces are very conspicuous and characteristic.

TIPULA MULTISTRIGATA sp. nov. Plate 1, fig. 10.

Mesonotum clear gray, the præscutum with three dark brown stripes, the median one split by a capillary pale line; median area of scutum broadly gray, the dark areas on lobes lying far laterad; wings whitish, variegated with brown, including a complete, narrow, white crossband beyond cord; R_{1+2} atrophied; R_2 very short or nearly lost by approximation of adjoining veins; M_{3+4} about one-third m; intermediate abdominal segments with the lateral margins conspicuously silvery-white.

Female.—Length, about 16 millimeters; wing, 14.

Frontal prolongation of head narrowly brownish yellow above, darker brown on sides; nasus distinct; palpi black. Antennæ with the scape obscure yellow, the basal half darkened; pedicel yellow; flagellum black; verticils exceeding segments. Head gray.

Mesonotal præscutum clear gray, with three, clearly defined, dark brown stripes, the median stripe split by a capillary pale vitta; scutum medially very broadly gray, the usual two dark areas of each scutal lobe lying far laterad; scutellum blackened, damaged in type; mediotergite gray, with a narrow dark brown median line, the posterior portion of sclerite more darkened. Pleura gray, the dorsopleural region buffy. Halteres yellow, the knobs dark brown. Legs with the coxæ gray pruinose; trochanters yellow; femora yellowish brown, the tips dark brown, relatively narrow and subequal in amount of both fore and hind legs (middle legs broken); hind femora with the central portion weakly darkened, leaving the narrow base yellow, with indications of an obscure yellow subterminal ring; tibiæ and basitarsi brownish yellow, the tips narrowly darkened; outer tarsal segments more uniformly blackened, tibial spur formula 1-?-2. Wings (Plate 1, fig. 10) whitish, with a strigate brown pattern that is arranged much as in *tetragramma* Edwards; cells C and Sc clear light yellow; a complete but narrow white crossband beyond cord; outer end of cell R_5 conspicuously white but outer end of cell R_3 uniformly darkened; cells R and M basad of origin of Rs with the dark markings much restricted in area; cell 2d A clear; veins chiefly dark brown. Squama naked. Venation: Tip of R_{1+2} atrophied; R_2 punctiform, so R_1 touches R_{2+3+4} or nearly so; Rs long, slightly exceeding twice m-cu; petiole of cell M_1 exceeding m.

Abdominal segments obscure yellow, trivittate with dark brown, on the fifth and succeeding segments the yellow coloration passing into gray; both tergites and sternites on segments

two to seven, inclusive, with the lateral margins narrowly silvery. Ovipositor with the basal shields shiny black; cerci blackish, reddish basally, relatively straight and slender, the margins smooth.

Habitat.—China-Tibet border.

Holotype, female, Yu-Long-Si, altitude 15,600 feet, August 7, 1930 (*Graham*).

Tipula multistrigata is most nearly allied to the larger and broader-winged *T. latistriga* Edwards (northeast Burma), differing in the pattern of the mesonotum and wings, in the latter with the white crossband beyond cord narrower, the white areas in cells R and M much wider. The venational details of the present form, as the loss of R_2 , with cell 1st M_2 narrow and M_{3+4} unusually short, provide additional features for the separation of the two flies.

TIPULA PEDICELLARIS sp. nov. Plate 1, fig. 11; Plate 3, fig. 32.

General coloration gray, the præscutum with a median brown stripe that is trilineate with darker brown; antennæ black, the pedicel abruptly orange; tips of femora broadly blackened, most extensive on forelegs; wings whitish, sparsely patterned with pale brown, the ground color including an incomplete fascia beyond cord; R_{1+2} entire; male hypopygium with the caudal margin of ninth tergite broadly emarginate; eighth sternite with a brush of long yellow setæ.

Male.—Length, about 13 millimeters; wing, 13.2; antenna, 4.

Female.—Length, about 14 millimeters; wing, 12.2; antenna, 2.2.

Frontal prolongation of head yellowish gray above, duller laterally; nasus distinct; palpi black, the terminal segment subequal to or a little shorter than the two preceding segments combined. Antennæ black, the scape pruinose, the pedicel abruptly orange; flagellar segments (male) with weak basal enlargements; verticils shorter than the segments; terminal segment about one-third the length of the penultimate. Head brownish gray, the orbits and vertical tubercle (male) more yellowish gray, the latter weakly notched; in the female the vertical tubercle is not or scarcely developed.

Mesonotal præscutum brownish gray, the lateral stripes narrow to almost obsolete; median stripe conspicuous, the broad margins and narrower median vitta dark brown, the intermediate portions paler brown; stripe narrowed to the suture;

posterior sclerites of mesonotum clearer gray. Pleura gray, the dorsopleural region dusky. Halteres obscure yellow, more brightened at bases, the knobs dark brown. Legs with the coxæ gray pruinose; trochanters reddish yellow; femora reddish yellow basally, the tips broadly blackened, broadest on forelegs where about the basal third is pale, narrowest on posterior femora where about the distal fourth is blackened; tibiæ and basitarsi black, the proximal ends a little paler; remainder of tarsi black; tibial spur formula 1-?-2, the middle legs broken. Wings (Plate 1, fig. 11) with the ground color whitish, with a pale brown clouding over most of disk; cell Sc and prearcular region yellowish, cell C more brownish yellow; stigma darker brown; the ground areas include a narrow incomplete fascia beyond cord, extending from costa to midlength of cell M_3 ; a broader white fascia, more or less parallel to last-described, lies before stigma, extending across outer ends of cells R and M; cells M, Cu, and basal half of 1st A extensively whitish. Squama naked. Venation: Rs more than one-half longer than m-cu; R_{1+2} long and entire, but pale except for the extreme base, which has two or three trichia; petiole of cell M_1 nearly three times m; m-cu on M_4 just beyond origin; cell 2d A narrow.

Abdominal segments chiefly orange, trivittate with brown, the lateral margins more pruinose; outer segments and hypopygium dark brown. Male hypopygium (Plate 3, fig. 32) relatively large, with the tergite, $9t$, sternite, $9s$, and basistyle, b , entirely distinct. Ninth tergite, $9t$, a large thin plate, pale except for the narrowly blackened margin; sclerite broad-based and parallel-sided for more than one-half the length, thence suddenly narrowed; caudal margin very broadly and gently emarginate, with indications of a low and obtuse black median tooth. Outer dististyle, od , flattened, pale, expanded outwardly into a spatula. Inner dististyle, id , with the heel portion produced into a slender rod that terminates in an acute spine. Ninth sternite, $9s$, with a small fleshy lobule on either side of median line. Eighth sternite, $8s$, sheathing, narrowed outwardly, the median caudal portion further produced into a broad liguliform lobe of thinner texture, this fringed with long yellow setæ.

Habitat.—China-Tibet border.

