

NEW OR LITTLE-KNOWN TIPULIDÆ FROM EASTERN ASIA (DIPTERA), XXVII¹

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FOUR PLATES

The majority of the crane flies discussed herewith are from various parts of the Japanese Empire, including the northern Kurile Islands, Manchoukuo, Korea, the main islands of Japan, and Formosa, where they were collected by my friends Messrs. Esaki, Gressitt, Hibi, Issiki, Machida, and Miyadi. The types resulting from the above material are preserved in my collection through the continued friendly interest of the entomologists mentioned. Other species are from western China, collected by the Rev. David C. Graham, preserved in the United States National Museum; in eastern Siberia, in the Russian Academy of Sciences, received through Dr. A. von Stackelberg; and from Siam, in the American Museum of Natural History, through Dr. C. Howard Curran. I wish to express my deepest thanks to all of the above-mentioned entomologists for this further coöperation in studying the tipulid fauna of eastern Asia.

TIPULINÆ

CTENACROSCELIS IGNICAUDATUS sp. nov. Plate 1, fig. 1; Plate 2, figs. 25 to 27.

Belongs to the *brobdignagius* group; mesonotal præscutum dark clove brown, with four relatively narrow grayish brown stripes; margin of præscutum dark; antenna with flagellar segments subcylindrical; pronotum dark brown above, broadly light yellow on sides; pleura chiefly yellow, with a narrow, dorsal, dark brown stripe and a small brown area on sternopleurite; femora reddish brown, the basal fifth or sixth blackened, the tip undarkened; wings with a strong reddish brown suffusion, the prearcular region darker; basal abdominal tergites dark brown, the outer segments and hypopygium brightened to fulvous.

¹ Contribution from the entomological laboratory, Massachusetts State College.

Male.—Length, about 30 millimeters; wing, 38.

Frontal prolongation of head brown, more brownish black on sides; palpi black throughout; nasus distinct. Antennæ with scape and pedicel brownish yellow; basal flagellar segment slightly darker, the outer segments dark brown; flagellar segments subcylindrical (Plate 2, fig. 25), ventral face very little produced; verticils numerous, shorter than the segments. Head brown.

Pronotum dark brown above, broadly light yellow on sides. Ground color of præscutum dark clove brown, with four relatively narrow, more grayish brown stripes; margin of præscutum unbrightened; scutum dark brown, the lobes variegated by more grayish brown; scutellum brown; mediotergite paler, more grayish yellow, but uniform in color. Pleura chiefly yellow, the dorsopleural area more brightly so; a narrow dark brown dorsal stripe extending from the cervical region along the dorsal pleurites to and including the pteropleurite; a small, isolated, brown spot on sternopleurite. Halteres brownish black, the extreme base of stem reddish. Legs with the coxæ testaceous-yellow, the fore and middle coxæ more darkened; trochanters reddish brown; femora reddish brown, the basal fifth or sixth black; tibiæ and basitarsi reddish brown, the outer tarsal segments brownish black. Wings (Plate 1, fig. 1) with a strong reddish brown suffusion, the costal region and cubital and anal veins more fulvous; stigma a very little paler yellow than the ground; prearcular region more infuscated; restricted oblitative areas before cord and beyond stigma; outer branches of M and Cu, with vein 2d A, narrowly seamed with brown; axilla narrowly darkened; veins reddish brown. Venation: m-cu about equal to distal section of Cu₁, cell M₄ thus being nearly as wide as long.

Basal abdominal tergites uniformly dark brown; outer two or three segments brightened to fulvous. Male hypopygium with the tergite (Plate 2, fig. 26, 9t) elongate, the caudal margin with a rather shallow V-shaped emargination, the distal third of sclerite with setæ that become longer and more conspicuous on outer lateral angles but do not form distinct tufts or pencils. Outer dististyle (Plate 2, fig. 27, od) shaped more or less like a dog's ear; inner style, *id*, long and slender, with abundant long erect setæ on basal third or more, the proximal end dilated. Eighth sternite (Plate 2, fig. 26, 8s) with very abundant sternal setæ, culminating in long yellow tufts on either side of a glabrous median emargination.

Habitat.—China (Szechwan).

Holotype, male, Mount Omei, altitude 5,500 to 11,000 feet, August 16 to 20, 1934 (*Graham*).

I hesitate to place this very distinct species in any of the groups defined by Edwards.² It fits best in the *brobdignagius* group, to which I am referring it, but with some slight question. The fly has the præscutal margins darkened and has a brown area on the sternopleurite. The black bases to the otherwise reddish brown femora are very conspicuous. In some details of coloration, the species agrees with the Oriental *Ctenacroscelis dives* (Brunetti), differing most conspicuously in the structure of the antennæ and the coloration of the legs.

CTENACROSCELIS LIBERTUS sp. nov. Plate 2, fig. 28.

Belongs to the *brobdignagius* group; pronotum weakly infumed on median portion, passing into orange-yellow on sides; præscutal stripes dark olive-green, bordered by slightly paler, nearly confluent; a capillary black median vitta on cephalic portion of sclerite; scutellum and mediotergite dark; pleura orange-fulvous, with a dorsal dark brown line from the cervical region to below the wing root; tips of femora dark brown; wings with a strong brownish yellow tinge; anterior prearcular field and costal region, together with stigma, darker brown; darker clouds in centers of outer medial field; abdominal tergites dark brown, basal sternites yellow; male hypopygium with the inner dististyle relatively short-stemmed, the apical beak unequally bifid.

Male.—Length, about 28 millimeters; wing, 33.

Frontal prolongation of head dark brown; nasus long and conspicuous; palpi dark. Antennæ with the scape brown; pedicel more brownish testaceous; flagellum broken. Head brownish gray, unmarked.

Pronotum weakly infumed on median portion, passing into orange-yellow on sides. Mesonotal præscutum rather broadly yellow laterally, the color continued around the front border of the sclerite, interrupted by a capillary black median vitta on cephalic portion of sclerite; præscutal stripes confluent or with the interspaces scarcely apparent; stripes dark olive-green, vaguely bordered by slightly paler; dark color not variegated by orange before the suture, as in *majesticus*; scutal lobes chiefly olive-green, the median area more reddish brown; scutellum dark brown; mediotergite brownish gray, with a very delicate median brown vitta. Pleura orange-fulvous, with a dark

² Stylops 1 (1932) 145-146.

brown dorsolongitudinal stripe beginning on the cervical sclerites, crossing the propleura, dorsal anepisternum and pteropleurite, becoming more expanded surrounding the wing base; dorsopleural region extensively orange; ventral pleurites uniformly pale. Halteres black, the base of stem narrowly pale. Legs with the coxæ and trochanters pale; femora brownish yellow, the tips rather narrowly darker brown but not blackened; tibiæ yellow, the tips more narrowly dark brown; tarsi passing into black; claws (male) toothed. Wings with a strong brownish yellow tinge, the anterior prearcular field and costal border darker, best evidenced by the black veins of the prearcular field; stigmal area about as dark as the costal border; somewhat darker clouds in outer end of cell M and as centers to the outer medial cells, this coloration possibly abnormal and in any case discolored by a purplish stain in the unique type; anterior and posterior cord weakly bordered by darker; veins brownish yellow. Venation: Cell M_1 short-petiolate, the petiole only about one-third of m ; $m-cu$ very close to fork of M_{3+4} , subequal to distal section of Cu_1 , cell M_4 thus markedly deeper than in *fulvolateralis*.

Abdominal tergites dark brown, the basal sternites abruptly light yellow. Male hypopygium with the ninth tergite (Plate 2, fig. 28, 9*t*.) having a shallow V-shaped notch, the lateral lobes obtuse; on dorsal surface of each lobe a second lower lobule with a brush of setæ distinct from the group at apex of the lobe itself. Outer dististyle, *od*, with the apex obtuse. Inner dististyle, *id*, with the stem relatively short and stout, the apex dilated, in profile appearing somewhat like a flamingo's head; additional to the primary decurved hooklike point is a smaller lateral one; at base of stem a dilated lobe, with coarse erect setæ. Eighth sternite rather strongly produced ventrad; caudal margin transverse or convexly rounded, with inconspicuous groups of yellow setæ on outer lateral portions, these lines continued cephalad on face of sclerite.

Habitat.—China (Szechwan).

Holotype, male, Wei Chow, 65 miles northwest of Chengtu, altitude 5,000 to 8,000 feet, July 25, 1933 (*Graham*).

The nearest allies of the present species are *Ctenacroscelis fulvolateralis* (Brunetti) and *C. majesticus* (Brunetti), of the Himalayan region of northern India. The latter species differs in the structure of the hypopygium and in details of coloration, especially the lack of a brown pleural stripe and the presence of a conspicuous orange spot on the præscutum before the suture.

From *fulvolateralis*, the present fly differs in the coloration of the body, femora, and wings and in the details of venation.

CTENACROSCELIS QUADRIFASCICULATUS sp. nov. Plate 1, fig. 2; Plate 2, figs. 29 and 30.

Belongs to the *serratus* group; mesonotal præscutum olive, with three more greenish stripes; scutellum and mediotergite orange; pleura orange-fulvous, with a conspicuous whitish longitudinal stripe; trochanters black; femora bright reddish, their bases narrowly blackened; wings fulvous-brown; cell M_1 short-petiolate; abdominal tergites dark reddish brown; male hypopygium with the sternite and basistyle only slightly produced, the latter emarginate at apex, each lobe with brushes of long, yellow setæ.

Male.—Length, about 25 millimeters; wing, 31.5.

Frontal prolongation of head long and slender, considerably exceeding the remainder of head, reddish brown, darker on sides; nasus conspicuous, depressed. Antennæ with scape and pedicel brown, the flagellum somewhat paler brown; first flagellar segment long and slender (Plate 2, fig. 29), subequal to the scape; intermediate flagellar segments strongly produced on ventral surface, much as in *serratus*, the serration most strongly developed on flagellar segments three to six, inclusive. Head grayish brown, the anterior vertex clearer gray.

Pronotum dark brown medially above, paler on sides. Ground color of præscutum olive, with three even more greenish stripes that are narrowly bordered by more grayish; lateral borders of præscutum castaneous; scutal lobes greenish, the median area restrictedly yellow; scutellum and mediotergite orange, the latter more whitish on posterior half. Pleura with the ground color orange-fulvous, with a conspicuous whitish longitudinal stripe, extending from behind the fore coxæ to the base of abdomen, widened posteriorly, narrowly bordered above on anepisternum and more extensively along ventral edge by darker brown; dorsopleural membrane pale. Halteres brownish black, the base of stem restrictedly reddish. Legs with the coxæ chestnut, the middle and hind pair paler at tips; trochanters black; femora bright reddish, the bases narrowly blackened, the tips scarcely darker; tarsi broken beyond second segment, the basal portion light brown. Wings (Plate 1, fig. 2) with a strong fulvous brown tinge, cell Sc clearer yellow; centers of the cells somewhat paler; wing base narrowly blackened; veins bright yellow. Venation: Cell M_1 with petiole about one-half m.

Abdominal tergites with basal two segments chestnut-brown, the lateral borders narrowly pale; median line of first tergite yellow; outer segments somewhat darker reddish brown. Male hypopygium (Plate 2, fig. 30) with the tergite, 9t, relatively short, the median notch shallower than in *serricornis*, the lateral lobes obliquely truncated, with abundant erect black setæ. Basistyle, *b*, not long-produced, the apex deeply emarginate to form two lobes, the upper or more dorsal a little more truncated, both lobes with brushes of long yellow setæ. Outer dististyle, *od*, moderately wide. Inner dististyle, *id*, long and slender, the apex suddenly narrowed, curved, set with five or six erect spines. Eighth sternite, 8s, without special armature.

Habitat.—China (Szechwan-Tibet Border).

Holotype, male, Mupin, altitude 3,500 feet, June, 1929 (*Graham*).

The present fly is most readily told from *Ctenacroscelis serricornis* (Brunetti) by the structure of the male hypopygium, especially the long hair brushes at apex of each basistyle.

CTENACROSCELIS REGIUS sp. nov. Plate 2, fig. 31.

General coloration of head and thorax orange, the latter unmarked except for four pale brownish gray stripes on præscutum and similarly colored areas on scutal lobes; flagellar segments cylindrical or virtually so, with short verticils; wings long and narrow, deep fulvous, the small stigmal area slightly more yellowish; cell M_1 petiolate; abdominal tergites chiefly brown; ovipositor with the cerci gently decurved at tips.

Female.—Length, about 45 millimeters; wing, 48.5 by 8.

Frontal prolongation of head relatively long, deep orange; nasus unusually long, subequal in length to the antennal scape; palpi with basal three segments brown, the incisures of the second and third segments restrictedly pale; terminal segment black. Antennæ yellowish orange, the outer flagellar segments scarcely darker; flagellar segments cylindrical or virtually so (Plate 2, fig. 31); setæ abundant but short, the terminal two segments with the setæ longer and more conspicuous. Head deep orange; vertical tubercle low, entire.

