

NEW OR LITTLE-KNOWN TIPULADÆ FROM EASTERN  
ASIA (DIPTERA), XLVIII

BY CHARLES P. ALEXANDER  
*Amherst, Massachusetts*

Separate from  
THE PHILIPPINE JOURNAL OF SCIENCE  
Published by the National Institute of Science and Technology,  
Manila, Philippines

VOLUME 90, No. 1, MARCH, 1961

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

BY CHARLES P. ALEXANDER  
*Amherst, Massachusetts*

## FOUR PLATES

In this paper I am continuing the discussion of species of crane-flies taken in the Himalayas of northern India by Dr. Fernand Schmid. The species described belong to the subfamily Tipulinæ and virtually all to the genus *Tipula* Linnæus which is strikingly developed throughout mountainous eastern and central Asia. I am very deeply indebted to Dr. Schmid for his continued interest in collecting these flies, the types of which are preserved in my personal collection.

## TIPULINÆ

**CTENACROSCELIS PEROBTUSUS** sp. nov.

Plate 1, fig. 11.

*Male*.—Length, about 33 millimeters; wing, 37; antenna, about 4.

*Female*.—Length, about 36 to 37 millimeters; wing, 34.5 to 36; antenna, about 4.

Allied to *Ctenacroscelis majesticus* (Brunetti), *C. dorsopleuralis* Alexander, and *C. dorsopleuralis surya* Alexander, differing from all especially in the structure of the male hypopygium.

Darkened pleural stripe narrow but clearly evident, lacking in *majesticus*; broadest on propleura, extending across the extreme dorsal pleurites to the wing root. Mesonotal præscutum with a conspicuous orange area before the suture, as in *majesticus*. Wings with the ground darker than in *majesticus*, the oblitative area before the stigma distinct. Male hypopygium (Plate 1, fig. 11) with the lobes of the tergite, *t*, very narrowly obtuse at tips, each densely covered with black setæ that extend almost to the apex of lobe, central area and margin with very short setulæ, emargination broad; no lateral hair brushes, as in *dorsopleuralis*. Outer dististyle, *d*, very broad, its apex unusually obtuse, not truncated; greatest width on basal half,

approximately two-thirds the length; setæ chiefly on basal half, the discal ones stout, outer setæ small and sparse. Inner dististyle with the basal enlargement low and obtuse, with few setæ; some distance back from tip on lower margin with a conspicuous dilation; apex produced ventrad into a sclerotized spine. Eighth sternite, *8s*, with the lobes low and obtuse, setæ very abundant, of moderate length only, when compared with *dorsopleuralis surya*; setal areas continued cephalad from the lobes onto the main body of sternite.

I have a homotype of *majesticus* that was compared with the type of *majesticus* by Edwards (Shillong, Assam). The hypopygium differs from that of the present fly in the following regards. Tergal lobes broadly obtuse at tips, the emargination narrowly U-shaped. Outer dististyle longer and narrower in proportion to its width, the length exceeding twice the diameter. Inner dististyle distinct, beyond midlength gradually dilated, thence narrowed to the blunt unarmed tip, with no marginal expansion. Central area of eighth sternite produced, very shallowly emarginate, forming two small lobes that bear relatively few long setæ.

*Habitat*.—Sikkim.

Holotype, male, Chongpung, altitude 4,920 feet, September 27, 1959 (*Schmid*). Allotype, female, Manu, altitude 4,920 feet, May 10, 1959 (*Schmid*). Paratype, female, Lingdok, altitude 4,600 feet, May 7, 1959 (*Schmid*).

**CTENACROSCELIS NIRVANA** sp. nov.

Plate 1, fig. 12.

Belongs to the *albovittatus* group; antennæ orange, terminal segment black; mesonotal præscutum with four brownish gray stripes that are narrowly bordered by darker; pleura brownish yellow with a dark brown dorsal stripe; femora yellow, tips broadly blackened, tarsi black, terminal segment orange, claws bidentate; wings weakly infuscated, restrictedly patterned with still darker areas; male hypopygium with the tergite long, posterior border broadly emarginate, lateral lobes narrow, with short setæ; outer dististyle expanded distally, the outer edge emarginate to the style appears shallowly forked; inner dististyle complex in structure, provided with outer points and blades; eighth sternite broad, with a triangular central setiferous area.

*Male*.—Length, about 21 millimeters; wing, 25; antenna, about 3.1.

Frontal prolongation of head elongate, dark brown, narrowly paler at base; nasus blackened, slender, with few setæ; palpi brownish black, second segment slightly paler. Antennæ with scape and pedicel pale yellow, remainder more orange-yellow, terminal segment abruptly black; flagellar segments subcylindrical, the verticils unusually small, on the more proximal segments scarcely one-fourth the length of the segment, a short dense pale pubescence additional to the verticils. Head dark brown, front and very narrow orbits obscure yellow; narrowest part of anterior vertex and sides of occipital area restrictedly darker; vertical tubercle far cephalad, tumid, narrowly impressed medially.

Cervical region pale yellow above, black on sides. Pronotum dark brown. Mesonotal præscutum with the interspaces obscure orange, disk with four brownish gray stripes that are narrowly bordered by darker brown, humeral region medium brown, lateral borders paler; scutum light brown, each lobe with two brownish gray areas that are narrowly bordered by brown, separated in front by a triangular yellow, somewhat as in *fumipennis*; scutellum brown, with long yellow setæ, narrowly yellowed on the delimited posterior border; mediotergite brownish gray, posterior third and lateral borders more ochreous; pleurotergite brownish yellow, katapleurotergite with long yellow setæ. Pleura brownish yellow, with a narrow but conspicuous dark brown longitudinal stripe, broadest on cervical region, narrowed posteriorly, ending opposite the origin of the wings, the adjoining dorsopleural membrane conspicuously light yellow, becoming darker above; meron yellow, banded with pale brown. Halteres dark brown, base of stem not brightened. Legs with coxæ pale brown basally, the tips broadly pale yellow, all with long pale setæ; trochanters obscure yellow; femora yellow, tips broadly blackened; tibiæ light yellow, tips narrowly darkened; tarsi orange, outer segments passing into black, terminal segment orange: claws bidentate, including an acute basal spine and a broad obtuse tooth at near midlength. Wings weakly darkened, paler at tip and on posterior half; prearcular and costal regions darker; stigma brown; restrictedly darkened seams on m-cu, outer end of cell 1st  $M_2$  and adjoining veins and on 1st A; veins brownish yellow, darker in the patterned parts.

Veins unusually glabrous, trichia lacking on virtually all veins expecting C and outer parts of R and R<sub>1</sub>. Venation: Both R<sub>1+2</sub> and R<sub>3</sub> strongly upcurved, especially the distal third of the latter; petiole of cell M<sub>1</sub> about one-half longer than m; m-cu long, gently sinuous, before one-third the length of M<sub>3+4</sub>.

Abdominal tergites medium brown, unpatterned; basal sternites more yellowed, vaguely patterned with pale brown; outer segments darkened. Male hypopygium (Plate 1, fig. 12) with the tergite, *t*, elongate, posterior border broadly emarginate, produced into long narrow lateral lobes, provided with short setæ, the border with very dense microscopic setulæ; center of disk back from the border more or less tumid. Outer dististyle, *d*, pale, expanded outwardly, the lower margin sclerotized, terminating in a short point, the upper angle rounded, the apex conspicuously emarginate to appear shallowly forked; setæ small and sparse. Inner dististyle very irregular in form, as shown; outer half with the beak bilobed, the upper lobe stouter; outer crest with a triangular flattened blade. Gonapophysis appearing as an oval glabrous dark-colored blade. Eighth sternite, 8s, broad, widened outwardly; central area of posterior border fringed with yellow setæ; central part of sternite with a large triangular area of similar setæ, the point of the area directed backward, not quite reaching midlength of the segment. Eighth tergite transverse, the outer lateral parts with very abundant delicate setæ; median area with a restricted group of longer hairs.

*Habitat*.—Sikkim.

Holotype, male, Teng, altitude 4,600 feet, May 12, 1959 (*Schmid*).

The most similar described species is *Ctenacroscelis fumipennis* (Brunetti), the hypopygium of which has equally but quite different complex inner dististyles. The emarginate tergite and outer dististyle of the present fly provided strong specific characters.

**TIPULA (BELLARDINA) ARJUNOIDES** sp. nov.

Plate 2, fig. 13.

Generally similar to *arjuna*; male hypopygium with the tergal lobes low, densely setiferous; from base of median emargination of tergite arises a conspicuous furcula; outer dististyle including a flattened outer blade and two smaller lobes at near mid-

length, all variously fringed with setæ; inner style a flattened glabrous paddlelike blade.

*Male*.—Length, about 22 millimeters; wing, 23.

Frontal prolongation of head dark cinnamon brown, the outer dorsal part, with the nasus, blackened; palpi black (outer segments broken). Antennæ with scape and pedicel light yellow; flagellum broken. Head brownish gray, more buffy on the low vertical tubercle; sides of genæ and a narrow central line on posterior vertex dark brown.

Pronotum broadly dark brown, abruptly light yellow on sides. Mesonotum almost uniformly dark brown, the præscutum with four scarcely differentiated stripes that are narrowly bordered by still darker, the lateral borders slightly darker; scutal lobes similarly vaguely patterned with darker brown, scutellum and postnotum slightly more pruinose. Pleura dark brown, broadly light gray behind, including the dorsal sternopleurite, ventral pteropleurite, katapleurotergite, metapleura and dorsal meron; dorsopleural region broadly and very conspicuously light yellow. Halteres infuscated, base of stem and apex of knob obscure yellow. Legs with coxæ medium brown basally, buffy gray outwardly; trochanters buffy yellow, darkened apically beneath; femora yellow, tips abruptly black, narrow but very conspicuous; tibiæ yellow, tips more narrowly dark brown; tarsi obscure yellow, outwardly passing into dark brown; claws toothed. Wings light brown, restrictedly patterned with yellow areas, including prestigmal and poststigmal brightenings, the latter continued backward across the base of cell  $R_2$  into cell  $R_5$ ; yellow marginal areas in centers of cells  $R_5$  through 1st A, the tips of the intervening veins darkened; basad of cord with yellow areas before origin of  $R_s$ , at near two-thirds cell M, crossing into cell Cu, and near the basal third of cells Cu and 1st A; slightly darker brown areas include the stigma, a small spot at origin of  $R_s$ , outer end of cell 1st  $M_2$ , and in cell M before and beyond the brightened area; veins yellow, including the darkened areas. Outer ends of veins beyond cord with small macrotrichia, sparse or lacking on proximal end of  $R_{4+5}$ ; basad of cord trichia more sparse but extending basad almost to arculus, including a series on the prearcular anal vein. Venation: Cell  $M_1$  deep, its petiole about one-third m; m-cu on  $M_4$  shortly beyond the vertical basal section.

Abdomen reddish yellow basally, basal tergite and lateral borders of succeeding segments restrictedly darker brown, hypopygium yellow. Male hypopygium (Plate 2, fig. 13) with the tergite, *t*, transverse, posterior margin with a U-shaped notch, forming broad thickened lobes that are provided with abundant long setæ; from base of notch protrudes a conspicuous furcula. Outer dististyle, *d*, large, extended into a flattened blade, at near midlength with two smaller lobes or blades, all with strong setæ, basal part extended outwardly into a point or narrow blade. Inner dististyle slightly smaller, appearing as a flattened glabrous paddlelike blade, its tip obtuse, rectangularly bent beyond base; margin of proximal half with long yellow setæ, the outer ones smaller.

*Habitat*.—Pakistan.

Holotype, male, Surgun Sur, Northwest Frontier Province, altitude 6,875 feet, July 29, 1953 (*Schmid*).

Although generally similar to *Tipula* (*Bellardina*) *arjuna* Alexander, the present fly is quite distinct in the hypopygial structure, including especially the tergite and dististyles.

**TIPULA (BELLARDINA) DYROPE** sp. nov.

Size relatively large (wing of female 22 millimeters); mesonotal præscutum dark brown, with four paler stripes, the intermediate pair yellowed; wings strongly infuscated, especially beyond the cord, restrictedly patterned with pale yellow; veins beyond cord with abundant macrotrichia; petiole of cell  $M_1$  long.

*Female*.—Length, about 19 millimeters; wing, 22; antenna, about 3.5.

Frontal prolongation of head long, slightly exceeding the remainder, brown throughout, without nasus; palpi with first and last segments black, intermediate ones brown, with pale incisures. Antennæ brownish black, pedicel yellow; basal enlargements of flagellar segments slightly developed; longest verticils exceeding the segments. Head with front and sides of vertical tubercle cinnamon brown, remainder of head much darker; vertical tubercle high, slightly emarginate at midlength.

Pronotal scutum dark brown, pale on sides, scutellum more yellowish brown. Mesonotal præscutum with ground dark brown, with four paler stripes, the intermediate pair more yellowed;

setæ of interspaces long and conspicuous; scutal lobes brown, central area more grayish brown; posterior sclerites of notum brownish gray, scutellum darkened on either side at base, mediotergite similarly darkened laterally; scutellum and mediotergite with very long pale setæ. Pleura chiefly dark brown; dorsopleural region buffy. Halteres with stem yellow, knob infuscated. Legs with coxæ dark brown, trochanters paler; remainder of legs yellowish brown, outer segments darker, tarsi black; tibial spurs long and slender. Wings strongly infuscated, especially beyond cord, very restrictedly patterned with pale yellow; prearcular and costal fields yellow; yellow areas include prestigmal and poststigmal brightenings, the latter barely indicated in cells  $R_3$  and  $R_5$ ; small clearly defined marginal spots in cells  $R_3$  to  $M_4$ , largest in the radial cells; no subterminal brightenings in radial field; basad of cord with very restricted brightenings in cell M, two in cell Cu, and one in 1st A; a narrow yellow line in cell 2nd A adjoining the vein, but without other pale marks; conspicuous more whitened oblitative marks before stigma, outer end of cell R, and in cell 1st  $M_2$ ; arculus restrictedly whitened; veins yellowish brown, more yellowed in the brightened fields. Veins beyond cord with abundant macrotrichia, lacking on bases of  $M_3$  and  $M_1$ ; basad of cord with trichia over the entire length of Sc, M and 1st A, lacking on most of Cu, and the restricted base of 2nd A; prearcular anal vein with trichia. Venation: Petiole of cell  $M_1$  long, subequal to m; cell 1st  $M_2$  short-pentagonal, m subtransverse; m-cu at fork of  $M_{3+4}$ .

Abdominal tergites reddish yellow, the lateral borders narrowly blackened; sternites more reddened, the posterior and lateral borders of the outer segments darkened. Ovipositor with cerci straight and relatively slender, tips subacute.

*Habitat*.—Sikkim.

Holotype, female, Yumtang, altitude 12,140 feet, June 27, 1959 (*Schmid*).

*Tipula (Bellardina) dryope* superficially is generally similar to *T. (B.) oenone* sp. nov., differing from this and other allied species in the greatly reduced yellow pattern of the wings. The trichiation of the wing veins of the present fly is quite different from that found in *oenone*.



**TIPULA (BELLARDINA) LITHOSTROTA sp. nov.**

Plate 2, fig. 14.

Size medium (wing 21 millimeters); mesonotal præscutum buffy, patterned with gray and brown; nasus lacking; basal flagellar segments bicolored, the outer passing into black; wings with a tessellated yellow and light brown pattern; male hypopygium with the tergite terminating in two spinulose lobes, with further ventral armature; outer dististyle angularly bent at near midlength, with a conspicuous subtriangular lobe.

*Male*.—Length, about 20 millimeters; wing, 21; antenna, about 4.