Holotype, male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*). Allotype, female, Yin-Kuan-Tsai, altitude 13,000 to 15,000 feet, July 25, 1930 (*Graham*).

Tipula pedicellaris is readily told from the other small regional species by the black antennæ, with only the pedicel

bright orange, the entire vein R_{1+2} and the structure of the male hypopygium.

LIMONIINÆ

LIMONIINI

LIMONIA (DICRANOMYIA) GRAHAMIANA sp. nov. Plate 1, fig. 12; Plate 3, fig. 33.

General coloration of thorax orange, the præscutum with a median brown line; femora yellow, the tips conspicuous dark brown; wings whitish subhyaline, the oval stigma dark brown; male hypopygium with the basistyle and ventral dististyle complicated by outgrowths, the latter with three such prolongations in the rostral region, all but the central one tufted with yellow setæ; ninth tergite with the caudal margin produced medially into a small tridentate plate.

Male.—Length, about 7.5 millimeters; wing, 9.

Rostrum brown; palpi dark brown. Antennæ black throughout; flagellar segments oval, without pedicels; terminal segment one-third longer than penultimate; verticils a little longer than the segments. Head yellowish gray; anterior vertex wider than diameter of scape.

Pronotum dark brown medially, orange-yellow on sides. Mesonotum orange-yellow, the præscutum with a conspicuous brown median line that becomes obsolete far before suture. Pleura orange-yellow. Halteres elongate, pale, the knobs weakly infuscated. Legs with the coxæ orange-yellow; trochanters and femora yellow, the tips of the latter broadly and conspicuously dark brown, the amount subequal on all legs; tibiæ yellow, the extreme bases and tips dark brown, these two areas about equal in degree; basitarsi obscure yellow, the distal third and remainder of tarsi brownish black. Wings (Plate 1, fig. 12) whitish subhyaline; stigma oval, dark brown, conspicuous; veins pale brown. Macrotrichia on veins beyond level of origin of R_s . Venation: Sc_1 ending opposite origin of R_s , Sc_2 some distance from its tip, Sc_1 being about two-thirds the length of R_s ; in one wing of type, a weak adventitious crossvein in cell Sc basad of Sc_2 ; free tip of Sc_2 lying a short distance basad of R_2 , the element subequal to R_1 alone; m-cu close to fork of M .

Abdominal tergites dark brown, the caudal margins of the segments very narrowly pale; basal sternites pale yellow, restrictedly darkened at the incisures; outer sternites infuscated; male hypopygium chiefly dark brown, the large outer lobes of the ventral dististyle abruptly white. Male hypopygium (Plate 3, fig. 33) with the median region of tergite, $9t$, produced caudad into a small plate, the apex of which is tridentate. Basistyle,

b, with the ventromesal lobe large and complex, with a small basal and a larger apical brush of setæ. Dorsal dististyle a slender, nearly straight rod. Ventral dististyle, *vd*, large and conspicuous, the sclerotized beak portion deeply trifid, the usual two spines lying in the notch of the outer pair of arms; outer arm long and curved, gradually narrowed outwardly, with a small tuft of yellow setæ; middle arm a smooth adzlike blade; basal arm short and stout, the entire apex with a dense brush of long yellow setæ. Mesal-apical lobe of gonapophysis slender. Ædeagus long and slender, weakly setiferous on basal portion.

Habitat.—China-Tibet border.

Holotype, male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*).

Limonia (*Dicranomyia*) *grahamiana* is named in honor of the collector of this rich series of Tipulidæ, the Reverend David C. Graham. This fly is very distinct from the now rather numerous species of the subgenus that have the male hypopygium greatly complicated by accessory outgrowths of the basistyle and ventral dististyle (as *stigmatica* Meigen, *magnicauda* Lundström, *complicata* de Meijere of the western Palæarctic region; *bifusifera* Edwards and *megacauda* of the eastern Palæarctic region; *cramptoniana* Alexander, *intricata* Alexander and *platyrostra* Alexander, of the Nearctic region). The nearest regional ally is *bifusifera* from Kashmir, which is very different in the black coloration of the body and legs, and in the details of the male hypopygium.

LIMONIA (DICRANOMYIA) PARAMORIO PLATYSOMA subsp. nov.

Male.—Length, about 5.5 millimeters; wing, 6.5.

Characters as in typical *paramorio* Alexander (eastern China, Yakushima), differing especially in an important feature of the male hypopygium. Each gonapophysis has the mesal-apical lobe very broad, the apex obtuse. In the typical form, the lobe is heavily blackened, slender, curved to the narrow acute point.

Habitat.—Japan (Kyushu).

Holotype, male, Mount Wakasugi, Chikuzen, May 3, 1931 (*Esaki et al.*).

LIMONIA (LIMONIA) EUPHILETA Alexander.

Limonia euphileta ALEXANDER, Insec. Inscit. Menst. 12 (1924) 154.

Limonia biceps ALEXANDER, Ann. & Mag. Nat. Hist. IX 15 (1925) 386-388, figs. 2-3.

The types of *euphileta* were two females from the mountains of Honshiu; the type of *biceps* was a single male from Kyushu.

It now appears from more abundant material taken in Honshiu that the type male was based on a specimen with abnormal venation. Normally, cell 1st M_2 is closed, only in abnormal specimens (but including both wings of the type of *biceps*) being open by the atrophy of *m*.

LIMONIA (LIMONIA) FUSCICEPS Alexander. Plate 3, fig. 34.

Limonia fusciceps ALEXANDER, Insec. Inscit. Menst. 12 (1924) 155-156.

Described from a unique female taken at Shimokebo, Hitaka, Hokkaido, Japan, August 13, 1923 (*Kuwayama*). One male and two additional females were taken on Mount Shirouma, Shinano, Honshiu, Japan, August 8, 1931 (*Machida and Nakamura*), considerably extending the range southward.

Allotype, male, Mount Shirouma, August 8, 1931. Tips of femora narrowly but conspicuously brownish black. Male hypopygium (Plate 3, fig. 34) with the caudal margin of tergite, *9t*, very shallowly notched. Dististyle, *d*, dilated and conspicuously hairy on basal half. Gonapophyses, *g*, with the apices blackened, acute, the outer margin back from the tip with an irregularly toothed flange. Apex of ædeagus, *a*, deeply emarginate.

In the present fauna *Limonia (Limonia) tanakai* Alexander is most similar in its general appearance, having the mesonotum and legs much as in the insect discussed. The ovipositor is quite different in the two flies, being simple in *tanakai*, but with the cerci bifid at the tips in *fusciceps*.

LIMONIA (LIMONIA) PULLATA Alexander. Plate 3, fig. 35.

Limonia pullata ALEXANDER, Insec. Inscit. Menst. 12 (1924) 151-152.

The unique type, a female, was from Hinoëmata, Iwashiro, Honshiu, Japan, July 24, 1923 (*Esaki*). An additional specimen of each sex was taken at Mount Shirouma, Shinano, Honshiu, Japan, August 8, 1931 (*Machida and Nakamura*).