Pronotum orange. Mesonotal præscutum orange with four pale brownish gray stripes that are little-apparent against the ground, the mesal margins of the intermediate pair narrowly bordered by brown, more intense in front; posterior sclerites of notum orange or orange-fulvous, each scutal lobe with two

confluent pale brownish gray areas. Pleura uniformly yellow. Halteres brown, the base of stem narrowly orange. Legs with the coxæ and trochanters yellow; femora orange, the tips very insensibly more fulvous, the ctenidium black; tibiæ and tarsi orange, the terminal tarsal segments passing into dark brown. Wings long and narrow, as shown by the measurements, the width almost uniform for most of the length; membrane deep fulvous, the small stigmal area slightly more yellowish; veins horn yellow. Venation: R_s subequal to R_{2+3} ; $r-m$ a little shorter than the basal section of R_{4+5} ; petiole of cell M_1 exceeding one-half m ; $m-cu$ a short distance before fork of M_{3+4} , slightly longer than the distal section of Cu_1 ; basal third of cell 2d A lying proximad of level of arculus.

Abdomen with sides of first tergite yellow, the median area and succeeding tergites medium brown, the lateral borders a trifle more grayish, bordered internally by vague dusky lines, more evident on the subterminal segments; sternites a trifle more yellowish brown. Ovipositor with the cerci deep castaneous, blackened basally, the tips gently decurved.

Habitat.—Siam.

Holotype, female, Chieng-mai, October 27, 1920 (in American Museum of Natural History).

The nearest ally of the present fly seems to be *Ctenacroscelis rex* Alexander, of Burma,³ which differs most evidently in the grayish black præscutal stripes and similarly colored areas on the scutal lobes. I cannot place the present fly in any of the groups of the genus defined by Edwards.⁴ In its major size it agrees with the *brobdignagius* group but differs in all details of coloration, while the long conspicuous nasus excludes it from the *monochrous* group. Because of lack of specimens I cannot say whether or not *Ctenacroscelis rex* has the nasus present or lacking. In the present fly it is unusually long and powerfully constructed.

TIPULA (VESTIPLEX) EXCISOIDES Alexander.

Tipula (Vestiplex) excisoides ALEXANDER, Philip. Journ. Sci. 52 (1933) 398-399.

Described from various stations in Kamchatka. One male, Lake Yôda, Paramushir Island, northern Kurile Islands, Japan, July 14, 1934 (*D. Miyadi*), in the Otsu Hydrobiological Station Laboratory, Otsu, Japan.

³ Insec. Inscit. Menst. 5 (1917) 21-23.

⁴ Loc. cit.

TIPULA (ARCTOTIPULA) MIYADII sp. nov. Plate 1, fig. 3; Plate 2, fig. 32.

General coloration (in alcoholic specimens) black, probably pruinose in fresh specimens; antennæ black throughout; wings tinged with brownish, the long-oval stigma brownish black, very conspicuous; cell M_1 petiolate; abdomen uniformly dark in male, the intermediate segments in female very narrowly ringed caudally with pale; male hypopygium with the lateral lobes of tergite truncate, the median notch deep, U-shaped; apical beak of inner dististyle very slender.

Male.—Length, about 15 millimeters; wing, 15.5; antenna, about 3.5.

Female.—Length, about 20 millimeters; wing, 20.

Described from alcoholic specimens.

Frontal prolongation of head and palpi black, the incisures of the latter restrictedly pale; nasus very long and conspicuous. Antennæ black throughout, short in both sexes; flagellar segments short-cylindrical, without well-defined basal enlargements; verticils longer than the segments. Head gray, with long conspicuous setæ.

Thorax (in alcohol) uniformly dark, in dry specimens presumably pruinose; it cannot be stated that the præscutum is or is not striped. Halteres dusky, the knobs slightly more darkened. Legs with coxæ and trochanters black, pruinose; femora obscure yellow basally, the outer third or so darker, the tips black; tibiæ and basitarsi brown basally, the tips black; remainder of tarsi black. Wings (Plate 1, fig. 3) tinged with brownish, the long-oval stigma brownish black; restricted obliterative areas before and beyond stigma and across base of cell 1st M_2 ; very vague to scarcely indicated darker seams along cord and on veins beyond cord; veins brownish black to black. Venation: Sc_1 represented by a weak spur some distance before end of Sc_2 ; petiole of cell M_1 subequal to m ; distal section of Cu_1 curved rather strongly to the anal angle of wing.

Abdomen uniformly dark in male, in female with the extreme caudal borders of the intermediate segments paler; hypopygium dark. Male hypopygium with the tergite (Plate 2, fig. 32, 9*t*) slightly longer than broad, the caudal margin with a deep U-shaped median notch; lateral lobes truncate; no lobule at base of median incision. Outer dististyle, *od*, flattened, more or less shaped like a human sole, the outer end narrowed. Inner dististyle, *id*, with the spine at near midlength of outer face powerful, acute; apex of beak of style slender, the tip narrowly obtuse.

Habitat.—Japan (Kurile Islands).

Holotype, alcoholic male, Lake Yôda, Paramushir Island, July 14, 1934 (*D. Miyadi*). Allotopotype, alcoholic female, in collection of the Otsu Hydrobiological Station, Otsu, Japan.

I take great pleasure in naming this distinct species of *Arctotipula* in honor of the collector, Dr. D. Miyadi, to whom I am indebted for the opportunity of examining a small series of crane flies from the northern Kurile Islands. The nearest allies are *Tipula* (*Arctotipula*) *salicetorum* Siebke (*nigricornis* Zetterstedt, preoccupied; *zetterstedti* Strobl, renaming of last) of northern Europe; *T. (A.) alascænsis* Alexander (Pribilof Islands, Alaska), and *T. (A.) hirtitergata* Alexander (northeastern Asia). The first-named species has a very different hypopygium.⁵ The two last-named species differ in the general coloration of the wings and legs, and, especially, in the structure of the male hypopygium, notably the broadly expanded apex or beak of the inner dististyle.

TIPULA (SCHUMMELIA) STIPATA sp. nov. Plate 1, fig. 4; Plate 2, fig. 33.

Belongs to the *continuata* group; allied to *bidenticulata*; male hypopygium with the caudal end of the inner dististyle produced backward into a broad compressed blade, its caudal end weakly emarginate.

Male.—Length, about 12 millimeters; wing, 13.

Female.—Length, about 11 to 12 millimeters; wing, 13 to 14.

Frontal prolongation of head yellow above, dark brown on sides; palpi black. Antennæ with the scape and pedicel yellow; basal segments of flagellum weakly bicolorous, the basal enlargements brownish black, the remainder of each segment somewhat paler, yellowish brown. In female the flagellum is conspicuously bicolorous, dark brown and light yellow. Head yellow, the posterior vertex more cinnamon brown on either side of the broad yellow median line.

Pronotum yellow medially, variegated with dark brown on sides. Mesonotal præscutum yellow, with three conspicuous brown stripes, the median one very narrowly split by a vaguely paler line; lateral borders of sclerite and posterior interspaces more or less suffused with dusky; median area of mesonotum behind the suture broadly yellow, the lateral portions dark brown, including the scutal lobes, parascutella and sides of medio-

⁵ Lundström, C., Acta Soc. Fauna Flora Fennica 29 No. 2 (1907) pl. 1, fig. 10; Lackschewitz, P., Norsk Entomologisk Tidskrift 3 (1933) 258, pl. 2, fig. 6.

tergite. Pleura yellow, more or less variegated by brown on anepisternum, ventral sternopleurite and meron; cervical region and propleura conspicuously darkened. Halteres with stem obscure yellow, the base of knob infuscated, the apex broadly yellow. Legs with the coxæ testaceous-yellow, the posterior pair in cases a little darkened at bases; trochanters yellow; femora yellow, the tips rather narrowly but conspicuously blackened; tibiæ yellowish brown, the tips narrowly darker; tarsi passing through brown to brownish black. Wings (Plate 1, fig. 4) subhyaline; cell Sc infumed, cell C yellow; stigma dark brown, conspicuous; broad brown seams on m-cu and distal section of vein Cu_1 ; weak darkened clouds in outer radial field and outer discal portion of cell 1st A; more yellowish areas before and beyond stigma and across cell 1st M_2 ; veins brown. Venation: R_{1+2} pale, with macrotrichia on basal half or more; cell 1st M_2 small; basal sections of M_{1+2} and M_3 so pale as to be virtually obliterated; petiole of cell M_1 more than twice m, usually several times this length.

Abdominal segments yellow basally, the outer ends broadly brown to dark brown, in cases more uniformly darkened. Male hypopygium with the caudal margin of tergite (Plate 2, fig. 33, 9t), as viewed from above, very gently emarginate; on ventral surface with a low, obtuse, median, blackened lobe and longer, subacute, spinous, lateral points, invisible from above. Outer dististyle long, gradually narrowed outwardly. Inner dististyle, *id.*, compact, with the posterior or caudal end produced backward into a broad, compressed blade that bears numerous setæ; this extension is somewhat as in *bidenticulata* and *nipponensis*, yet quite distinct in conformation.

Habitat.—Japan (Saghalien).

Holotype, male, Takinosawa, July 26, 1922 (*Esaki*). Allotype, female, Nodosam, July 30, 1922 (*Esaki*). Paratype, female, Konuma, July 21, 1922 (*Esaki*).

I had earlier misdetermined this material as being *Tipula nipponensis* Alexander.⁶ The nearest ally is *Tipula* (*Schumelia*) *bidenticulata* Alexander, which differs especially in the structure of the inner dististyle of the hypopygium and in the wing pattern and venation, as the larger cell 1st M_2 .

⁶ Philip. Journ. Sci. 24 (1924) 604.

TIPULA (OREOMYZA) MALAISEI Alexander.

Tipula malaisei ALEXANDER, Arkiv för Zoologi, Band 19 A, No. 9 (1927) 6-8, fig. 3.

Described from Petropavlovsk, Kamchatka, July 13 and 14, 1922 (*R. Malaise*). Two females, Lake Sue-Bettobu 26, Shumshir Island, northern Kurile Islands, Japan, July 22, 1934 (*Miyadi*); Otsu Hydrobiological Laboratory, Otsu, Japan.

TIPULA (LUNATIPULA) JUSTA sp. nov. Plate 1, fig. 5; Plate 2, fig. 34.

Belongs to the *variipetiolaris* group; size large (wing over 20 millimeters); mesonotal præscutum with a clear gray median stripe that is narrowly bordered by dark brown; wings brown, striped longitudinally with white; male hypopygium with the inner dististyle gradually diverging outwardly; eighth sternite with the median lobe long-triangular in outline.

Male.—Length, 17 to 19 millimeters; wing, 22 to 24.5.

Frontal prolongation of head relatively long, dark reddish brown; nasus lacking; palpi brown, the last segment black. Antennæ with scape and pedicel fulvous; flagellum dark brown, the basal enlargement slightly developed; longest verticils exceeding the segments. Head gray.

Pronotum brown, darker laterally. Mesonotal præscutum with the median stripe clear gray, bordered laterally by dark brown, the margins becoming narrower and finally obsolete behind; posterior interspaces slightly clearer ashen-gray than the median stripe; lateral stripes, and humeral and lateral borders of sclerite, more infumed, the extreme lateral margin still darker; posterior sclerites of mesonotum dull gray, the mediotergite with indications of a capillary darker vitta. Pleura chiefly gray, variegated by slightly more brownish areas; dorso-pleural membrane infuscated, more strongly so behind. Halteres dusky, the knobs dark brown. Legs with the coxæ and trochanters brownish gray; femora brownish yellow, the tips narrowly blackened; tibiæ brownish yellow, the tips more narrowly infuscated; tarsi pale basally, passing into black. Wings (Plate 1, fig. 5) with a strong brown tinge, striped longitudinally with whitish, the latter including streaks in the anal cells; outer end of cell R and a broad continuous line from cell 1st M_2 to the wing tip, involving portions of cells R_5 , M_1 , and 2d M_2 ; restricted oblitative areas before and beyond stigma; base of

cell M_3 pale, sending an extension to margin along vein M_4 ; restricted darker brown areas include the stigma, tip of Sc_2 , origin of R_s and cord; veins dark, paler in the more brownish yellow costal region. Venation: Cell Sc_2 relatively long, due to the length of the free tip of Sc_2 ; cell M_1 petiolate, this subequal to or longer than m .

Abdominal tergites obscure yellow, narrowly trivittate with dark brown, the stripes continuous or nearly so; lateral borders of tergites more grayish; hypopygium more uniformly brown. Male hypopygium with the tergite (Plate 2, fig. 34, 9t) having the median point acute, subtended by a few setæ. Inner dististyle, *id*, not parallel-sided, as in *variipetiolaris*, gradually diverging outwardly. Eighth sternite, $8s$, with median lobe long-triangular in outline, not expanded distally, as in *minensis*.

Habitat.—China (Szechwan).

Holotype, male, Wei Chow, 65 miles northwest of Chengtu, altitude 9,000 to 12,500 feet, August 15, 1933 (*Graham*). Paratopotypes, 2 males, altitude 15,200 feet, August 14, 1933 (*Graham*).

The nearest relatives of the present species are *Tipula* (*Lunatipula*) *minensis* Alexander and *T. (L.) variipetiolaris* Alexander, which differ especially in the hypopygial structure, as discussed above. In stature the present fly agrees more nearly with *minensis*. The length of the petiole of cell M_1 does not show the variation evidenced in *variipetiolaris*.

NEPHROTOMA INTEGR sp. nov. Plate 1, fig. 6; Plate 3, fig. 35.

