

NEW OR LITTLE-KNOW TIPULIDÆ FROM EASTERN
ASIA (DIPTERA), LXI

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 95, No. 3, SEPTEMBER, 1966

MANILA
BUREAU OF PRINTING
1968

045783

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

By CHARLES P. ALEXANDER
Amherst, Massachusetts

(Received for publication, July 6, 1966.)

SEVEN PLATES

The crane flies discussed at this time belong to the two genera *Tipula* Linnæus and *Dolichopeza* Curtis, both in the subfamily Tipulinæ. The majority of the species treated were collected by Dr. Fernand Schmid, in various parts of India, chiefly in Assam, Kumaon, and Sikkim. Certain other species, all belonging to the subgenus *Tipulodina* Enderlein in the genus *Tipula*, were taken by Dr. Edward I. Coher, Dr. Elliott McClure, Mr. P. Susai Nathan and Mrs. M. E. Walsh, in South India and in southeastern Asia. I again wish to express my deep thanks to all of the above for the privilege of retaining the materials in my personal collection.

THIRD LIST OF PATRONYMICS IN THE GENUS TIPULA

The previous lists of names of workers in the Tipulidæ and related families to whom the species had been dedicated appeared in this series of papers, Asia Part 53 (1964) and Asia Part 56 (1965). As stated previously such names include only those of persons who have contributed to our knowledge of some field of study within this group of flies and do not include the further extensive list of collectors to whom the species have been dedicated.

- BELLAMY, RICHARD E.—*Tipula* (*Triplicitipula*) *bellamyi* Alexander.
BRÖLEMANN, HENRY W.—*Tipula* (*Nobilotipula*) *brolemanniana* sp.nov.
(This report).
DOBROTWORSKY, N. V.—*Tipula* (*Vestiplex*) *dobrotworskyana* sp.nov.
(This report).
HEMMINGSSEN, AXEL M.—*Tipula* (*Emodotipula*) *hemmingseni* sp.nov.
(This report).
HINTON, HOWARD E.—*Tipula* (*Emodotipula*) *hintoniana* sp.nov.
(This report).
MASAKI, JUJIRO—*Tipula* (*Nippotipula*) *masakiana* sp.nov.
(This report).
NEEDHAM, JAMES G.—*Tipula* (*Indotipula*) *needhamana* sp.nov.
(This report).

- SCHUMMEL, THEODOR E.—*Tipula (Vestiplex) schummelana* sp.nov.
(This report).
- TONNOIR, ANDRÉ L.—*Tipula (Schummelia) tonnoirana* sp.nov.
(This report).
- WAHLGREN, EINAR—*Tipula (Vestiplex) wahlgrenana* sp.nov.
(This report).
- WARDLE, ROBERT A.—*Tipula (Nobilotipula) wardleana* sp.nov.
(This report).
- WILLIAMS, INEZ W.—*Tipula (Arctotipula) williamsiana* Alexander.
- VAN DER WULP, FREDERIK M.—*Tipula (Indotipula) wulpiana* sp.nov.
(This report).

The novelties described herewith honor Brölemann, Dobrotworsky, Hemmingsen, Hinton, Masaki, Needham, Schummel, Tonnoir, Wahlgren, Wardle, and van der Wulp. The species dedicated to Bellamy¹ was described in 1965, being based on a species from western North America. Dr. Bellamy's outstanding Doctor of Philosophy thesis on the crane flies of northern Florida is still unpublished. The species named for Dr. Inez W. Williams² is in recognition of her classic study of the morphology and wing venation of the primitive crane flies of the family Tanyderidæ. The practice of dedicating species of the genus *Tipula* for students of crane flies will be continued in a later part in this series of papers.

Genus TIPULA Linnaeus

Tipula LINNAEUS, Syst. Natur. Ed. 10 (1758) 585.

TIPULA (NIPPOTIPULA) MASAKIANA sp. nov.

Plate 1, fig. 1; Plate 2, fig. 15.

Allied to *pulcherrima*; mesonotum yellowish gray, very conspicuously patterned with brown; legs light brown, outer trasal segments darker; wings whitened with an extensive pale brown clouded pattern; abdomen relatively short, rich chestnut brown; male hypopygium with posterior border of tergite prolonged into lateral arms that are separated by a U-shaped emargination; inner dististyle very small, the slender blackened beak unequally bidentate; posterior extension of eighth sternite trilobed.

Male.—Length, about 27 millimeters; wing, 23.5; abdomen alone, about 18; antenna, about 6.5.

¹ Alexander C. P. New subgenera and species of crane flies from California (Diptera: Tipulidæ). Pacific Insects 7 (1965) 383-385.

² Williams, Inez W. The external morphology of the primitive tanyderid dipteran *Protoplasma fitchii* O. S., with notes on the other Tanyderidæ. Jour. N.Y. Ent. Soc. 41 (1933) 1-35, 1 fig., 7 plates with 38 figs. [*Tipula (Arctotipula) williamsiana* Alexander, Amer. Mid. Nat. 24 (1940) 611-614, figs. 9, 13].

Frontal prolongation of head yellow, nearly as long as the remainder, nasus lacking; palpi with proximal three segments medium brown, the terminal one black. Antennæ with scape elongate, yellow, dorsal surface with two deep transverse furrows; pedicel very small, yellow; basal flagellar segments light brown, the outer three or four darker; basal enlargements relatively small, verticils longer than the segments. Head light grayish brown, front and narrow orbits clear gray; a dark brown central stripe from summit of the very low vertical tubercle to the occiput; setæ abundant, long and delicate but shorter than those of thorax.

Pronotum restrictedly yellowed, median area and sides brown. Mesonotal præscutum with ground yellowish gray, very conspicuously patterned with brown, with four primary stripes, including a narrow intermediate pair and broader sublaterals; other conspicuous darkenings include the usual interspaces that are expanded anteriorly in the humeral region and the very broad lateral margins; scutum light gray, each lobe with two darker brown primary areas, the broader central region and the lateral borders much paler brown; scutellum light gray, with a pale brown central line; mediotergite light gray on posterior half and narrowly along anterior border, the intermediate band medium brown, pleurotergite more uniformly pale brownish yellow, white pruinose; the entire thoracic dorsum, excepting the parascutella and pleurotergite, with very abundant erect long yellow setæ. Pleura variegated with brown, gray and whitish yellow; brown areas on anepisternum and ventral sternopleurite, whitened parts chiefly along the sutures, dorsopleural membrane pale yellow; pleura with very long setæ, as in the subgenus. Halteres with stem obscure yellow, knob clear light yellow. Legs with coxæ brownish gray, with abundant long setæ; trochanters brownish yellow; remainder of legs light brown, with greenish tints, outer tarsal segments darker; tarsi shorter than tibiæ; claws simple. Wings (Plate 1, fig. 1) whitened, with an extensive but relatively inconspicuous brown pattern; cells C and Sc uniformly pale brown; about four slightly darker brown clouds in radial field, the first at arculus, second midway to origin of Rs, paler posteriorly; third area at origin of Rs, darker on anterior third; fourth cloud at and before fork of Rs, confluent with the slightly darker stigma; other pale brown washes across outer radial cells, beyond midlength

and at end of cell M and as extensive clouds in anal cells; pale marginal spots in centers of cells R₅ to 1st A inclusive; veins chiefly yellow, brownish yellow where seamed with brown clouds. Venation: m-cu before midlength of M₃₊₄.

Abdomen rich chestnut brown, vaguely patterned, the extreme lateral and posterior borders yellowed. Male hypopygium (Plate 2, fig. 15) with posterior border of tergite, *t*, produced into lateral arms that are separated by a shallow U-shaped emargination, the margin narrowly thickened; surface of tergite, including bases of lateral lobes, with very abundant delicate setæ, apices of lobes glabrous. Outer dististyle, *d*, an elongate subrectangular plate, base darkened, remainder brownish yellow, at midlength produced into a brown triangular blade, the margin with a slender spine; inner style much smaller, only about one-third or less the area of the outer; distal third blackened, bent at a right angle, apex unequally bidentate; outer margin at bend with five strong setæ, with numerous longer pale setæ on outer lobe at base. Phallosome, *p*, including the stout ædeagus and shorter very slender rod-like apophyses, their tips only slightly expanded. Eighth sternite, *8s*, relatively large, the posterior extension trilobed, with additional very small lateral earlike projections that bear a few strong setæ; lateral lobes slightly more pointed, with delicate setæ throughout, central projection a more compressed blade, the tip obtuse, surface glabrous.

Habitat.—India (Assam).

Holotype, male, Chug, Kameng, Northeast Frontier Agency, altitude 7,300 feet, April 17, 1961 (*Schmid*).

The species is named for Jujiro Masaki who has made important studies on the biology and control of the economically important rice crane fly, *Tipula* (*Yamatotipula*) *aino* Alexander (1933, 1959).

The most similar species is *Tipula* (*Nippotipula*) *pulcherrima* Brunetti with a wide distribution in the Himalayas. Besides colorational distinctions the two species differ in all details of the male hypopygium, including the tergite, both dististyles, and the eighth sternite.