Allotype male, Mount Shirouma, August 8, 1931. Characters as in female, differing as follows: Pedicel of antennæ black, like the scape; basal flagellar segment almost entirely yellow. Femur with the terminal black area slightly more extensive than the yellow subterminal ring; indications of a third dark annulus on each femur just beyond midlength. Eighth and ninth tergites variegated with brown. Male hypopygium (Plate 3, fig. 35) with the caudal margin of tergite, *9t*, weakly trilobed. Basistyle, *b*, uniformly darkened, the ventromesal lobe occupying the entire face of segment. A single dististyle, *d*, that is suddenly narrowed beyond midlength, passing into yellow and

becoming subangularly bent at this point. Gonapophyses, *g*, with the mesal-apical lobe long and slender, pale.

LIMONIA (LIMONIA) DILUTISSIMA sp. nov. Plate 1, fig. 13; Plate 3, fig. 36.

Belongs to the *flavipes* group; general coloration black, the mesonotal præscutum with the interspaces more reddish; knobs of halteres dark brown; femora obscure yellow, the tips narrowly blackened, preceded by a more or less distinct, more yellowish ring; wings pale yellow, with a diffuse, pale brown, clouded pattern; male hypopygium with the mesal-apical lobe of gonapophysis very short and obtuse at apex.

Male.—Length, 8.5 to 9.5 millimeters; wing, 10 to 11.5.

Female.—Length, 11 to 12 millimeters; wing, 11 to 12.5.

Rostrum and palpi black. Antennæ black throughout; flagellar segments subcylindrical, with the longest verticils more than twice the length of the segments and unilaterally arranged; terminal segment about one-third longer than penultimate. Head black, sparsely pruinose.

Pronotum black. Mesonotal præscutum with the ground color reddish, with heavy black median and sublateral stripes that vary in amount, the sublaterals sometimes much reduced; posterior sclerites of mesonotum chiefly brownish black or black; scutellum usually pale on caudal portion; lateral margins of mediotergite and most of pleurotergite pale. Pleura black, pruinose. Halteres obscure yellow, the knobs dark brown. Legs with the fore coxæ blackened, remaining coxæ obscure yellow, more or less darkened basally; trochanters yellow; femora obscure yellow, the tips narrowly blackened, the amount subequal on all legs, preceded by a more or less distinct clearer yellow ring; tibiæ obscure yellow, the tips narrowly darkened; tarsi chiefly dark brown. Wings (Plate 1, fig. 13) pale yellow, variegated by extensive very pale brown clouds, these including most of cells beyond cord, with other areas in basal portion of wing, as a large cloud in cell R before origin of Rs and others in the outer ends of cells Cu to 2d A, inclusive; vein Cu in cell M seamed with darker brown, especially on basal half, interrupted near outer end by a large cream-colored area; a broad band of the latter color along the cord; veins pale brown, Sc₁ and R₂ so pale as to be nearly obsolete. Venation: Sc₂ ending at near midlength of Rs, much longer than Sc₁; R₁₊₂ about three times R₂ alone; m-cu close to fork of M; cell 2d A relatively narrow.

Abdomen, including hypopygium, black, the basal two or three sternites obscure yellow. Male hypopygium (Plate 3, fig. 36)

with the caudal margin of tergite, 9t, rounded. Basistyle, *b*, with the mesal lobe occupying the entire face and thus not appearing as a lobe. Dististyle, *d*, single, dark-colored except at the narrow base and tip. Gonapophyses, *g*, with the mesal-apical lobe unusually short and obtuse.

Habitat.—China-Tibet border.

Holotype, male, Yir-Kuan-Tsai, altitude 13,000 to 15,000 feet, July 25, 1930 (*Graham*). Allotopotype, female. Paratopotypes, 8 males and females; paratypes, 22 males and females, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930; 6 males and females, Yu-Long-Si, altitude 15,600 feet, July 28 and August 7, 1930.

Among the regional species, this fly seems to be most nearly related to *Limonia* (*Limonia*) *dilutior* Edwards, of the western Palæarctic region. It is well distinguished by the coloration of the body and legs, and by the very obtuse apices of the gonapophyses.

LIMONIA (LIMONIA) HOSTILIS sp. nov. Plate 1, fig. 14.

General coloration dark brown; tips of femora abruptly white; wings with a strong blackish tinge, without whitish areas; Sc₂ elongate, about four times Sc₁.

Sex?—Wing, 11.5 millimeters.

Rostrum and palpi brownish black. Antennæ brownish black throughout; flagellar segments oval, the longest verticils exceeding the segments and unilaterally arranged. Head dark brown.

Pronotum, mesonotum, and pleura almost uniformly dark brown. Halteres dark brown. Legs with the coxæ brown, the fore coxæ more yellowish brown; trochanters obscure yellow; femora dark brown, more brightened basally, the tips narrowly and abruptly whitened; tibiæ and tarsi dark brown; claws with a powerful acute spine on basal half, with a series of smaller serrations lying more basad. Wings (Plate 1, fig. 14) with a strong blackish tinge, the stigma only vaguely indicated and not ringed with a faint line resembling a water-mark; scarcely evident darkened clouds on Sc₂, origin of Rs, and along cord; no pale areas on wing disk; veins brown. Venation: Sc₂ elongate, approximately four times the length of Sc₁; R₂ about one-third R₁₊₂; m-cu at fork of M.

Abdomen broken.

Habitat.—China-Tibet border.

Holotype, 1 specimen, sex unknown, near Yien-Long-Shien, altitude 13,000 to 15,000 feet, August 3 to 6, 1930 (*Graham*).

The only near ally of the present fly would appear to be the larger *Limonia* (*Limonia*) *latipennis* Edwards (northeastern Burma), which is readily told by the size, very broad wings that are conspicuously variegated with whitish areas at cord and beyond stigma, and by the nearly equal veins Sc_1 and Sc_2 .

LIMONIA (LIMONIA) KASHMIRICA (Edwards).

Limonia kashmirica EDWARDS, Ann. & Mag. Nat. Hist. IX 20 (1927)
226-227.

Limonia kashmirica EDWARDS, Ann. & Mag. Nat. Hist. X 1 (1928)
701-702.

Described from a female from Kashmir, altitude 11,000 to 13,000 feet. Later recorded from Tibet (Chumbitang, altitude 13,000 feet, July 25, 1924). In the Graham collection from the China-Tibet border were several additional specimens: Yin-Kuan-Tsai, altitude 13,000 to 15,000 feet, July 25, 1930; Yu-Long-Si, altitude 15,600 feet, July 28 and August 7, 1930; near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930.

The present specimens are identical with Edward's Tibetan material, but that the Kashmir type is conspecific with these Tibetan specimens is doubtful. In the present series, all but one individual are considerably larger than the type (female, length, 12 to 14 millimeters; wing, 12 to 14), and they have the anterior vertex narrow as described by Edwards for his Tibetan material, much narrower than in the Kashmir type.