Mesonotal præscutum obscure reddish yellow, with three polished brownish black stripes that are not bordered by a different color; mediotergite dark, with a median yellow triangle; antennæ elongate, flagellum black; wings brownish yellow, the wing tip broadly darkened; abdomen yellow, the tergites with broad, brownish black triangles; eighth sternite darkened; male hypopygium with the median area of tergite entire; basistyle with a blackened bifid lobe; inner dististyle with a high glabrous vertical crest; ninth sternite with a median pubescent lobe.

Male.—Length, about 12 to 13 millimeters; wing, 10 to 12.5; antenna, about 5.8 to 6.8.

Female.—Length, about 15 millimeters; wing, 12.

Frontal prolongation of head yellow, the outer half of dorsal surface, together with the nasus, more or less infuscated; palpi brownish black. Antennæ (male) relatively elongate, as shown by the measurements; scape obscure yellow; pedicel and basal segment of flagellum brownish yellow; remainder of flagellum

black, the elongate segments rather strongly incised, the verticils shorter than the segments. Head orange; a small, dark, orbital spot at narrowest point of anterior vertex; occipital brand very small, undifferentiated from the ground.

Pronotum obscure yellow medially, dark brown on sides. Anterior lateral pretergites pale yellow. Mesonotal præscutum obscure reddish yellow, with three polished brownish black to black stripes, the median one with a more reddish median line; stripes not margined with another color; scutum yellow medially, the lobes solidly brownish black; scutellum obscure brownish yellow, the parascutella dark brown; mediotergite dark brown with a central yellow triangle, the point directed backward. Pleura very pale yellow, variegated with reddish brown on ventral anepisternum, ventral sternopleurite and meron, and dorsal portion of pleurotergite. Halteres with stem brownish yellow, the base of knob dark brown, the apex obscure yellow. Legs with fore coxæ darkened on anterior faces, remainder of coxæ and all trochanters yellow; femora yellowish brown, the bases clearer yellow, the extreme tips blackened; tibiæ pale brown, the tips narrowly darkened; tarsi brownish black to black. Wings (Plate 1, fig. 6) with a strong brownish yellow tinge, cells C and Sc somewhat darker; stigma dark brown; brown seams along cord and outer end of cell 1st M_2 ; wing tip broadly brown, the color extending basad almost to level of outer end of cell 1st M_2 , especially along the veins; veins brown. Stigmal trichia variable, from eight to twenty-five in number, all in cell R_1 . Venation: Cell M_1 sessile; m-cu at or close to fork of M_4 , the latter shortly before M_3 .

Abdominal tergites yellow, the segments with broad, posterior, brownish black triangles, on the outer segments becoming more transverse, bandlike; lateral borders of tergites with a darkened spot at near midlength; sternites with posterior margins more narrowly darkened, the eighth sternite chiefly blackened; hypopygium reddish yellow. Male hypopygium with the lateral horns of tergite (Plate 3, fig. 35, 9t) relatively broad; median tergal area entire, transverse, with weak spines and setæ on lateral portions only. Basistyle with a blackened lobe that is more or less bifid at tip. Outer dististyle, *od*, relatively narrow, extended into a long slender point. Inner dististyle, *id*, with a high, vertical, glabrous crest; beak slender. Ninth sternite with a median fingerlike lobe, directed ventrad, the lobe with abundant delicate setulæ. Eighth sternite with a shallow median notch, the adjacent portions of the lobes with nu-

merous long setæ that are directed caudad and mesad. Penis stout.

Habitat.—Formosa.

Holotype, male, Rokki, altitude 1,000 feet, May 16, 1934 (*Gressitt*). Allotopotype, female, pinned with the type. Paratopotypes, 2 males, 1 female.

The coloration of the posterior sclerites of the mesonotum indicates that the present fly is allied to species of the *palloris* group, but the coloration of the præscutum and structure of the male hypopygium are very different from all described members of that group. The blackened bifid lobe on the basistyle of the male hypopygium is very similar to that found in *Nephrotoma biarmigera* Alexander (eastern China), which is otherwise an entirely different fly.

NEPHROTOMA ESAKII Alexander. Plate 1, fig. 7; Plate 3, fig. 36.

Nephrotoma esakii ALEXANDER, Philip. Journ. Sci. 24 (1924) 596–597.

Described from Kamiotoineppu, Hokkaido, Japan, August 25, 1922 (*Esaki*). Additional specimens: Sapporo, Hokkaido, July 23, 1924 (*M. Hori*); 1 male, Yumoto, Shimotsuke, Honshiu, Japan, altitude 5,000 feet, August 6, 1934 (*Issiki*).

The venation is shown (Plate 1, fig. 7). The male hypopygium is somewhat peculiar and may be described as follows: Ninth tergite (Plate 3, fig. 36, 9*t*) deeply and acutely notched medially, the lateral lobes obtuse. Outer dististyle, *od*, entirely blackened, elongate, gently arcuate, more or less boomerang-shaped. Inner dististyle, *id*, with the beak stout; crest erect. Membrane between the eighth and ninth sternites with a conspicuous depressed lobe shaped about as shown in the figure, 9*s*. Eighth sternite with the median area of posterior border without setæ, the remainder of sclerite with long, conspicuous, black setæ.

NEPHROTOMA SERRISTYLA sp. nov. Plate 1, fig. 8; Plate 3, fig. 37.

General coloration of mesonotal præscutum yellow, with three polished, reddish ferruginous stripes; lateral ends of suture broadly and conspicuously black; antennæ (male) relatively long, the basal flagellar segments bicolorous; head orange-yellow, without occipital brand; pronotum entirely light yellow; wings weakly tinged with brown, the stigma slightly darker brown; male hypopygium with the inner dististyle bearing a conspicuous serrate crest, the apical beak slender, black; mem-

brane between eighth and ninth sternites with a prow-shaped orange lobe.

Male.—Length, 10 to 11 millimeters; wing, 10.5 to 11.

Female.—Length, 13 to 14 millimeters; wing, 12 to 13.

Frontal prolongation of head, including nasus, yellow; palpi obscure yellow throughout. Antennæ (male) relatively long and stout, if bent backward extending approximately to base of abdomen; basal three segments yellow, the succeeding three or four segments bicolorous, dark brown basally, the remainder yellowish brown; outer flagellar segments uniformly brownish black; flagellar segments rather strongly incised. In female the short antennæ are less evidently bicolorous. Head orange-yellow, without evident occipital brand.

Pronotum entirely light yellow. Mesonotal præscutum yellow, with three, polished, reddish ferruginous stripes that are not bordered or variegated by other colors, except that in certain specimens the median stripe is somewhat paler in its central portion; lateral end of suture and lateral borders of scutal lobes intensely black; scutum yellow medially, the lobes extensively reddish ferruginous; scutellum testaceous-brown, the parascutella yellow; mediotergite uniformly yellow. Pleura yellow, the ventral anepisternum and sternopleurite, and dorsal and posterior pleurotergite slightly more reddish. Halteres dusky, the knobs faintly obscure yellow. Legs with the coxæ and trochanters yellow; femora and tibiæ yellow, the tips very narrowly and inconspicuously darkened; tarsi passing through brown to black. Wings (Plate 1, fig. 8) with a weak brown tinge; stigma oval, slightly darker brown; veins brown. A few scattered stigmal trichia in cell R_1 . Venation: Sc_2 ending a short distance beyond origin of Rs , Sc_1 weakly preserved; cell M_1 short-petiolate to sessile; m-cu close to fork of M_4 , the latter some distance before fork of M_3 .

Abdomen orange-yellow, the tergites very weakly darkened before suture; in cases, the subterminal segments darkened; hypopygium yellow. Male hypopygium with the lateral horns of tergite (Plate 3, fig. 37, 9*t*) acute, unarmed with blackened spines except at extreme base. Outer dististyle, *od*, pale, the apical third attenuate. Inner dististyle, *id*, with the apical beak slender, intensely blackened; dorsal crest broad and extensive, the margin produced into several pale points. Membrane between eighth and ninth sternites with a small prow-shaped lobe, orange in color.

Habitat.—China, eastern Siberia.

Holotype, male, Chungking, Szechwan, China, altitude 1,000 to 2,000 feet, May 6 to 27, 1930 (*Graham*). Allotopotype, female. Paratopotypes, 6 males and females; paratype, 1 male, Kotikowo Station of the Ussuri Railway, Ussuri Province, eastern Siberia, July 26, 1927 (*Stackelberg*).

Nephrotoma serristyla is most closely allied to *N. parvirostra* Alexander, differing most conspicuously in the coloration of the thorax and antennæ. The serrate dorsal crest of the inner dististyle occurs in several other species of the genus, including besides *parvirostra*, the European *N. scurra* (Meigen).

NEPRHOTOMA PROFUNDA sp. nov. Plate 1, fig. 9; Plate 3, fig. 38.

General coloration of thorax polished yellow, the præscutum with three reddish brown stripes; antennæ short, the flagellar segments with very long verticils; wings with stigma dark brown; abdominal tergites yellow, trivittate with black; male hypopygium with the eighth sternite long, profoundly incised, the margins of the notch fringed with long yellow setæ.

Male.—Length, about 12.5 to 15 millimeters; wing, 11.5 to 14.

Female.—Length, about 16 to 18 millimeters; wing, 13 to 14.

Frontal prolongation of head varying from yellow to brown; palpi with basal segments dark brown, the outer two segments paler. Antennæ unusually short, in male if bent backward not attaining the wing root; basal three segments obscure yellow, the remainder passing into black; flagellar segments very weakly incised, the basal enlargements only feebly developed; verticils very long, exceeding the segments. Head yellow, without clearly defined occipital brand.

Pronotum darkened medially, yellow on sides. Mesonotal præscutum polished yellow, with three reddish brown stripes that are not bordered by any other color; lateral stripes straight; scutum yellow medially, the lobes extensively reddish brown; scutellum testaceous-yellow; mediotergite light yellow, with a median brown line, narrowed behind and not attaining the posterior margin. Pleura yellow, with more reddish areas on anepisternum, ventral sternopleurite, and pleurotergite. Halteres dusky, the base of stem restrictedly paler. Legs with the coxæ and trochanters yellow; femora and tibiæ yellow, the tips not or scarcely darkened; tarsi passing into brown. Wings (Plate 1, fig. 9) with the ground color yellow, cells C and Sc more saturated; stigma dark brown, conspicuous; restricted dark seams

on anterior cord and wing tip; veins brown, more yellowish in prearcular and costal portions of wing. Venation: Sc_2 extending to a short distance beyond origin of Rs , Sc_1 weakly preserved; cell M_1 variable, from sessile to having a petiole longer than m ; $m-cu$ at fork of M_4 or shortly beyond base of latter.

Abdominal tergites yellow, trivittate with black, the median stripe broader; lateral stripes slightly constricted and interrupted on basal ring; median region of sternites weakly darkened; eighth segment chiefly blackened; hypopygium chiefly reddish brown. Male hypopygium with the tergite (Plate 3, fig. 38, 9*t*) having the median notch narrow. Outer dististyle, *od*, long-attenuate. Inner dististyle, *id*, with the apical beak slender; dorsal crest pale, irregularly toothed. Eighth sternite, 8*s*, long, with a very deep and acute median incision that extends cephalad to about the basal third of the sclerite; margin of incision with long, conspicuous, yellow setæ. Gonapophyses, *g*, subequal in length to ædeagus, appearing as smooth, weakly curved blades, their tips acute.

Habitat.—China (Szechwan).

Holotype, male, Chengtu, altitude 1,700 feet, May 10 to 14, 1933 (*Graham*). Allotopotype, female. Paratopotypes, numerous males and females.

The nearest ally is *Nephrotoma minuticornis* Alexander (Japan), which differs most conspicuously in the pale stigma of the wings and in the structure of the male hypopygium, especially of the eighth sternite.

NEPHROTOMA BIFASCIGERA *sp. nov.* Plate 1, fig. 10; Plate 3, figs. 39 and 40.

General coloration yellow, the præscutum with three black stripes, the lateral pair outcurved; antennal flagellum black; occipital brand very large; pronotum yellow medially, darkened on sides; scutellum with a linear black median dash; mediotergite with an inverted T-shaped black area; pleura spotted with black; femora yellow, the tips narrowly blackened; wings subhyaline; stigma dark brown; a narrow dark seam on anterior cord; abdominal tergites with a broad, median black stripe, the lateral borders of the segments grayish brown; a subterminal black ring; male hypopygium with the lateral horns of tergite crowned with black spines; eighth sternite broad, the lateral angles with tufts of black setæ, the median area filled with pale membrane; gonapophyses yellow, broadly flattened, the tips bispinous.

Male.—Length, about 11 to 11.5 millimeters; wing, 10 to 10.5.

Frontal prolongation of head light yellow, the dorsal surface with an oval or U-shaped dark brown mark, the arms directed caudad; nasus dark; palpi black, the outer segment a little brighter. Antennæ with scape reddish yellow; pedicel and base of first flagellar segment a little more brownish yellow; remainder of flagellum black; segments of moderate length and only feebly incised; longest verticils subequal to the segments. Front light sulphur yellow, the posterior portions more orange; occipital brand very large, subcircular or oval in outline, sending a narrow point cephalad almost to summit of vertical tubercle; a pale brown to darker spot near orbits behind antennal fossæ.