Frontal prolongation of head light brown, darker basally above, without nasus; palpi light brown, terminal segment black. Antennæ with scape obscure yellow, above with four transverse impressions; pedicel clear light yellow; basal flagellar segments bicolored, dark brown to black on the relatively small basal enlargement, the outer end obscure yellow, the latter becoming more obscured outwardly, on the sixth or seventh segment passing into black; longest verticils about one-half longer than the segment. Head buffy, patterned with brown on central part of vertex, including the conspicuous entire tubercle; a small brown spot laterad of antennal fossa; posterior orbits broadly paler brown; sides of vertical tubercle somewhat clearer yellow.

Pronotum brown, patterned with buffy, the scutum with conspicuous black and yellow setæ. Mesonotal præscutum with the ground restrictedly buffy, disk with four stripes, including a greenish gray intermediate pair, the borders brown, confluent posteriorly; lateral stripes appearing almost uniformly brown because of the very broad margins, each stripe further encircled by a narrow yellow ring; lateral præscutal margins strongly darkened, humeral region less evidently so; interspaces with conspicuous erect setæ; scutal lobes greenish gray, each with two brown areas that are bordered internally by darker, central region darker brown posteriorly; scutellum gray, with a central brown vitta and sparse brown setigerous punctures, parascutella light brown; mediotergite buffy yellow, with a capillary brown central line and a more diffuse brown area on either side of anterior half; scutellum and mediotergite with conspicuous black setæ; pleurotergite yellowed to reddish brown, the elevated katapleurotergite more silvery pruinose. Pleura buffy brown, including the anterior dorsopleural region; a broad darker brown longitudinal stripe beginning on propleura, wid-

ened behind, more pruinose on the pteropleurite. Halteres yellow, base of knob weakly darkened. Legs with coxæ buffy yellow, freckled with abundant brown setigerous punctures; trochanters yellow; femora reddish yellow, tips narrowly brownish black; tibiæ slightly darker, the tips gradually passing into black; tarsi black; claws of male with a small tooth. Wings with the ground light yellow, costal region clearer yellow, unpatterned; a conspicuous light brown zigzag pattern, as in various allied species, before the cord with a central area before midlength of basal cells, bordered on either side by a subequal band of the ground color; darker brown areas at arculus, origin of Rs, cord and outer end of cell 1st  $M_2$ ; stigma brownish yellow, inconspicuous; beyond cord with nearly the outer half of cell  $R_5$  yellowed, all outer medial cells with a central yellow marginal spot, poststigmatal pale area relatively extensive; veins brown, Sc, R and both branches of Cu more yellowed. Macrotrichia of veins relatively small and sparse, beyond cord lacking on  $R_{2+3}$ , all but base of  $R_{1+2}$ ,  $R_3$ ,  $M_2$ ,  $M_3$  and  $M_4$ ; lacking on basal third of  $R_{4+5}$  and  $M_1$ ; trichia on outer third of basal section of basal section of  $Cu_1$  and all of second section; present on outer half of 2nd A but virtually lacking on 1st A; strong trichia on prearcular anal vein. Venation: Cell  $R_3$  strongly narrowed at midlength; petiole of cell  $M_1$  shorter than m; m-cu at near three-fourths to four-fifths  $M_{3+4}$ .

Abdomen brownish yellow, basal tergite infuscated, bases of succeeding tergites narrowly brownish black, the outer margins narrowly buffy; seventh and eighth segments more brownish black; hypopygium dark reddish brown. Male hypopygium (Plate 2, fig. 14) with the tergite, *t*, narrowly produced into two low blackened lobes, separated by a very shallow emargination, bearing short black setæ, on ventral surface and nearer the midline more concentrated; cephalad of these setæ on ventral surface with a bifid sclerotized plate; lateral margins of ventral surface broadly infolded. Outer dististyle, *d*, angularly bent at midlength into a flattened paddle, its apex broadly obtuse; at bend with a conspicuous triangular lobe. Inner dististyle smaller, angularly bent at near one-fourth the length, expanded outwardly, margins strongly infolded, apex obliquely truncate.

*Habitat*.—Sikkim.

Holotype, male, Gey, altitude 11, 650 feet, in *Rhododendron* association, May 18, 1959 (*Schmid*).

The most similar species is *Tipula* (*Bellardina*) *tesselatipennis* Brunetti, which has the tergal armature of the hypopygium somewhat the same but differs in the ventral plates and structure of the dististyles. I have re-described the types of *tesselatipennis* in another paper [Rec. Indian Mus. 44 (1942) 36-37, fig. 2]. It should be noted that the nasus in this species is short but evident.

**TIPULA (BELLARDINA) OENONE sp. nov.**

Plate 2, fig. 15.

Size large (wing of male 25 millimeters); general coloration of thorax brown and gray; frontal prolongation of head long, without nasus; wings brownish gray, with a restricted yellow pattern that does not include the arcular region or cell 2nd A; male hypopygium with the posterior border of tergite glabrous, subtruncate; outer dististyle trilobed.

*Male*.—Length, about 20 millimeters; wing, 25; antenna, about 5.7.

*Female*.—Length, about 22 millimeters; wing, 17; antenna, about 3.3.

Frontal prolongation of head elongate, subequal to the remainder, dark brown, without nasus, palpi black, a trifle longer than the prolongation. Antennæ with scape yellowish brown, pedicel brown, apex broadly yellow; flagellum dark brown, passing into brownish black, the apices of the proximal three or four segments paler; flagellar segments strongly incised, the basal enlargement conspicuous; verticils longer than the segments. Head brown, the low vertical tubercle more pruinose, with a chestnut brown area on either side adjoining the eye.

Pronotum brown, the protuberant central area of the scutum blackened. Mesonotal præscutum virtually covered by three brown stripes, darker in the allotype; in type, the central stripe paler brown, interspaces with long pale setæ; scutal lobes chestnut brown, central area paler; scutellum brownish gray, with long yellow setæ; mediotergite brownish gray, with a central darkened vitta, pleurotergite brown, the narrow elevated katapleurotergite more blackened. Pleura dark brown, variegated with brownish gray on the dorsal sternopleurite, posterior sclerites similar; sternopleurite and meron with long yellow setæ. Halteres with stem obscure yellow, knob slightly darkened.

Legs with coxæ and trochanters brownish gray; femora light brown, tips narrowly and inconspicuously darker; tibiæ reddish brown, tarsi passing into brownish black; claws of male with a basal tooth. Wings with the ground brownish gray, prearcular and costal regions more yellowed; a restricted yellow pattern, including a zigzag band across the cells basad of the cord, extending from before the stigma across R and M into cells Cu and 1st A, not including 2nd A; a series of small marginal spots in cells  $R_5$  to  $M_4$ , the last small; subterminal brightenings in cells  $R_3$  and  $R_5$ , connecting with the marginal area in cell  $R_3$  to form a more or less evident T-shaped mark; stigma and areas at origin of Rs and over anterior cord darker brown; oblitative areas before and beyond stigma and across cell 1st  $M_2$  more whitened; veins yellow. Veins unusually glabrous, with scattered macrotrichia on  $R_{2+3}$ , outer half of  $R_{4+5}$  and distal end of  $M_1$ ; basad of cord with very few trichia on outer end of M and anal veins; a strong series on prearcular anal vein; squama with long trichia. Wings of female smaller than in male, as shown by measurements, the outer veins even more glabrous. Venation: Rs arcuated basally; cell  $M_1$  short-petiolate, especially in female where the petiole is virtually lacking.

Abdomen dark chestnut brown, lateral tergal border blackened, posterior margins narrowly pale, outer segments more uniformly blackened; in female, ovipositor with both cerci and hypovalvæ blackened, relatively long. Male hypopygium (Plate 2, fig. 15) with the posterior border of tergite, *t*, subtruncate, the margin with two low lobes on either side of midline; ventral armature including longitudinal thickenings and pale circular membranous cushions that are very densely provided with microscopic setulæ. Ninth sternite with a group of long setæ. Outer dististyle, *d*, trilobed, the outer lobe a long simple rod, its tip acute, inner arm bilobed, one blade smaller, subglabrous, with small setæ only, the larger arm with numerous long yellow setæ. Inner dististyle massive, the triangular beak short; dorsal crest with numerous strong black setæ and a compact group of sensory pits. Gonapophyses long and narrow.

*Habitat*.—Sikkim.

Holotype, male, Chumzomoi Choka, altitude 11,800 feet, in *Rhododendron* association, July 8, 1959 (*Schmid*). Allotopotype, female, pinned with type.

Generally similar regional species, such as *Tipula* (*Bellardina*) *gregoryi* Edwards and *T. (B.) waltoni* Edwards, evidently are not closely allied to the present fly since they possess a nasus. The larger forms that similarly lack the nasus, including *T. (B.) brunettiana* Alexander, *T. (B.) schmidiana* sp. nov., and *T. (B.) wardi* Edwards, are quite different in coloration, venation, and hypopygial structure.

**TIPULA (BELLARDINA) SCHMIDIANA** sp. nov.

Plate 2, fig. 16.

Allied to *brunettiana*; size large (wing of male about 35 millimeters); mesonotal præscutum brownish yellow with four stripes, the lateral pair white, crossing the suture onto the scutal lobes; wings subfalcate in outline, brownish white, with a clearer white longitudinal stripe at near midwidth; costal border and longitudinal stripes along Cu and in outer medial field brown; virtually all cells of wings with abundant brown dots, producing a freckled appearance; male hypopygium with the thumb of the outer dististyle relatively small.

*Male*.—Length, about 31 to 32 millimeters; wing 34 to 37; antenna, about 4.3 to 4.5.

Frontal prolongation of head long, slightly exceeding the remainder of head, without nasus; light gray above, brown on more than the lower half, the dorsal edge near eye still darker; palpi brown, terminal segment brownish black. Antennæ with scape light brown, with four transverse impressed lines on dorsal surface, with relatively few short setæ; pedicel brownish gray; flagellum brownish yellow, terminal segment darker; flagellar segments with small basal enlargements, verticils about one-third longer than the segments. Head light gray above, abruptly dark brown on genæ and beneath; a vague darkened capillary median vitta behind the low entire vertical tubercle.

Pronotum whitened, scutum with conspicuous setæ from brown punctures, the lateral ones longer; sides of scutellum produced into a blunt point. Mesonotal præscutum with the ground color of disk brownish yellow, lateral borders and posterior interspaces darker brown; four discal stripes, the intermediate pair yellowish gray, narrowly bordered by brown, lateral pair broader, whitened, conspicuously bordered by brownish black, broader on internal margin before suture; the white color crosses the suture onto the anterior ends of the scutal lobes, the latter dark-

er gray behind, internally with strong yellow setæ from brown punctures, central area of scutum gray, vaguely lined with darker; scutellum lighter gray, with setæ from brown punctures, parascutella dark brown; mediotergite light gray, patterned with three brown areas that are visible chiefly from above, provided with long erect setæ from brown punctures; lateral pair broader, pale brown, on anterior two-thirds, median line narrowed posteriorly and reaching the border on the otherwise light brownish gray caudal third; pleurotergite brown above, the katapleurotergite brown and tumid, its dorsal edge lined with silvery. Pleura brown, propleura and sides of cervical region dark brown; mesepisternum brownish gray, with a more whitened stripe across the dorsal sternopleurite; pteropleurite light gray beneath wing root, dark brown below; ventral part, with the metapleura, whitened; meron light brown with a narrow white dorsal line. Halteres brownish yellow, knob black. Legs with coxæ brownish gray, with abundant long setæ from vaguely darkened punctures; trochanters pinkish, pruinose; remainder of legs dark brown, outer tarsal segments black; claws of male with a relatively small basal tooth. Wings long and narrow, posterior border of outer half slightly concave to produce a subfalcate outline; ground color brownish white, clearer white at midwidth, cells C and Sc, with the stigma darker; longitudinal brownish gray stripes in base of cell Cu, beyond one-third the wing length crossing into the posterior margin of cell M; a comparable but narrower line in outer medial field, extending from fork of M across the outer end of cell 1st  $M_2$  about to three-fifths the length of vein  $M_1$ ; all wing cells beyond arculus sprinkled with small brown dots, less numerous in the radial field, more abundant posteriorly; anal cells washed with dusky, the outlines of the enclosed dots less distinct; apex of cell  $R_5$  clear, the borders of the remaining posterior cells narrowly darkened, interrupted by three whitened spots in outer ends of anal cells; prearcular cells whitened, unpatterned; veins brownish yellow, only slightly darker in the patterned areas. Most veins beyond cord with short macrotrichia, lacking on outer two-thirds of  $R_{1+2}$  and extreme bases of  $R_{4+5}$  and  $M_1$ ; vein 1st A glabrous except for a few trichia at either end, 2nd A glabrous on less than proximal half. Venation:  $R_2$  very short to punctiform; vein  $R_3$  long and sinuous, narrowing cell  $R_3$  at near midlength; petiole of cell  $M_1$  subequal to m.

Abdomen elongate, yellowish brown, basal tergite darker, pruinose on sides, freckled with brown punctures; margins of remaining tergites very narrowly light gray, bordered internally by a similarly narrow darker line; sternites light yellowish brown, their dorsal edges light gray; outer segments darker brown, including the relatively small hypopygium; segments with abundant short setæ from conspicuous brown punctures to produce a freckled appearance, virtually lacking mid-dorsally, more abundant and evident on tergites than on sternites. Male hypopygium (Plate 2, fig. 16) with the tergite, *t*, transverse, subrectangular in outline, lateral angles conspicuous; posterior border nearly truncate, fringed with abundant relatively short setæ, those of the outer angles longer; ventral plate four-toothed, lateral points directed laterad, intermediate pair separated by a deep U-shaped notch. Outer dististyle, *d*, mitten-shaped, the thumb a relatively small darkened brown point, outer third of style with abundant setæ, the outermost of these pale. Inner style with apex obliquely truncate, sensory area long and narrow.

*Habitat*.—Sikkim.

Holotype, male, Churong, altitude 12,460 feet, in *Rhododendror* association, April 18, 1959 (*Schmid*). Paratypes, 3 males, Tangshing, altitude 12,000 to 12,800 feet, in *Rhododendron* association, April 15 to 17, 1959 (*Schmid*); 1 male, Dzungri, altitude 13,222 feet, in *Rhododendron* association, April 14, 1959 (*Schmid*).

This large and striking crane-fly is dedicated to the collector, Dr. Fernand Schmid, to whom our present satisfactory knowledge of the Himalayan crane-fly fauna is chiefly due. The closest relatives are the equally large and striking *Tipula* (*Belardina*) *brunettiana* Alexander and *T. (B.) wardi* Edwards, especially the former. The single most evident feature of the present fly is the abundant brown dotting in the wing cells, quite lacking in *brunettiana*.

TIPULA (SCHUMMELIA) LIOTERGA sp. nov.

Plate 1, fig. 1; Plate 2, fig. 17.

Size medium (wing 13 millimeters); general coloration of notum brown, præscutum yellowed anteriorly, pleura yellow, dorsopleural membrane darkened behind; antennal flagellum black, segments with unusually long verticils; tibiæ and tarsi black, claws simple; wings yellow, conspicuously brightened in

the prearcular and costal fields; a restricted brown pattern including the stigma and very narrow seams on outer veins; macrotrichia of veins conspicuous, including a series on m-cu, cell 2nd A narrow; male hypopygium with posterior margin of the short transverse tergite trilobed; inner dististyle terminating in a slender decurved beak.

*Male*.—Length, about 11.5 millimeters; wing, 13; antenna, about 4.

Frontal prolongation of head brownish black, paler beneath; nasus very long and slender, longer than its terminal bristles; palpi black, outer two segments more pruinose. Antennæ with scape and pedicel light yellow, flagellum black; basal enlargements of flagellar segments small, more produced above and here with unusually long verticils that exceed the segments in length. Head with front and broad anterior vertex light gray, posterior part of head dark grayish brown, with abundant short black setæ on sides; no vertical tubercle.