In most of these specimens, there is a distinct, subterminal, black ring on the femora that is usually slightly narrower than the blackened apex but in cases is wider and very distinct, the yellow annulus inclosed being very conspicuous.

LIMONIA (LIMONIA) SYNEMPORA sp. nov. Plate 1, fig. 15.

Belongs to the *flavipes* group, allied to *kashmirica*; general coloration of mesonotum and pleura light reddish brown; wings with the ground color yellow, almost concealed by a slightly darker brown pattern, including areas at origin of R_s , fork of Sc and on R_2 ; Sc_1 and Sc_2 subequal; m-cu close to fork of M .

Female.—Length, about 14 millimeters; wing, 15.

Rostrum and palpi brownish black. Antennæ dark brown throughout; flagellar segments oval, with relatively short and inconspicuous verticils. Head dark brown, sparsely pruinose; anterior vertex a little wider than diameter of scape.

Pronotum and mesonotum reddish brown, with poorly defined darker markings. Pleura brownish yellow, the pleurotergite

somewhat brighter yellow. Halteres dusky, the base of knob darker, the base of stem and apex of knob yellow. Legs with the fore coxæ brown; remaining coxæ less evidently infuscated; trochanters yellow; femora yellow, the tips narrowly and abruptly brownish black, preceded by a slightly broader, clearer yellow ring that is scarcely delimited on its proximal portion; tibiæ and tarsi light brown, the terminal tarsal segments darker. Wings (Plate 1, fig. 15) with the ground color yellow, almost concealed by a very slightly darker pattern; three small, darker brown areas near costal border, lying at origin of R_s , fork of Sc and on R_2 ; cord and basal section of M_3 more narrowly bordered with brown; marginal areas of the ground in outer ends of cells $2d M_2$ and M_3 , and at ends of veins Cu_1 , 1st A and $2d A$. Venation: Sc_1 and Sc_2 subequal; cell 1st M_2 of moderate size, with $m-cu$ just beyond fork of M .

Abdominal tergites brown, the bases of the segments narrowly obscure yellow; basal sternites obscure yellow, ringed caudally with brown; outer sternites yellow at base, brown laterally and caudally; genital segment obscure yellow.

Habitat.—China-Tibet border.

Holotype, female, Yu-Long-Si, altitude 15,600 feet, July 28, 1930 (*Graham*).

The only near ally of the present fly is *Limonia* (*Limonia*) *kashmirica* (Edwards), which differs especially in the pattern and venation of the wings, notably the elongate Sc_2 and distal position of $m-cu$.

LIMONIA (LIMONIA) IMPROVISA sp. nov. Plate 1, fig. 16; Plate 3, fig. 37.

Belongs to the *bifasciata* group; mesonotum reddish brown, the præscutum with three more or less distinct brownish black stripes; pleura dark; knobs of halteres darkened; femora yellow with two black subterminal rings; wings yellow, variegated with dark brown; stigmal area solidly darkened; R_{1+2} and R_2 subequal; male hypopygium with the dorsal dististyle a distinct blackened rod; ventral dististyle deeply split into two divergent arms or blades; gonapophyses naked at apices.

Male.—Length, 9 to 10 millimeters; wing, 12 to 13.

Female.—Length, about 10 millimeters; wing, 13.

Rostrum and palpi black. Antennæ brownish black, the pedicel obscure yellow; flagellar segments oval; terminal segment elongate, about equal to the two preceding segments combined. Head dark brown above, obscure orange beneath; anterior vertex narrow.

Mesonotal præscutum reddish brown, brownish black medially and laterally, the ground color in certain cases more restricted than in others by extensions of the dark areas; scutellum obscure yellow behind, darker basally; mediotergite yellow, with a brownish black median line that is wider at cephalic end. Pleura chiefly brownish black. Halteres pale yellow, the knobs abruptly blackened. Legs with the fore coxæ blackened; remaining coxæ and all trochanters yellow; femora yellow, with two conspicuous black rings, one postmedial, the other subterminal, the yellow apex a trifle narrower than the subterminal yellow ring; tibiæ light brown, the tips narrowly darker; tarsi somewhat darker brown. Wings (Plate 1, fig. 16) yellow, variegated with light and dark brown, somewhat as in *quadrinotata* and allies; costal border undarkened except at arculus and fork of Sc; stigma uniformly darkened; a dark area in cell R beyond arculus, with a single additional mark at midway to origin of Rs; paler brown clouds and washes in the apical and caudal cells very conspicuous; veins dark brown. Venation: Sc₁ and Sc₂ subequal; R₁₊₂ and R₂ about equal; m-cu before fork of M.

Abdomen obscure yellow, the caudal margins of the segments narrowly and vaguely ringed with brown; hypopygium yellow. Male hypopygium (Plate 3, fig. 37) with the basistyle, *b*, terminating in two fleshy lobes, as in the group. Dorsal dististyle a sinuous blackened spine; ventral dististyle, *vd*, with the two portions deeply divided and widely diverging, the larger and more-flattened rostral portion with setæ. Gonapophyses, *g*, without setæ at tips.

Habitat.—China-Tibet border.

Holotype, male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*). Allotype, female, Yu-Long-Si, altitude 15,600 feet, August 7, 1930. Paratopotypes, 2 males; paratype, 1 specimen, sex unknown, with allotype.

Limonia (*Limonia*) *improvisa* is most readily told from all described allies by the solidly darkened stigmal area of the wings and by the structure of the hypopygium. The entirely separate dorsal dististyle and the outline of the ventral dististyle remind one of the conditions found in certain *Dicranomyia* species, especially in the *morio* group. In the Nearctic fauna, the fly is closest to *hudsonica* (Osten Sacken); in the Asiatic region it is but distantly allied to species such as *mendax* Alexander, *quadrinotata* (Meigen), and *yunnanica* Edwards.

ANTOCHA (ANTOCHA) FORTIDENS sp. nov. Plate 1, fig. 17; Plate 3, fig. 38.

Male.—Length, about 7.3 millimeters; wing, 8.4.

Very closely allied to *Antocha (Antocha) nebulipennis* Alexander³ (western China), differing especially in the structure of the male hypopygium, notably the strong tooth on outer margin of outer dististyle before apex.

General coloration of thorax clear light gray, the præscutum with three conspicuous brown stripes, the median one weakly split on posterior two-thirds by a pale vitta. Knobs of halteres weakly darkened. Legs dark brown. Male hypopygium (Plate 3, fig. 38) with a strong erect spine or tooth on outer margin of outer dististyle, *od*, before the acute tip.

Habitat.—China-Tibet border.

Holotype, male, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*).

PEDICIINI

DICRANOTA (RHAPHIDOLABIS) POLYMERA sp. nov. Plate 1, fig. 18; Plate 3, fig. 39.