Pronotum light yellow, weakly infuscated on sides. Mesonotal præscutum yellow, with three subnitidous black stripes that are very narrowly bordered by a more opaque black; median stripe narrowed at posterior end and reaching the suture; lateral stripes with a paler brown spot at anterior end, giving an out-curved appearance; a narrow brown line on posterior pretergites before the suture; scutum light yellow, each lobe with two confluent black areas, leaving the median area and lateral borders broadly pale; scutellum testaceous-yellow, with a narrow, dark brown, median vitta; parascutella obscure yellow; mediotergite sulphur yellow, with an inverted T-shaped black area, the stem a little widened at anterior end. Pleura yellow, variegated with brownish black, including areas on ventral and posterior anepisternum, ventral sternopleurite, and extreme ventral meron; less-evident brown areas on dorsal and ventral pleurotergite and a small dark spot on the meropleurite. Halteres yellow, the base of knob weakly darkened. Legs with the coxæ yellow, the anterior pair slightly darker basally; trochanters yellow; femora yellow, the tips narrowly but conspicuously blackened, the amount subequal on all legs; tibiæ yellow, the tips narrowly infuscated; tarsi black. Wings (Plate 1, fig. 10) subhyaline, cells C and Sc concolorous; stigma oval, dark brown; a very narrow to scarcely evident dark seam on anterior cord; veins brown. A group of from ten to fifteen stigmal trichia in cell R_1 . Venation: Sc_2 ending shortly beyond origin of Rs , Sc_1 preserved; cell M_1 subsessile to sessile; m-cu at or shortly before fork of M_4 .

Abdominal tergites orange, with a broken, brownish black, median stripe, interrupted at posterior borders, widest and most conspicuous on the intermediate segments, becoming narrower and subobsolete on the fifth and sixth segments; lateral borders

of tergites more grayish brown; segments seven to nine chiefly black, the styli yellow; sternites yellow, with a median brownish black line, in cases more extensive, leaving the posterior borders pale. Male hypopygium with the lateral arms of tergite (Plate 3, fig. 39, 9t) stout, crowned with numerous black spines; median incision narrow; a conspicuous U-shaped pale area on disk of tergite. Outer dististyle (Plate 3, fig. 39, od) moderately attenuated; setæ and punctures pale and inconspicuous. Inner dististyle, *id*, with a long, low, dorsal crest; apical beak slender. Eighth sternite (Plate 3, fig. 40, 8s) broad, each lateral angle a little produced and bearing a tuft of long setæ, the entire median area between these lobes filled with white membrane. Gonapophyses (Plate 3, fig. 40, g) appearing as broadly flattened, bispinous, yellow plates.

Habitat.—Eastern Siberia.

Holotype, male, Beitonovo, Amur River, Amur Province, May 28, 1915 (*Popoff*). Paratopotype, one broken male; paratype, 1 male, Osernaja, mouth of Amur River, May 31, 1910 (*W. Soldatov*); type in the Russian Academy of Sciences, Leningrad.

This fly bears a certain resemblance to *Nephrotoma virgata* (Coquillett) and traces to this species by means of keys to the local fauna. The male hypopygium is very distinctive.

NEPHROTOMA SUBLAMELLATA sp. nov. Plate 1, fig. 11; Plate 4, fig. 41.

Nephrotoma lamellata Riedel, variety; ALEXANDER, Philip. Journ. Sci. 24 (1924) 599.

Mesonotal præscutum with three feebly shining black stripes; scutellum brownish black; mediotergite yellow, with a median inverted T-shaped black area; pleura yellow, with conspicuous black markings; femora and tibiæ yellow, the tips very narrowly and insensibly darkened; wings tinged with yellow; stigma oval, dark brown, with numerous trichia; wing tip and a seam on anterior cord darkened; male hypopygium with the lateral angles of tergite produced into flattened, inwardly directed plates; gonapophyses appearing as flattened yellow blades, the outer edge and apex with microscopic serrations.

Male.—Length, about 14 millimeters; wing, 14.

Frontal prolongation of head light yellow, the dorsal portion on distal half, including nasus, blackened; palpi yellowish. Antennæ (male) of moderate length, if bent backward extending to the wing root or just beyond; scape and pedicel orange; first flagellar segment brown; remainder of flagellum black, the segments rather strongly incised; verticils shorter than the segments. Head orange-yellow, the occipital brand large, dark

brown, its anterior margin not clearly defined; a weak infuscation on narrowest part of vertex bordering the eye.

Pronotum broadly light yellow medially, blackened on sides. Mesonotal præscutum light yellow, with three, feebly shining, black stripes that are very narrowly and insensibly bordered by darker; a large velvety black area opposite anterior end of lateral stripes; scutum yellow medially, each lobe with a large, feebly shining, black area, crossing the lateral portions of suture; scutellum brownish black, the parascutella and adjoining portions of scutal lobes light yellow; mediotergite yellow, with a median brown stripe, behind widely expanded and more blackened; scutellum and mediotergite with inconspicuous pale setæ. Pleura light yellow, conspicuously variegated with black areas on the ventral anepisternum, ventral sternopleurite, ventral meron and dorsal pleurotergite. Halteres chiefly pale reddish, the base of knob weakly suffused. Legs with the fore coxæ yellow, blackened basally, remaining coxæ and all trochanters yellow; femora and tibiæ yellow, the tips narrowly and weakly darkened; tarsi brownish black. Wings (Plate 1, fig. 11) tinged with yellow, cells C and Sc somewhat more saturated yellow; stigma oval, dark brown; wing tip narrowly but conspicuously darkened; a brown seam on anterior cord; veins brown, Sc more yellow. About fifty stigmal trichia in cell R_1 . Venation: Sc_2 ending opposite to just beyond origin of Rs, Sc_1 represented by a short spur; cell M_1 very short-petiolate to barely sessile; m-cu at fork of M_4 , the latter a short distance before M_3 .

Abdominal tergites yellow, with three more or less distinct stripes that are somewhat obscured by abundant yellow setæ over the surface of the segments; subterminal segments blackened; hypopygium obscure yellow. Male hypopygium with the ninth tergite (Plate 4, fig. 41, 9t) with powerful, flattened, lateral blades, directed strongly mesad, with additional submedian flattened plates that bear the usual blackened teeth and setæ. Outer dististyle, *od*, unusually narrow, the tip attenuate. Inner dististyle, *id*, with the apical beak pale; no dorsal crest. Ninth sternite with a conspicuous protuberant horseshoe-shaped area. Eighth sternite with the caudal margin scarcely emarginate, unarmed. Gonapophyses, *g*, appearing as large, geniculate, flattened, yellow blades, the outer edge and apex weakly serrate.

Habitat.—Japan (Saghalien).

Holotype, male, Shimizu, July 27, 1922 (*Esaki*); in author's collection.

The nearest allies of the present species are *Nephrotoma lamellata* (Riedel) and *N. ozenumensis* Alexander, which differ in several details of coloration and structure of the male hypopygium. The yellow legs are rather distinctive in this particular group of species.

NEPHROTOMA CHOSENSIS sp. nov. Plate 1, fig. 12; Plate 4, fig. 42.

General coloration yellow, conspicuously patterned with black; mesonotal præscutum with three black stripes, the lateral pair outcurved to margin at anterior end; a median dark line on mediotergite; pleura conspicuously patterned with black; femoral tips narrowly blackened; wings rather strongly tinged with brownish yellow; stigma oval, dark brown; abdominal tergites with three interrupted black stripes; male hypopygium with the inner dististyle unprovided with dorsal crest; eighth sternite without lobes or setal modifications; gonapophyses appearing as elongate yellow blades.

Male.—Length, about 13 millimeters; wing, 12; antenna, 4.2.

Frontal prolongation of head yellow, the dorsal surface, including nasus, black; palpi brown. Antennæ of moderate length, if bent backward extending about to wing root; scape light brown; pedicel a little darker; flagellum black; flagellar segments rather strongly incised, the basal enlargement conspicuous; longest verticils subequal to the segments. Head orange, paling to yellow behind; occipital brand large, brownish black, sending an anterior prolongation to summit of vertical tubercle.

Pronotum yellow medially, black on sides. Mesonotal præscutum dirty yellow, with three polished black stripes that are not bordered by a different color; lateral stripes bent outward to margin at outer ends; a black area on lateral portion of præscutum before suture; scutum yellow, each lobe with two confluent black areas, not connected with the lateral præscutal stripes; scutellum light brown, parascutella yellow; mediotergite testaceous-yellow, with a median black stripe that narrows behind, the posterior borders of sclerite less heavily darkened. Pleura yellow, variegated with black on anepisternum, ventral sternopleurite, ventral meron, dorsocephalic portion of pteropleurite, and on pleurotergite. Halteres obscure yellow, the base of knob infuscated, the apex yellow. Legs with the coxæ yellow, blackened basally, most broadly so on forelegs, narrowest on middle coxæ; trochanters yellow; fore femora yellow basally, the outer half darkened, with a vague, obscure yellow, subterminal ring before the narrow more-blackened tips;

middle femora yellow, the tips narrowly black; tibiae yellow, passing into brownish yellow, the tips narrowly darkened; tarsi dark brown or brownish black. Wings (Plate 1, fig. 12) rather strongly tinged with brownish yellow, cell Sc somewhat darker than cell C; stigma oval, dark brown, narrowly bordered by paler brown; a seam on anterior cord and wing tip narrowly infuscated; veins brownish black. Stigmal trichia reduced in number to four or five. Venation: Sc_2 ending just beyond origin of Rs, Sc_1 opposite this origin; cell M_1 short-petiolate; m-cu at fork of M.

Abdominal tergites with three broken black stripes, the median row interrupted at both base and apex of each segment; lateral stripes more complete, interrupted at posterior portions of segments; sternites yellow, diffusely infuscated medially; subterminal segments and hypopygium more extensively darkened. Male hypopygium with the lateral lobes of tergite (Plate 4, fig. 42, 9t) broadly truncated, separated by a deep U-shaped median notch, the margin with abundant blackened spicules, the dorsal surface with more scattered points; from ventral surface of lateral lobes on outer portion a slender spine bearing one or two blackened spicules near base. Outer dististyle, *od*, relatively small, the tip little produced, the length about two and one-half times the width. Inner dististyle, *id*, without a dorsal crest; apical beak relatively slender. Eighth sternite with caudal margin very gently emarginate, without lobes or specially modified setae. Gonapophyses, *g*, appearing as flattened elongate blades, a little constricted beyond midlength, the tips oval, spatulate.

Habitat.—Korea.

Holotype, male, Kongo San, October 17, 1933 (*Machida*).

Most generally similar to *Nephrotoma contrasta* Alexander and *N. sublamellata* sp. nov., differing most evidently in the details of structure of the male hypopygium.

NEPHROTOMA MARTYNOVI sp. nov. Plate 1, fig. 13; Plate 4, fig. 43.

Size large; general coloration yellow, the præscutum with three black stripes, the lateral pair straight or with an isolated brown spot opposite their anterior end; antennal flagellum black, the segments rather strongly incised; occipital brand small; pronotum, scutellum, and mediotergite yellow; pleura yellow, variegated by more reddish areas; fore femora broadly blackened, the remaining femora narrowly so; wings yellow, more saturated in costal portion; stigma dark brown, with few trichia; narrow dark seams on cord and at wing tip; abdomen

yellow, indistinctly trivittate with darker; subterminal segments black; hypopygium pale at apex; lateral horns of ninth tergite of male hypopygium slender, glabrous; eighth sternite unarmed; gonapophyses appearing as flattened blades.

Male.—Length, 15 to 16 millimeters; wing, 14 to 15.

Female.—Length, 22 to 23 millimeters; wing, 15 to 16.

Frontal prolongation of head obscure yellow, darker dorsally, the nasus black; palpi brown. Antennæ with scape and pedicel orange; flagellum black; flagellar segments rather strongly incised; verticils a little shorter than the segments. Head orange; occipital brand small, dark brown, triangular in outline; vertical tubercle entire; a small brown orbital spot on either side of vertical tubercle.

Pronotum and propleura entirely yellow. Mesonotal præscutum yellow, with three black stripes that are very insensibly margined with more opaque black; lateral stripes straight or with a small isolated paler brown spot opposite their anterior ends; scutum yellow, each lobe with two confluent black areas, crossing the suture and becoming confluent with the lateral præscutal stripes; scutellum testaceous-yellow, the parascutella bright yellow; mediotergite yellow, the posterior portion slightly more orange though scarcely darkened; the type female shows a median linear dark dash on mediotergite. Pleura yellow, variegated by more reddish areas on ventral anepisternum, ventral sternopleurite, ventral meron and ventral pleurotergite. Halteres yellow, the base of knob weakly darkened, the apex clear light yellow. Legs with the coxæ and trochanters yellow; femora yellow, the tips blackened, very broadly so on the forelegs where more than the outer half is included; narrower on the middle and posterior legs where only the outer eighth or tenth is darkened; tibiæ obscure yellow, the tips narrowly darkened; tarsi black. Wings (Plate 1, fig. 13) with a yellow tinge, the base and cells C and Sc clearer yellow; stigma oval, dark brown; wing tip narrowly infumed; cord, including the distal section of vein Cu_1 , seamed with brown; veins beyond cord more narrowly seamed with darker; veins dark brown, the prearcular and costal veins more yellow. Stigmal trichia reduced in number to five or six. Venation: Sc_2 ending opposite or just beyond origin of Rs, Sc_1 barely indicated; cell M_1 sessile; m-cu just beyond origin of vein M_4 .