Cervical region and pronotum yellow, scutum broadly infuscated above, with long erect pale setæ. Mesonotal præscutum with anterior end and the humeral region extensively yellowed, the remainder with four light brown stripes, the lateral pair and the broad margins darker brown; scutum brownish yellow, lobes with a major darker brown area; posterior sclerites of notum brown, with long erect pale setæ on scutellum and mediotergite; pleurotergite infuscated above, the katapleurotergite yellowed. Pleura yellow, the posterior two-thirds of the dorso-pleural membrane conspicuously dark brown. Halteres infuscated, base of stem and apex of knob obscure yellow. Legs with all coxæ clear light yellow, trochanters darker yellow; femora yellow basally, outwardly passing through brown to black, remainder of legs black; fore tibiæ with a single spur; claws of male simple. Wings (Plate 1, fig. 1) yellow, the prearcular and costal fields conspicuously more saturated yellow; stigma oval, dark brown; veins of outer half of wing with conspicuous narrow brown seams to produce a striped appearance; veins brownish black, more yellowed in the brightened fields. Veins with conspicuous macrotrichia, extending back to arculus on Sc, R and 1st A, virtually to base on M, on Cu<sub>1</sub> lacking on more than proximal half; vein 2nd A with trichia on less than outer half; prearcular anal vein with strong trichia; several trichia on



m-cu; squama setose. Venation: Rs relatively long and straight, about one-half longer than m-cu; cell  $M_1$  deep, its petiole subequal to or a trifle shorter than m; m-cu close to fork of  $M_{3+4}$ , the latter subequal to  $M_{1+2}$ ; cell 2nd A narrow.

Basal abdominal tergites brownish yellow, with a broken median brown stripe, interrupted at posterior borders, lateral margins narrowly darkened near outer ends; basal sternites clear light yellow, outer segments passing into black. Male hypopygium (Plate 2, fig. 17) with the tergite, *t*, unusually short and broad, narrowed posteriorly, the margin with broad lateral lobes and a narrower median one, this subacute at tip; outer margin glabrous, disk and sides with setæ of normal size. Outer dististyle, *d*, pale, about four to four-and-one-half times as long as wide, with pale setæ. Inner dististyle simple, pale throughout, including a slender slightly decurved beak, its tip narrowly obtuse, lower beak broader, glabrous; region of dorsal crest protuberant, densely clothed with delicate yellow setæ and fewer strong pale setæ; outer basal lobe a smaller protuberance, with a few stout darkened setæ, posteriorly these more slender, yellow, on opposite margin near base with a low oval protuberance, with abundant long setæ. Ædeagus slender, blackened, without developed apophyses. Eighth sternite narrowly transverse, margin truncate, unmodified, with unusually few or less setæ on the outer fourth.

*Habitat*.—Sikkim.

Holotype, male, Chateng, altitude 8,700 feet, May 22, 1959 (*Schmid*).

I am assigning this distinct fly to *Schummelia* with some slight question. The antennal verticils and some features of the venation are more as in *Indotipula* but the tibial spur formula and other characters place it in *Schummelia*. It is quite distinct from other species in the diagnostic features listed, especially the coloration and venation of the wings and the structure of the hypopygium, particularly the tergite and inner dististyle.

**TIPULA (SCHUMMELIA) NOBILIOR** sp. nov.

Plate 2, fig. 18.

Size very large (wing of male 18 millimeters or more); antennal flagellum black; mesonotal præscutum with four brown stripes that are narrowly bordered by darker brown; knobs of

halteres light yellow; wings strongly darkened, conspicuously variegated with whitened spots, stigma darker brown; male hypopygium with the tergite appearing as a narrowly transverse blackened plate; outer dististyle unusually long and slender, inner style irregular in conformation.

*Male*.—Length, about 16 millimeters; wing, 18.5; antenna, about 5.5.

*Female*.—Length, about 19 millimeters; wing, 23; antenna, about 3.8.

Frontal prolongation of head obscure yellow above, somewhat darker below, with a narrow still darker line between the two, nasus short; palpi with first segment yellowed, two and three dark brown, with pale incisures, terminal segment black. Antennæ with scape and pedicel yellow, flagellum black; flagellar segments in male weakly enlarged at base, a little exceeding their longest verticils; antennæ of female shorter. Head dark brown, paler behind, orbits broadly yellow in front, narrowed behind; vertical tubercle low.

Pronotal scutum brown, yellowed laterally, scutellum light yellow. Mesonotal præscutum with four brown stripes that are narrowly bordered by darker brown, the anterior third of intermediate stripes much darker brown; outer margin of humeral region dark brown, enclosing a slightly larger triangular light yellow area immediately before the lateral stripes; lateral margins of præscutum pale brown, variegated internally by two vague more yellowed spots; each scutal lobe with two yellowish brown areas bordered by darker brown; scutellum brown, in female more yellowed, with a darker central line, parascutella paler; mediotergite obscure yellow with a large pale brown area on either side of midline of anterior two-thirds, not evident in female; pleurotergite yellowed; setæ of præscutum very small and sparse, longer on scutellum and mediotergite. Pleura chiefly dark brown, the dorsal sternopleurite and anepisternum paler; dorsopleural membrane and posterior pleurites yellow. Halteres with stem dusky, base narrowly more yellowed, knob light yellow. Legs with fore coxæ dark brown, paler apically, mid-coxæ darkened on anterior face, yellowed behind; posterior coxæ with a much smaller dark brown spot; trochanters brownish yellow; femora brownish black, restrictedly more yellowed basally, tips more blackened; tibiæ brownish black, genua nar-

rowly and inconspicuously whitened; tarsi black; claws simple. Wings strongly darkened, conspicuously variegated with whitened spots; stigma darker brown; cells C and Sc more yellowed, especially the latter; the white spots are before and beyond stigma, across base of cell 1st  $M_2$ , near outer end of cell M, extended into cell Cu; two in cell 1st A, the basal one extended into Cu; bases of all outer medial cells with a whitened spot, in cells  $M_3$  and  $M_4$  these being part of the obliterative area at base of cell 1st  $M_2$ ; veins dark brown, Sc and R more yellowed. Most longitudinal veins beyond arculus with macrotrichia over virtually their whole length, lacking on basal section of  $Cu_1$ . Venation: Petiole of cell  $M_1$  shorter than m; Rs and m-cu subequal.

Basal segments of abdomen yellow, patterned with brown, the apices of the second and succeeding segments dark brown, the posterior borders narrowly pale; outer sternites darkened; hypopygium black. Male hypopygium (Plate 2, fig. 18) with the tergite, *t*, very broadly transverse, appearing as a narrow blackened plate, more expanded laterally, the central region narrow; surface with a few small setæ. Outer dististyle, *d*, unusually long and slender, broadest at base, tapering very gradually to the narrowly obtuse apex, with numerous setæ, those of outer margin very long, the longest about one-third the style. Inner dististyle of unique conformation, as shown; beak and lower beak blackened, the former a little larger; outer basal lobe dilated, lower posterior margin with two blackened spines, one more slender, the two spines more or less decussate.

*Habitat*.—Sikkim.

Holotype, male, Chumzomoi Choka, altitude 11,800 feet, in *Rhododendron* association, July 8, 1959 (Schmid). Allotype, female, Lachen, altitude 8,900 feet, June 13, 1959 (Schmid).

*Tipula* (*Schummelia*) *nobilior* is the largest species of the subgenus in the local fauna, differing from other regional forms not only in the great size but likewise in the wing pattern and structure of the male hypopygium, including especially the tergite and inner dististyle.

TIPULA (SCHUMMELIA) PENICILLARIS sp. nov.

Plate 1, fig. 2; Plate 2, fig. 19.

Size medium (wing, about 12 millimeters); mesonotal præscutum with four brown stripes that are narrowly bordered by

darker brown; pleura brown, narrowly lined with yellow; base of knob of halteres dark brown, apex broadly light yellow; femora obscure yellow, tips conspicuously blackened, claws of male toothed; wings broad, infuscated, variegated by creamy areas; Rs relatively long and straight; male hypopygium with outer dististyle entirely pale, long and narrow.

*Male*.—Length, about 12 millimeters; wing, 12 to 12.5; antenna, about 3.5.

*Female*.—Length, about 13.5 millimeters; wing, 12.5.

Frontal prolongation of head relatively long, darkened above, obscure yellow on sides; nasus stout; palpi dark brown. Antennæ of male with scape and pedicel light yellow, first flagellar segment light brown, outer segments brownish black; flagellar segments exceeding their verticils, with moderate basal enlargements; terminal segment not exceeding one-half the penultimate; in female, proximal flagellar segments brownish yellow to light brown, pedicel more brightened, flagellum dark brown. Head yellow behind eyes and on orbits, the center of vertex broadly brown, posterior part of head brownish yellow; anterior vertex broad, nearly equal to the exposed part of eye; no vertical tubercle.

Pronotum brown. Mesonotal præscutum with four brown stripes that are narrowly bordered by darker brown, this forming the median vitta; interspaces obscured, especially in front; humeral and lateral margins broadly light yellow; scutal lobes brown, the central area pale; scutellum and mediotergite weakly infuscated on either side, central area obscure yellow, pleurotergite pale, silvery pruinose. Pleura chiefly brown, narrowly lined with yellow, sternopleurite more broadly pale; dorsopleural membrane darkened. Halteres with stem yellowish brown, brighter basally, knob dark brown, apex broadly light yellow. Legs with coxæ yellow, outer faces slightly darkened, especially on fore coxæ; trochanters testaceous yellow; femora obscure yellow, tips conspicuously blackened, the amount subequal on all legs and including about the distal eighth of segment; tibiæ brown, tarsi black; claws of male hairy basally, with a small tooth. Wings (Plate 1, fig. 2) broad, infuscated, variegated with creamy areas; prearcular and costal fields brownish yellow; pale spots before and beyond stigma, across base of cell 1st  $M_2$ , two areas in cell M, with others in cells Cu and 1st A;

cell  $M_1$  extensively pale; veins pale, more yellowed in the brightened fields, whitened in the obliterative areas. Longitudinal veins with numerous macrotrichia, including the basal half of  $R_{1+2}$  and outer end of 1st A. Venation: Rs relatively long and straight, subequal to m-cu.

First abdominal tergite brown, succeeding segments yellow or brownish yellow, narrowly darkened laterally, the outer three or four segments brownish black. Ovipositor with cerci straight, very long and slender. Male hypopygium (Plate 2, fig. 19) with posterior border of tergite, *t*, gently emarginate, with a broad median projection that may be bent cephalad beneath the margin (upper figure) or projecting (lower figure), presenting quite different appearances; small obtuse lateral knobs or blunt teeth. Outer mesal angle of basistyle or adjoining base of dististyle with a stout lobe that bears about 15 to 20 very long stout dark-colored setæ, these about three-fourths the length of the inner dististyle. Outer dististyle, *d*, long and narrow, pale throughout, basal setæ conspicuous, outer ones small and weak; inner style as shown, its dorsal crest very long, produced backward into an obtuse lobe; surface of style with long erect pale setæ, on opposite face with microscopic black setæ that are directed backward. Phallosome including the slender black ædeagus, *a*, and circular disklike apophyses, with extremely minute setulæ and abundant roughened tubercles. Eighth sternite unmodified.

*Habitat*.—India (Kumaon).

Holotype, male, Dakwani, Pauri Garhwal, altitude 9,300 to 11,000 feet, August 7, 1958 (*Schmid*). Allotopotype, female, pinned with type. Paratypes, males and females, Kulara, Pauri Garhwal, altitude 12,000 feet, August 4, 1958 (*Schmid*).

The most similar regional species is *Tipula* (*Schummelia*) *chumbiensis* Edwards, which likewise has broad wings with a comparable pattern. This differs in the coloration of the thorax and legs, simple claws, darkened outer dististyle, and other characters.

**TIPULA (ACUTIPULA) INDRA** sp. nov.

Plate 2, fig. 20.

Size large (wing of male about 20 millimeters); antennæ short; mesonotum generally dark brown, pleura and the broad margins of præscutum and mediotergite yellow; wings brown,

patterned with dark brown and whitened areas, the oblitative mark at cord very conspicuous; abdomen yellowish brown, outer segments black; male hypopygium with tergal lobe spiculate, entire, subtended by conspicuous shoulders; outer lobe of inner dististyle produced into a small outer blade and a more basal powerful spine; outer dististyle about twice as long as broad; eighth sternite with posterior border emarginate, the broad rounded lobes fringed with relatively short setæ and covered with abundant blackened spicules.

*Male*.—Length, about 14 to 15 millimeters; wing, 19 to 20; antenna, about 2.8 to 2.9.

Frontal prolongation of head dark brown, including the broad nasus; palpi black. Antennæ short; scape and pedicel yellowish brown, flagellum darker brown; flagellar segments subcylindrical, without well developed basal enlargements, a little shorter than the longest verticils. Head dark brown, the front and antennal fossæ restrictedly more yellowed.

Pronotum yellow. Mesonotal præscutum with the anterior and lateral borders yellow, disk with four grayish brown stripes that are broadly margined by slightly darker brown lines that are subequal in diameter to the stripes, the intermediate pair paling to orange at anterior end; posterior sclerites of notum dark brown, vaguely pruinose; mediotergite with lateral borders broadly light yellow, the color continued forward onto the dorsal pleurotergite, the center of the latter weakly darkened. Pleura orange yellow, including the dorsopleural membrane. Halteres long, dark brown, apex of knob paler. Legs with coxæ and trochanters yellow; remainder of legs black, femoral bases narrowly obscure yellow; claws of male toothed. Wings brown, prearcular and costal fields more yellowed; stigma and an area at end of Sc darker brown; a conspicuous brown mark beyond one-third the length of cell Cu, with a further darkening in outer end of cell M near m-cu; oblitative area before cord extending from before stigma across cell 1st M<sub>2</sub>, continuous and very conspicuous; comparable whitened areas before and beyond the dark mark in cell Cu; slightly more yellowed areas beyond midlength of cell M, base of cell M<sub>4</sub> and narrowly in bases of cells M<sub>1</sub>, 2nd M<sub>2</sub>, and near outer end of R<sub>5</sub>; cell Cu<sub>1</sub> (the narrow space between the cubital branches) darkened; veins dark brown, more yellowed in the brightened fields. Veins beyond cord with

a few macrotrichia on  $M_{1+2}$  and basal half of  $M_2$ ; before cord with very sparse trichia on Rs, M, anals, and near base of Cu. Venation: Rs subequal to m-cu or  $R_{2+3}$ ; petiole of cell  $M_1$  and m subequal; m-cu on  $M_{3+4}$  before fork.

Abdominal tergites yellowish brown, basal ones narrowly more darkened sublaterally, the actual borders narrowly whitened, sternites clearer yellow; segments six to nine, including the large hypopygium, with the exception of the outer dististyle, black. Male hypopygium (Plate 2, fig. 20) with the tergite, *t*, produced posteriorly into a depressed median lobe, the short tip broad, entire, subtended by conspicuous shoulders, the apices of all with abundant blackened spicules. Ninth sternite with a very small lobe bearing a compact pencil of unusually long yellow setæ. Outer dististyle, *d*, white, about twice as long as its greatest width, before apex with the outer margin gently emarginate; setæ sparse, chiefly along border. Inner dististyle with the beak relatively slender, outer lobe large, produced into a powerful spine, with a smaller flattened blade beyond, the lobe virtually glabrous; sensory area large; before midlength of style with a transverse row of setæ, the outer ones stronger. Eighth sternite, *8s*, large, posterior border emarginate, lateral lobes broadly rounded, fringed with relatively short yellow setæ and densely covered with short blackened spicules, those of the median area long and normal, the emargination filled with pale membrane that is densely setuliferous.

*Habitat*.—Sikkim.

Holotype, male, Lathong, altitude 6,560 feet, May 15, 1959 (*Schmid*). Paratopotypes, 3 males.