General coloration gray, the præscutum with four narrow blackish stripes; antennæ 17-segmented, the scape and pedicel darker than the flagellum; femora yellow, with a conspicuous, nearly terminal, brown ring; wings yellow, the stigma and seams along cord and vein Cu brown; cell R_3 petiolate by presence of vein R_{2+3+4} ; male hypopygium with the basistyle divided at apex into two lobes, the outer one slenderer.

Male.—Length, about 6 millimeters; wing, 7.

Rostrum gray; palpi black. Antennæ 17-segmented, relatively short; scape and pedicel black, flagellum pale brown; flagellar segments beyond basal two short-oval. Head gray.

Mesonotum dark gray, the præscutum with four narrow, more blackish stripes, the intermediate pair separated by a line that is more brownish gray than the ground. Pleura dark gray. Halteres pale, the knobs weakly darkened. Legs with the coxæ obscure brownish yellow; trochanters pale yellow; femora yellow, with a broad, dark brown, nearly terminal ring, the extreme apex a trifle paler than the ring itself; tibiæ obscure yellow, the tips narrowly infuscated; tarsi black, the proximal end of basitarsus slightly paler. Wings (Plate 1, fig. 18) relatively narrow, strongly suffused with yellow, the prearcular and costal regions clearer yellow; stigma oval, dark brown; somewhat

³ Philip. Journ. Sci. 44 (1931) 352-353.

paler brown clouds and seams along entire length of vein Cu_1 , the cord, outer medial forks, and the axilla; still paler to scarcely evident clouds at origin of Rs and tip of vein 2d A; veins pale, darker in the infuscated areas. Macrotrichia of veins long and conspicuous. Venation: Sc_1 a distance before origin of Rs about equal to three-fourths the length of the latter; R_{2+3+4} present, shorter than m-cu; R_2 longer than R_{1+2} ; R_3 straight; m-cu a little exceeding the second section of M_{3+4} .

Abdominal tergites brownish black; basal sternites a trifle paler, darkened at incisures; hypopygium obscure yellow. Male hypopygium (Plate 3, fig. 39) with the apex of basistyle, *b*, deeply bifid, produced into a slender outer arm that gradually narrows to the subacute tip, the surface with relatively sparse setæ, and into an inner arm that is more spatulate, provided with long conspicuous setæ, the outermost longest. A single dististyle, *d*, that is smaller than the inner lobe of basistyle but of about the same shape, densely set with blackened setæ. Interbase, *i*, a long slender blade from a slightly enlarged base. Lateral arm of tergite, *9t*, only about one-third the size of the interbase but of nearly the same outline. *Ædeagus* very small.

Habitat.—Japan (Kiushiu).

Holotype, male, Wakasugiyama, Chizuzen, November 15 to 16, 1930 (*Esaki et al.*).

The present fly needs no comparison with any described *Rhaphidolabis*. The presence of 17 antennal segments marks the species as being very distinct, the range in number of antennal segments hitherto known being from 12 to 15, inclusive. The plasticity in the number of antennal segments in several genera, notably in the tribes Hexatomini and Pediciini, is becoming increasingly evident as new material becomes available from all regions of the globe.

DICRANOTA (DICRANOTA) *CÆSIA* sp. nov. Plate 1, fig. 19.

General coloration light gray, the præscutum with three dark brown stripes; halteres pale, the knobs dusky; legs black; wings whitish, the prearcular region light yellow; membrane with clearly defined brown spots and seams, the latter including a broad seam along vein Cu.

Female.—Length, 8.5 to 9 millimeters; wing, 9.5 to 10.

Rostrum short, gray; palpi black. Antennæ 15-segmented, black; flagellar segments short-oval, with inconspicuous verticils. Head light gray.

Mesonotal præscutum light gray, with three dark brown stripes, the median one broader, entire; lateral stripes less distinct; posterior sclerites of mesonotum dark gray. Pleura light blue-gray. Halteres pale, the knobs dusky. Legs with the coxæ pruinose; trochanters brownish yellow; remainder of legs black. Wings (Plate 1, fig. 19) whitish, the prearcular region light yellow; a conspicuous brown pattern, including spots at Sc_2 and origin of R_s , and seams along cord and vein Cu_1 ; vein 2d A more narrowly seamed; stigmal area paler brown than the other areas. Venation: R_s arcuated at origin; r-m variable in position, from before the fork of R_s to connecting with R_5 some distance beyond base.

Abdomen gray, the extreme caudal margin of the seventh tergite and intermediate sternites pale. Ovipositor with the cerci rather strongly upcurved, horn-colored.

Habitat.—China-Tibet border.

Holotype, female, near Tang-Gu, altitude 14,000 feet, August 3 to 6, 1930 (*Graham*). Paratopotype, a broken female.

The only allied described species is *Dicranota (Dicranota) nubecula* Edwards (northeastern Burma); this differs conspicuously in the blackish coloration of the body, which is but slightly if at all pruinose; the uniformly pale halteres; and the diffuse brown areas of the more obscure wings. The broad dark seam along vein Cu_1 is lacking in *nubecula*, while the outer medial forks have large circular brown clouds.

DICRANOTA (DICRANOTA) PALLIDIPIES sp. nov. Plate 1, fig. 20.

General coloration gray, the mesonotal præscutum with three brown stripes; knobs of halteres weakly darkened; legs pale, the tips of femora, tibiæ, and basitarsi narrowly and weakly infuscated; wings whitish, with a conspicuous brown pattern that includes a broad seam on vein Cu , this becoming narrower to subobsolete on Cu_1 ; R_s angulated and spurred at origin; r-m subequal to basal section of R_5 ; cell 1st M_2 closed.

Sex?—Wing, 10.5 millimeters.

Rostrum gray; palpi black. Antennæ black, broken beyond midlength. Head gray.

Pronotum gray, dark brown medially. Mesonotal præscutum light gray, with three conspicuous dark brown stripes, the broad median vitta weakly notched at extreme cephalic end; posterior sclerites of mesonotum gray. Pleura gray. Halteres pale, the knobs weakly darkened. Legs with the coxæ pruinose; tro-

chanters obscure yellow; femora, tibiæ, and basitarsi obscure yellow, the tips narrowly pale brown; remainder of tarsi passing to darker brown. Wings (Plate 1, fig. 20) with the ground color whitish, conspicuously patterned with dark brown, the arrangement of areas almost exactly as in *cæsia*, the center of the stigmal area paler, more yellowish; a cloud at fork of M_{1+2} . Venation: R_s angulated and short-spurred at origin; R_5 gently arcuated; r-m subequal to basal section of R_5 ; cell 1st M_2 closed.

Habitat.—China-Tibet border.

Holotype, sex?, Yu-Long-Si, altitude 15,600 feet, August 7, 1930 (*Graham*).

Dicranota (Dicranota) pallidipes is most nearly related to *D. (D.) cæsia* sp. nov., differing especially in the coloration of the legs, and in the venation and details of pattern of the wings. These two species, with *D. (D.) nubecula* Edwards, are the largest and most conspicuous members of the subgenus in eastern Asia.