TIPULA (EMODOTIPULA) HEMMINGSENI sp. nov. Plate 1, fig. 2; Plate 2, figs. 16, 17.

Size large (wing over 18 millimeters); mesonotal præscutum grayish yellow with four narrow brownish gray stripes that are bordered by dark brown; head, scutellum and mediotergite each with a central dark line; wings pale yellow, conspicuously marbled with pale and darker brown, cell C light

yellow, Sc darkened; male hypopygium with posterior border of tergite with paired bifid dorsal lobes and a more ventral lateral cushion; outer dististyle boomerang-shaped, distal half with conspicuous blackened spinoid setæ, inner style with three blackened spines at base of beak; eighth sternite large, strongly constricted at basal fourth, posterior border with conspicuous lateral lobes that bear very long yellow setæ, the intervening margin with somewhat shorter setæ.

Male.—Length, about 16 millimeters; wing, 18.5; antenna, about 3.5.

Frontal prolongation of head relatively small, obscure yellow, sides infuscated; nasus yellow; palpi with proximal three segments medium brown, terminal segment more yellowed. Antennæ short; scape and pedicel light yellow, flagellum brown; segments with basal enlargements small, verticils longer than the segments. Front and vertical tubercle very pale whitish yellow; vertex grayish yellow with a conspicuous light brown central area extending from behind the vertical tubercle to the occiput, narrowed and paler behind.

Pronotal scutum brownish yellow, with three brown areas. Mesonotal præscutum grayish yellow with four narrow brownish gray stripes that are bordered by dark brown, anterior margin and humeral region narrowly darkened; scutum grayish yellow, each lobe with two nearly confluent brownish gray areas, their mesal and anterior borders narrowly brown; scutellum yellow with a very conspicuous dark brown central line, parascutella paler brown; mediotergite gray with a central dark line, the lateral and posterior portions paler brown; mesonotum with abundant erect very long pale setæ. Pleura brownish gray, variegated with darker brown on propleura, anepisternum, ventral sternopleurite and meron; dorsopleural membrane clear yellow anteriorly, more infuscated behind. Halteres with stem and apex of knob yellow, the base of latter infuscated. Legs with coxæ brownish gray; trochanters yellow; femora obscure yellow with a narrow incomplete subterminal brown ring; tibiæ brownish yellow, apices slightly darker; tarsi brownish black; claws small, simple. Wings (Plate 1, fig. 2) with the ground pale yellow, heavily and conspicuously marbled with pale and darker brown; cell C light yellow, Sc darkened, stigma conspicuously yellow, narrowly ringed with brown; darker brown clouds at arculus, along vein Cu in cell M, in outer radial field, and as a major area over outer end of cell 1st M₂ and adjoining veins; paler

brown washes elsewhere on disk, the dark color subequal to or slightly more extensive than the ground; veins brown, light brown in the brightened costal field. Venation: Rs very long, nearly three times m-cu; petiole of cell M_1 about one-half m; m-cu at near three-fourths M_{3+4} ; cell 2nd A relatively narrow.

Abdominal tergites chiefly light brown, base of second segment more yellowed; sternites light yellow, the outer ones more brownish yellow. Male hypopygium (Plate 2, figs. 16, 17) with posterior border of tergite, *t*, with a pair of unequally bifid lobes above, their margins with blackened spicules, more ventrally with a lateral blackened cushion on either side. Outer dististyle, *d*, boomerang-shaped, outer half narrowed with a few blackened spicules at tip, more basally with a semicircular arrangement of strong black setæ; inner style shorter, the beak a flattened dark blade, body of style with three blackened spines, as illustrated. Eighth sternite, *8s*, distinctive, large, margins strongly constricted at basal fourth, posterior border with conspicuous lateral lobes that bear very long yellow setæ, the intervening margin nearly truncate, with somewhat shorter yellow setæ.

Habitat.—India (Assam).

Holotype, male, Shergaon, Kameng, Northeast Frontier Agency, altitude 6,300 feet, May 7, 1961 (*Schmid*).

I am pleased to dedicate this interesting crane fly to Dr. Axel M. Hemmingsen, distinguished student of the biology and ecology of the Tipulidæ in Europe and in the Canary Islands. Attention is directed to an important paper by Hemmingsen on a member of this same subgenus, *Emodotipula* Alexander, the sole European representative, *Tipula* (*Emodotipula*) *saginata* Bergoth.³

TIPULA (EMODOTIPULA) HINTONIANA sp. nov. Plate 1, fig. 3; Plate 2, fig. 18.

Mesonotum yellow, patterned with brown, including four præscutal stripes and a capillary brownish black line extending from the suture to abdomen, pleura yellowed; wings pale yellow, rather sparsely clouded with pale brown; basal abdominal tergites yellowish orange, terminal five segments brownish black; male hypopygium with the inner dististyle blackened outwardly,

³Hemmingsen, A. M. The lotic crane-fly, *Tipula saginata* Bergr., and the adaptive radiation of the Tipulinæ, with a test of Dyar's Law. Vidsk. Medd. fra Dansk naturh. Foren. 128 (1965) 93-150, 8 figs., 2 plates.

the beak irregularly obtuse, outer margin with two strong black spines; eighth sternite with conspicuous lateral lobes on posterior border, median area with two groups of long yellow setæ.

Male.—Length, about 17 millimeters; wing, 18; antenna, about 5.

Frontal prolongation of head light yellow above, including the slender nasus, ventral half dark brown; palpi with proximal two segments dark brown, the fourth and apex of third yellowed. Antennæ relatively short, about one-fourth the wing; scape and pedicel light yellow, flagellum brownish black; basal enlargements of segments relatively small, with long verticils that exceed the segments. Head yellow, more whitened on front and anterior face of the low vertical tubercle; a capillary black central vitta from behind the tubercle to the occiput.

Pronotum yellow, central area of scutum light brown. Mesonotal præscutum yellow, with four light brown stripes that are narrowly margined with darker brown, the intermediate pair narrower, gently sinuous at midlength, slightly widening the median ground interspace; two paler brown lateral areas and a microscopic triangular brownish black dash at extreme anterior end of median interspace; scutum yellow, each lobe with three light brown areas, the inner pair confluent, margined with darker on mesal and cephalic borders, third area occupying the posterior callus; posterior sclerites yellowed, with a capillary brownish black line extending from suture to the abdomen; disk of mediotergite sparsely gray pruinose, pleurotergite light yellow; long conspicuous erect to reclinate yellow setæ on præscutal and scutal interspaces, scutellum and mediotergite, lacking on parascutella and pleurotergite. Pleura yellowed, including the dorsopleural membrane, the latter vaguely darkened behind the anterior spiracle. Halteres with stem light yellow, knob brownish black, its apex paler. Legs with coxæ and trochanters yellow, the former with long yellow setæ; femora obscure brownish yellow, clearer yellow basally, tips brownish black; tibiæ light brown, extreme tips slightly darker; tarsi brownish black; claws simple. Wings (Plate 1, fig. 3) pale yellow, rather sparsely clouded with pale brown, especially beyond the level of Rs, including areas at origin of Rs and outer end of R; larger comparable clouds in outer half of cell M and more extensively in outer ends of cells Cu and 1st A; cord narrowly darkened, beyond this with clouds over outer

end of cell 1st M_2 and across midlength of outer radial cells; wing tip and extreme posterior border of cell 2nd A clouded; stigma yellowish brown, cells C and Sc more saturated yellow; veins brown, slightly more yellowed in the costal field. Anterior branch of Rs without trichia. Venation: Rs long, virtually straight, nearly three times m-cu; vein R_3 arched; m-cu at near three-fourths M_{3+4} ; cell M_1 deep, its petiole about one-fourth to one-third m; cell 2nd A relatively narrow.

Basal abdominal tergites dull yellowish orange, restrictedly patterned with brown on sides, sternites yellow; outer half of fifth and all succeeding segments brownish black. Male hypopygium (Plate 2, fig. 18) with the tergite, *t*, having the margin conspicuously lobed, the apices blackened and with dense microscopic spines having obtuse tips, the inner group larger (in figure only one-half is shown). Basistyle small, the margin with two obtuse darkened lobes at point of insertion of the dististyles. Outer dististyle, *d*, a large stout lobe that narrows gradually outwardly, the apex with several stout black spines, on outer margin of style before midlength with a compact group of about eight long black setæ, with other more slender bristles on disk; inner style smaller, beak blackened, irregularly obtuse at tip, outer margin with two strong black spines. Phallosome, *p*, a depressed-flattened shield-shaped plate, as shown. Eighth sternite, *8s*, distinctive, large, posterior border generally truncate, each lateral angle produced into a conspicuous rounded lobe or knob, its inner margin with setæ, the outer pair very long; median region extensive, fringed with long yellow setæ that are arranged in two more or less separate groups.

Habitat.—India (Assam).

Holotype, male, Nyukmadong, Kameng, Northeast Frontier Agency, altitude 8,000 feet, April 23, 1961 (*Schmid*).