Abdomen obscure yellow, the basal segments scarcely marked or with vague indications of darker stripes only; in female, with three darker stripes; male with subterminal segments

intensely black, the styli yellow; basal sternites unmarked. Male hypopygium with the ninth tergite (Plate 4, fig. 43, 9t) having the lateral horns slender and entirely glabrous; intermediate lobes obtuse, with numerous black spines and setæ, the apex further produced into a triangular pale point. Outer dististyle, *od*, pale, only moderately attenuated at tip, the cephalic margin a little attenuate. Inner dististyle, *id*, without dorsal crest. Eighth sternite with the caudal margin virtually entire or with a barely indicated median emargination, without lobes; setæ of posterior border longer but not modified into brushes. Gonapophyses, *g*, elongate, compressed-flattened, in profile appearing like a duck's head, the tip obtuse.

Habitat.—Eastern Siberia, Manchoukuo.

Holotype, male, Silinche Station, East Chinese Railway, Manchoukuo, July 10, 1911 (*Spechilov*). Allotype, female, Ulunga, Amur Province, eastern Siberia, June 24, 1910 (*Mishin*). Paratypes, a broken female, Habarovsk district, Samnjur River, Amur Province, July 9 to 11, 1910 (*Czerski*); a broken male, Bikin River, Ussuri, July 9, 1927 (*Martynov*); a broken male, Maiche region, near Shkotovo, June 4, 1927 (*Martynov*).

The species is named in honor of Dr. A. B. Martynov, distinguished student of recent and fossil insects. The nearest relatives are species such as *Nephrotoma geminata* Alexander and *N. subpallida* Alexander, which are readily told by the small size, different coloration of the wings, and the structure of the male hypopygium. The unmarked prothorax and mediotergite separate the species from other large, somewhat similar species in the western Palæarctic region, such as *N. quadrifaria* (Meigen).

NEPHROTOMA DAISENSIS sp. nov. Plate 1, fig. 14.

General coloration yellow and black; antennæ black throughout; mesonotal præscutum almost entirely covered by a black dorsal shield composed of the entirely confluent stripes; scutellum and parascutella black; mediotergite black; pleura yellow, conspicuously variegated by black areas; femora yellow basally, the tips broadly blackened; wings with a strong yellow tinge; stigma long-oval, dark brown; wing tip broadly infumed; Sc_2 ending some distance beyond the origin of R_s , Sc_1 lacking; abdominal tergites orange, the outer segments uniformly blackened, the intermediate tergites with black triangular areas.

Female.—Length, about 16 millimeters; wing, 14.5.

Frontal prolongation of head polished black above, more yellow on sides; nasus black; palpi obscure brownish yellow. An-

tennæ black throughout; flagellar segments (female) with basal enlargements poorly developed; verticils longer than the segments. Head sulphur yellow, the occiput and posterior vertex velvety black, the color extending cephalad to the level of the narrowest part of the anterior vertex and here sending a broad orbital extension to the eyes; ground color restricted to the front, anterior part of vertex and posterior orbits; genæ more pruinose, with long silvery setæ.

Pronotum broadly yellow medially, the sides conspicuously blackened. Mesonotal præscutum almost covered by a large shield-shaped polished black area comprising the usual three stripes that are entirely confluent; yellow ground color restricted to humeral triangles and a smaller linear area before the suture; darkened shield not or scarcely bordered by more opaque black; scutum with lobes black, the obscure yellow ground restricted to the anterior half of the median area and small, brighter yellow, lateral areas above the wing root; scutellum and parascutella black, the surface very weakly pruinose; mediotergite black, very weakly pruinose, brightened by yellow only at extreme anterolateral angle. Pleura yellow, conspicuously variegated by black on the propleura, anepisternum, ventral sternopleurite, ventral meron, ventral pteropleurite, and as a large U-shaped area on the pleurotergite. Halteres obscure yellow throughout. Legs with the coxæ gray pruinose, with conspicuous white setæ, the apices of posterior coxæ obscure yellow; trochanters yellow; femora yellow basally, the tips broadly blackened, more conspicuously so on the forelegs where more than the outer half is included, narrowest on the posterior legs where about the distal fourth is darkened; tibiæ brown, the tips darker; tarsi black. Wings (Plate 1, fig. 14) with a strong yellow tinge, prearcular region and cells C and Sc more saturated yellow; stigma long-oval, dark brown; wing tip broadly infumed; a diffuse brown seam along cord, reaching the posterior margin along distal section of vein Cu_1 ; veins dark brown, more yellow in the brightened areas. About twenty-five stigmal trichia in cell R_1 . Venation: Sc_2 ending some distance beyond origin of the straight Rs, Sc_1 lacking; cell M_1 petiolate; m-cu on M_4 some distance beyond origin.

Abdominal tergites with the ground color orange; basal tergite black, more grayish laterally; tergites two to four black medially, the areas triangular, with the point directed cephalad; succeeding tergites blackened, only the base of the fifth restrictedly pale.

Habitat.—Japan (Honshiu).

Holotype, female, Mount Daisen, Hôki, altitude 2,600 feet, June 6, 1930 (*Hibi*).

The nearest allies appear to be *Nephrotoma ozenumensis* Alexander and *N. pullata* (Alexander), which differ in the details of coloration. The present fly has the entire disk of the præscutum polished black, without indications of different color on the interspaces; the scutellum, parascutella, and mediotergite conspicuously black.

NEPHROTOMA CATENATA sp. nov. Plate 1, fig. 15.

General coloration of mesonotal præscutum yellow, with three polished black stripes that are bordered by velvety black, more broadly so at and near their cephalic ends so all three stripes are interconnected; scutellum, parascutella, mediotergite, and pleura yellow; halteres dusky; wings broad, pale grayish yellow, stigma yellow; abdomen yellow to weakly brownish yellow, unpatterned except for darkenings on tergites six and seven.

Female.—Length, 15 to 16 millimeters; wing, 12 to 12.5.

Frontal prolongation of head light yellow, a little deeper yellow above and on nasus, the latter with black setæ; palpi yellow, the basal two segments weakly darker. Antennæ with basal five segments yellow, the succeeding segments passing into dark brown; flagellar segments (female) scarcely incised; longest verticils subequal to or a little longer than the segments. Head orange-yellow; no occipital brand.

Pronotum clear light yellow above, more reddish yellow on sides. Mesonotal præscutum light yellow, with three polished black stripes that are narrowly bordered by velvety black; extensive invasions of this latter color include the sides of the sclerite, involving the entire lateral border excepting a small yellow spot at midlength of the lateral stripe; the lateral and median stripes broadly connected at cephalic ends of former, restricting the yellow ground color to the posterior interspaces; entire cephalic border of median stripe velvety black; scutum with lobes polished black, the suture and lateral portions velvety black, connecting with the lateral præscutal areas, restricting the yellow ground color to a narrow median area; scutellum, including parascutella, yellow, mediotergite entirely yellow. Pleurotergite and pleura yellow, the latter slightly variegated with reddish yellow on anepisternum and ventral sternopleurite. Halteres dusky, the base of stem restrictedly pale. Legs with the coxæ and trochanters yellow; remainder of legs obscure yellow, the tips of femora and tibiæ very narrowly and weakly

darkened; terminal tarsal segments brownish black. Wings (Plate 1, fig. 15) broad, pale grayish yellow, the prearcular region and cells C and Sc clearer yellow; stigma yellow; veins brown. A few stigmal trichia in cell R_1 . Venation: Sc_2 ending a short distance beyond origin of the oblique Rs, Sc_1 represented by a weak spur; cell M_1 narrowly sessile; m-cu a short distance before fork of M_4 , the latter a corresponding distance before fork of M_3 .

Abdomen yellow to weakly brownish yellow on tergites, but without evident pattern; sixth and seventh tergites more darkened.

Habitat.—China (Szechwan).

Holotype, female, Mount Omei, altitude 11,000 feet, August 18, 1934 (Graham). Paratopotype, female.

Nephrotoma catenata is very distinct from the other regional species of the genus in the peculiar pattern of the præscutum and scutum. I cannot indicate any close allies, but the species shows some points of resemblance to *N. minuticornis* Alexander (Japan).

NEPHROTOMA ATROSTYLA sp. nov. Plate 1, fig. 16; Plate 4, fig. 44.

Mesonotal præscutum yellow with three polished black stripes; lateral stripes outcurved but entirely polished; antennæ with basal three segments yellow, the succeeding flagellar segments dark brown, with their bases yellow; occipital band very extensive; central portion of mediotergite darkened; pleura almost uniformly yellow; wings tinged with yellow; stigma rather dark brown; wing tip and a seam on anterior cord brown; abdominal tergites trivittate with black; male hypopygium with both dististyles black; outer style sole-shaped.

Male.—Length, about 11 millimeters; wing, 10.5.

Frontal prolongation of head short, yellow, the nasus a little darker; palpi brown. Antennæ with basal three segments yellow; succeeding flagellar segments bicolorous, dark brown, with the basal enlargements conspicuously yellow; at midlength of the organ, the yellow color becomes more obscure and finally passes into brown; longest verticils nearly as long as the slender segments. Head orange, the extensive occipital and posterior portions of the vertex brown, triangular in outline, the point at anterior end disconnected from a delicate brown median line on vertical tubercle.

Pronotum yellow, weakly darkened on sides. Mesonotal præscutum yellow, with three polished black stripes, the median one very broad in front; lateral stripes strongly outcurved almost

to margin, the outcurved portion equally polished; median area of scutum yellow, the lobes covered by extensive polished black areas; lateral ends of suture black; scutellum brownish testaceous, the parascutella a trifle darker; mediotergite yellow with a broad, dark brown, median stripe on anterior half, the posterior portion more extensively paler brown; mediotergite with setæ on posterolateral portions. Pleura polished yellow, scarcely variegated by more reddish areas, these most evident on ventral portion of pleurotergite. Halteres chiefly pale brown, the apices of knobs a trifle brightened. Legs with coxæ and trochanters yellow; remainder of legs broken. Wings (Plate 1, fig. 16) tinged with yellow, the costal region scarcely brighter; stigma oval, rather dark brown; wing tip narrowly but conspicuously dark brown; a conspicuous brown cloud on anterior cord; posterior cord more narrowly seamed; veins brown. About a score of stigmal trichia in cell R_1 . Venation: Sc_2 ending a short distance beyond origin of Rs ; $r-m$ reduced by approximation of veins; cell M_1 broadly sessile; cell 1st M_2 elongate, parallel-sided; $m-cu$ at fork of M_{3+4} ; cell M_4 narrow.

Abdomen orange, the tergites extensively blackened medially, the basal ring undarkened; lateral borders of tergites conspicuously blackened on outer ring; eighth and ninth segments, including style of hypopygium, chiefly black; basal sternites yellow, the intermediate segments black. Male hypopygium with the tergite (Plate 4, fig. 44, 9*t*) having two broadly flattened, divergent lobes, separated by a U-shaped notch, the blackened spines numerous; dorsal surface of tergite highly protuberant on either side of a narrow median depression. Outer dististyle, *od*, sole-shaped; marginal setæ short, basal ones long and stout. Inner dististyle, *id*, with the apical beak slender; no dorsal crest. Eighth sternite with caudal margin entire; from membrane between the eighth and ninth sternites a depressed rectangular lobe, more or less parallel-sided, the tip obtuse. Gonapophyses exceeding the very small ædeagus, each apophysis unequally bifid at apex (Plate 4, fig. 44, *p*).

Habitat.—Eastern Siberia.

Holotype, male, Samnjur River, near Habarovsk, Ussuri, July 7, 1910 (*Gondok's Expedition*); Russian Academy of Sciences.

The bicolorous flagellar segments, with the bases yellow, together with the black hypopygium, readily separate the present fly from other regional species. By manuscript keys, it runs to *Nephrotoma angustistria* Alexander, of northern Japan, differing

most evidently in all details of structure and coloration of the male hypopygium. The antennæ of the male sex are much shorter than in *angustistria*.

LIMONIINÆ

LIMONIINI

LIMONIA (LIBNOTES) PERPARVULOIDES sp. nov. Plate 1, fig. 17; Plate 4, fig. 45.

Allied to *perparvula*; tips of femora narrowly and abruptly yellow; wings pale grayish subhyaline; stigma oval, pale brown; Sc_1 ending just beyond fork of Rs, Sc_2 at its tip; Rs relatively long and oblique, approximately three times as long as the basal section of R_{4+5} .

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

Head broken.