HETERANGÆUS PALLIDELLUS sp. nov. Plate 1, fig. 21.

General coloration of mesothorax pale yellow; antennæ 13-segmented, flagellum pale yellow; legs yellow, the tips of femora and tibiæ narrowly and abruptly blackened; wings whitish, with a very pale brown pattern, arranged chiefly as broken crossbands; cell C chiefly pale, sparsely variegated by dark spots and dots; R_s weakly angulated, not spurred; supernumerary crossvein in cell R_4 in approximate transverse alignment with R_2 .

Female.—Length, 11 to 12 millimeters; wing, 9 to 9.5

Rostrum and palpi brownish black. Antennæ 13-segmented; scape and pedicel dark brown, flagellum light yellow; flagellar segments short, each with one appressed seta that is more than twice the length of the segment alone. Head brownish gray, clearer on the orbits.

Mesonotum and pleura almost uniformly pale yellow, the præscutum with an ill-defined median dark stripe. Halteres pale. Legs yellow, the tips of femora and tibiæ conspicuously blackened; outer tarsal segments blackened. Wings (Plate 1, fig. 21) whitish, with a very pale brown pattern, arranged chiefly as broken crossbands at level of origin of R_s , along cord and across the outer series of supernumerary crossveins; cell C pale, variegated by small brown spots; dark area at origin of R_s only slightly involving cell C; transverse dark areas in cell 1st A lacking or few in number. Venation: R_s weakly

angulated but not spurred at origin; Sc_2 some distance before origin of R_s ; supernumerary crossvein in cell R_4 in approximate transverse alignment with R_2 ; venation of radial field more or less variable, r-m either connecting directly with fork of R_s or up to one-third its length beyond this fork; supernumerary crossvein in cell M_1 at or before midlength of cell.

Abdomen with basal segments yellow, beyond the third passing into dark brown. Ovipositor with the compressed cerci upcurved, blackened basally.

Habitat.—Japan (Honshiu).

Holotype, female, Mount Kurobegoro, Echiu, in subalpine meadow, altitude 7,800 feet, August 8, 1931 (*Imanishi*). Paratopotype, female.

The only other *Heterangæus* with cell C pale, variegated by darker, is *H. gloriosus* (Alexander), of Saghalien. This differs most evidently in the dark wing pattern, with cells C and 1st A more extensively involved, and in the venation, as the long-spurred R_s and the distal position of the supernumerary crossvein in cell R_4 .

HETERANGÆUS JAPONICUS CRENATUS subsp. nov.

Male.—Length, about 8 millimeters; wing, 8.

Generally similar to typical *japonicus* (Alexander), differing as follows: Halteres shorter, if bent backward ending shortly beyond midlength of abdominal tergite two; in typical *japonicus* the halteres are unusually long and slender, if bent backward extending to caudal margin of tergite two or nearly so. Wings with the dark pattern broader, restricting the white ground, the dark color deep and more intense. Wings broader, the posterior border strongly crenate, cell 2d A being much wider and more deeply incised than in the typical form.

Habitat.—Japan (Honshiu).

Holotype, male, Mount Ohdai, Nara, June 5, 1930 (*Sakaguchi*).

ULA KIUSHIENSIS sp. nov. Plate 1, fig. 22; Plate 3, fig. 40.

General coloration of mesonotal præscutum reddish brown, darker medially; postnotum and pleura darker reddish brown; knobs of halteres infuscated; wings with stigmal area almost uniformly darkened, with only a minute paler central area; cell 1st M_2 relatively large, subequal in length to vein M_4 ; male hypopygium brownish black, the dististyle arcuate, with seven or eight blackened spines that are scattered, some extending down mesal face of style to near midlength.

Male.—Length, about 5.5 millimeters; wing, 6.3.

Rostrum and palpi black. Antennæ black throughout, in male elongate, if bent backward extending to shortly beyond base of abdomen; flagellar segments subcylindrical, with verticils that are shorter than the segments. Head blackish, sparsely pruinose.

Mesonotum reddish brown, the præscutum darker brown medially; postnotum dark reddish brown. Pleura reddish brown. Halteres pale, the knobs dark brown. Legs with the coxæ and trochanters yellow; remainder of legs obscure yellow, the tips of femora, tibiæ, and outer segments of tarsi infuscated. Wings (Plate 1, fig. 22) with a strong brown tinge; stigma almost uniformly darker brown, only the central portion restrictedly paler; a dusky cloud on r-m; scarcely evident smaller clouds on Sc₂ and origin of Rs; veins brown. Venation: Basal section of R₅ eliminated, r-m being at the fork of Rs; cell 1st M₂ subequal in length to vein M₄.

Abdominal tergites uniformly brownish black; sternites obscure yellow, infuscated laterally; hypopygium brownish black. Male hypopygium (Plate 3, fig. 40) with the caudal margin of tergite, 9t, evenly and convexly rounded, with a marginal series of long setæ. Dististyle, *d*, elongate and slightly arcuate, armed with seven or eight spines that continue down the mesal face of style. What appears to be a lateral tergal arm lies at the lateral portion of the tergite, just mesad of the basistyle and appears as a slender sinuous spine from a dilated base, about the distal half of this spine paling to white.

Habitat.—Japan (Kiushiu).

Holotype, male, Sobosan, Bungo, August 8, 1931 (*K. Yasumatsu*).

Ula kiushiuensis is most generally similar to *U. succincta* Alexander (Honshiu), differing most evidently in the distinct structure of the male hypopygium.

ILLUSTRATIONS

[a, *Ædeagus*; b, *basistyle*; d, *dististyle*; g, *gonapophysis*; i, *interbase*; id, *inner dististyle*; od, *outer dististyle*; p, *phallosome*; s, *sternite*; t, *tergite*; vd, *ventral dististyle*.]

PLATE 1

- FIG. 1. *Tipula* (*Schummelia*) *esakiana* sp. nov., venation.
2. *Tipula* (*Schummelia*) *honorifica* sp. nov., venation.
3. *Tipula* (*Acutipula*) *biramosa* sp. nov., venation.
4. *Tipula* (*Vestiplex*) *grahami* sp. nov., venation.
5. *Tipula* (*Lunatipula*) *transfixa* sp. nov., venation.
6. *Tipula* *oreada* sp. nov., venation.
7. *Tipula* *variipetiolearis* sp. nov., venation.
8. *Tipula* *submutila* sp. nov., venation.
9. *Tipula* *jedoensis* sp. nov., venation.
10. *Tipula* *multistrigata* sp. nov., venation.
11. *Tipula* *pedicellaris* sp. nov., venation.
12. *Limonia* (*Dicranomyia*) *grahamiana* sp. nov., venation.
13. *Limonia* (*Limonia*) *dilutissima* sp. nov., venation.
14. *Limonia* (*Limonia*) *hostilis* sp. nov., venation.
15. *Limonia* (*Limonia*) *synempora* sp. nov., venation.
16. *Limonia* (*Limonia*) *improvisa* sp. nov., venation.
17. *Antocha* (*Antocha*) *fortidens* sp. nov., venation.
18. *Dicranota* (*Rhaphidolabis*) *polymera* sp. nov., venation.
19. *Dicranota* (*Dicranota*) *cæsia* sp. nov., venation.
20. *Dicranota* (*Dicranota*) *pallidipes* sp. nov., venation.
21. *Heterangæus* *pallidellus* sp. nov., venation.
22. *Ula* *kiushiuensis* sp. nov., venation.