The species is named in honor of Dr. Howard E. Hinton, outstanding student of insect biology and physiology, including the Tipulidæ. Other original members of the subgenus include *Tipula* (*Emodotipula*) *fabriciana* Alexander, *T. (E.) Hemmingseni* sp. nov., *T. (E.) marmoratipennis* Brunetti, *T. (E.) submarmoratipennis* Alexander, and *T. (E.) stylostena* Alexander, all quite different from the present fly in hypopygial structure. The most similar species are *fabriciana* and *hemmingseni*. Extralimital species include *T. (E.) holoteles* Alexander, *T. (E.) multibarbata* Alexander, *T. (E.) multiseta*

Alexander, and *T. (E.) naviculifer* Alexander, in eastern Asia, and *T. (E.) saginata* Bergroth in Europe. A group of somewhat similar species occurring at high altitudes in Tibet and western China had been placed in this general arrangement by Savchenko as the *justa* group in the subgenus *Lunatipula* Edwards, these including *Tipula barnesiana* Alexander, *T. justa* Alexander, *T. minensis* Alexander, and *T. variipetiolearis* Alexander. In a more recent paper [Philip. Jour. Sci. **94** (1965) 235-286, 5 pls.] I have referred these latter species to the subgenus *Triplixtipula* Alexander which otherwise is restricted to the western Nearctic region.

TIPULA (NOBILOTIPULA) BROLEMANNIANA sp. nov.

Plate 1, fig. 4.

Size medium (wing of female 14 millimeters); head yellow, the vertex conspicuously patterned with black, vertical tubercle high; mesonotum yellow, handsomely patterned with black and gray; wings light yellow, outer ends of cell R_3 and R_5 weakly darkened, stigma dark brown, conspicuous; vein R_3 deflected strongly cephalad, cell R_2 correspondingly narrowed; petiole of cell M_1 short; sternites and basal four tergites yellowed, remainder of abdomen black; valves of ovipositor very short.

Female.—Length, about 11.5 millimeters; wing, 14; antenna, about 3.

Frontal prolongation of head orange yellow, relatively short and deep, less than the remainder of head, nasus short and stout; palpi brownish yellow, terminal segment somewhat clearer yellow. Antennæ with scape and pedicel orange, flagellum black, the segments not incised, longer than their verticils. Head with a very high and rounded vertical tubercle; posterior vertex orange, occiput slightly darker; anterior vertex with a transverse nearly continuous velvety black stripe that is very narrowly interrupted at midline; front and vertical tubercle orange, the latter with a vague central plumbeous line; setæ of head microscopic, those of posterior genæ a little longer.

Pronotal scutum light yellow with a scarcely evident pale brown central vitta. Mesonotal præscutum light yellow, handsomely patterned, including two intermediate black stripes that are separated by a reddish gray central line, the stripes paler and narrowed behind, lateral stripes gray, narrowly bordered by light cinnamon brown; posterior sclerites of notum light yellow, each scutal lobe with a long-oval gray area that

is encircled by very pale brown; mesonotum unusually glabrous, scutellum and mediotergite with a few long delicate whitened setæ. Pleura and pleurotergite light yellow, variegated by more orange areas on anepisternum, meron and anapleurotergite; dorsopleural membrane orange. Halteres with stem yellowish brown, base of knob a trifle more darkened, apex pale yellow. Legs with coxæ orange, with long white setæ; trochanters yellow; femora yellow, tips narrowly black; tibiæ more infuscated, tips passing into black; tarsi black. Wings (Plate 1, fig. 4) light yellow, prearcular and costal fields still clearer yellow; outer ends of cells R_3 and R_5 weakly darkened; stigma dark brown, conspicuous; veins dark brown, more yellowed in the brightened fields. Veins beyond cord with numerous macrotrichia, including base of R_{1+2} , R_3 except the outer end, complete series on distal sections of R_{4+5} and M_{1+2} , with fewer on M_2 , lacking on the more posterior veins. Venation: Vein R_3 deflected strongly cephalad, cell R_2 being only about two-thirds as extensive at margin as cell R_5 ; cell M_1 very deep, its petiole one-half m or less.

Abdominal tergites one to four obscure yellow, their posterior borders narrowly more brownish orange, tergites five through eight black, lateral borders narrowly obscure yellow; basal seven sternites light yellow, terminal two brownish black, membrane brownish black. Ovipositor with cerci exceedingly reduced, hypovalvæ a little longer.

Habitat.—India (Assam).

Holotype, female, Nyukmadong, Kameng, Northeast Frontier Agency, altitude 8,000 feet, April 21, 1961 (*Schmid*).

The species is named for Henry W. Brölemann (1860–1933), distinguished student of the World Chilopoda and Diplopoda, author of outstanding paper on the male hypopygium of the European species of *Nephrotoma* (as *Pachyrrhina*)—in Bull. Soc. Hist. Nat. Toulouse 51 (1923) 472–521, 13 plates. The species is quite distinct from the other regional members of the subgenus *Nobilotipula* Alexander, *Tipula* (*Nobilotipula*) *specularis* Alexander and *T. (N.) wardleana* sp.nov., in the coloration of the body, legs and wings and in the trichiation of the wing veins.

TIPULA (NOBILOTIPULA) WARDLEANA sp. nov. Plate 1, fig. 5; Plate 2, fig. 19.

Size large (wing of male 17.5 millimeters); head light yellow, very slightly patterned with darker; antennæ with scape and

pedicel orange, flagellum black; mesothorax light yellow, conspicuously patterned with gray and black; legs black, femoral bases narrowly yellow, claws small, simple; wings strongly infuscated on outer third, base more yellowed, stigma darker brown, veins unusually glabrous; abdomen elongate, basal segments orange yellow with a darker central stripe, fifth and succeeding segments black; male hypopygium quite different in structure from *specularis*.

Male.—Length, about 18 millimeters; wing, 17.5; antenna, about 5.

Frontal prolongation of head light yellow, the dorsum and stout nasus more orange, the latter with abundant black setæ; first segment of palpus and base of second obscure yellow, the remainder brownish black. Antennæ with scape orange, pedicel dull orange, flagellum black, the bases of proximal two segments slightly brightened; basal enlargements of segments moderate in size, verticils dorsal, shorter than the segments. Head light yellow with a small very pale brown cloud on either side of the low entire vertical tubercle.

Pronotal scutum yellow, restrictedly more orange medially, posterior margin, with the propleura, narrowly dark brown. Mesonotal præscutum light yellow with four conspicuous stripes, the intermediate pair confluent except at posterior end, lateral margins broadly black, internal margins gray, lateral stripes with centers narrowly light gray, broadly margined except at posterior end by dull black; scutum light yellow, each lobe with a single clear gray area that is narrowly bordered on mesal and cephalic margins by dull black; scutellum and post-notum orange yellow, posterior border of mediotergite with a pair of oval gray areas, ventral declivity of the katapleurotergite narrowly gray; scutellum and mediotergite with long yellow setæ. Pleura yellow, including the dorsopleural membrane; ventral sternopleurite broadly gray, meral region more narrowly so. Halteres with stem brownish yellow, knob clear orange yellow. Legs with coxæ orange, fore pair very restrictedly darkened basally; trochanters yellow; femora black, bases narrowly yellow, including about the proximal fourth; tibiæ and tarsi black; claws very small, simple. Wings (Plate 1, fig. 5) strongly infuscated outwardly, the proximal two-thirds more yellowed, including much of cell R_1 and bases of cells R_2 and R_3 surrounding the darker brown stigma; veins brown, slightly more yellowed in the brighter parts, especially at

and before the arculus. Veins unusually glabrous, including extensive series of trichia on R_{2+3} and basal two-thirds of R_3 , lacking on R_{4+5} and all medial branches. Venation: Rs gently arcuated; cell M_1 about four times its petiole which is shorter than M; m-cu close to for M_{3+4} .

Abdomen elongate; basal tergites orange yellow with a diffuse dark brown central stripe from base of second segment outward, fifth and succeeding segments, including most of the hypopygium, black; basal sternites orange, each with a light silvery area at lateral border close to apex, including also the adjoining tergal margin, third sternite with a central brown area, fourth with posterior half blackened. Male hypopygium (Plate 2, fig. 19) with the tergite, *t*, large, transverse, posterior border nearly truncate, with a narrow median incision, the outer third of lobes with very numerous short black setæ. Basistyle and ninth sternite, *9s*, closely united, the latter extended into a subtruncated blade, its mesal end farther produced into a blackened lobe, the outer margin corrugated. Outer dististyle, *d*, slightly dilated on outer third, most of the setæ concentrated on this expanded portion and along inner margin; inner style with body oval, extended into a slender beak, its tip obtuse, outer margin with very long erect yellow setæ, lower beak with tip very obtuse. Phallosome, *p*, with a pair of smooth hornlike gonapophyses, lateral margin of each at near midlength with a conspicuous arm with rounded tip. Ædeagus long and very slender.

Habitat.—India (Assam).

Holotype, male, Bomdi La, Kameng, Northeast Frontier Agency, altitude 8,800 feet, April 29, 1961 (*Schmid*).