Mesonotal præscutum yellow, darkened medially and less distinctly on the sides; posterior sclerites of notum testaceous-yellow, the scutal lobes weakly darkened. Pleura with the anepisternum and sternopleurite weakly darkened, the posterior sclerites and pleurotergite more testaceous-yellow. Halteres pale, the knobs dark brown. Legs with the coxæ and trochanters testaceous-yellow; femora brownish black, the tips narrowly and abruptly light yellow; tibiæ black, the tarsi a very little paler. Wings (Plate 1, fig. 17) pale grayish subhyaline, the prearcular region and cells C and Sc pale yellow; stigma oval, pale brown; veins brown, more flavous in the yellow areas. Venation: Sc of moderate length, Sc_1 ending just beyond fork of Rs, Sc_2 at its tip; Rs relatively long and oblique, much longer than in *perparvula*, approximately three times the basal section of R_{4+5} ; free tip of Sc_2 and R_2 in transverse alignment; m-cu at midlength of the long cell 1st M_2 ; anal veins beyond origin gently convergent.

Abdominal tergites brown, the lateral margins darker; sternites more yellow. Male hypopygium (Plate 4, fig. 45) much as in *perparvula* but the apex of the rostral prolongation of the ventral dististyle, *vd*, a little stouter. In both species, the surface of the dorsal dististyle has several very delicate setulæ.

Habitat.—Formosa.

Holotype, male, Raisya, altitude 2,500 feet, November 21, 1934 (*Issiki*).

Very closely allied to and possibly only a geographical race of *Limonia* (*Libnotes*) *perparvula* Alexander (Luzon), which differs chiefly in the venation of the radial field. The latter species is now known from two provinces in Luzon (Pampanga

and Tayabas) and shows very little variation in the venation of the radial field. These two species are the smallest representatives of the subgenus so far discovered in the Philippines and northward in eastern Asia.

LIMONIA (LIMONIA) EDURA sp. nov. Plate 1, fig. 18.

General coloration reddish brown, the disk of præscutum with indications of three darker stripes; front silvery white; anterior vertex wide; halteres and legs dark; wings with a strong fulvous-brown tinge, with narrow, darker brown seams on the cross-veins and deflections; Rs very long, in alignment with R_{2+3} ; cell 1st M_2 elongate, subequal to vein M_{1+2} beyond it; m-cu shortly before fork of M.

Female.—Length, about 6 millimeters; wing, 6.5.

Rostrum and palpi black. Antennæ with scape and pedicel black; flagellum broken. Front and anterior portion of vertex silvery white; posterior portion of vertex black; anterior vertex wide, the eyes with coarse ommatidia.

Pronotum obscure yellow. Mesonotal præscutum reddish brown, the humeral and lateral portions paling to yellow, the disk with very vague indications of three darker stripes; posterior sclerites of notum dark brown. Pleura dark brown. Halteres relatively short, dusky. Legs with the fore coxæ dark brown, the remaining coxæ and all trochanters more brownish yellow; remainder of legs dark brown. Wings (Plate 1, fig. 18) with a strong fulvous-brown tinge, the prearcular field light yellow; very narrow, darker brown seams at fork of Sc, origin of Rs, stigma, cord, and outer end of cell 1st M_2 , best indicated by the darker veins; veins pale, except as noted above. Venation: Sc relatively long, Sc_1 ending beyond one-third the length of Rs, Sc_2 at its tip; Rs very long, in alignment with R_{2+3} ; free tip of Sc_2 pale, lying shortly basad of the gently arcuated R_2 ; cell 1st M_2 elongate, subequal to vein M_{1+2} beyond it; m-cu shortly before fork of M, about two-thirds the distal section of Cu_1 ; anal veins at bases gently diverging.

Abdomen dark brown, the segment before the hypovalvæ pale. Ovipositor with cerci very small, slender and upcurved, the much larger, compressed hypovalvæ blackened at bases.

Habitat.—Japan (Honshiu).

Holotype, female, Yumoto, Shimotsuke, altitude 5,000 feet, August 7, 1934 (*Issiki*).

Limonía (Limonía) edura is very different from other small regional species of the subgenus. It is somewhat like *L. (L.)*

yakushimensis Alexander, but the alliance is not particularly close and I cannot indicate any other similar species.

LIMONIA (LIMONIA) JUVENCA sp. nov. Plate 1, fig. 19; Plate 4, fig. 46.

General coloration of mesonotum light yellow, the præscutum with a median brown stripe that is constricted at midlength; antennæ (male) relatively elongate; pleura yellow; halteres dusky; legs brown, the femora without paler annuli; wings pale brown, variegated by darker clouds and pale areas; Sc unusually short, Sc₂ ending exactly opposite the origin of Rs, Sc₁ at its tip; m-cu before fork of M; male hypopygium with a single dististyle that terminates in a pendant blackened lobe; ædeagus with the surface covered by dense pale setulæ.

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

Rostrum and palpi black, the former moderately elongate, approximately one-third to one-fourth the remainder of head. Antennæ brown, the scape a little darker; antennæ elongate, if bent backward extending to the wing root or approximately so; flagellar segments subcylindrical to long-oval, with a dense white pubescence, additional to the short verticils. Head dark grayish brown.

Pronotum and cervical sclerites dark brown, paler laterally. Mesonotal præscutum light yellow, with a conspicuous, bright brown, median stripe that is somewhat constricted at midlength; scutal lobes darkened, the median area pale; scutellum yellow, the parascutella darker; mediotergite brownish testaceous. Pleura yellow. Halteres dusky, the base of stem restrictedly yellow. Legs with the coxæ and trochanters yellow, femora uniformly brown, without sign of apical or subapical brightening; tibiæ and tarsi brown. Wings (Plate 1, fig. 19) slightly teneral, pale brown, variegated by slightly darker clouds and paler areas; the darker clouds include the origin of Rs, cord, outer end of cell 1st M₂, wing tip, and an area in cell R at near midlength; stigma darker brown; veins brown. Venation: Sc very short, Sc₂ ending exactly opposite origin of Rs, Sc₁ shortly before its tip; R₁₊₂ about twice R₂; m-cu a short distance before fork of M.

Abdomen dark brown; hypopygium scarcely brighter. Male hypopygium (Plate 4, fig. 46) with the caudal margin of tergite, 9*t*, gently emarginate, with conspicuous setæ. Basistyle, *b*, with ventromesal lobe very extensive, appearing as a densely setiferous cushion. Dististyle, *d*, with abundant setæ, the pendant tip constricted and blackened. Gonapophyses, *g*, with mesal-

apical lobe long and slender, the extreme tip narrowed and blackened. *Ædeagus*, *a*, depressed, the entire surface with abundant delicate pale setulæ, the apex with two divergent arms.

Habitat.—Japan (Honshiu).

Holotype, male, Yumoto, Shimotsuke, altitude 5,000 feet, August 5, 1934 (*Issiki*).

The nearest ally of the present species is *Limonia* (*Limonia*) *esakii* (Alexander), of Formosa. It is even closer to specimens from Honshiu that I had formerly considered to represent *esakii*, but which I am now compelled to regard as being at least sub-specifically distinct. The present fly differs from the latter specimens in the unvariegated femora and the unusually short *Sc*. The latter feature is quite as in the subgenus *Dicranomyia*, but the structure of the male hypopygium is definitely as in *Limonia*.

LIMONIA (LIMONIA) NITOEI (Edwards).

Limnobia nitoei EDWARDS, Ann. & Mag. Nat. Hist. VIII 18 (1916) 247-248.

Hitherto known only from the unique type male, taken on Arisan, Formosa, altitude 8,000 feet, October 10, 1912, by Nitobe.

Allotype, female, Raisya, Formosa, altitude 3,000 feet, November 24, 1934 (*Issiki*).

Female.—Length, about 8 millimeters; wing, 9.

Differs from the male, as described, only as follows:

Antennæ black throughout. Anterior vertex about as wide as diameter of scape. Mesonotal præscutum with a brown median stripe, additional to the darker lateral stripes. Pleura chiefly intense black, the color involving the ventral anepisternum and all of the sternopleurite, pteropleurite, and pleurotergite, the dorsal anepisternum and dorsopleural region almost entirely yellow. Fore and middle coxæ extensively blackened on outer faces; basal dark ring of femora very narrow and much paler than the black tip. Wings with inner ends of cells 2d *M*₂ and *M*₃ (closing cell 1st *M*₂) about in transverse alignment or with the latter a little closer to the wing base. Dark abdominal rings black or nearly so, involving not only the broad bases but also the adjoining very narrow posterior borders and extreme lateral margins.

LIMONIA (PSEUDOGLOCHINA) MONOCYCLA sp. nov. Plate 1, fig. 20.

Mesonotum brown, the præscutum darker on borders; median region of posterior sclerites of notum pale; flagellar segments with the secondary pubescence much shorter than the verticils;

tibiæ white, each with a single narrow dark ring; wings faintly tinged with brownish yellow; stigma oval, dark brown; Sc long, Sc₁ ending opposite r-m or virtually so; m-cu shortly beyond fork of M; cell 2d M₂ deep; cell 2d A small.

Male.—Length, about 6 to 7 millimeters; wing, 6.5 to 8.

Rostrum brown; palpi black. Antennæ with the scape dark brown, the remainder of organ black; flagellar segments oval, with short but conspicuous apical pedicels to produce a bead-like appearance; longest verticils subequal in length to the segments; secondary pubescence short and inconspicuous; terminal segment longer than the penultimate, the outer end narrowed. Head light fulvous.

Pronotum slightly darkened medially, the sides whitish. Mesonotal præscutum brown medially, bordered laterally by darker brown; scutum dark brown, slightly paler medially; scutellum pale brown, the parascutella darker; mediotergite paler medially than at the sides. Pleura chiefly pale yellow, the ventral sternopleurite dark brown. Halteres dark brown throughout. Legs with the coxæ dark brown, the fore coxæ paler basally; trochanters black; fore femora white, the extreme base and wider apex black; middle femora dusky on basal third, thence paling to dirty white, the tip narrowly black, preceded by a subequal clearer white ring; posterior femora broadly black at both ends, the intermediate half or more only a little paler, brownish black; all tibiæ white, with a narrow black ring just before midlength; tarsi white. Wings (Plate 1, fig. 20) faintly tinged with brownish yellow, cells C and Sc slightly more saturated yellow; stigma oval, dark brown, very conspicuous; veins beyond cord brownish black, basad of cord somewhat paler. Venation: Sc long, Sc₁ ending opposite r-m or virtually so, Sc₂ about opposite fork of Rs; in the paratype figured, Sc is a little shorter; m-cu shortly beyond fork of M; cell 2d M₂ deep, approximately three times its petiole; cell 2d A small but extended, the anal angle weak.

Abdominal tergites chiefly dark brown, the caudal margins restrictedly paler; sternites paler brown, the caudal borders more broadly yellow; hypopygium chiefly pale, the ventral dististyle yellow.

Habitat.—Formosa.

Holotype, male, Kanshirei, altitude 1,500 feet, October 17, 1934 (*Issiki*).

The nearest allies are *Limonia* (*Pseudoglochina*) *angustapicalis* Alexander (Luzon), which differs in the coloration, vena-

tion, and structure of the antennæ, which are longer, with the secondary pubescence of the flagellar segments long and conspicuous; and *L. (P.) uncinctipes* Alexander (Philippines and Borneo), which differs in the wing coloration and venation, as the short Sc, with Sc₁ ending before the fork of Rs.

LIMONIA (PSEUDOGLOCHINA) DIMELANIA sp. nov. Plate 1, fig. 21.

Mesonotal præscutum brown, the anterolateral and cephalic portions white; posterior sclerites of mesonotum dark brown, with a narrow white median line; tibiæ with two narrow black rings; wings strongly suffused with brown, cells C and Sc darker; stigma long-oval, dark brown; Sc₁ ending about opposite midlength of the long Rs, the latter nearly twice the basal section of R₄₊₅; cell 2d M₂ a little longer than its petiole; m-cu at fork of M; vein 2d A long.

Male.—Length, about 6 millimeters; wing, 6.8.

Rostrum dark brown; palpi black. Antennæ relatively short, black throughout; verticils shorter than the oval segments, the latter with short apical pedicels; secondary pubescence relatively long, only a little shorter than the verticils; terminal segment equal in length to the penultimate. Head orange-fulvous.

Pronotum entirely white. Mesonotal præscutum very convex and protuberant, the anterolateral and cephalic portions white, only weakly darkened medially; remainder of mesonotum rather dark brown, with a narrow white median line, beginning beyond midlength of the præscutum, extending caudad to base of abdomen, narrowly bordered throughout its length by more brownish black. Pleura white, the ventral sternopleurite brownish black. Halteres dark throughout. Legs with the fore coxæ and trochanters dark, the remaining coxæ and trochanters pale; middle leg with femora yellow, paling to white on distal third, the tip narrowly and weakly darkened; posterior femora yellow, the posterior fourth or fifth black, the extreme tip pale; forelegs broken; tibiæ white, each with two narrow black rings, the first at near one-fourth the length, the second just beyond midlength; tarsi white. Wings (Plate 1, fig. 21) strongly suffused with brown, cells C and Sc even darker; stigma long-oval, dark brown; a small dark cloud at origin of Rs; veins brown. A few scattered trichia at distal end of vein 1st A; trichia shorter than in *riukiensis*. Venation: Sc₁ ending opposite or just beyond midlength of the long Rs, Sc₂ immediately beyond the origin of the latter; Rs nearly two times the basal section of R₄₊₅; cell 2d M₂ a little longer than its petiole; m-cu at fork of M; vein 2d A long, but still shorter than in *riukiensis*.

Abdomen with the tergites dark brown, the central portions and posterior margins of the intermediate segments a little paler; sternites pale; hypopygium dark.