PLATE 2

- FIG. 23. *Tipula* (*Schummelia*) *esakiana* sp. nov., male hypopygium, details.
24. *Tipula* (*Schummelia*) *honorifica* sp. nov., male hypopygium, details.
25. *Tipula* (*Acutipula*) *incorrupta* sp. nov., male hypopygium, details.
26. *Tipula* (*Acutipula*) *biramosa* sp. nov., male hypopygium, details.
27. *Tipula* (*Acutipula*) *biramosa* sp. nov., male hypopygium, dististyles.
28. *Tipula* (*Vestiplex*) *grahami* sp. nov., male hypopygium, details.
29. *Tipula* (*Lunatipula*) *transfixa* sp. nov., male hypopygium, details.
30. *Tipula* *oreada* sp. nov., male hypopygium, details.

PLATE 3

- FIG. 31. *Tipula* *variipetiolearis* sp. nov., male hypopygium, details.
32. *Tipula* *pedicellaris* sp. nov., male hypopygium, details.
33. *Limonia* (*Dicranomyia*) *grahamiana* sp. nov., male hypopygium.

- FIG. 34. *Limonia (Limonia) fusciceps* Alexander, male hypopygium.
35. *Limonia (Limonia) pullata* Alexander, male hypopygium.
36. *Limonia (Limonia) dilutissima* sp. nov., male hypopygium.
37. *Limonia (Limonia) improvisa* sp. nov., male hypopygium.
38. *Antocha (Antocha) fortidens* sp. nov., male hypopygium.
39. *Dicranota (Rhaphidolabis) polymera* sp. nov., male hypopygium.
40. *Ula kiushiensis* sp. nov., male hypopygium.

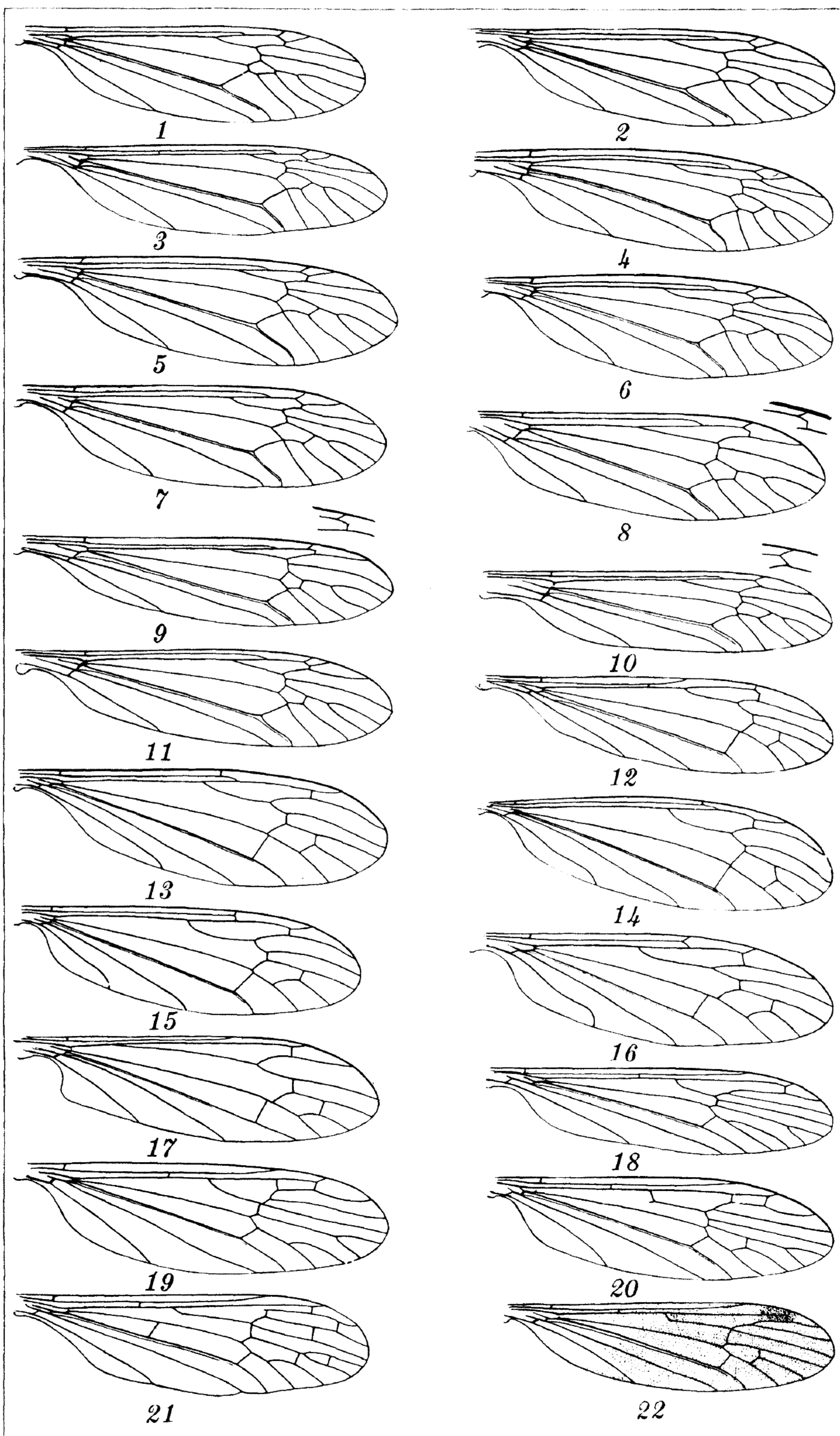


PLATE 1.