The most similar regional described species is *Tipula (Acutipula) interrupta* Brunetti, which likewise has the apical lobe of the tergite entire, differing conspicuously in all structures of the hypopygium, including the tergite, eighth sternite, and both dististyles.

**TIPULA (ACUTIPULA) KUMPA** sp. nov.

Plate 3, fig. 21.

Size large (wing of male 24 millimeters); mesonotal præscutum light brown with four more yellowed stripes, the lateral borders clearer yellow; scutellum conspicuously patterned; wings with a darkening before midlength of cell Cu; bases of outer medial cells slightly whitened; male hypopygium with the apical lobe of tergite shallowly divided; outer dististyle broad, bilobed

at apex; outer lobe of inner style broad, with about 20 short reddish spines; eighth sternite with posterior border very shallowly emarginate, the low lateral lobes with short inconspicuous setæ.

*Male*.—Length, about 22 millimeters; wing, 24; antenna, about 3.

Frontal prolongation of head dark chestnut brown; nasus elongate, with long black setæ; palpi black. Antennæ with scape and pedicel brownish yellow; flagellum brownish black, the tips of the segments slightly paler to produce a weak bi-colored appearance, outer segments more uniformly brownish black; basal enlargements of segments scarcely developed; verticils shorter than the segments. Head with anterior vertex brownish gray, posterior vertex chiefly brownish black, posterior orbits narrowly reddened.

Pronotum brownish yellow, clearer yellow on sides. Mesonotal præscutum with the ground light brown, with four poorly indicated more yellowed stripes, lateral margins clearer yellow; scutum plumbeous, each lobe with two brown areas, the anterior one smaller and more distinct; scutellum with a plumbeous basal darkening, posterior border with two circular rich brown spots, parascutella brownish gray; mediotergite broadly rich brown, lateral margins light yellow; pleurotergite and pleura light yellow, in the type badly damaged by *Corrodentia* but apparently unpatterned. Halteres brownish black, extreme tip of knob yellowed. Legs with coxæ and trochanters yellow; remainder of legs brownish black to black, claws toothed. Wings patterned much as in *robusta* and some other species, medium brown, the stigma, a cloud near outer end of cell M and one before midlength of Cu darker brown, the last preceded and followed by whitened areas; other pale marks include one in cell M before the darkened part, before cord, posterior end of m-cu, and a restricted area in bases of cells M<sub>1</sub>, 2nd M<sub>2</sub> and M<sub>3</sub>; veins brown. Venation: Rs subequal to m-cu; petiole of cell M<sub>1</sub> subequal to m; m-cu shortly before fork of M<sub>3+4</sub>.

Abdominal tergites brownish yellow, the basal rings narrowly more pruinose, posterior borders very narrowly darkened, sublateral parts weakly infuscated, the actual borders yellow; outer segments brownish black, central region of eighth sternite and the styli yellowed. Male hypopygium (Plate 3, fig. 21)



with the posterior border of the tergite, *t*, produced into a relatively slender lobe that is divided into two lobules by a relatively short split, the lobules with abundant small spinules. Ninth sternite, *9s*, with a stout lobe tipped with a dense brush of long setæ. Outer dististyle, *d*, broad, apex shallowly emarginate to form two unequal lobes; vestiture short and sparse. Inner dististyle distinctive; beak slender, especially the apex; outer lobe extensive, produced into a stouter beaklike extension, the outer part with about twenty short stout reddish spines; region of outer basal lobe produced, tipped with about four small spines and more numerous longer setæ. Eighth sternite, *8s*, narrowed outwardly, posterior border very shallowly emarginate, the very low lateral lobes with a concentration of short inconspicuous setæ; posterior border with exceedingly numerous and dense small pale setæ.

*Habitat*.—Sikkim.

Holotype, male, Chumtang, altitude 5,120 feet, July 30, 1959 (*Schmid*.)

The specific name, *kumpa*, is that of a Sikkimese tribe discussed by Hooker in the "Himalayan Journals." The fly is quite distinct from other large-sized regional members of the subgenus in the pattern of the mesonotum and especially in the structure of the male hypopygium, including the dististyles and eighth sternite.

**TIPULA (ACUTIPULA) SICULA** sp. nov.

Plate 3, fig. 22.

Size large (wing of male about 23 millimeters); general coloration of præscutum olive gray with four slightly darker stripes that are narrowly margined with brown, pleura yellow; legs very long, black, femoral bases narrowly obscure yellow; wings with anterior half darker brown, posterior part paler, more brownish gray, with darkened areas, especially at base of outer radial field, outer end of cell M and at near midlength of cell Cu; extensive whitened areas on disk; outer radial and medial veins without macrotrichia, anal veins with trichia throughout their lengths; basal abdominal segments light brown, outer segments, including hypopygium, dark brown; male hypopygium with tergite narrowed outwardly, the outer blade split into two slender spiculate lobes; outer lobe of inner dististyle produced into a long needlelike spine, subtended by numerous long powerful setæ; eighth sternite unmodified.

*Male*.—Length, about 22 millimeters; wing, 23.5; antenna, about 3.5.

Fore leg, femur, 16; tibia, 19, basitarsus, 25.

Hind leg, femur, 19; tibia, 22; basitarsus, 33.

Frontal prolongation of head brownish gray, nasus black, elongate; palpi black. Antennæ relatively short; scape brownish yellow, pedicel clearer yellow, flagellar segments beyond the second bicolored, the small basal swelling black, remainder yellow, the latter color becoming more obscure on outer segments; verticils long, nearly twice the segments. Head dark gray; anterior vertex flat, with a blackened area on either side, narrowly separated at the midline.

Pronotum clear orange yellow. Mesonotal præscutum with the ground olive gray, with four slightly darker stripes that are narrowly margined with brown, the cephalic border conspicuously dark brown, lateral margins yellowed, more extensively so before the suture; point of the suture impressed and blackened; scutum olive gray, each lobe with two scarcely darker areas that are indicated by narrow brown margins; scutellum brownish gray with a very faint darker central line, parascutella brownish yellow, gray ventrally; mediotergite brownish gray, the posterior third and broad lateral margins yellow; pleurotergite obscure yellow above, the katapleurotergite brighter yellow; præscutum with sparse short setæ, scutellum and mediotergite with long erect yellow setæ. Pleura yellow, including the more orange yellow dorsopleural region, the latter a little darker posteriorly. Halteres dark brown, base of stem narrowly yellowed. Legs with coxæ; trochanters testaceous yellow; remainder of legs black, femoral bases narrowly obscure yellow; claws toothed; legs very long, as shown by the measurements. Wings with anterior half darker brown, the posterior part paler, more brownish gray, with darker areas in bases of outer radial cells beyond cord, in outer end of cell M and at near midlength of cell Cu; large and conspicuous whitened areas before cord, at near two-thirds the length of cell M, and before and beyond the dark marking in cell Cu; bases of outer medial cells a trifle paler than their centers, the apices narrowly darkened; stigma long, darker brown than the ground; veins dark brown. Outer radial and medial veins without macrotrichia, even lacking on  $R_{4+5}$ ; M and both anals with trichia over virtually their entire

lengths. Venation: Rs subequal to or a trifle longer than m-cu;  $R_{1+2}$  turned cephalad on outer third; petiole of cell  $M_1$  a little shorter than m,  $M_{3+4}$  shorter than basal section of  $M_3$ ; cell 2nd A broad.

Abdomen light brown, the lateral and posterior borders of the basal and intermediate segments narrowly darker, the extreme edges pale; basal sternites yellow, more distal ones brown; outer segments, including hypopygium, dark brown. Male hypopygium (Plate 3, fig. 22) with the tergite, *t*, narrowed outwardly, produced into a broad yellow blade that is narrowly split at apex by a U-shaped notch to form two narrow lobes that are set with blackened spicules. Ninth sternite on either side with a dense brush of long yellow setæ. Other dististyle, *d*, pale, tip broadly rounded, the length about two and one-half times the greatest width, which is at near one-third the length; setæ short and scattered, from small punctures. Inner style with the beak powerful, obtuse at tip; outer lobe a little smaller, its inner apical angle produced into a long needlelike spine, the adjacent part of apex with about a score of long powerful setæ, the longest slightly exceeding the spine, the more basal ones shortest; sensory area lying in the angle between the beak and the outer lobe. Gonapophyses appearing as narrow paddlelike blades. Eighth sternite unmodified.

*Habitat*.—Sikkim.

Holotype, male, Manu, altitude 4,920 feet, May 10, 1959 (*Schmid*).

Although generally similar to other regional members of the subgenus, especially *Tipula (Acutipula) robusta* Brunetti, the present fly differs conspicuously in the male hypopygium. In *robusta* more than the basal half of cell M of the wings is whitened whereas in the present fly it is infuscated.

**TIPULA (ACUTIPULA) TRIPLACA** sp. nov.

Plate 1, fig. 3; Plate 3, fig. 23.

Allied to *quadrinotata*; mesonotum dark brownish gray, præscutum with four inconspicuous darker brown stripes, anterior border conspicuously blackened; pleura clear light yellow below; wings suffused with brown, restrictedly patterned with darker, including the costal border; male hypopygium with the tergite terminating in three flattened yellow blades, all provided with abundant blackened spicules; eighth sternite broad, posterior

border truncate, lateral angles weakly produced, with a broad group of yellow setæ.

*Male*.—Length, about 16 millimeters; wing, 19; antenna, about 3.

Frontal prolongation of head, including nasus, dark brown, palpi black. Antennæ relatively short; scape brownish yellow, pedicel yellow, basal flagellar segments weakly bicolored, darker on proximal portion, the tips paler, outer segments more uniformly dark brown; flagellar segments much shorter than the longest verticils. Head dark brown; anterior vertex relatively narrow.

Pronotum dark brown. Mesonotal præscutum with the ground dark brownish gray, disk almost covered by four darker brown stripes that are inconspicuous against the ground, subhumeral and sublateral areas obscure yellow, the anterior border narrowly margined with black; posterior sclerites of notum brownish black, the scutellum posteriorly more intensely blackened; mediotergite brownish gray, yellowed laterally, pleurotergite with central part dark brown, the dorsal and ventral portions yellowed. Pleura brownish yellow dorsally, passing into clear light yellow below, dorsopleural membrane dusky. Halteres brownish black, extreme base of stem reddened, apex of the small knob slightly paler. Legs with coxæ and trochanters pale yellow; femora brownish yellow, clearer basally, the tips conspicuously blackened, the amount subequal on all legs; tibiæ and tarsi brown, the terminal tarsal segments brownish black; claws of male toothed. Wings (Plate 1, fig. 3) suffused with brown, stigma and costal border darkened brown; relatively large brown clouds near outer end of cell R adjoining vein M and before midlength of cell Cu, both clouds preceded and followed by more whitened areas; very faint dusky clouds beyond anterior cord, outer end of cell 1st  $M_2$  and fork of  $M_{1+2}$ ; obliterative area at cord conspicuous; slight whitened areas on veins  $M_1$ ,  $M_2$  and  $M_3$  immediately distad of the darkened parts; veins brown. Macrotrichia on veins  $R_3$  and  $R_{4+5}$ , lacking on outer medial and cubital branches; both anal veins with scattered but virtually complete series of small trichia. Venation: Petiole of cell  $M_1$  and m subequal; m-cu just before outer end of  $M_{3+4}$ .

Abdominal tergites reddish brown medially, darker brown laterally, subterminal segments and hypopygium dark brown;

basal sternites yellowed, becoming darker outwardly. Male hypopygium (Plate 3, fig. 23) with the tergite, *t*, terminating in three flattened yellow blades, subequal in size and shape, all with tips obtuse and provided with small blackened spicules over virtually the whole surface; lateral blades slightly more oblique than the vertical central one; surface at base of blades with long reddish setæ. Outer dististyle, *d*, narrowed on outer half, setæ small and sparse; inner style generally as in *quadrinotata*, with two spines, the outer one larger, near its base with a group of long yellow setæ; both beak and lower beak relatively small, triangular in outline; a small conical lobe at apex of basistyle, provided with long yellow setæ. Gonapophyses appearing as divergent brownish yellow blades. Eighth sternite, *8s*, broad, posterior border truncate, lateral angles weakly produced, with a broad group of yellow setæ.

*Habitat*.—North Bengal.

Holotype, male, Kurseong, Darjeeling District, altitude 5,455 feet, August 18, 1958 (*Camilleri*).

The most similar regional species is *Tipula (Acutipula) quadrinotata* Brunetti, which differs most evidently in the structure of the male hypopygium, particularly the tergite, which has only two spiculate blades, as is common in the subgenus.

**TIPULA (ANOMALOPTERA) BATHROXANTHA** sp. nov.

Plate 3, figs. 24, 25.

Size medium (wing of male about 12 millimeters); mesonotum yellow, præscutum with four brown stripes; antennæ of male elongate, all flagellar segments black with light yellow bases; femora obscure yellow, outer segments of leg darker; wings brownish yellow, stigma distinct; male hypopygium with the beak of the inner dististyle slender, heavily blackened, outer basal lobe large.

*Male*.—Length, about 13 millimeters; wing, 12.2; antenna, about 5.2.

Frontal prolongation of head yellow, nasus concolorous, elongate; palpi testaceous yellow, distal end of terminal segment more orange. Antennæ relatively long, as shown by the measurements; scape and pedicel yellow, flagellar segments bicolored, their bases yellow, the outer ends more extensively brownish black, the bicolored nature persisting to the terminal seg-

ment; basal enlargements moderately developed, verticils shorter than the segments. Head pale brown, the front, vertex surrounding the antennal fossæ and the orbits more yellowed; no vertical tubercle.

Pronotal scutum brownish orange, the sides and the scutellum clearer yellow. Mesonotal præscutum yellow, with four entire light brown stripes, the intermediate pair virtually confluent at the midline, their anterior fourth paling to brownish yellow; scutum yellow, the lobes inconspicuously grayish brown; scutellum and postnotum testaceous yellow; præscutum nearly glabrous, with microscopic setæ on the anterior interspaces; vestiture of scutellum and mediotergite black, longer and more conspicuous, especially on the sides of the mediotergite behind, pleurotergite glabrous. Pleura yellow above, vaguely whitish pruinose below. Halteres short, stem obscure yellow, knob infuscated. Legs with coxæ yellow, trochanters more orange; femora obscure yellow, vestiture short; tibiæ brown, obscure yellow basally, tarsi passing into brownish black; claws small, simple. Wings brownish yellow, clearer yellow basally and in costal region, especially cell Sc, stigma oval, medium brown; veins brownish yellow, clearer yellow in the brightened parts. Wing tip weakly notched at termination of veins  $M_1$  or  $M_2$ , the condition similar in both wings of the type. Outer veins of radial field and distal ends of veins  $M_1$  and  $M_2$  with macrotrichia, these lacking on  $R_{1+2}$  and  $M_3$ , sparse on  $M_4$ ; an almost complete series on distal section of  $Cu_1$  and the outer end of the basal section; Sc with a complete series of trichia; anal veins glabrous, including the prearcular section. Venation:  $Sc_2$  ending just before midlength of Rs, the latter arcuated, subequal to m-cu; cell  $M_1$  sessile or with the petiole very short;  $M_{3+4}$  short, subequal to the vertical basal section of  $M_4$ .

Abdomen with basal tergite and proximal four sternites obscure yellow, succeeding tergites light brown, fifth and following segments brownish black, the hypopygium more yellowed, especially distally. Male hypopygium (Plate 3, fig. 24) with the tergite, *t*, emarginate posteriorly, the inner borders of the broad lobes with about 15 short blackened spicules; proctiger large and conspicuous, hairy on sides. Outer dististyle, *d*, with the spine broad-based, blackened, slightly upcurved; inner style with the beak slender, heavily blackened, lower beak broad-based, tapering to the narrowly obtuse tip; outer basal lobe a

broad fleshy structure with scattered small setæ. Gonapophysis very long and narrow, pale. Sternal spatula, 8s, broad, parallel-sided or very slightly widened outwardly, apex truncated, very obtuse, surface with very abundant evenly distributed setulæ.