This interesting fly is named for Professor Robert A. Wardle, author of entomological text books and of two outstanding papers on the structure of crane-fly larvæ [Proc. Zool. Soc. London, Part 1 (1926) 1–23, 22 figs.; Part 2 (1926) 25–48, 17 figs.]. The recent discovery of two further members of the present subgenus is of unusual interest, the regional species being listed under the preceding. As known the subgenus is very small, including in addition to the three species mentioned, also *Tipula* (*Nobilotipula*) *fuiana* Alexander, of Fukien, eastern China, and two in eastern North America, including the subgenotype, *T. (N.) nobilis* Loew. The immature stages of the American species were described briefly by the writer [Crane-flies of New York 2 (1920) 1002–1004].

TIPULA (SCHUMMELIA) TONNOIRANA sp. nov. Plate 1, fig. 6; Plate 2, fig. 20.

Allied to *argentacea*; antennal flagellum beyond the base black; mesonotum yellow, the præscutum with four light brown stripes, scutum and scutellum with a central darkened line, postnotal katapleurotergite silvery, as in the group; wings cream colored, strikingly patterned with brown, prearcular and costal fields orange yellow, cell M_1 sessile or very short-petiolate; abdomen yellowed at base, darkened outwardly, the outer three segments brownish black; male hypopygium large and unusually complex especially the inner dististyle.

Male.—Length, about 11 to 12 millimeters; wing, 13 to 14.5; antenna, about 3.8 to 4.

Female.—Length, about 14 millimeters; wing, 15; antenna, about 3.2.

Frontal prolongation of head dull orange, paler beneath, shorter than remainder; nasus short and stout, tufted with black setæ, palpi black, basal segment paler. Antennæ with proximal three segments yellow, remainder black, the fourth vaguely bicolored; segments subequal to their longest verticils. Front pale yellow, vertex brownish yellow, central area of posterior vertex more infuscated, with a further small brown spot immediately behind each antennal fossa.

Pronotal scutum obscure yellow, broadly pale brown medially, less evident on sides. Mesonotal præscutum with ground yellow, with four light brown stripes that are narrowly bordered by deeper brown, including a delicate median vitta; lateral stripes and centers of scutal lobes more uniformly brown; remainder of mesonotum yellow with a continuous brown central line on scutum and scutellum but not on mediotergite; pleurotergite obscure yellow, the elevated katapleurotergite bright silvery, as in the group; mesonotum with conspicuous setæ, longest on the mediotergite. Pleura yellow. Halteres yellow, knobs more intensely so. Legs with coxæ and trochanters yellow; femora obscure yellow, tips brownish black; tibiæ yellowish brown, tarsi black; claws of male toothed. Wings (Plate 1, fig. 6) restrictedly cream colored, heavily patterned with brown; prearcular and costal fields light orange yellow, stigma darker brown; the darkest wing pattern includes the outer radial field, distal half of cell 1st M_2 , and bases of M_1 and 2nd M_2 , and over the cord, especially m-cu; other conspicuous brown clouds in outer ends of cells M_4 to 2nd A inclusive; paler brown washes in cell R and in cell M adjoining vein Cu; distal ends of outer medial cells yellowed; veins brown,

yellow in the brightened fields. Venation: Rs shorter than the unusually long oblique m-cu; cell M_1 narrowly to more broadly sessile, in cases very short-petiolate; m-cu at near two-thirds M_{3+4} .

Abdomen yellow basally, on segments three to six the tergites slightly more infuscated; outer segments, including the large hypopygium, brownish black. Male hypopygium (Plate 2, fig. 20) with the tergite, *t*, unusually large and massive, blackened, posterior border broadly emarginate, outer angles produced; posterior face concave, on either side extended into a point. Midregion of ninth sternite with a slender projecting sclerotized rod that is directed caudad and ventrad; no blackened setæ as are found in *atrosetosa*. Outer dististyle, *d*, elongate, yellow, narrowed to the tip, provided with conspicuous setæ; inner style distinctive, more complex in structure than in similar species; beak and lower beak slender, blackened, divergent; region of posterior crest produced backward into a long arm that is expanded above into a semihyaline blade, on lower margin at base with a pale lobe that terminates in a blackened point, the region of the outer basal lobe with a stronger black spine, the two decussate.

Habitat.—India (Sikkim).

Holotype, male, Lachung, altitude 8,610 feet, July 2, 1959 (*Schmid*). Allotopotype, female, July 5, 1959. Paratopotypes, 3 males, 1 pinned with allotype, July 5, 1959 (*Schmid*).

The species is dedicated to André Léon Tonnoir (1885–1940), distinguished student of the biology and taxonomy of the Diptera of Belgium, Australia and New Zealand, including the Tipulidæ. Studies on the Belgian Tipulidæ and Ptychopteridæ, 1919–1921. Other related species having the thoracic katapleurotergite strikingly silvery pruinose include *Tipula* (*Schummelia*) *argentacea* Alexander, *T. (S.) argentsigna* Alexander, *T. (S.) atrosetosa* Alexander, *T. (S.) costolutea* Alexander, *T. (S.) tanyrhina* Alexander, and less evidently a few additional species, all being quite different from the present fly, especially in the simple unmodified inner dististyle of the hypopygium.

TIPULA (VESTIPLEX) DOBROTORSKYANA sp. nov.

Plate 3, figs. 21, 22.

Allied to *subtineta*; antennæ relatively short, less than one-fourth the wing, scape and pedicel yellow, flagellum darkened, the more proximal segments weakly bicolored; wings pale

yellow with a relatively inconspicuous pale brown clouded pattern; abdomen yellow, tergites with three brown stripes, hypopygium dark brown; male hypopygium with the appendage of ninth sternite very long and slender, simple; basistyle produced into a very long slender blackened spine that is directed dorsad.

Male.—Length, about 21 to 22 millimeters; wing, 21.5 to 22; antenna, about 4.4 to 4.5.

Frontal prolongation of head with dorsal half orange, ventral half more darkened; nasus long, yellow; palpi light brown. Antennæ relatively short; scape and pedicel light yellow, first flagellar segment darker yellow, succeeding segments weakly bicolored, the basal enlargements black, remainder paler, the outer segments more uniformly darkened, terminal segment small, yellow; flagellar segments weakly incised, subequal to their longest verticils. Head obscure yellow with a narrow brown central vitta extending from summit of the low vertical tubercle to the occiput.

Pronotum yellow, with three small brown spots. Mesonotal præscutum with ground intense yellow, the disk with four brownish gray stripes, the intermediate pair separated by a dark brown interspace, mesal margins of lateral stripes more darkened; scutum yellowed, each lobe with two brown areas, their mesal margin narrowly more darkened; scutellum yellow, central part darkened; mediotergite yellow, narrowly infuscated on central part, sides and posterior end more reddened; very long pale yellow setæ on scutum, scutellum and mediotergite. Pleura obscure yellow, the pleurotergite more clearly whitish yellow, the anepisternum and ventral sternopleurite with vague darker areas. Halteres with base of stem yellowed, remainder pale brown, knob dark brown, its apex restrictedly obscure yellow. Legs with coxæ obscure yellow, with conspicuous yellow setæ; trochanters yellow; femora yellowish brown, tips outwardly, remaining tarsal segments black; claws small, narrowly blackened; tibiae and basitarsi light brown, darkened with basal tooth. Wings pale yellow, with a relatively inconspicuous pale brown clouded pattern, costal border, especially cell Sc darker; the markings in base of cell R, at origin of Rs; anterior cord and wing tip in outer radial field slightly darker than the remaining pattern; outer half of cell M with a darkened cloud on either side of a large yellowed subterminal area; veins brown, somewhat paler in costal and subcostal fields. Venation: Rs long, slightly less than twice

m-cu; petiole of cell M_1 longer than m; m-cu close to fork of M_{3+4} ; cell 2nd A narrow.

Abdomen yellow, tergites with three brown stripes, the sublateral pair narrower, lateral borders pale yellow; outer segments dark brown, patterned with yellow, hypopygium dark brown. Male hypopygium (Plate 3, figs. 21, 22) with dorsal lobes of tergite, *t*, erect, relatively slender, cylindrical, outer half with strong setæ that are directed chiefly mesad; ventral lobes heavily blackened, surface microscopically corrugated. Ninth sternite, *9s*, with the appendage brownish yellow, very long and slender, bent at near midlength, narrowed very gradually, tip a short blackened spine, surface of basal half with numerous very long yellow setæ, these becoming shorter and sparse toward tip of appendage. Basistyle, *b*, with very long slender blackened spine that is directed strongly dorsad, with a smaller point at its base, the major spine about two-thirds as long as the appendage of the ninth sternite. Outer dististyle, *d*, relatively long and slender, with numerous setæ; ventral style with beak strongly developed, lower beak obtuse, surface microscopically corrugated. Phallosome, *p*, with ædeagus unusually stout.

Habitat.—India (Assam).

Holotype, male Chug, Kameng, Northeast Frontier Agency, altitude 7,300 feet, April 17, 1961 (*Schmid*). Paratypes, 1 male, Domkho, altitude 6,900 feet, May 11, 1961; 1 male, Rupa, altitude 5,200 feet, May 2, 1961; 7 males, Shergaon, altitude 6,400 feet, May 8–9, 1961 (*Schmid*).