Habitat.—Formosa.

Holotype, male, Kanshirei, altitude 1,500 feet, October 17, 1934 (*Issiki*).

The nearest ally is *Limonia* (*Pseudoglochina*) *riukiensis* Alexander, which differs most conspicuously in the pattern and venation of the wings.

ANTOCHA (ANTOCHA) PLATYPHALLUS sp. nov. Plate 1, fig. 22; Plate 4, fig. 47.

General coloration of mesonotal præscutum light brown; antennæ short, black throughout; halteres pale throughout; wings with a gray tinge, the veins very pale and scarcely apparent; abdomen dark brown, the hypopygium paler; male hypopygium with the dististyles fused basally; ædeagus and subtending apophyses forming a flattened, depressed phallosome.

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

Rostrum brown; palpi black. Antennæ short, black throughout; flagellar segments oval; terminal segment about one-third longer than the penultimate; verticils a little shorter than the segments. Head brownish gray.

Pronotum dark brown. Mesonotal præscutum with the ground color gray, the disk chiefly covered by three light brown stripes, the median one a little more intensely darkened on cephalic portion; posterior sclerites of notum testaceous-yellow. Pleura testaceous-yellow, weakly infumed on ventral sternopleurite. Halteres pale throughout. Legs with the coxæ and trochanters yellow; remainder of legs pale brown. Wings (Plate 1, fig. 22) with a gray tinge, the prearcular region whitish; veins so pale as to be but little evident against the ground. Venation: R_2 lying a little distad of level of r-m; m-cu shortly before fork of M.

Abdomen dark brown; hypopygium brownish yellow. Male hypopygium (Plate 4, fig. 47) with the dististyles more or less fused on basal fourth, almost superimposed in a position of rest; inner style a little dilated near base. Ædeagus unusually broad, depressed, the apex trilobed, the organ subtended by gonapophyses with acute, mesally directed tips. Inner gonapophyses, *g*, with a short branch, the apex obtusely rounded.

Habitat.—Japan (Honshiu).

Holotype, male, Yumoto, Shimotsuke, altitude 5,000 feet, August, 5, 1934 (*Issiki*).

The coloration of the wings, with pale veins, is much like that of *Antocha* (*Antocha*) *sagana* Alexander, but the structure of the male hypopygium is quite different from that of any regional species so far described.

ERIOPTERINI

GONOMYIA (GONOMYIA) LATIFOLIA sp. nov. Plate 1, fig. 23; Plate 4, fig. 48.

Allied to *foliacea*; rostrum orange-yellow; mesonotal præscutum and scutum dark brown, sparsely pruinose; scutellum clear yellow; pleura pale brown, striped longitudinally with whitish; knobs of halteres weakly darkened; legs brownish black; wings grayish subhyaline, the stigma pale brown; Sc long, Sc₁ ending at about midlength of Rs; m-cu about one-half its length beyond fork of M; abdominal tergites dark brown; male hypopygium with the outer dististyle a flattened, foliaceous blade, the surface sparsely setiferous; inner dististyle with the apical spine acute at tip; ædeagus complex, the ventral margin with several pale spinous points.

Male.—Length, about 4.5 millimeters; wing, 4.8.

Rostrum orange-yellow; palpi dark. Antennæ black throughout. Head gray.

Mesonotal præscutum and scutum dark brown, sparsely pruinose, the humeral region of the former restrictedly brightened; pseudosutural foveæ dark; extreme posterior margin of scutal lobes and anterior half of median area yellow, the posterior half of latter black and heavily pruinose; scutellum clear light yellow, the parascutella dark; mediotergite black, heavily pruinose. Pleura pale brown, striped longitudinally with whitish, the latter including the dorsopleural region and a ventral stripe from behind the fore coxæ to the base of abdomen. Halteres of moderate length only, pale, the knobs weakly darkened. Legs with the coxæ and trochanters brown; remainder of legs brownish black. Wings (Plate 1, fig. 23) grayish subhyaline, the prearcular region narrowly yellowish; stigma pale brown, ill-delimited; veins brownish black. Costal fringe of moderate length. Venation: Sc₁ ending almost opposite midlength of Rs, Sc₂ close to its tip; m-cu about one-half its length beyond fork of M.

Abdominal tergites dark brown, the outer sternites somewhat paler. Male hypopygium (Plate 4, fig. 48) with the outer dististyle, *od*, a flattened foliaceous blade, much as in *foliacea*, the tip exceedingly acute; surface of style with setæ small and reduced in number, the mesal edge quite glabrous. Inner disti-

style, *id*, almost as long, complex in structure, as shown by the figure; outer arm blackened and acute at tip, nearer base with two spinous points and a powerful black spinous seta; inner lobe with two fasciculate bristles. Gonapophyses, *g*, blackened, the two together appearing more or less lyriform, the outer margin of each with a small acute spine, much as in *bibarbata*. Ædeagus, *a*, complex, the ventral margin with several pale spinous points that are not present in *foliacea*.

Habitat.—Formosa.

Holotype, male, Kanshirei, altitude 1,500 feet, October 19, 1934 (*Issiki*).

The nearest relative is *Gonomyia* (*Gonomyia*) *foliacea* Alexander (Formosa), which differs in the coloration of the thorax and legs and in the structure of the male hypopygium, especially the inner dististyle and ædeagus.

GONOMYIA (LIPOPHLEPS) PRÆDITA sp. nov. Plate 1, fig. 24.

Belongs to the *abbreviata* group; most nearly allied to *gracilistylus*; wings gray, without brown tinge, narrow, the anal cells correspondingly restricted; vein R_3 with macrotrichia throughout its length.

Female.—Length, about 4.5 millimeters; wing, 4.8.

Rostrum brown; palpi black. Antennæ dark throughout; flagellar segments elongate, the verticils relatively long and conspicuous (for the female sex). Head dark.

Pronotum yellow. Mesonotal præscutum pale brown, sparsely pruinose, the humeral region yellow; pseudosutural foveæ pale; posterior sclerites of notum paler, the scutellum yellow, dusted with whitish pollen. Pleura chiefly pale, the anepisternum somewhat darkened. Halteres moderately elongate, the stem pale, the knob weakly darkened. Wings (Plate 1, fig. 24) tinged with gray, the stigmal region undarkened; veins pale brown; wings much narrower than in *gracilistylus*, the cells correspondingly narrowed, most evident in the anal field. Vein R_3 with macrotrichia throughout its entire length. Venation: R_s angulated and spurred at origin; distance on costa between tips of veins R_{1+2} and R_3 about equal in length to the latter vein.

Abdominal tergites brown, the sternites more yellowish. Ovipositor with the valves long and slender, especially the cerci.

Habitat.—Formosa.

Holotype, female, Kanshirei, altitude 1,500 feet, October 17, 1934 (*Issiki*).

The nearest relative of the present fly is *Gonomyia* (*Lipophleps*) *gracilistylus* Alexander (Japan: Honshiu, Kiushiu), which differs in the broad, strongly tinted wings and details of trichiation. The male sex in this group of species offers unusually strong characters, and it may be expected that additional structures will be available when the male of the present insect is discovered. I formerly placed the members of this group in the subgenus *Gonomyia*, but now follow Edwards⁷ in considering the *abbreviata* group as being more correctly placed in *Lipophleps*.

⁷ Journ. Fed. Malay St. Mus. 14 (1928) 103.

ILLUSTRATIONS

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

PLATE 1

- FIG. 1. *Ctenacroscelis ignicaudatus* sp. nov., venation.
 2. *Ctenacroscelis quadrifasciculatus* sp. nov., venation.
 3. *Tipula* (*Arctotipula*) *miyadai* sp. nov., venation.
 4. *Tipula* (*Schummelia*) *stipata* sp. nov., venation.
 5. *Tipula* (*Lunatipula*) *justa* sp. nov., venation.
 6. *Nephrotoma integra* sp. nov., venation.
 7. *Nephrotoma esakii* Alexander, venation.
 8. *Nephrotoma serristyla* sp. nov., venation.
 9. *Nephrotoma profunda* sp. nov., venation.
 10. *Nephrotoma bifascigera* sp. nov., venation.
 11. *Nephrotoma sublamellata* sp. nov., venation.
 12. *Nephrotoma chosensis* sp. nov., venation.
 13. *Nephrotoma martynovi* sp. nov., venation.
 14. *Nephrotoma daisensis* sp. nov., venation.
 15. *Nephrotoma catenata* sp. nov., venation.
 16. *Nephrotoma atrostyla* sp. nov., venation.
 17. *Limonia* (*Libnotes*) *perparvuloides* sp. nov., venation.
 18. *Limonia* (*Limonia*) *edura* sp. nov., venation.
 19. *Limonia* (*Limonia*) *juvenca* sp. nov., venation.
 20. *Limonia* (*Pseudoglochina*) *monocycla* sp. nov., venation.
 21. *Limonia* (*Pseudoglochina*) *dimelania* sp. nov., venation.
 22. *Antocha* (*Antocha*) *platyphallus* sp. nov., venation.
 23. *Gonomyia* (*Gonomyia*) *latifolia* sp. nov., venation.
 24. *Gonomyia* (*Lipophleps*) *prædita* sp. nov., venation.

PLATE 2

- FIG. 25. *Ctenacroscelis ignicaudatus* sp. nov., five basal segments of antennal flagellum, male.
 26. *Ctenacroscelis ignicaudatus* sp. nov., male hypopygium, details.
 27. *Ctenacroscelis ignicaudatus* sp. nov., male hypopygium, details.
 28. *Ctenacroscelis libertus* sp. nov., male hypopygium, details.
 29. *Ctenacroscelis quadrifasciculatus* sp. nov., five basal segments of antennal flagellum, male.
 30. *Ctenacroscelis quadrifasciculatus* sp. nov., male hypopygium, details.
 31. *Ctenacroscelis regius* sp. nov., five basal segments of antennal flagellum, female.
 32. *Tipula* (*Arctotipula*) *miyadai* sp. nov., male hypopygium, details.
 33. *Tipula* (*Schummelia*) *stipata* sp. nov., male hypopygium, details.
 34. *Tipula* (*Lunatipula*) *justa* sp. nov., male hypopygium, details.

PLATE 3

- FIG. 35. *Nephrotoma integra* sp. nov., male hypopygium, details.
36. *Nephrotoma esakii* Alexander, male hypopygium, details.
37. *Nephrotoma serristyla* sp. nov., male hypopygium, details.
38. *Nephrotoma profunda* sp. nov., male hypopygium, details.
39. *Nephrotoma bifascigera* sp. nov., male hypopygium, details.
40. *Nephrotoma bifascigera* sp. nov., male hypopygium, details.

PLATE 4

- FIG. 41. *Nephrotoma sublamellata* sp. nov., male hypopygium, details.
42. *Nephrotoma chosensis* sp. nov., male hypopygium, details.
43. *Nephrotoma martynovi* sp. nov., male hypopygium, details.
44. *Nephrotoma atrostyla* sp. nov., male hypopygium, details.
45. *Limonia* (*Libnotes*) *perparvuloides* sp. nov., male hypopygium.
46. *Limonia* (*Limonia*) *juvenca* sp. nov., male hypopygium.
47. *Antocha* (*Antocha*) *platyphallus* sp. nov., male hypopygium.
48. *Gonomyia* (*Gonomyia*) *latifolia* sp. nov., male hypopygium.

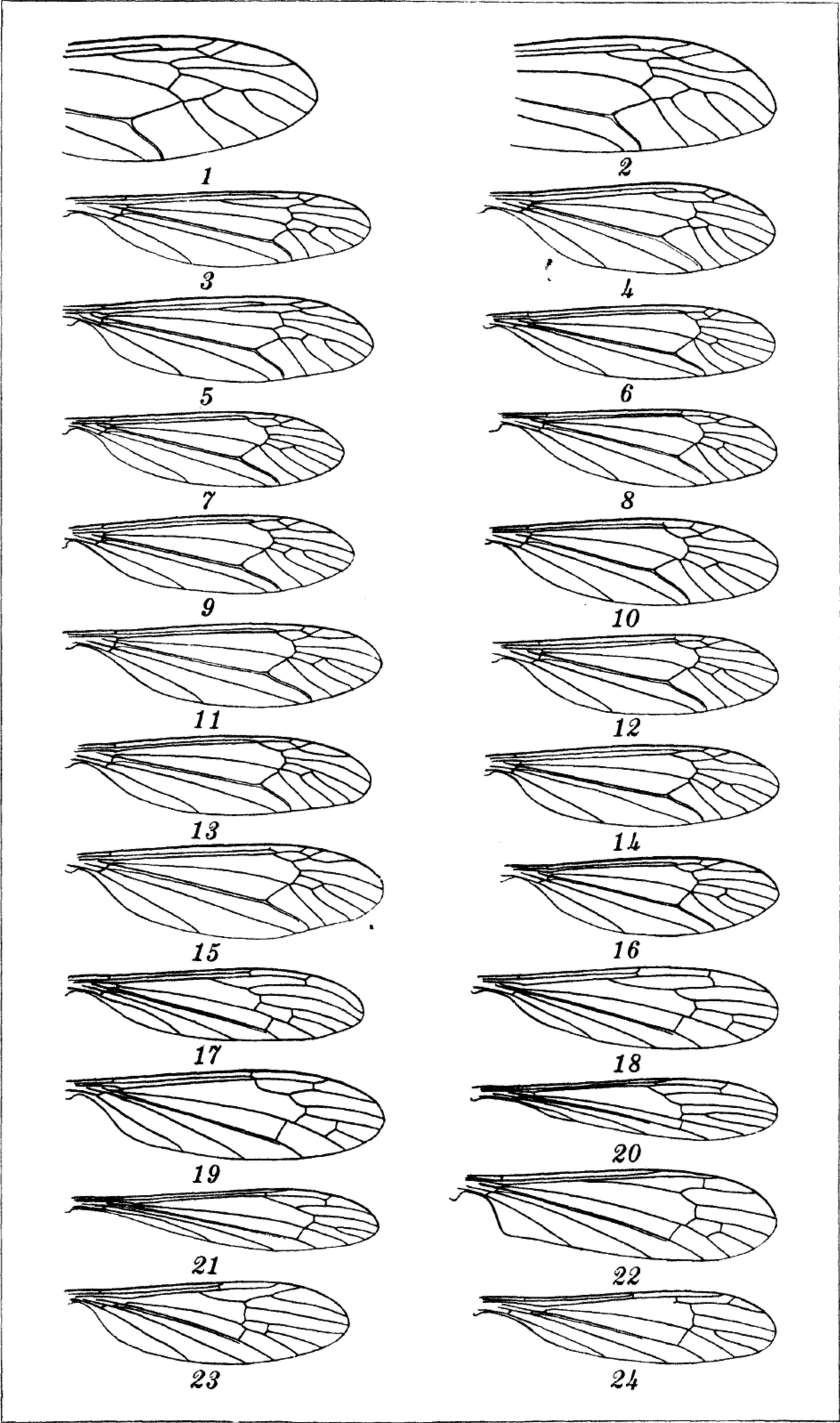


PLATE 1.