*Habitat*.—Kashmir.

Holotype, male, Gilgit, altitude 4,770 feet, June 9, 1954 (*Schmid*).

There now are four known species of *Anomaloptera*, including the subgenotype, *Tipula (Anomaloptera) nigra* Linnæus, of Europe, together with *T. (A.) ligulifera* Alexander, of eastern Siberia, *T. (A.) xanthocera* Alexander, of Kashmir, and the present fly. All have the basic structure of the male hypopygium generally alike but with the details, especially of the inner dististyle, quite distinct. The present fly differs from *xanthocera* not only in the coloration of the body and antennæ but likewise in the wing trichiation and in the structure of the hypopygium, particularly the inner dististyle. I am figuring the dististyle of *xanthocera* for comparison (Plate 3, fig. 25, d), calling attention to the unusual length of the style, its unblackened obtuse beak and the greatly reduced outer basal lobe.

Mannheims [in Lindner, *Die Fliegen* 170 (1952) 107] calls attention to the characters in the present subgenus that serve to connect it with the genus *Nephrotoma* Meigen. There can be little question but that *Anomaloptera*, together with *Schummelia* Edwards and *Trichotipula* Alexander, are the groups that are most nearly allied to *Nephrotoma* and likewise to *Dolichopeza*.

**TIPULA (INDOTIPULA) DIACAENA** sp. nov.

Plate 1, fig. 4; Plate 3, fig. 26.

Size relatively large (wing of male 13.5 millimeters); general coloration of mesonotum medium brown, pleura yellow, the mesepisternum chiefly brown; veins  $M_1$  and  $M_2$  with macrotrichia; male hypopygium with the posterior border of tergite trilobed; inner dististyle very high, the beak appearing as a deep cleaver-like blade, lower beak slender, blackened; outer basal lobe a large blackened structure that terminates in two strong black spines.

*Male*.—Length, about 11 millimeters; wing, 13.5; antenna, about 4.2.

Frontal prolongation of head yellow above, brown laterally and beneath; nasus elongate; palpi brown. Antennæ of male relatively long; scape and pedicel yellow, flagellum black; flagellar segments with basal enlargements small, longest verticils nearly equal to the segments. Head with front and cephalic part of anterior vertex light yellow; posterior part of head dark brownish gray with a more blackened spot on orbits at narrowest point of the vertex, sending a median extension onto the very low impressed vertical tubercle.

Pronotum medium brown, sides light yellow. Mesonotal præscutum yellow laterally, more obscured in front, disk medium brown, more intense laterally, the central area behind more yellowed; scutum brownish yellow, central area slightly more yellowed with a vague dusky median line, scutellum obscure yellow, parascutella darker; mediotergite weakly infuscated on disk, lateral and posterior parts more yellowed, with indications of a narrow pale central line, pleurotergite brown. Pleura yellow, the anterior two-thirds of the mesepisternum brown, to form a transverse girdle. Halteres brownish black, apex of knob vaguely paler. Legs with coxæ yellow, trochanters more testaceous yellow; remainder of legs broken. Wings (Plate 1, fig. 4) strongly suffused with brown, prearcular and costal regions, with cell  $Cu_1$ , more brownish yellow; stigma darker brown; small obliterative areas before stigma and across base of cell 1st  $M_2$ ; veins brown. Most veins beyond cord with macrotrichia, including  $M_1$  and  $M_2$ , sparse on  $M_3$ , lacking on  $M_4$ ; a very few trichia on outer ends of veins  $M$  and 2nd  $A$ , lacking or reduced to one or two on  $Cu$  and 1st  $A$ . Venation: Cell  $M_1$  deep, its petiole about two-thirds to three-fourths  $m$ ; cell 2nd  $A$  narrowly.

Abdominal tergites dark brown, extreme posterior borders silvery, sternites more yellowed, hypopygium darkened. Male hypopygium (Plate 3, fig. 26) with the tergite,  $t$ , large, narrowed posteriorly, the outer third more yellowed, margin conspicuously trilobed, the broad lateral lobes heavily blackened, borders obscurely toothed, with coarse black punctures, median lobe smooth, terminating in a very obtuse blackened point. Ninth sternite with oval lobes provided with conspicuous yellow setæ, the lateral ones longer. Outer dististyle,  $d$ , long and narrow, tapering outwardly, with very long marginal setæ; inner style very high, the beak appearing as a deep cleaverlike blade, lower



beak slender, blackened; outer basal lobe a large blackened structure that terminates in two strong black spines, the lower one longer. Gonapophyses appearing as paddlelike blades. Eighth sternite with posterior border broadly convex, the posterior half with relatively sparse setæ of moderate length.

*Habitat*.—Sikkim.

Holotype, male, Palam, altitude 5,100 feet, April 25, 1959 (Schmid).

*Tipula (Indotipula) diacaena* resembles other regional species of the subgenus, as *T. (I.) sudra* sp. nov. and *T. (I.) varuna* sp. nov., differing very conspicuously in the structure of the male hypopygium.

**TIPULA (INDOTIPULA) GUPTA** sp. nov.

Plate 3, fig. 27.

Size medium (wing of male 12.5 millimeters); general coloration of mesonotal præscutum brown, lateral and humeral borders yellow, pleura chiefly yellow; wings strongly tinged with brownish yellow, stigma distinct, obliterative area at base of cell 1st  $M_2$  large and conspicuous; outer radial and medial veins with abundant macrotrichia; male hypopygium with tergal lobes large, spiculose; inner dististyle short and compact, beak very large, lower beak small, blackened, no well-developed outer basal lobe.

*Male*.—Length, about 10.5 millimeters; wing, 12.5; antenna, about 4.

Frontal prolongation of head fulvous yellow, paler yellow beneath, nasus yellow; palpi with extreme base yellowed, remainder brown. Antennæ with scape and pedicel light yellow, the outer end of scape slightly darker, flagellum black; flagellar segments with small basal enlargements, longest verticils nearly equal to the segments. Front and anterior vertex behind the antennal bases yellow, posterior part of head brown, with a vague more blackened central line that extends cephalad as a fine point into the notch of the very low vertical tubercle, orbits with a similar vague darkened spot.

Cervical region yellow. Pronotal scutum yellow, weakly patterned with three pale brown spots, scutellum yellow. Mesonotal præscutum with the disk chiefly covered by four brown stripes, the intermediate pair vaguely margined with darker,

lateral stripes more solidly darkened, lateral and humeral regions light yellow; scutum with lobes light brown, darker brown laterally, including the outer end of the suture, central area of scutum broadly yellow; scutellum yellow, parascutella slightly darker; mediotergite clear yellow, virtually glabrous, with two or three long setæ on either side, pleurotergite yellow, narrowly more darkened posteriorly, katapleurotergite in front extensively paler yellow. Pleura yellow, the propleura slightly infuscated, anterior half of mesepisternum less evidently so. Halteres with stem infuscated, knob dark brown. Legs with all coxæ and trochanters yellow; femora brown, bases broadly more yellowed, tips narrowly blackened; tibiæ and tarsi brownish black to black; claws of male bidentate, the basal spine small and more slender. Wings strongly tinged with brownish yellow, the prearcular and costal fields, together with cell  $Cu_1$ , more yellowed; stigma oval, darker brown; obliterative areas before stigma and across cell 1st  $M_2$ , the latter large and conspicuous, invading the adjacent cells R and  $M_3$ ; veins brown, more brownish yellow in the brightened fields. Outer radial veins, together with  $M_1$  and  $M_2$ , with abundant macrotrichia,  $M_3$  with trichia on outer half,  $M_4$  glabrous; both sections of  $Cu_1$  with abundant trichia, the more proximal ones much longer; anal veins glabrous; prearcular anal vein with long trichia. Venation: Petiole of cell  $M_1$  relatively long, about equal to  $m$ ; cell 2nd A relatively broad for a species of *Indotipula*.

Abdominal tergites brownish yellow, the third and succeeding segments darker brown, becoming still darker on the outer segments; basal sternites light yellow. Male hypopygium (Plate 3, fig. 278) with the outer fourth of the tergite,  $t$ , produced into a depressed-flattened plate, its posterior border broadly emarginate, forming unusually broad lobes provided with abundant blackened spicules, midregion glabrous. Outer dististyle,  $d$ , elongate, beyond midlength the margin pale and submembranous, the outer end of style more or less pendant, with abundant rather short setæ; inner style short and compact, beak very large, yellow, lower beak much smaller, blackened, its surface microscopically squamose; no well developed outer basal lobe. Eighth sternite unmodified.

*Habitat*.—India (Kumaon).

Holotype, male, Tungnath, Pauri Garhwal, altitude 9,000 feet, June 1, 1958 (*Schmid*).

The most similar regional species is *Tipula* (*Indotipula*) *walkeri* Brunetti (*tenuipes* Brunetti), which differs in the coloration of the body and wings but especially in the structure of the male hypopygium, including the tergite and dististyles. The oblitative area in cell 1st  $M_2$  of the wings is unusually large and conspicuous whereas it is quite lacking in *walkeri*.

**TIPULA (INDOTIPULA) PUGIONIS sp. nov.**

Plate 1, fig. 5; Plate 3, fig. 29.

Size medium (wing of male about 14 millimeters); general coloration of thorax yellowish orange, præscutum only slightly patterned, pleura clearer yellow, unmarked; antennæ of male relatively long; wings strongly suffused, stigma darker; outer wing veins with abundant macrotrichia; cell  $M_1$  deep, its petiole shorter than  $m$ ; outer abdominal segments uniformly blackened; male hypopygium with the tergal lobes spiculose; outer dististyle pointed at tip, the apex with a few black spinoid setæ; inner dististyle with the beak truncate, outer basal lobe produced into a daggerlike black spine; eighth sternite with the margin membranous, with three groups of long yellow setæ.

*Male*.—Length, about 9 to 10 millimeters; wing, 13.5 to 14; antenna, about 5.2 to 5.4.

*Female*.—Length, about 13 to 14 millimeters; wing, 15 to 15.5.

Frontal prolongation of head, with the nasus, orange yellow; palpi yellowed, outer segments slightly more infuscated. Antennæ of male relatively long, as shown by the measurements; scape and pedicel yellow, flagellum black; flagellar segments elongate, the basal enlargements very small; segments slightly exceeding the longest verticils. Head orange, without vertical tubercle.

Pronotum and mesonotum yellowish orange, præscutum with three vaguely differentiated deeper orange stripes, lateral borders clearer yellow; vestiture of notum virtually lacking, including only two or three weak setæ on the præscutal interspaces; a smaller group of blackened setæ behind the root of the halter. Pleura clearer yellow, unpatterned. Halteres with stem light brown, yellowed at base, knob brownish black. Legs with all coxæ and trochanters clear yellow; femora brownish yellow, clearer yellow basally, tips narrowly blackened; tibiæ brownish black, tips narrowly more blackened; tarsi brownish black; claws of male small, simple. Wings (Plate 1, fig. 5)

strongly suffused with brown, prearcular and costal fields, together with the space between the cubital branches, more yellowed; stigma dark brown; restricted obliterative areas before stigma and across base of cell 1st  $M_2$ ; veins dark brown, more yellowish brown in the brightened areas. Veins beyond cord with abundant macrotrichia of moderate length, including full series on veins  $M_{1+2}$ ,  $M_1$  and  $M_2$ , and for almost the full length of  $M_3$  and  $M_4$ ; no trichia on  $R_{1+2}$ ; basad of cord, lacking on  $Rs$ ,  $Cu_1$  and anal veins; a few trichia on extreme outer end of vein  $M$ ; prearcular anal vein with trichia; squama naked. Venation:  $Sc_2$  ending at near two-thirds to three-fourths the length of  $Rs$ , longer than  $m-cu$ ; cell  $M_1$  very deep, its petiole about one-half to two-thirds  $m$ ; cell 2nd  $A$  narrow.

Basal abdominal segments brownish yellow, beyond the fourth brownish black, including the eighth segment and hypopygium; in the female, tergites more extensively darkened, proximal two segments yellowed on sides, intermediate segments brownish black, with pale posterior borders, subterminal segments black; ovipositor horn yellow, basal shield blackened on proximal two-thirds. Male hypopygium (Plate 3, fig. 29) with the tergite,  $t$ , blackened, narrowed outwardly into a flattened yellow blade, the tip split into two rounded lobes that are provided with blackened spicules, these passing into long black setæ on outer margins. Region of ninth sternite with a loose pencil of relatively few long yellow setæ. Outer dististyle,  $d$ , yellow, strongly pointed outwardly, the apex and inner margin with four or five blackened spinoid setæ, more basally these becoming long normal bristles; outer or convex margin at near midlength with more abundant long black setæ, outwardly the setæ yellow, fewer but long; inner style distinctive, body yellow, beak short, broadly truncated at tip, lower beak blackened, its apex more narrowly truncate; apex of style with a few yellow setæ; outer basal lobe large, blackened, constricted at near midlength, the slightly expanded head setiferous, produced into a long dagger-like black spine. Phallosome including bladelike gonapophyses and the needlelike ædeagus. Eighth sternite,  $8s$ , broad, the posterior border extensively membranous, fringed with abundant long yellow setæ arranged in three groups, those of the incurved lateral groups longer and stronger than the more abundant but somewhat shorter central setæ; punctures of the latter small but very dense.

*Habitat*.—Sikkim.

Holotype, male, Manu, altitude 4,920 feet, May 10, 1959 (Schmid). Allotopotype, female. Paratopotypes, 1 male, 1 female, with the type.

*Tipula (Indotipula) pugionis* is quite distinct from other generally similar regional species in the structure of the male hypopygium, particularly the dististyles. The fly is most similar to species such as *T. (I.) walkeri* Brunetti, yet quite distinct. Edwards provided brief additional notes on the type of *T. (I.) fulvipennis* Walker, the preoccupied name that was re-named by Brunetti as above, and these further observations indicate differences in coloration of the body and legs, structure of the antennæ, and coloration and venation of the wings.

**TIPULA (INDOTIPULA) SUBDILATA** sp. nov.

Plate 3, fig. 28.

Size medium (wing of male about 12.5 millimeters); general coloration of thoracic notum brown, pleura darkened in front, more yellowed posteriorly; wings strongly darkened, stigma dark brown; veins  $M_1$  and  $M_2$  with numerous macrotrichia; petiole of cell  $M_1$  about one-half m; male hypopygium with the tergite terminating in two spiculose lobes; margin of outer dististyle expanded at near one-third the length, inner style unusually compact, without a well-developed outer basal lobe.

*Male*.—Length, about 10 to 10.5 millimeters; wing, 12 to 12.5; antenna, about 3.7 to 3.8.

Frontal prolongation of head yellowish brown, paler ventrally, nasus elongate; palpi yellowish brown. Antennæ with scape and pedicel yellow, flagellum black; flagellar segments subcylindrical, with very small basal enlargements, the segments slightly exceeding the longest verticils. Head with the front and cephalic end of anterior vertex orange, the remainder of vertex dark brown, with indications of a capillary darker vitta; vertical tubercle very small, indistinctly divided; occipital region vaguely yellowed.

Pronotum brown. Mesonotal præscutum with four pale brown stripes that are scarcely differentiated from the ground but indicated by slightly darker margins, lateral borders more yellowed; scutum brown on anterior half, the posterior part of each lobe more brownish yellow; scutellum yellow, the outer

end infuscated, parascutella yellowed; mediotergite obscure yellow, pleurotergite infuscated on posterior half, yellowed anteriorly; præscutal setæ exceedingly small and sparse. Propleura and mesepisternum darkened, mesepimeron and meron more yellowed. Halteres dark brown, base of stem restrictedly yellowed. Legs with coxæ obscure yellow, fore pair slightly more darkened; trochanters yellow; remainder of legs brownish black, femoral bases yellowed, more narrowly so on posterior pair; claws of male toothed. Wings strongly darkened, prearcular and costal fields more yellowed; stigma oval, darker brown; small but evident oblitative areas before stigma and across base of cell 1st  $M_2$ ; veins dark brown. Veins  $M_1$ ,  $M_2$  and, in cases,  $M_3$  with numerous macrotrichia,  $M_4$ , Cu and anals glabrous; a few strong trichia on the prearcular anal vein. Venation: Cell  $M_1$  very deep, its petiole about one-half m or less.