I dedicate this species to Mr. N. V. Dobrotworsky, outstanding student of the Nematoceros Diptera of Australia, including the Tipulidæ. The closest relative is *Tipula (Vestiplex) subtincta* Brunetti which offers conspicuously in the hypopygial structure, particularly the appendage of the ninth sternite and the armature of the basistyle. The length of the spine of the basistyle in this species marks the extreme as presently known in the subgenus.

TIPULA (VESTIPLEX) MALLA PLACIBILIS subsp. nov.

Male.—Length, about 14 to 15 millimeters; wing, 14 to 17.5; antenna, about 5.5 to 6.

Female.—Length, about 14 millimeters; wing, 6.

Close to typical *malla* Alexander, differing chiefly in slight details of the male hypopygium. Antennal flagellum black; in typical *malla* the first flagellar segment is longer, yellow,

succeeding two or three segments bicolored, the basal enlargement black, the remainder yellow, this color gradually darkening outwardly, the distal segments uniformly brownish black. The male hypopygium of the present fly has the outer dististyle broader, with long setæ. Appendage of ninth sternite conspicuously dilated beyond the narrow base; in typical *malla* the base is dilated, thence narrowed suddenly into the slender outer half.

The female that has been designated as allotype is subapterous, as shown by the measurements. The female sex of typical *malla* remains unknown but may be assumed likewise to be subapterous.

Habitat.—India (Sikkim).

Holotype, male, Yedang, altitude 10,600 feet, in *Rhododendron* association, June 9, 1959, (*Schmid*). Allotype, female, Talam, altitude 11,300 feet, in *Rhododendron* association. Paratopotypes, males, with the holotype, June 9–10, 1959. Paratypes, males, Namnasa, altitude 9,500 feet, June 12, 1959; 1 male, with the allotype, June 16, 1959; 1 male, Tombu, altitude 10,450 feet, June 15, 1959 (*Schmid*).

TIPULA (VESTIPLEX) SCHUMMELANA sp. nov. Plate 1, fig. 7; Plate 3, fig. 23.

Mesonotal præscutum yellow pollinose with four entire brown stripes; head yellowed; legs black, base and a subequal subterminal ring bright yellow; wings cream yellow, the prearcular and costal fields more saturated yellow, disk with an extensive pale brown marbled pattern; abdomen yellow basally, terminal five segments black; male hypopygium with appendage of ninth sternite elongate, at apex expanded into a triangular blade that is provided with long yellow setæ.

Male.—Length, about 13.5 millimeters; wing, 15.5; antenna, about 5.

Frontal prolongation of head above, including the nasus, yellow, brown on the sides and beneath, palpi black. Antennæ with proximal three segments yellow, second flagellar segment bicolored, light brown, the base black, succeeding segments black; basal enlargements of flagellar segments conspicuous, with coarse verticils that are shorter than the segments; terminal segment very small. Head yellow.

Pronotum yellowed, scutum brown medially. Mesonotal præscutum with the ground yellow pollinose, disk with four entire brown stripes, the median interspace obliterated at anterior

end, lateral border less evidently darkened; scutum yellowed medially, lobes patterned with brown; scutellum testaceous yellow with a brown central line; mediotergite yellowed, on either side with a sinuous brown line, these converging on posterior half, contiguous at border behind. Pleura and pleurotergite yellow, dorsopleural membrane light brown. Halteres with stem yellowed, knob dark brown. Legs with coxæ yellow pollinose, trochanters clearer yellow; femora black, base and a subequal subterminal ring yellow, the latter subequal in extent to the blackened tip, remainder of legs black; claws of male with a small tooth. Wings (Plate 1, fig. 7) with the ground cream yellow, the prearcular and costal fields bright yellow, including veins Sc and R; disk with an extensive pale brown marbled pattern that is subequal in area to the ground before the cord, more extensive in the outer cells; in cells R and M the ground areas alternate with the brown pattern, beyond the cord a ground vitta crosses the radial field from C into cell R₅ near bases of the cells; stigma slightly darker brown; veins pale brown except as described. Venation: Rs long, nearly two times m-cu; petiole of cell M₁ and m subequal.

Abdomen yellow basally, the outer five segments black. Male hypopygium (Plate 3, fig. 23) with the tergite, *t*, of the unique type damaged, apparently with both the dorsal and ventral plates of either side small but heavily blackened. Ninth sternite, *9s*, with the appendage distinctive, enlarged at base, thence narrowed into a slender stem, the outer half expanded into a triangular blade, its angles obtuse, disk with several long yellow setæ; basal part of stem black with longer yellow setæ. Basistyle, *b*, at apex produced into a small weakly sclerotized triangular point. Outer dististyle, *d*, about five times as long as broad, with long black setæ; inner style with beak slender, tip obtuse, dorsal crest low, with a few stout setæ; lower beak only slightly produced; outer basal lobe extended backward as a broad yellow lobe, the obtuse apex with several long yellow setæ. Phallosome, *p*, appearing as a long oval structure without lateral projections, tip obtuse; lower plates as shown.

Habitat.—India (Sikkim).

Holotype, male Chamiteng, altitude 9,900 feet, August 24, 1959 (*Schmid*).

The species is dedicated to Theodor Emil Schummel (1786–1848) who published an important paper on the Tipulidæ in

1833. The most similar regional species include *Tipula* (*Vestiplex*) *eurydice* Alexander and *T. (V.) malla* Alexander, which are somewhat similar in their general appearance, including the wings and legs, differing evidently in the hypopygial structure, including the basistyle, sternal appendage, inner dististyle and phallosome. The ninth tergite of the present fly is not sufficiently well preserved to figure but is distinct from that of the two species listed.

TIPULA (VESTIPLEX) WAHLGRENANA sp. nov. Plate 1, fig. 8; Plate 3, fig. 24.

Allied to *distifurca*; antennæ relatively long, flagellum bicolored black and yellow; mesonotal præscutum with four brownish gray stripes that are narrowly margined with darker brown; vertex with a brownish black central vitta; femur weakly darkened, tip brown, preceded by a narrower obscure yellow ring; wings light yellow, extensively clouded with pale brown, including the outer fifth; abdominal tergites brownish yellow with a darker brown central stripe, outer segments dark brown; male hypopygium with appendage of ninth sternite simple, basistyle with two spines, the outer one small, phallosome unusually narrow.

Male.—Length, about 17 millimeters, wing, 18; antennæ, about 5.1.

Frontal prolongation of head yellow above, including the nasus, laterally weakly infuscated. Antennæ relatively long; scape and pedicel light yellow, first flagellar segment slightly darker, remaining segments bicolored, basal enlargement black, pedicels yellow; segments a little exceeding their longest verticils. Head buffy with a very conspicuous capillary brownish black line extending from the low vertical tubercle to the occiput.

Pronotum yellow, anterior border of scutum narrowly bordered with brown, scutellum slightly darkened laterally. Mesonotal præscutum light gray with four darker brownish gray stripes that are narrowly bordered by darker brown, most distinct at anterior end of central interspace and along mesal edge of lateral stripe; scutum with central area yellowed, lobes light gray, each with three large brown areas, the posterior one largest; scutellum and mediotergite yellow pollinose, with a central brown darkening, parascutella and pleurotergite clearer yellow; posterior sclerites of notum, especially the scutellum and mediotergite, with very long yellow

setæ. Pleura yellowed, clearer ventrally and behind, dorso-pleural region weakly darkened. Halteres with stem yellow, clearer at base, outer end of stem and base of knob dark brown, apex of the latter yellow. Legs with coxæ and trochanters yellow; femora yellow basally, weakly darkened outwardly, tip brown, preceded by a narrower obscure yellow ring, tibiæ and tarsi brown; claws of male small, toothed. Wings (Plate 1, fig. 8) with the ground light yellow, very extensively clouded by pale brown, including the uninterrupted outer fifth of surface; stigma and areas at origin of Rs and over the anterior cord darker brown; prearcular and costal fields brighter yellow; veins brown, paler in the yellowed fields. Venation: Rs more than twice m-cu; inner end of cell 1st M_2 pointed.

Abdominal tergites brownish yellow with a darker brown central stripe, sternites yellow; segments six and seven darker brown, restrictedly patterned with yellow, eight and nine dark brown. Male hypopygium (Plate 3, fig. 24) with the dorsal tergal lobes, *t*, fleshy divergent, separated by a deep and narrow V-shaped emargination; ventral lobes narrower, with a broad U-shaped emargination, each lobe blackened and microscopically scabrous at apex. Ninth sternite, *9s*, with the appendage a long slender rod, the short simple tip bent at a right angle, surface with scattered very long and delicate yellow setæ almost to apex. Basistyle, *b*, with two acute blackened spines, the outer small, the inner one long and slender. Outer dististyle, *d*, an elongate lobe with abundant setæ; inner style long but massive, at its base with a flattened yellow plate that narrows into a blackened rod of about the same size as the inner spine of the basistyle, the basal part with abundant long yellow setæ, the structure evidently representing the lower beak of the style; outer basal lobe a low setiferous lobe. Phallosome, *p*, unusually slender, the apex narrowly split.

Habitat.—India (Kumaon).

Holotype, male, Khumyara, Pauri Garhwal, altitude 4,300 to 5,000 feet, May 28, 1958 (*Schmid*).