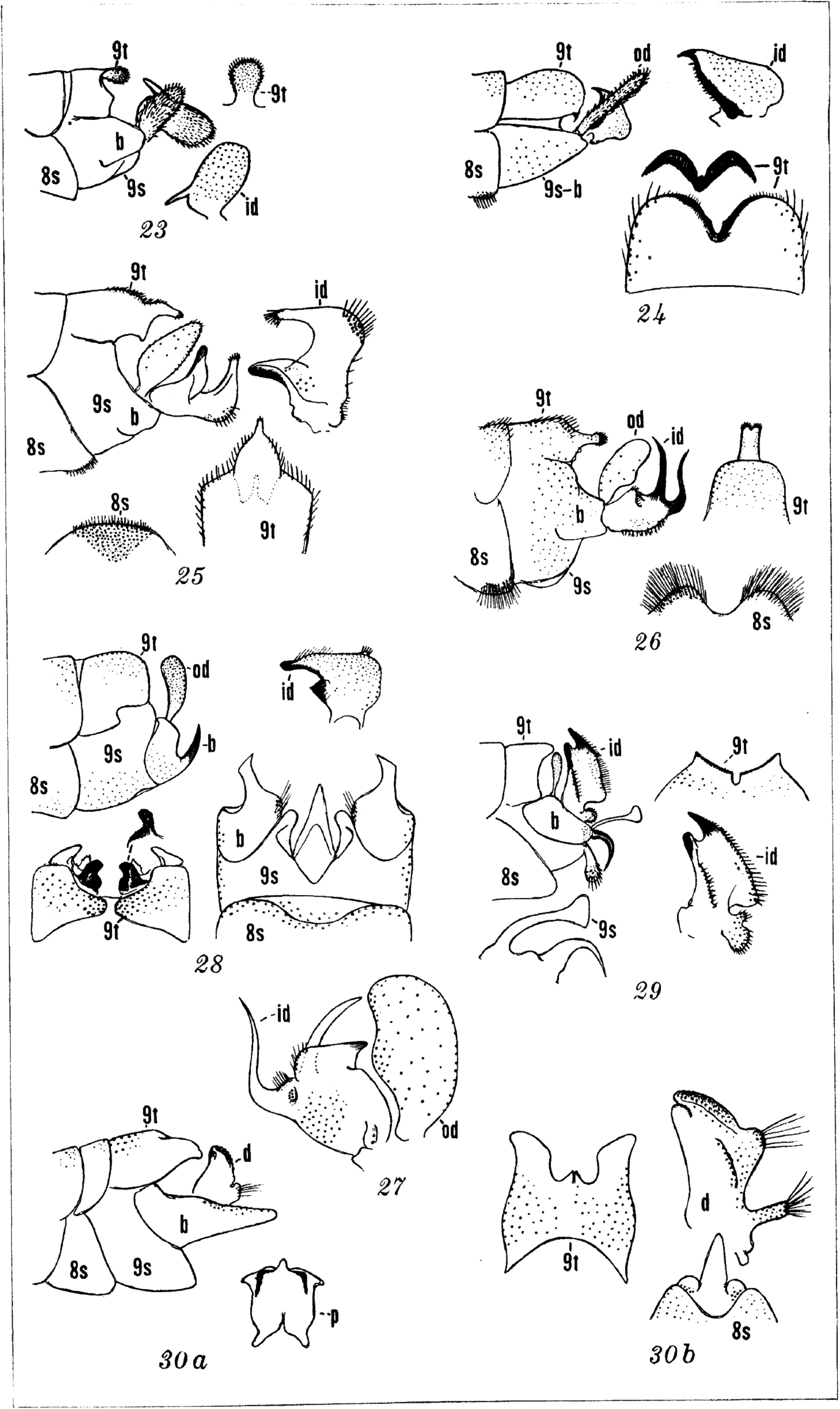


PLATE 2.



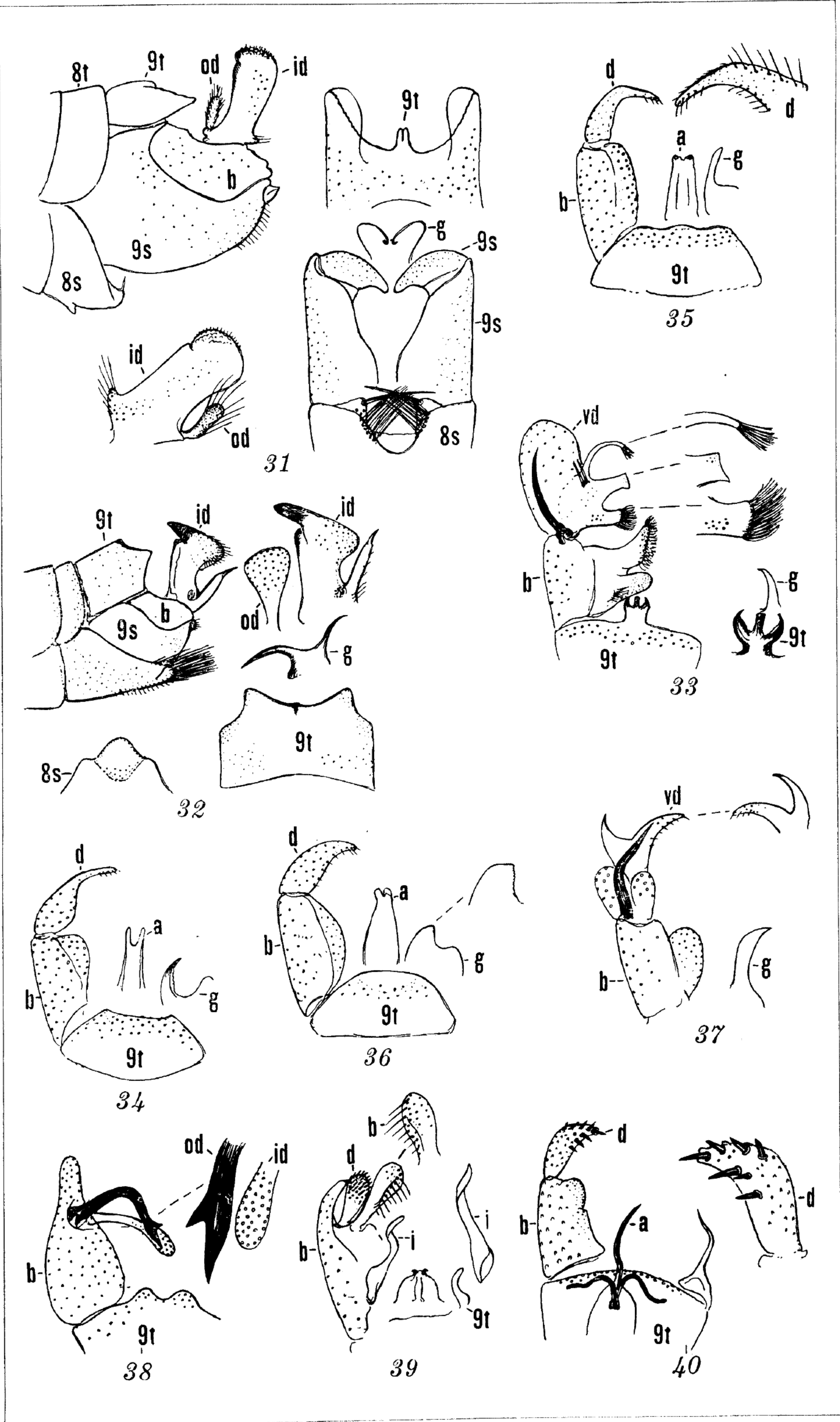


PLATE 3.