Abdomen brownish yellow, intermediate tergites patterned with brown, the posterior borders narrowly pale; basal sternites yellow; subterminal segments dark brown, outer ones brownish black. Male hypopygium (Plate 3, fig. 28) with the tergite, *t*, narrowed outwardly, posterior border terminating in two subtriangular lobes that are separated by a U-shaped notch, lobes with microscopic black spinoid setæ at and near apex with normal black setæ more basad. Outer dististyle, *d*, relatively stout, strongly darkened basally, at near one-third the length with the margin strongly expanded; inner style unusually compact, beak relatively slender, pale, lower beak low, strongly blackened; outer crest and margin with strong yellow setæ; no well developed outer basal lobe. Eighth sternite unmodified.

*Habitat*.—Sikkim.

Holotype, male, Palam, altitude 5,100 feet, April 25, 1959 (*Schmid*). Paratypes, male, Teng, altitude 4,600 feet, May 12, 1959 (*Schmid*); male, Zomphuk, altitude 6,500 feet, October 1, 1959 (*Schmid*).

*Tipula* (*Indotipula*) *subdilata* is generally similar to some other regional species having darkened wings, very deep cell  $M_1$ , and setose outer wing veins, such including *T. (I.) diacaena* sp. nov., *T. (I.) pugionis* sp. nov., and *T. (I.) varuna* sp. nov., all differing among themselves in hypopygial characters. In the present fly, the outer basal lobe of the inner dististyle is lacking or virtually so.

**TIPULA (INDOTIPULA) SUDRA** sp. nov.

Plate 1, fig. 6; Plate 4, fig. 30.

Allied to *divisa*; general coloration of præscutum brownish gray, with four stripes that are broadly margined with cinnamon brown; pleura light yellow with a conspicuous cinnamon brown area on mesepisternum; wings strongly tinged with yellowish brown, the costal border and stigma darker; outer medial veins with trichia; male hypopygium large, black; tergite conspicuously emarginate, the large lobes with blackened spicules and long conspicuous setæ; inner dististyle with the outer basal lobe strongly developed into a blackened spine; ninth sternite with two very long lobes that are tufted with long flattened setæ.

*Male*.—Length about 12 to 13.5 millimeters; wing 15 to 16; antenna about 4.6 to 5.

Frontal prolongation of head, including nasus, light yellow, dark brown beneath and on sides. Antennæ with scape and pedicel obscure yellow flagellum black; segments subequal to the longest verticils, basal enlargements small. Front and anterior vertex surrounding the antennæ light yellow, posterior vertex brownish gray, with a capillary blackened central vitta.

Pronotum light brown, the sides broadly light yellow. Mesonotal præscutum with four brownish gray stripes that are broadly margined with cinnamon brown, the humeral and lateral areas yellowed; scutum cinnamon brown; scutellum and postnotum orange, the former more yellowed basally. Pleura light yellow, anterior half of mesepisternum conspicuously cinnamon brown. Halteres with stem brownish yellow, knob dark brown, the tip narrowly pale. Legs with coxæ and trochanters yellow; femora brownish yellow, tips narrowly blackened; tibiæ and tarsi blackened; claws of male bidentate, having a basal tooth additional to the one at midlength. Wings (Plate 1, fig. 6) strongly tinged with yellowish brown, cells C and Sc, with the stigma, darker brown; obliterative areas before stigma and across base of cell 1st  $M_2$ ; veins brown. Numerous macrotrichia on outer radial veins, excepting base of  $R_{1+2}$  in cases;  $M_1$ ,  $M_2$  and tip of  $M_3$  with trichia. Venation: Rs longer than m-cu; cell  $M_1$  deep, its petiole subequal to or shorter than m; cell 2nd A narrow.

Abdominal tergites dark brown, the posterior borders narrowly paler; sternites yellow, eighth and ninth segments brown-

ish black. Male hypopygium (Plate 4, fig. 30) large, brownish black. Ninth tergite, *t*, large, narrowed outwardly, terminating in two large lobes, tips rounded, with blackened spicules and more abundant long black setæ; inner margins of lobes at base incurved and slightly produced to form two small intermediate lobules. Ninth sternite, *9s*, with very strong lobes tufted with long flattened setæ to form a dense brush, the setæ subequal in length to the lobes, the more basal ones small. Outer dististyle, *d*, long and narrow, with conspicuous setæ, tip obtuse; inner style with beak relatively slender, dorsal crest small and pointed; outer basal lobe very large and conspicuous, terminating in a blackened spine or hook that bears a secondary lateral spine near base (not clearly evident in some cases and the possibility exists that these structures are asymmetrical on the two sides). Eighth sternite unmodified.

*Habitat*.—India (Kumaon, North Bengal, Sikkim).

Holotype, male, Pau Kal, Teri Garhwal, Kumaon, altitude 4,000 to 5,000 feet, April 21, 1958 (*Schmid*). Paratopotype, 1 male, with the type. Paratypes, male, Jaspur, Teri Garhwal, Kumaon, altitude 3,500 to 5,000 feet, April 15, 1958 (*Schmid*); male, Kurseong, North Bengal, altitude 5,455 feet, August 25, 1958 (*Camilleri*); male, Manu, Sikkim, altitude 4,920 feet, May 10, 1959 (*Schmid*).

The most similar species include *Tipula* (*Indotipula*) *divisa* Brunetti and *T. (I.) elegantula* Brunetti, which, while evidently allied, disagree in several important regards. Edwards had examined typical material of both species and has provided some further notes. It does not seem that Edwards would have overlooked the major spines of the inner dististyle characteristic of the present fly.

**TIPULA (INDOTIPULA) VARUNA** sp. nov.

Plate 1, fig. 7; Plate 4, fig. 31.

Size relatively large (wing of male 14 millimeters); præscutum with lateral borders broadly yellow, disk with four brown stripes; scutellum yellow; pleura darkened anteriorly, paler behind; wings brown, prearcular and costal fields more yellowish brown; outer wing veins with abundant macrotrichia, cell  $M_1$  deep; male hypopygium with tergite blackened, the lobes subtended by narrower lateral arms; outer dististyle long and narrow, near tip with strong black spinoid setæ, inner style



complex, outer basal lobe very large, spinous; eighth sternite unmodified.

*Male*.—Length, about 12 millimeters; wing, 14; antenna, about 4.

Frontal prolongation of head buffy yellow above, including nasus, brown on lower half; palpi black. Antennæ with scape obscure yellow, pedicel clearer yellow, flagellum black; flagellar segments with small but conspicuous basal enlargements with very long setæ that are subequal to or a little longer than the segments. Head brownish gray, the front and a circular area surrounding each antennal fossa yellow, bordered behind by a narrow transverse brown band.

Cervical region yellow, pronotum brown. Mesonotal præscutum with humeral and lateral borders broadly yellow, disk with four brown stripes, best indicated by darker margins, the cephalic ends of the intermediate pair more brownish yellow; interspaces grayish brown; scutum obscure yellow medially, the lobes patterned with brown, becoming brownish black laterally in front at the suture; scutellum yellow, parascutella darker; mediotergite yellow, pleurotergite darker above, the lower margin obscure yellow. Pleura with mesepisternum darkened anteriorly, the posterior part and propleura less evidently darkened, posterior pleurites more reddish yellow; dorsopleural membrane brown, paler behind. Halteres with stem infuscated, obscure yellow at base, knob brownish black. Legs with coxæ reddish yellow; trochanters yellow; remainder of legs dark brown, tarsi and tips of femora more blackened; claws of male conspicuously toothed. Wings (Plate 1, fig. 7) strongly suffused with brown, prearcular and costal fields more yellowish brown; stigma long-oval, dark brown; obliterative areas before stigma and across base of cell 1st  $M_2$  small but conspicuous, especially the latter; veins brown. Veins beyond cord with abundant macrotrichia, including all outer branches of  $M$ , lacking on all but base of  $R_{1+2}$ , sparse on  $M_4$ ; basad of cord lacking on  $R_s$ ,  $Cu$  and anals, with a single trichium near tip of 1st  $A$ . Venation: Cell  $M_1$  deep, its petiole about one-half  $m$ ;  $m-cu$  close to fork of  $M_{3+4}$ ; cell 2nd  $A$  relatively narrow, especially on basal half.

Abdominal tergites brown, more reddened on first segment, sternites more reddish yellow; hypopygium black. Male hypo-

pygium (Plate 4, fig. 13) with the ninth tergite, *t*, black, produced caudad into conspicuous lobes, subtended laterally by slightly shorter and more slender lobes, their outer faces with delicate setulæ, inner margins with sparse coarse setæ; outer margins of central lobes fringed with conspicuous setæ, apex and inner margin with sparse denticles; median region of ventral surface on either side produced into a blackened plate. Ninth sternite beneath on either side with a rounded lobe that is densely set with small setæ, subtended at base by a pencil of long yellow bristles. Outer dististyle, *d*, long and narrow, the base dilated, tip decurved; outer end with several strong black spinoid setæ, longer on the decurved part, outer margin of stem with numerous long normal setæ; inner style complex, the body with a small pale beak and a larger blackened lower beak, its apex microscopically roughened; immediately back from beak on outer margin with a long narrow yellow dorsal crest, paling into membrane outwardly; outer basal lobe very large and conspicuous, blackened, exceeding in area the body of the style, bilobed into a flattened inner blade and a narrower outer arm that terminates in a stout blunt spine with a further acute spine on margin. Phallosome with the apophyses appearing as narrow yellow blades, subequal in length to the slender ædeagus. Eighth sternite unmodified, with sparse setæ.

*Habitat*.—Sikkim.

Holotype, male, Teng, altitude 4,600 feet, May 12, 1959 (*Schmid*).

*Tipula (Indotipula) varuna* is readily told from the other now numerous known species of the subgenus that have cell  $M_1$  of the wings very deep and the outer veins with trichia by the somewhat remarkable male hypopygium. Lateral arms on the tergite are likewise found in *T. (I.) palnica* Edwards, an entirely different fly in all other regards.

**TIPULA (VESTIPLEX) DORON** sp. nov.

Plate 1, fig. 8; Plate 4, fig. 32.

Size medium (wing of male 15 millimeters); wings of female semiatrophied; general coloration of mesonotum gray, the præscutum with four stripes, intermediate pair darker; central region of scutellum and mediotergite broadly blackened; wings light brown, vaguely patterned with darker brown and more yellowed areas; abdomen orange yellow, basal tergites with three

very conspicuous entire black stripes, outer segments uniformly blackened; each cercus of ovipositor with two rows of small teeth; male hypopygium with posterior border of tergite broadly emarginate; appendage of ninth sternite conspicuous, narrowed to a point; outer margin of basistyle with a quadrate blackened glabrous lobe.

*Male*.—Length, about 14 millimeters; wings, 15; antenna, about 5.

*Female*.—Length, about 13 millimeters; wing, 6.5; antenna, about 2.8.

*Male*.—Frontal prolongation of head of moderate length, slightly shorter than remainder of head, light gray above, brownish black laterally and beneath; nasus distinct, palpi black. Antennæ with scape and pedicel yellowish brown, flagellum black; flagellar segments with strong basal enlargements, clothed with dense black setulæ; verticils shorter than the segments, outspreading, five to each segment. Head light gray, more infuscated on the genæ; central area of vertex weakly darkened, with a very conspicuous capillary black median line, extending from the very narrow elevated vertical tubercle almost to the occiput, posterior orbits more yellowed.

Pronotum gray, patterned with dark brown, scutum above with dense short black setæ. Mesonotal præscutum with the humeral region light gray, posterior interspaces more infuscated; disk with four stripes, intermediate pair darker, virtually confluent, lateral stripes gray, indistinctly margined internally with brown, outer borders narrowly darker brown; scutellum virtually covered by a black line that extends cephalad over the central part of the scutum, parascutella and remainder of scutellum light gray; mediotergite yellow pollinose, especially behind, with a large black central area, pointed posteriorly; pleurotergite more yellowed, darker above; vestiture of scutellum and mediotergite sparse and almost microscopic. Pleura yellowish brown above, clearer gray below; dorsopleural membrane dark brown. Halteres relatively short, reddish brown, the elongate knobs black. Legs with coxæ gray, the fore pair darkened anteriorly, all with long white setæ; trochanters obscure yellow to brownish yellow; femora brownish black, bases broadly more yellowed; tibiæ brown, paler basally, passing into brownish black; tarsi black, proximal end of basitarsus slightly paler;

claws of male enlarged at base, produced into small tooth. Wings (Plate 1, fig 8) with disk light brown, vaguely patterned with more yellowed areas, chiefly in the basal cells, including also a poststigmatal band extending posteriorly into cell 1st  $M_2$ ; slightly darker areas at arculus, origin of Rs, stigma and anterior cord, somewhat less evident in cell M and in outer radial cells; cell Sc yellow; veins brown, Sc and  $Cu_2$  more yellowed. Squama naked; veins beyond cord with numerous small trichia, lacking on outer half of  $R_{1+2}$ , bases of  $M_1$ ,  $M_2$  and  $M_3$ , all sections of  $M_{1+2}$  and  $M_4$ ; distal section of  $Cu_1$  with trichia on central half; no trichia on Rs, M or 1st A; a strong series on more than outer half of 2nd A; a very few on prearcular section of 1st A. Venation:  $R_{1+2}$  preserved; Rs nearly twice m-cu; cell  $M_1$  about one-third longer than its petiole.

Abdominal tergites conspicuously orange yellow, with three very conspicuous entire black stripes, the lateral ones slightly wider than the median line and about two-thirds as broad as the ground interspaces; sternites yellow, the more proximal segments weakly darkened, posterior end of sternite two and succeeding segments broadly darkened medially, more heavily so at posterior end of each segment; outer segments, including hypopygium, blackened. Male hypopygium (Plate 4, fig. 32) with the tergite, *t*, transverse, posterior border with a broad V-shaped emargination, the lobes triangular, their mesal edge straight, fringed with short black recurved setæ. Appendage of ninth sternite conspicuous, the outer end narrowed to a subacute point, outer surface with very long setæ over much of the length. Basistyle, *b*, with a quadrate blackened lobe on margin, its outer angles rounded, surface glabrous. Outer dististyle, *d*, dusky, relatively short, apex obtuse, surface with abundant short setæ, marginal ones recurved; inner style with beak conspicuous, apex obtuse, lower beak low, blackened; outer crest with abundant coarse black setæ, more numerous posteriorly. *Æ*deagus triangular in outline, broad at base.

*Female*.—Coloration as in male, showing only slight differences. Wings semiatrophied, as shown by the measurements, almost uniformly medium brown; veins slightly darker; cell  $M_1$  longer than in *tardigrada*. Ovipositor with cerci large, both the ventral and lateral serrulations small and numerous; hypovalvæ profoundly separated at midline, the outer ends more narrowed, obtuse at tips.

*Habitat*.—Sikkim.

Holotype, male, Gey, altitude 11,650 feet, in *Rhododendron* association, May 18, 1959 (*Schmid*). Allotopotype, female, in copula, pinned with type.

The most similar species is *Tipula (Vestiplex) tardigrada* Edwards, of Yunnan, which has the wings of the female reduced to a comparable degree and with the general structure of the hypopygium somewhat the same. The two flies differ in the coloration, including the antennæ, body and wings, and in details of structure of the hypopygium.