The species is named for Einar Wahlgren, Swedish entomologist, who published on the Tipulidæ. It is closest to *Tipula* (*Vestipter*) *distifurca* Alexander, being most readily told by the long bicolored antennæ and by the hypopygial

structure, including especially the tergite, appendage of the ninth sternite, basistyle and dististyles.

TIPULA (TIPULODINA) BREVIGLADIA sp. nov. Plate 1, fig. 9; Plate 3, fig. 25.

Belongs to the *pedata* group; mesonotal præscutum with four light brown stripes, the intermediate pair in front separated by a capillary darker line; antennæ relatively long, outer end of scape darkened; femora brownish yellow, more whitened on outer fourth of fore and middle pairs, intermediate tarsal segments uniformly whitened; wings whitened, pattered with brown, the seam on cord conspicuous, darkened cloud in cell M small; male hypopygium with the outer basal lobe of the inner dististyle short, its outer third a blackened spine, eighth sternite extended into a broad obtuse lobe, central area pale with a darkened line on either side.

Male.—Length, about 18 millimeters; wing, 13.5; antenna, about 5.

Frontal prolongation of head light yellow, nasus concolorous, sides broadly dark brown; palpi with first segment dark brown, segments two and three pale brown, the base narrowly whitened, terminal segment whitened, the proximal seventh brown. Antennæ relatively long; scape with proximal half whitened, outer end brown; pedicel brownish testaceous, flagellum brownish black; basal enlargements conspicuous, verticils exceeding the segments. Front and anterior vertex whitened, posterior vertex very light brown; a capillary darker brown central line extending from the anterior vertex virtually to the occiput.

Pronotal scutum brown medially, the sides, with the scutellum, whitened. Mesonotal præscutum with the restricted ground yellow, the disk with four light brown stripes, the intermediate pair on more than anterior half with a darker capillary line; central area of scutum buffy, lobes brownish gray; scutellum, including parascutella, brown, the latter bordered by yellow; mediotergite brownish gray, narrowly yellowed on sides, pleurotergite brownish gray above, the katapleurotergite light yellow, its ventral edge light brown. Pleura clear light yellow. Halteres dark brown. Legs with coxæ and trochanters light yellow; fore and middle femora brownish yellow, the outer fourth more whitened to form a broad diffuse ring; tibiæ brownish black with a broad white subterminal ring that is subequal to the darkened apex on fore leg, somewhat more extensive on the middle tibiæ; tarsi with proximal

two-thirds to three-fourths black, the tip white, more extensive on middle legs; remainder of tarsi white, the terminal segment weakly infuscated; hind femora brownish yellow; the tips narrowly brownish black, tibia black with two white rings, the outer one broader, nearly three times the darkened apex; basitarsi with proximal half black, outer end and remaining segments white, terminal segment pale brown. Wings (Plate 1, fig. 9) whitened, patterned with brown, including the apex in outer radial cells and with conspicuous seams on anterior and posterior cords, separated at M ; outer medial veins excepting M_4 narrowly seamed with brown; stigma darkened, confluent with the seam at cord; a very restricted brown cloud at near midlength at cell M , not reaching vein M , cell Sc darkened; veins light brown, darker in the patterned areas. Venation: Rs subequal to R_{2+3} ; cell M_1 subequal in length to its petiole; $m-cu$ close to fork of M_{3+4} .

Abdominal tergites light brown, the posterior ends narrowly more darkened, on intermediate tergites the extreme border pale; sternites somewhat paler brown, outer segments lined longitudinally with brown, remainder of hypopygium yellowed. Male hypopygium (Plate 3, fig. 25) with tergite, t , subtransverse, posterior border subtruncate to very gently emarginate, each lateral angle produced into a lobe that bears numerous black setæ. Outer dististyle, d , pale, narrowed outwardly, with numerous very long pale setæ; inner style with body high, beak obtuse, blackened; posterior crest an irregular oval lobe, margin weakly indented, outer border near apex with long yellow setæ; outer basal lobe a relatively short blade, broadest on proximal two-thirds, outer end narrowed into a slender black spine; setæ of lobe small and inconspicuous; sensory area conspicuous. Eighth sternite, $8s$, extended into a broad obtuse lobe.

Habitat.—Thailand.

Holotype, male, Ban Pong, near Chiangmai, altitude 1,000 feet, September 11, 1959 (*Coher*).

The most similar species appears to be *Tipula* (*Tipulodina*) *micracantha* Alexander, still known to me only from the unique type taken at Baria, in former French Indo China. This differs in the larger size and in details of hypopygial structure, particularly the tergite, inner dististyle and eighth sternite.

TIPULA (TIPULODINA) FELICITA sp. nov. Plate 1, fig. 10; Plate 4, fig. 26.

Belongs to the *pedata* group; antennæ relatively short; mesonotal præscutum yellow with a broad medium brown stripe;

legs with basitarsi blackened, the outer end white, proximal end of second tarsal segment narrowly darkened, remainder white; wings whitened, patterned with brown including the tip and a heavy pattern along cord, the darkened cloud in cell M small; m-cu at fork of M_{3+4} ; male hypopygium with outer basal lobe of inner dististyle simple, nearly straight, with sparse setæ, the tip narrowly truncate; eighth sternite with posterior border produced into a triangular ligula, tip narrowly obtuse.

Male.—Length, about 21 millimeters; wing, 17; antenna, about 3.5.

Frontal prolongation of head yellow, sides narrowly darkened; nasus elongate, brownish yellow, tipped with long yellow setæ; palpi with proximal three segments brown, the incisures pale, terminal segment with basal fifth darkened, the remainder light yellow. Antennæ relatively short; scape and pedicel brownish yellow, flagellum black; segments shorter than the longest verticils, the basal enlargements moderate. Head above brownish gray, clearer gray anteriorly, vertex with a capillary brown central stripe; anterior part of vertex surrounding the antennal bases clear light yellow.

Pronotum brown medially, sides broadly yellow. Mesonotal præscutum yellow, clearest on sides, with a broad medium brownish gray central stripe that is divided on anterior half by a capillary blackened median vitta, lateral stripes very pale, scarcely differentiated from the ground; scutal lobes medium brown, scutellum dark brown, parascutella yellowed; medio-tergite brown, yellow pollinose, with a central darkened vitta, posterior border darkened; pleurotergite yellowed, katapleurotergite weakly darkened. Pleura yellow. Halteres brown, base of stem narrowly yellowed, knob brownish black. Legs with coxæ and trochanters yellow; fore femora brownish yellow, tips narrowly dark brown; white tibial ring slightly more extensive than the darkened apex; basitarsi blackened on proximal half, remainder of tarsi white; middle femora similar to fore pair, tibiæ with white ring subequal to the darkened tip, basitarsi with proximal three-fourths blackened, tip white, remainder of tarsi white; the basal third of second segment dark; posterior legs with femora approximately the same as others; tibiæ black with two white rings, the more basal about three-fifths as extensive as the subterminal one; basitarsi

blackened, outer third white, second segment white, its base narrowly darkened, outer tarsal segments slightly infuscated. The paratype has the second tarsal segment almost uniformly white. Wings (Plate 1, fig. 10) whitened, with a brown pattern that includes the broad tip, more conspicuous in cells R_2 and R_3 , much paler in R_5 ; darker areas include the stigma, a broad seam at anterior cord, with narrower areas over m-cu, distal section at Cu_1 and the arculus; darkened cloud before midlength of cell M small; veins brown. Venation: R_s and R_{2+3} subequal; petiole of cell M_1 shorter than m; m-cu at fork of M_{3+4} ; cell 2nd A narrow.

Abdomen elongate; tergites light brown, incisures yellowed, preceded by a narrow darkened ring, outer segments brown, narrowly yellow basally, sternites light yellow, hypopygium chiefly yellow. Male hypopygium (Plate 4, fig. 26) with lateral tergal lobes, *t*, bearing abundant black setæ, posterior border very gently emarginate. Outer dististyle, *d*, a small pale oval lobe; inner style with body flattened, expanded outwardly, the small posterior lobe blackened, with long setæ; outer basal lobe a long simple blade, almost straight, outer fifth slightly curved, darkened, tip narrowly truncate; marginal setæ of lobe sparse and inconspicuous; an additional long central row of microscopic setulæ that are scarcely apparent except under high magnification. Eighth sternite, *8s*, with posterior border produced into a triangular ligule, tip narrowly obtuse, midregion with small setæ.

Habitat.—Java.

Holotype, male, Mount Djampang, Tengal, altitude 1,500 to 2,000 feet, March 1933 (*M. E. Walsh*). Paratype, male, Pelaboean Ratoe (*Bryant and Palmer*).

The nearest relatives of the present fly include *Tipula* (*Tipulodina*) *fuscitarsis* Edwards and *T. (T.) pedata* Wiedemann, which have the wings with m-cu at near midlength of M_{3+4} and with the structure of the male hypopygium distinct, including especially the tergite, inner dististyle and eighth sternite.

TIPULA (TIPULODINA) MCCLUREANA sp. nov. Plate 1, fig. 11; Plate 4, fig. 27.