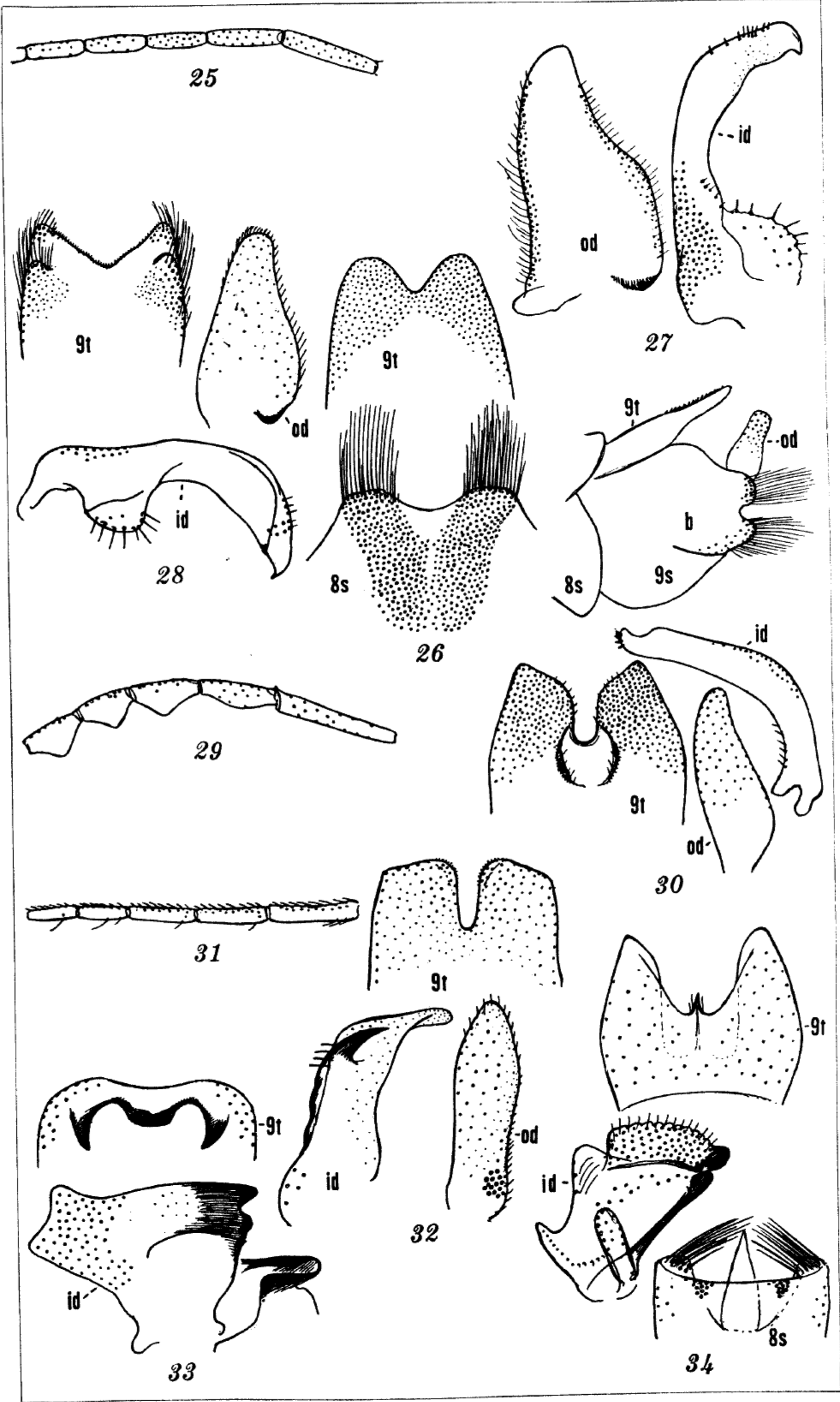


PLATE 2.

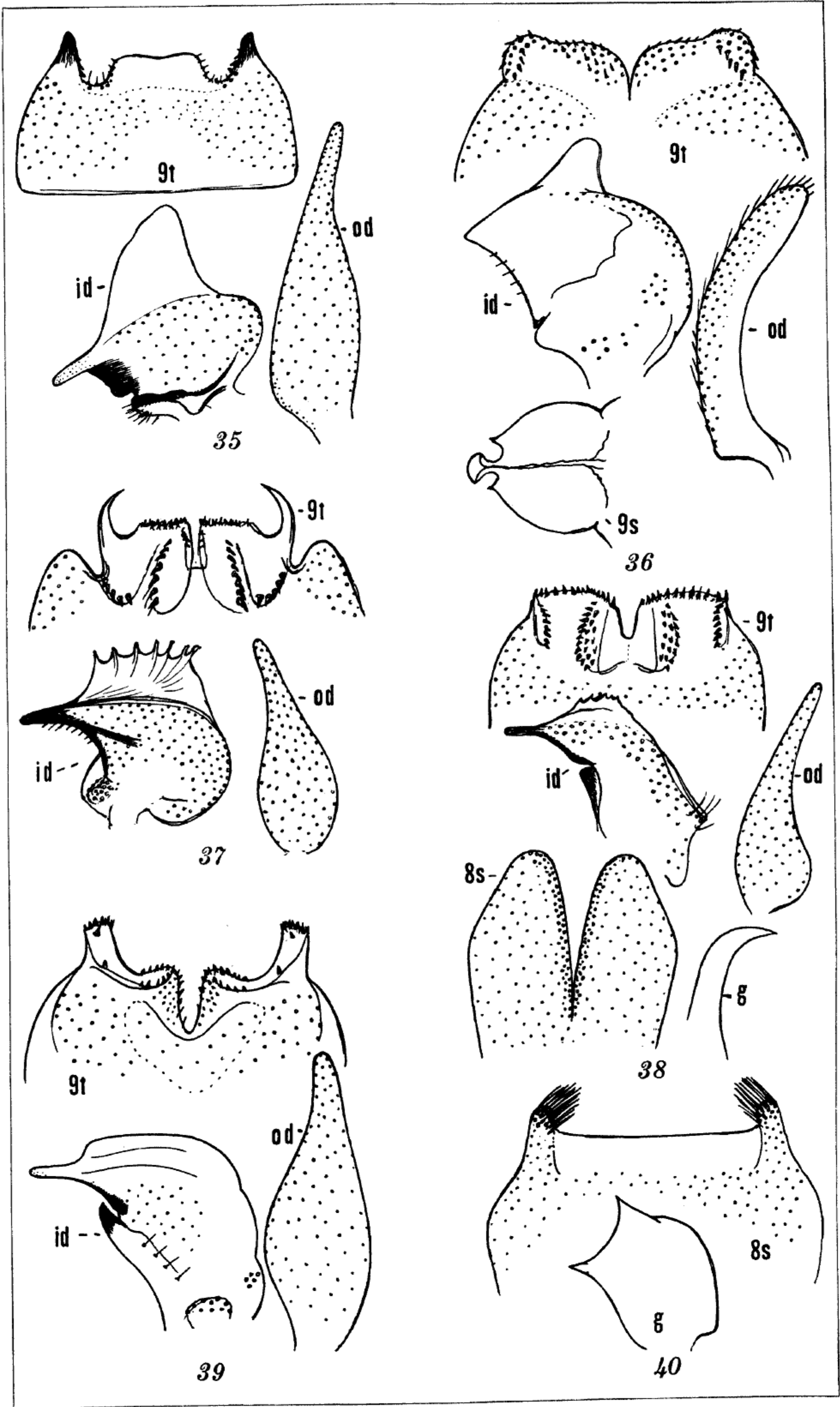


PLATE 3.

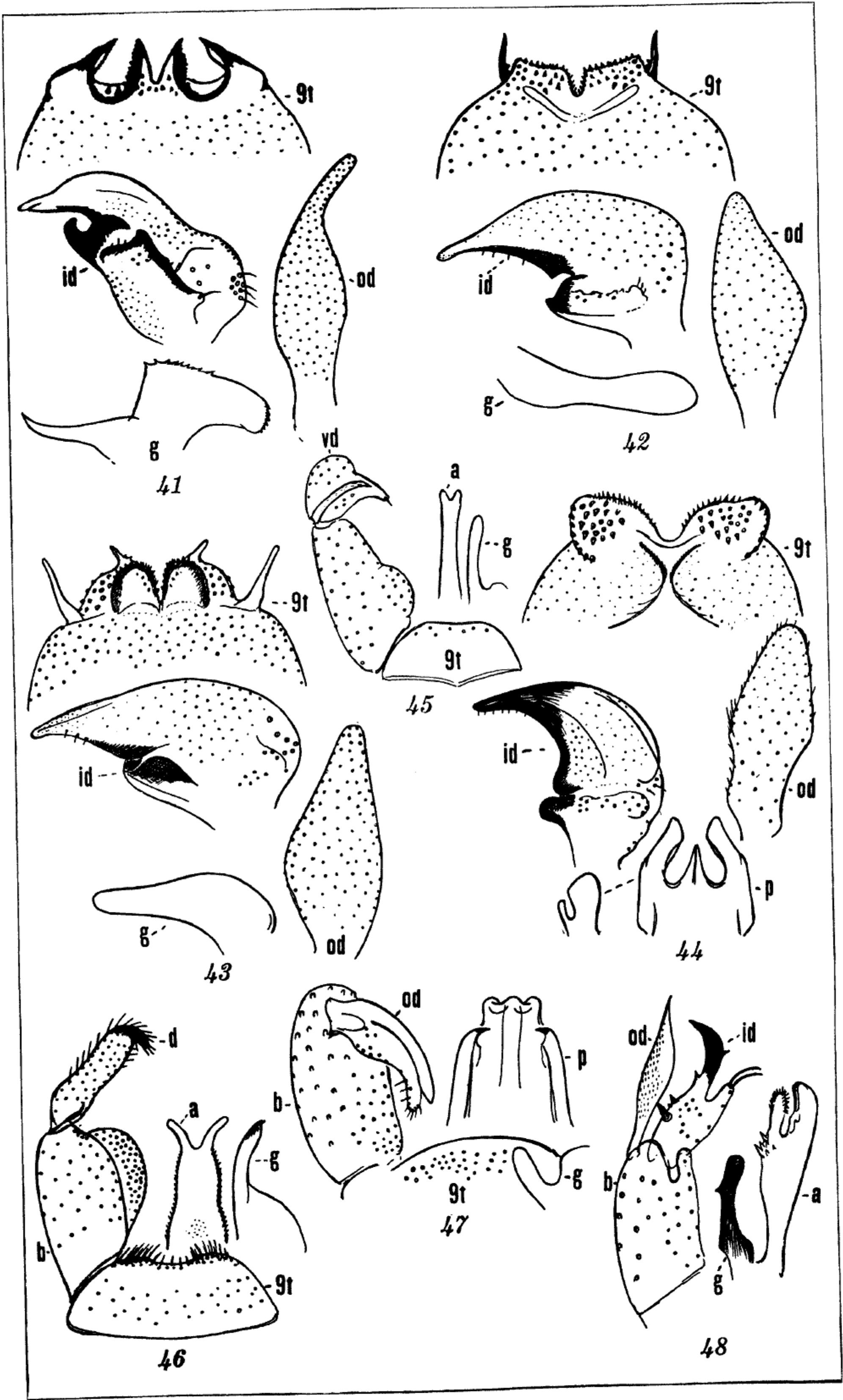


PLATE 4.