**TIPULA (VESTIPLEX) TANYCERA sp. nov.**

Plate 4, fig. 33.

Allied to *mitchelli*; size large (wing of male about 20 millimeters); antennæ of male elongate (about 8.5); thorax gray, præscutum with four stripes that are narrowly bordered by dark brown, the lateral stripes clear gray; wings brown, variegated by whitish and darker areas; abdomen chiefly orange yellow, tergites darkened sublaterally; male hypopygium with basistyle unarmed; tergal saucer blackened, lateral tooth far caudad, posterior border with variable crenulations; inner dististyle with a conspicuous blackened tooth at near midlength; ædeagus slender, subtended by long pale angulated gonapophyses.

*Male*.—Length, about 19 to 20 millimeters; wing, 20 to 21; antenna, about 8.5 to 8.7.

*Female*.—Length, about 22 millimeters; wing, 17.

Frontal prolongation of head brownish above, darker brown on sides; nasus stout; palpi brownish black. Antennæ of male 13-segmented, elongate; scape and pedicel yellow, flagellum black; flagellar segments beyond the first strongly incised, with conspicuous basal enlargements, the pedicels slender and sinuous, longest verticils not exceeding two-thirds the length of the segments. Head gray, yellowed on front, with a narrow dark brown capillary line extending from the summit of the entire vertical tubercle onto the posterior vertex, narrowed behind, not reaching the occiput.

Pronotum brownish gray, scutum with a narrow brown central line. Mesonotal præscutum brownish gray, with four stripes that are narrowly bordered by dark brown, lateral stripes clear

blue gray, intermediate pair duller gray; scutum with lobes chiefly covered by two confluent blue-gray areas that are bordered by brown, restricting the gray central area to a narrow line; scutellum gray with a brown median vitta; mediotergite gray with a capillary brownish black central line, pleurotergite light gray; vestiture of mesonotum short and sparse. Pleura light gray on dorsal sternopleurite, the remainder chiefly clearer blue gray; dorsopleural membrane dull yellow. Halteres with stem pale yellow, more orange at base, knob dark brown. Legs with coxæ light gray; trochanters yellow, with a dark spot beneath; femora brownish yellow, tips narrowly and inconspicuously black, the amount subequal on all legs, on posterior pair including about the outer tenth; tibiæ yellowish brown, tips narrowly more darkened; basitarsi light brown, outer segments passing into black; claws of male small, simple. Wings brown, variegated with whitened areas; prearcular and costal fields more yellowed, especially cell Sc; stigma small, brownish yellow; darker brown spots at origin of Rs, cord and two in cell R, these enclosing a more or less distinct whitened area; other major whitenings before and beyond stigma, in outer half of cell R, and in the broad bases of cells Cu and 1st A; oblitative area across cell 1st M<sub>2</sub> slightly more whitened, conspicuous; veins brown, more brownish yellow in the yellowed areas. Veins beyond cord with relatively sparse and scattered macrotrichia, lacking on R<sub>2+3</sub>, R<sub>3</sub>, all but tips of outer medial veins, and extensively lacking before cord, there being none on Rs, M or 1st A, very few on basal section of Cu<sub>1</sub>, more numerous on outer third of 2nd A; squama naked. Venation: Rs about one-half longer than m-cu; petiole of cell M<sub>1</sub> subequal to or shorter than m.

Abdomen chiefly orange yellow, tergites with a broad pale brown sublateral line, more evident on the proximal segments, lateral margins buffy; outer segments slightly more darkened. Ovipositor with cerci microscopically toothed on outer two-thirds only, distinct on about the outer half, the more proximal teeth small and sparse; hypovalvæ produced into long needlelike points, separated from the truncated sides by a deep U-shaped notch, somewhat as in *pallidicosta*. Male hypopygium (Plate 4, fig. 33) with the tergal saucer *t*, heavily blackened, the acute lateral tooth far caudad; posterior margin variable as regards toothings and crenulations, two conditions being illustrated; la-

teral tooth largest, obtuse, appearing more acute when viewed from the side. Basistyle, *b*, unarmed. Outer dististyle, *d*, broad, its total length less than three times the width; inner style simple, its outer margin with a conspicuous blackened tooth, the tip obtuse. Ædeagus long and slender, subtended on either side at base by a large pale gonapophysis that is angularly bent at near midlength.

*Habitat*.—Pakistan.

Holotype, male, Salf-ul-Maluk Sar, Northwest Frontier Province, altitude 11,000 feet, along lake margin, July 2, 1953 (*Schmid*). Allotopotype, female, pinned with a paratopotype male. Paratopotypes, 3 males; paratypes, 5 males, Kalarian Baihk, Northwest Frontier Province, altitude 11,270 feet, along lake delta, July 13, 1953 (*Schmid*).

The most similar species is *Tipula (Vestiplex) mitchelli* Edwards, likewise from the northwestern Himalayas, differing evidently in the armature of the tergal plate, both dististyles, and the phallosome. The hypopygial details in *mitchelli* have been described and illustrated in the references cited below.\*

TIPULA (OREOMYZA) FAUTRIX sp. nov.

Plate 1, fig. 9; Plate 4, fig. 34.

Belongs to the *variipennis* group; size medium (wing of male 14 millimeters); general coloration gray, præscutum with four brown stripes, pleura slightly patterned; antennæ with basal segments yellow, flagellum black; frontal prolongation of head unusually long, without nasus; legs black, femoral bases narrowly yellow; wings yellow, variegated with light and darker brown;  $R_{1+2}$  chiefly atrophied; basal abdominal segments yellow, slightly lined with brown, outer segments black; male hypopygium with tergite emarginate, lateral lobes obtuse, glabrous at tips; phallosome with lateral apophyses elongate, each terminating in a strong reddish spine.

*Male*.—Length, about 13 millimeters; wing, 14 antenna, about 4.1.

Frontal prolongation of head black, pruinose, unusually long, subequal to remainder of head; no nasus; palpi black. Antennæ with scape obscure yellow, weakly patterned with brown

\* Alexander, C. P., Records Indian Mus. 44 (1942) 39.

Savtshenko, E. N., Horæ Soc. Ent. Union Sovet. 47 (1960).

at either end; pedicel yellow, flagellum black, basal two-thirds of first segment obscure yellow; basal enlargements of segments small, verticils shorter than the segments. Head light gray in front, slightly infuscated behind, especially on central part; posterior orbits gray; vertical tubercle conspicuous, rounded; setæ of anterior vertex small and sparse with only about four on either side.

Pronotum gray, patterned medially and at lateral ends with dark brown. Mesonotal præscutum yellowish gray, with four brown stripes, the narrow intermediate pair only slightly wider than the median interspace, lateral stripes with the posterior end paling to gray; scutum gray, each lobe with two brown areas, the posterior one more than four times as extensive as the others, central region behind weakly darkened; posterior sclerites of notum gray, with a darker central vitta, the mediotergite further darkened sublaterally; pleurotergite gray, brighter on the katapleurotergite. Pleura yellowish gray, the propleura darkened; anepisternum, ventral sternopleurite and meron paler brownish gray; dorsopleural membrane light brown. Halteres with stem yellow, knob brownish black. Legs with coxæ buffy yellow, fore pair slightly darker; trochanters yellow; remainder of legs black, femoral bases narrowly yellowed, a little more extensively so on fore pair; claws with small tooth. Wings (Plate 1, fig. 9) with the restricted ground cream yellow, the prearcular and costal fields bright yellow, especially cell Sc; a conspicuous pale brown and darker brown pattern, including the stigma and slightly paler brown clouds at origin of Rs, anterior cord and before midlength of cells R and M; the paler brown pattern includes all cells distad of level of outer end of cell 1st  $M_2$ , there being no brightening in the outer radial and medial fields; basad of cord the yellow and pale brown areas subequal in extent; a conspicuous whitened oblitative area in bases of cells 1st  $M_2$  and  $M_3$ , the prestigmal whitened area very small; yellow areas beyond stigma in bases of cells  $R_2$  and  $R_3$  relatively small, barely entering cell  $R_3$ ; veins brown, yellow in the brightened fields, especially Sc, R,  $Cu_2$  and the prearcular veins. Macrotrichia on outer radial veins and distal ends of all outer medial veins, lacking on Sc, Rs, main stems of M and Cu and 1st A; 2nd A with a few scattered trichia on central portion; prearcular veins glabrous. Venation:  $R_{1+2}$  virtually atrophied, represented by a faint basal spur; Rs about twice



the oblique m-cu; basal section of  $R_{4+5}$  reduced; m-cu on  $M_4$  some distance beyond the origin, leaving a transverse basal section of the latter that is subequal to or only a little shorter than  $M_{3+4}$ ; cell 1st  $M_2$  relatively large.

Abdomen with basal three tergites yellow, with indications of a pale brown central stripe, best indicated on posterior part, and darker sublateral lines, the margin of outer half of each segment light gray pruinose; tergite four darker, the sublateral stripe and gray border more evident; basal sternites yellow; segments five to nine black, the hypopygial dististyles pale. Male hypopygium (Plate 4, fig. 34) with the tergite, *t*, large, posterior border produced into two lobes, obtuse, tips glabrous; median area with a narrow secondary U-shaped notch, the cephalic part of tergal plate with a central furrow. Outer dististyle, *d*, simple, gradually narrowed outwardly, tip obtuse, the length of style about four times the greatest width; inner style massive, beak slender, lower beak stouter, with tip rounded, both beaks blackened; outer basal lobe pale, covered with dense pale setulæ and fewer setæ; dorsal crest almost straight, setæ unusually small and sparse. Phallosome, *p*, including two pairs of apophyses, the outer ones elongate, narrowed into a strong reddish spine, with a few microscopic appressed spinules back from tip on inner margin. Eighth sternite unmodified.

*Habitat*.—Sikkim.

Holotype, male, Gey, altitude 11,650 feet, in *Rhododendron* association, May 18, 1959 (*Schmid*).

The generally similar regional species include *Tipula* (*Oreomyza*) *laetabunda* Alexander, *T. (O.) ranee* sp. nov., and some others, all differing among themselves in the wing pattern and in the structure of the male hypopygium.

**TIPULA (OREOMYZA) MYSTAX** sp. nov.

Plate 4, fig. 35.

Belongs to the *variipennis* group; size large (wing of male 16 millimeters); thorax gray, præscutum with four clearly defined black stripes; front of head with abundant long black setæ; antennæ relatively long, black throughout; legs black, claws simple; wings grayish brown, patterned with large whitened areas and sparse darker brown markings; veins unusually glabrous; vein  $R_{1+2}$  entire; abdomen plumbeous, tergites with a poorly indicated brownish black median stripe; male hypo-

pygium with tergite transverse, the broad obtuse lobes yellow; inner dististyle massive, the region of the outer basal lobe bluntly produced.

*Male*.—Length, about 15 millimeters; wing, 16; antenna, about 6.

Frontal prolongation of head black, gray pruinose, especially at base above, nasus distinct; palpi black; region of nasus, sides of the prolongation and front before the antennal bases with abundant black setæ of unusual length. Antennæ black throughout; flagellar segments slightly incised beyond the small basal enlargements; verticils very short and inconspicuous, scarcely as long as the diameter at the point of their insertion. Head dark brown.

Pronotum brownish black. Mesonotal præscutum light gray, with four clearly defined black stripes, the intermediate pair divided by a broad brownish gray line that is about equal in width to the stripes at near their midlength; scutum blue-gray, center of each lobe with a single black area; scutellum dark gray, parascutella brownish black; mediotergite light gray in front, brownish black behind, pleurotergite gray above, darker posteriorly behind. Pleura gray. Halteres with stem light brown, knob brownish black. Legs with coxæ gray; trochanters brownish gray; remainder of legs entirely black; claws simple. Wings grayish brown, patterned with large whitened areas and about three darker brown spots, the largest at origin of  $R_s$ , stigma and over the anterior cord; the pale areas are in the bases of cells R and M, continued backward into cells Cu and 1st A; before and beyond origin of  $R_s$ , the latter larger; at near two-thirds the length of cell M; post-stigmal, extending posteriorly into cell  $R_3$ ; in cells 1st  $M_2$  and base of cell  $M_3$ , and two marginal areas in cell 1st A; cell Sc more uniformly light yellow; veins brown. Veins unusually glabrous, beyond cord with a few trichia on distal section of  $R_{4+5}$ , none on the remaining veins. Venation:  $R_{1+2}$  entire; petiole of cell  $M_1$  a trifle shorter than m; m-cu on  $M_4$  beyond the short vertical base.

Abdominal tergites plumbeous, segments one to three with a vaguely differentiated brownish black median stripe, broadly interrupted at the posterior margins; lateral tergal borders paling to buffy; sternites darker plumbeous; hypopygium, excepting the outer appendages, black. Male hypopygium (Plate 4, fig. 35)

with the tergite, *t*, transverse; posterior border with two broad yellow lobes that are separated by a U-shaped notch that is produced cephalad into a dorsal furrow; lobes with very small pale setæ additional to a group of about four or five black setæ near outer lateral end, margins microscopically crenulate. Basistyle complete, the ventral end with a close group of long yellow setæ that are directed ventrad. Outer dististyle, *d*, flattened, broadest before midlength, gradually narrowed to the obtuse tip; inner style massive, both beaks blackened, obtuse, particularly the lower beak; region of outer basal lobe farther produced into a bluntly obtuse to triangular lobe. Gonapophyses, small, simple. Eighth sternite unmodified.

*Habitat*.—Sikkim.

Holotype, male, Chumzomoi Choka, altitude 11,800 feet, in *Rhododendron* association, July 8, 1959 (*Schmid*).

*Tipula (Oreomyza) mystax* is readily told from other regional members of the *variipennis* group by the large size, coloration of the body, legs and wings, and especially by the unusual development of setæ on the front, suggesting the specific name. It should be noted that virtually all of the other regional members of the group have vein  $R_{1+2}$  chiefly or entirely atrophied, such including *T. (O.) camillerii* Alexander, *T. (O.) faultrix* sp. nov., *T. (O.) laetabunda* Alexander, *T. (O.) ranee* sp. nov. and *T. (O.) striatipennis* Brunetti.

**TIPULA (OREOMYZA) RANEE** sp. nov.

Plate 1, fig. 10.

Size medium (wing of female, 12.5 millimeters); general coloration of thorax gray; præscutum with four brown stripes; antennæ with scape and pedicel light yellow, flagellum black; narrow dark central stripes on head and on posterior sclerites of mesonotum; femora with a yellow subterminal ring; wings whitened, heavily patterned with brown, cells C and Sc light yellow; a nearly complete white crossband beyond cord; tip of vein  $R_{1+2}$  atrophied or subatrophied; cell  $M_1$  deep; lateral borders of abdominal segments narrowly silvery.

*Female*.—Length, about 13 millimeters; wing, 12.5 antenna, about 2.6.

Frontal prolongation of head of moderate length, grayish yellow above, lower half dark brown; nasus long, light yellow. Antennæ with scape and pedicel light yellow, flagellum black;

flagellar segments (female) elongate, a trifle exceeding the longest verticils. Front and vertical tubercle buffy yellow, posterior part of head brownish gray, with a capillary dark brown median vitta.