Belongs to the *pedata* group; antennæ short; mesonotal præscutum yellowed; with a conspicuous dark brown central stripe, pleura light yellow; fore femora light brown, broadly more whitened before tips; wings with ground weakly infumed, patterned with darker brown, the apical area including the

outer end of cell R_5 , m-cu shortly before fork of M_{3+4} ; male hypopygium with the outer basal lobe of inner dististyle a long swordlike blade that narrows to a blackened terminal spine; eighth sternite produced into a subtriangular pale blade, its tip obtuse, with long setæ.

Male.—Length, about 22 millimeters; wing, 16.5; antenna, about 3.6.

Described from alcoholic material. Frontal prolongation of head light brown, nasus elongate, brownish yellow; palpi with proximal two segments brown, third segment light brown, the outer half and all of terminal segment whitened. Antennæ short, about one-third longer than total length of head, brown, the small basal enlargements of segments vaguely darker; outer segments a little shorter than the longest verticils. Head brown, slightly paler beneath.

Pronotal scutum obscure yellow, darker medially. Mesonotal præscutum yellowed, with a conspicuous dark brown central stripe, broad in front, narrowed posteriorly, ending just before suture, lateral stripes scarcely differentiated from the ground; posterior sclerites of notum yellowed, central region of scutellum and mediotergite weakly darkened, pleurotergite yellow, the katapleurotergite darkened, especially ventrally. Pleura light yellow. Halteres with stem yellowed, the small knob weakly darkened. Legs with coxæ and trochanters yellow; fore femora light brown, broadly more whitened before tip, tibiæ brown with a white subterminal ring that is slightly less than the tip; basitarsi dark brown with more than the outer third white, succeeding segments white, terminal one brown; middle femora with pale ring scarcely indicated, the apex narrowly dark, tibiæ and tarsi about as in fore pair; posterior femora light brown, tip darkened, tibiæ black with two white rings, tarsi about as described above, the base of second segment weakly darkened; claws of male simple. Wings (Plate 1, fig. 11) with the ground weakly infuscated, with a darker brown pattern that includes the apex in cells R_2 through R_5 attaining vein M_1 ; a conspicuous darker band at cord completely crosses the wing, the confluent stigma darker; outer end of cell 1st M_2 and distal medial veins narrowly seamed with brown, more evident on M_1 ; darkened cloud in cell M small, paler anteriorly; veins light brown, darker in the patterned areas. Venation: Petiole of cell M_1 shorter than m; m-cu shortly before fork of M_{3+4} .

Abdomen brownish yellow, tergites conspicuously patterned medially with brown, their bases yellowed, this becoming more extensive on outer segments; dorsopleural membrane weakly darkened; hypopygium yellowed. Male hypopygium (Plate 4, fig. 27) with posterior border of tergite, *t*, gently emarginate, with low setiferous lateral lobes, more anterior on either side with a more conspicuous lobe bearing coarse black setæ. Dorsal dististyle, *d*, an oval flattened blade with long pale setæ; inner style with body suboval, beak obtuse, lower beak lacking or reduced to a small protuberance, the margin heavily blackened, posterior lobe appearing as a small smooth blackened structure, its outer margin with about six strong setæ but without teeth as in some allied species; outer basal lobe a long swordlike blade, narrowed very gradually into a long black terminal spine; sensory area at base of lobe with an adjoining group of long yellow setæ and with a row of smaller yellow setæ extending almost to the terminal spine. Eighth sternite, *8s*, with posterior border produced into a subtriangular pale blade, tip obtuse, with long setæ, with progressively smaller hairs more basally on the blade.

Habitat.—Malaya.

Holotype, alcoholic male, Gombak Forest Reserve, Selangor, October 31, 1961 (*Elliott McClure*).

I am pleased to name this fly for the collector, Dr. H. Elliott McClure, student of insect ecology, to whom I am indebted for specimens taken in Malaya and much earlier in the Churchill District of Canada. The reared specimen was accompanied by the immature stages with the following data: "Adult emerged, pupal period about seven days. The larvæ breed in rotting three stubs and have a long larval life, two to three months—taken at the 140-foot platform. A further pupal skin was sent that emerged on September 15, 1961 reared from a larva taken in a tree stub also at the 140-foot platform, accompanied only by a single detached wing of an adult. From this wing it is apparent that this represents a second species of *Tipulodina*, being a member of the *venusta* group with no darkening in cell M and with the wing pattern further reduced. The pupal skin, with the wing, is preserved in a separate vial." These immature stages, including one larva and two cast pupal skins, were submitted to Dr. George W. Byers, of the University of Kansas, Lawrence, for further study.

The species that are most similar to the present fly are *Tipula* (*Tipulodina*) *fuscitarsis* Edwards and *T. (T.) pedata* Wiedemann, differing in the coloration of the body and wings, the venation, and especially in the structure of the male hypopygium and the antennæ.

TIPULA (TIPULODINA) SUSAINATHANI sp. nov. Plate 1, fig. 12; Plate 4, fig. 23.

Belongs to the *venusta* group; antennæ relatively long, about one-third the body; mesonotal præscutum light yellow with four brownish gray stripes; pleura silvery white with a small brown spot on dorsal margin of anepisternum; fore femora with a white ring shortly before tip, white tibial rings broad, fore and middle tarsi with bases of second segment blackened; wings crystal clear, darkened area at apex extending from cells R_3 to M_1 ; male hypopygium with outer basal lobe of the inner dististyle long and slender, exceeding in length the body of style, at tip with two blackened spines, the margin at near midlength with a smaller pale spine.

Male.—Length, about 23 to 25 millimeters; wing, 19 to 21; antenna, about 7 to 8.

Frontal prolongation of head light yellow with a conspicuous brown area on either side, nasus elongate, pale; palpi brownish black, terminal segment paler. Antennæ of male elongate, about one-third the wing; scape whitened, pedicel dark brown, flagellum black, flagellar segments with conspicuous basal enlargements, longer than their verticils. Front and anterior vertex infuscated on sides behind, clear gray in front with a paler brown central line; genæ and lower surface abruptly yellow.

Pronotal scutum dark brown medially, sides somewhat more extensively yellowish white. Mesonotal præscutum with the ground light yellow, disk with four brownish gray stripes, the intermediate pair separated by a capillary black line, lateral stripes with inner margins brown, posterior interspaces weakly darkened; scutal lobes with a large brown area, the anterior part slightly paler, blackened along the suture, central region paler brown, yellowed at suture and behind, posterior callosities yellowed; scutellum light brown, anterior border narrowly yellowed; mediotergite dark brown on posterior third, ash gray anteriorly, pleurotergite gray with a darkened area on dorsal katapleurotergite. Pleura, including the dorsopleural region, silvery white with a tiny darkened spot on dorsal anepisternum adjoining the membrane. Halteres brownish black,

base of stem yellow. Legs with coxæ whitened; trochanters white with greenish tints; fore femora black with a broad white subterminal ring that is nearly four times the black tip, the setæ whitened; tibiæ black with a broad white subterminal ring that is about three times the black tip; basitarsi black on proximal two-fifths, the remainder white except for the narrow apex; second segment white, tinged with green, basal fourth blackened, remaining tarsal segments whitened, with green tints; middle femora brown, paler basally, with a whitened ring that is obscured by abundant black setæ, tibiæ and tarsi almost as in the fore legs; posterior femora pale brown, passing into black on outer third; tibiæ black with two white rings, the outer one about one-half more extensive than the subbasal annulus; tarsi white, with green tints, the proximal fifth of basitarsi black. Wings (Plate 1, fig. 12) crystal clear, tip narrowly dark brown, including cells R_3 and R_4 , with slight invasions of cells R_2 and M_1 , the darkened cells with more or less evident paler centers; a very reduced brown spot in bases of cells R_3 and R_5 at anterior cord; stigma darker, brownish black; veins black. Venation: R_s nearly as long as R_{2+3} ; cell M_1 about one-third to one-half longer than its petiole; outer end of cell 1st M_2 pointed; m-cu at fork of M_{3+4} .

Abdomen elongate; basal abdominal tergites brown, first segment with a darker brown x-shaped area; succeeding segments pale laterally, the posterior borders with conspicuous dark brown triangles that are shorter and broader on outer segments; sternites of type yellowed, in paratype almost as dark as the tergites; hypopygium dark brown, posterior border of eighth sternite brownish yellow. Male hypopygium (Plate 4, fig. 28) with posterior border of tergite U-shaped, the conspicuous lateral lobes with numerous stout black setæ, dorsally and nearer the midline on either side with a low lobe provided densely with more delicate black setæ. Inner dististyle, d , with the outer basal lobe distinctive, longer than the body of style, at tip divided into two nearly equal black spines, at near midlength of inner margin with a slightly smaller pale spine; a continuous row of long yellow setæ extends the entire length of blade. In *xanthippe* the outer basal lobe is much shorter, extending only to about two-thirds the length of body style, without a lateral spine. In both species the

sensory area is large and conspicuous, placed near base of outer basal lobe.

Habitat.—South India.

Holotype, male, Cinchona, Anamalai Hills, altitude 3,500 feet, May 1965 (*P. Susai Nathan*). Paratopotype, 1 male.