Pronotum gray, patterned with brown, narrowly but intensely so at midline of scutum. Mesonotal præscutum light gray, with four brown stripes, the intermediate pair obsolete at their anterior ends, relatively narrow, separated by a ground line of about one-half their width; lateral stripes narrower and paler; pseudosutural foveæ reduced to a circular black spot; posterior sclerites of notum light gray, scutal lobes with two brown areas, the posterior one large and distinct; scutellum and mediotergite with a central brown vitta, pleurotergite more infuscated. Pleura gray, dorsopleural membrane light brown. Halteres with stem yellow, knob dark brown. Legs with coxæ yellowish gray; trochanters yellow; femora yellow basally, passing into dark brown, with a broad and conspicuous yellow subterminal ring on all legs; tibiæ and basitarsi light brown, tips darker, remainder of tarsi passing into dark brown. Wings (Plate 1, fig. 10) with the restricted ground white, heavily patterned with brown; prearcular field and cells C and Sc light yellow; white ground areas before and beyond origin of Rs, narrowly interrupted, and beyond midlength of cell M; a nearly complete band beyond cord, virtually crossing the wing, nearly interrupted in cell 1st  $M_2$  and again at posterior margin; pale areas in cell Cu and outer half of cell  $R_5$ ; a common are anear bases of cells Cu and 1st A; bases of both anal cells, two small spots at outer end of cell 1st A, with a still smaller one in cell 2nd A; veins brown, Sc clear light yellow. Abundant macrotrichia on veins beyond cord, including  $R_3$ ,  $R_{4+5}$  and distal ends of outer medial veins; Sc and anal veins glabrous. Venation: Tip of  $R_{1+2}$  atrophied in one wing of type, entire but paler in the other wing; Rs long, nearly three times m-cu; cell  $M_1$  very deep, its petiole about one-third m; basal section of vein  $M_1$  perpendicular, relatively long.

Abdomen evidently discolored, tergites apparently obscure yellow, with a brown central stripe; lateral borders of both tergites and sternites narrowly but conspicuously silvery, these areas bordered internally by dark brown; basal sternites yellow, the outer ones darker. Ovipositor with cerci long and slender, nearly straight; dorsal shield dark brown.

*Habitat*.—India (Kumaon).

Holotype, female, Kulara, Pauri Garhwal, altitude 12,000 feet, August 3, 1958 (*Schmid*).

This attractive fly is most nearly allied to *Tipula (Oreomyza) camillerii* Alexander and *T. (O.) striatipennis* Brunetti, among the described regional species. It is readily told from these and others by the coloration of the body, legs and wings.

# ILLUSTRATIONS

[Legend: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *s*, sternite; *t*, tergite.]

## PLATE 1

- FIG. 1. *Tipula* (*Schummelia*) *lioterga* sp. nov.; venation.  
2. *Tipula* (*Schummelia*) *penicillaris* sp. nov.; venation.  
3. *Tipula* (*Acutipula*) *triplaca* sp. nov.; venation.  
4. *Tipula* (*Indotipula*) *diacæna* sp. nov.; venation.  
5. *Tipula* (*Indotipula*) *pugionis* sp. nov.; venation.  
6. *Tipula* (*Indotipula*) *sudra* sp. nov.; venation.  
7. *Tipula* (*Indotipula*) *varuna* sp. nov.; venation.  
8. *Tipula* (*Vestipleæ*) *doron* sp. nov.; venation.  
9. *Tipula* (*Oreomyza*) *fautrix* sp. nov.; venation.  
10. *Tipula* (*Oreomyza*) *raneæ* sp. nov.; venation.  
11. *Ctenacroscelis perobtus* sp. nov.; male hypopygium.  
12. *Ctenacroscelis nirvana* sp. nov.; male hypopygium.

## PLATE 2

- FIG. 13. *Tipula* (*Bellardina*) *arjunoides* sp. nov.; male hypopygium.  
14. *Tipula* (*Bellardina*) *lithostrota* sp. nov.; male hypopygium.  
15. *Tipula* (*Bellardina*) *oenone* sp. nov.; male hypopygium.  
16. *Tipula* (*Bellardina*) *schmidiana* sp. nov.; male hypopygium.  
17. *Tipula* (*Schummelia*) *lioterga* sp. nov.; male hypopygium.  
18. *Tipula* (*Schummelia*) *nobilior* sp. nov.; male hypopygium.  
19. *Tipula* (*Schummelia*) *penicillaris* sp. nov.; male hypopygium.  
20. *Tipula* (*Acutipula*) *indra* sp. nov.; male hypopygium.

## PLATE 3

- FIG. 21. *Tipula* (*Acutipula*) *kumpa* sp. nov.; male hypopygium.  
22. *Tipula* (*Acutipula*) *sicula* sp. nov.; male hypopygium.  
23. *Tipula* (*Acutipula*) *triplaca* sp. nov.; male hypopygium.  
24. *Tipula* (*Anomaloptera*) *bathroxantha* sp. nov.; male hypopygium.  
25. *Tipula* (*Anomaloptera*) *xanthocera* Alexander; male hypopygium.  
26. *Tipula* (*Indotipula*) *diacæna* sp. nov.; male hypopygium.  
27. *Tipula* (*Indotipula*) *gupta* sp. nov.; male hypopygium.  
28. *Tipula* (*Indotipula*) *subdilata* sp. nov.; male hypopygium.  
29. *Tipula* (*Indotipula*) *pugionis* sp. nov.; male hypopygium.

## PLATE 4

- FIG. 30. *Tipula* (*Indotipula*) *sudra* sp. nov.; male hypopygium.  
31. *Tipula* (*Indotipula*) *varuna* sp. nov.; male hypopygium.  
32. *Tipula* (*Vestipleæ*) *doron* sp. nov.; male hypopygium.  
33. *Tipula* (*Vestipleæ*) *tanycera* sp. nov.; male hypopygium.  
34. *Tipula* (*Oreomyza*) *fautrix* sp. nov.; male hypopygium.  
35. *Tipula* (*Oreomyza*) *mystax* sp. nov.; male hypopygium.

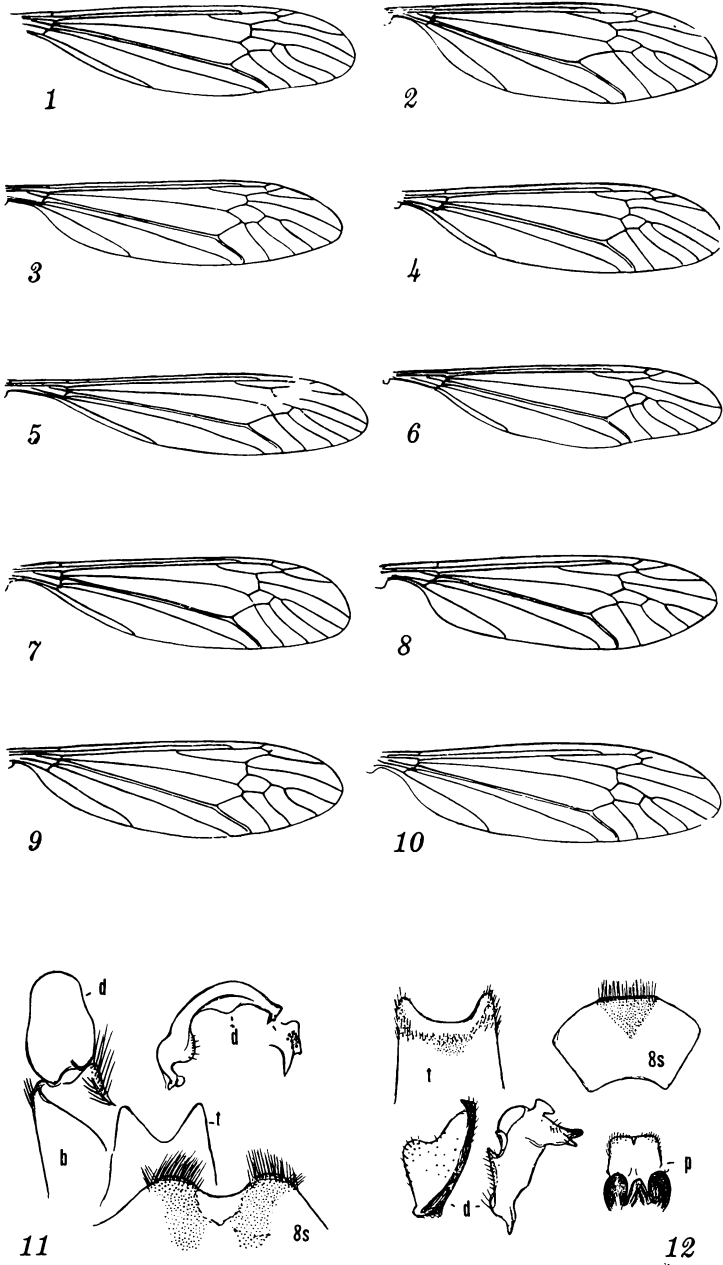
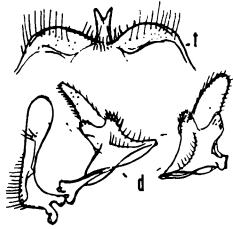
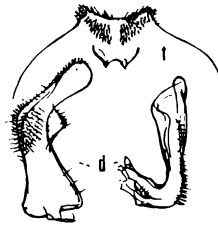


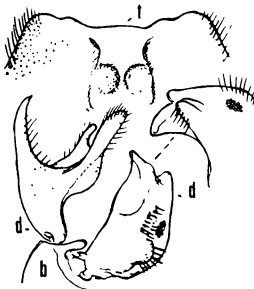
PLATE 1.



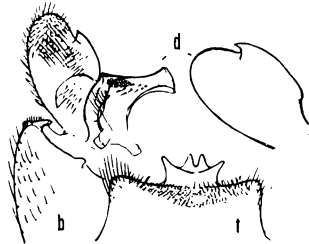
13



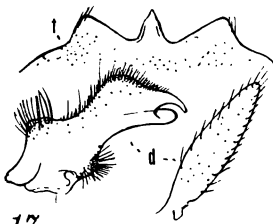
14



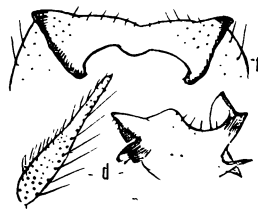
15



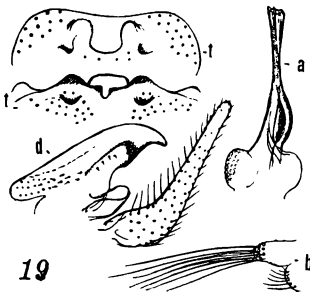
16



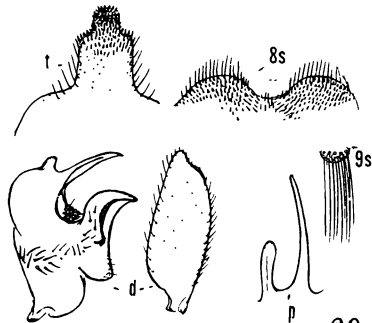
17



18

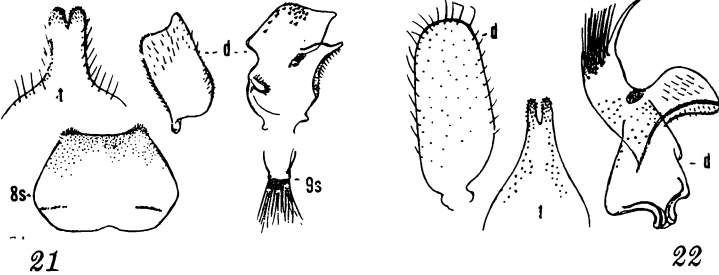


19



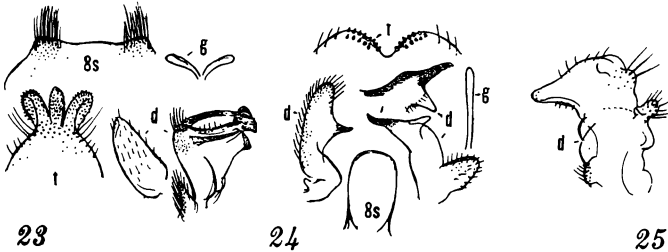
20





21

22



23

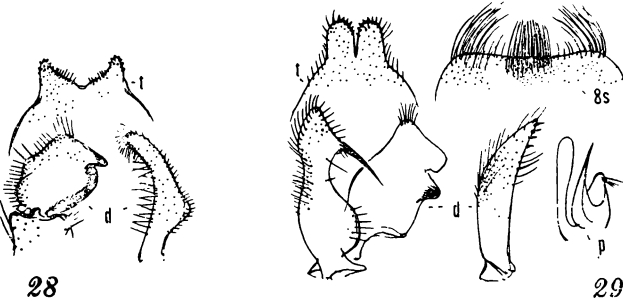
24

25



26

27



28

29

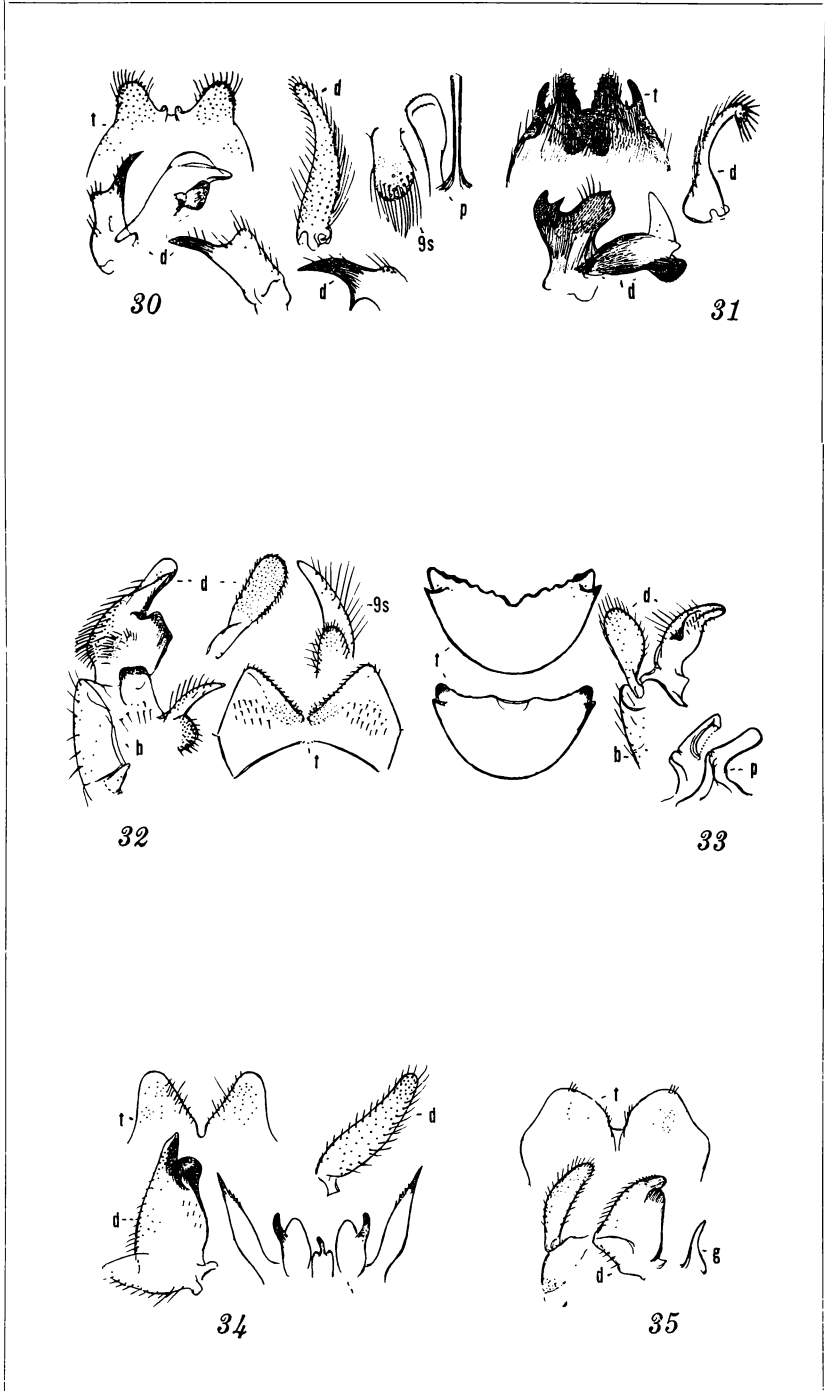


PLATE 4.