The species is named for Mr. P. Susai Nathan (1891–date), capable entomologist and professional field collector of insects in many parts of India but particularly in the various states of South India. The species is most similar to *Tipula* (*Tipulodina*) *xanthippe* Alexander, from the Nilgiri Hills, South India, differing evidently in the hypopygial structure, as described above. The hypopygium of *xanthippe* has been described and figured by the writer in an earlier paper [Rec. Indian Mus. 50 (1952) 339–340, fig. 7b].

TIPULA (INDOTIPULA) NEEDHAMANA sp. nov. Plate 1, fig. 13; Plate 4, figs. 29, 30.

General coloration of mesonotum brownish gray, præscutum with four black stripes, scutellum and postnotum yellowed; antennæ of male elongate; halteres yellow; femora dark brown, tips blackened; wings fulvous brown, prearcular and costal fields more saturated yellow, oblitative area at cord conspicuous; male hypopygium with posterior border of tergite with strong incurved lateral arms and a weakly bilobed median projection; outer dististyle black, strongly bent at near mid-length to appear boomerang-shaped, the apex unequally bidentate; eighth sternite with posterior border produced medially into a rounded lobe that bears a small brush of long yellow setæ.

Male.—Length, about 16 millimeters; wing, 17.5; antenna, about 7.

Frontal prolongation of head obscure yellow, nasus elongate, concolorous; palpi broken. Antennæ of male elongate; scape and pedicel yellow, flagellum brownish black, the lower surface of the elongate first segment paler, the segment exceeding the two following segments combined; basal enlargements of segments distinct, verticils shorter than the segments. Front and vertex light golden yellow, posterior vertex with a brown spot that is extended over the occiput; no vertical tubercle; anterior vertex broad, about equal to the length of the scape.

Pronotal scutum brownish black, brownish yellow on sides, scutellum yellow. Mesonotal præscutum brownish gray with four conspicuous black stripes; scutal lobes brownish black, scutellum and postnotum yellowed, restrictedly patterned with

darker. Pleura brown, ventral sclerites, including the sternopleurite, yellowed. Halteres obscure yellow. Legs with coxæ and trochanters orange yellow, bases of fore coxæ narrowly darker; femora dark brown, bases narrowly yellow, tip more broadly blackened; tibiæ dark brown, tips more narrowly black; tarsi brownish black; claws of male toothed. Wings (Plate 1, fig. 13) fulvous brown, prearcular and costal fields more saturated yellow; stigma small, pale brown, scarcely differentiated; obliterative band before stigma and along cord in cells R, 1st M_2 and base of M_3 very conspicuous; veins medium brown. Outer radial veins with macrotrichia, with others on most of M_1 and sparsely on M_2 . Venation: Rs about one-fifth longer than the oblique m-cu; petiole of cell M_1 longer than m.

Abdominal tergites with proximal five segments orange yellow, with a continuous black central stripe, third to fifth tergites darkened sublaterally, the borders yellowed; sternites light yellow; sixth and succeeding segments, including the hypopygium and appendages black. Male hypopygium (Plate 4, figs. 29, 30) with the tergite, *t*, subquadrate, posterior border with lateral arms strongly developed, incurved, median emargination heavily blackened, produced into a central black lobe, its apex microscopically notched. Outer dististyle, *d*, a blackened boomerang-shaped structure, at near midlength bent at a right angle and extended into a weak head, its apex unequally bidentate; outer margin of style with coarse black setæ, larger at the bend; inner style massive compact simple blade, beak very broad and obtuse, lower beak lacking. Phallosome, *p*, with ædeagus long and narrow; gonapophyses appearing as divergent pale membranous blades, their mesal edge narrowly blackened. Eighth sternite, *8s*, broad, posterior border convex, the median region farther produced into a rounded lobe with a concentration of long yellow setæ to form a small brush, setæ elsewhere on sclerite smaller and blackened.

Habitat.—India (Sikkim).

Holotype, male, Yedang, altitude 9,680 feet, in *Rhododendron* association, June 10, 1959 (*Schmid*).

I take particular pleasure in dedicating this distinct fly to Dr. James Needham (1868–1957), one of the World's outstanding scientists, discoverer, with John Henry Comstock, of the universally used Comstock-Needham system of wing venation.

An outstanding paper by Needham⁴ presented the first comprehensive account of the wing venation in the family Tipulidæ (pages 217–248 of reference cited), together with a summary of the larval habitats of the North American genera (page 239). It was this paper primarily that influenced me to enter Cornell University, Ithaca, New York, in order to study with Dr. Needham (1909–1917) and which decided me to prepare the thesis for the degree of Doctor of Philosophy on the subject of crane-fly biology.⁵

The species is quite distinct from all other members of the subgenus in the hypopygial structure, particularly the somewhat remarkable outer dististyle.

TIPULA (INDOTIPULA) WULPIANA sp. nov. Plate 1, fig. 14; Plate 4, fig. 31.

Allied to *diacaena*, differing chiefly in the structure of the male hypopygium, including the tergite and inner dististyle; ninth tergite with lateral lobes produced into acute spines; inner dististyle with spines of the outer basal lobe small, subequal.

Male.—Length, about 12 millimeters; wing, 13; antenna, about 4.

Frontal prolongation of head yellow above, including the conspicuous nasus, sides darker; palpi brownish black. Antennæ with scape and pedicel brownish yellow, flagellum black; segments slightly exceeding the longest verticils. Front and anterior vertex yellowed, with a dusky vitta between the antennal bases; vertex brown, including a central darkening on anterior vertex.

Pronotum light brown, yellowed on sides. Mesonotal præscutum with disk covered by four brown stripes that are scarcely differentiated from the interspaces, the lateral pair solidly darkened, the intermediate pair more yellowed, narrowly margined with brown, lateral and humeral regions broadly light yellow; scutum with lobes brown, central area more yellowed, with indications of a pale brown capillary median

⁴ Needham, J. G. Crane-flies Family Tipulidæ, in 23rd Rept. of the State Entomologist (New York) for 1907. Education Dept. Bull. 433 (1908) 199–248, figs. 5–16, plates 11–32.

⁵ Alexander, C. P. The crane flies of New York. Part I. Distribution and taxonomy of the adult flies. Cornell Univ. Agr. Expt. Sta., Mem. 25 (1919) 767–993, text figs. 121–132, plates 30–55, with 354 figs.

Alexander, C. P. The crane flies of New York. Part II. Biology and phylogeny. Cornell Univ. Agr. Expt. Sta., Mem. 38 (1920) 691–1133, portrait (of K.W.T. Beling), plates 12–97, with 539 figs.

vitta; scutellum and postnotum brownish yellow; a few erect setæ on præscutal interspaces. Pleura and pleurotergite yellowed. Halteres with stem light brown, knob darker brown. Legs with coxæ and trochanters yellow; femora brown, tips narrowly brownish black; tibiæ and tarsi brown; claws of male toothed. Wings (Plate 1, fig. 14) strongly tinged with brown, costal region darker brown, stigma still darker; obliterative areas before stigma and across cell 1st M_2 very restricted and inconspicuous; veins brown. Outer radial and medial veins with macrotrichia, lacking on R_{1+2} and M_4 . Venation: Rs a little longer than m-cu; petiole of cell M_1 and m subequal.

Abdomen brown, posterior borders of segments narrowly obscure yellow, hypopygium and preceding segments darker brown. Male hypopygium (Plate 4, fig. 31) much as in *diacaena*, differing conspicuously in the tergite and inner dististyle. Ninth tergite, *t*, transverse, the posterior border with broad blackened lateral lobes, the outer angle of each produced into an acute point or spine, the low inner angle microscopically roughened; central area with a blackened knob, smaller than in *diacaena*. Mesal faces of basistyle and ninth sternite with very long yellow setæ, including a long brush on sternal lobe. Outer dististyle, *d*, long and slender, yellow; inner style with body a massive blackened blade, the region of the posterior crest produced; outer basal lobe bispinous, as in *diacaena* but of quite different shape, the spines small, subequal. Phallosome, *p*, with the gonapophyses scooplike.

Habitat.—India (Sikkim).

Holotype, male, Manu, altitude 4,920 feet, August 5, 1959 (*Schmid*).

The species is named for Frederik Maurits van der Wulp (1818–1899), distinguished Dutch Dipterologist, including the Oriental Tipulidæ. His "Catalogue of the Diptera of South Asia, 1896" was the earliest attempt to list the Oriental species.

The only described regional species having the hypopygial tergite generally as in the present fly is *Tipula (Indotipula) diacaena* Alexander, likewise from Sikkim, flying in the Spring. The differences in the hypopygium of the two flies indicates their distinctness.

Genus DOLICHOPEZA Curtis

Dolichopeza CURTIS, British Entomol. (1825) 62.

The 11 subgenera presently recognized in *Dolichopeza* have been listed in an earlier part of this series of papers [Asia, Part 58 (1965)].

DOLICHOPEZA (NESOPEZA) ASURA sp. nov.

Plate 5, figs. 32, 42, 43.

Allied to *himalayæ*; general coloration of thorax almost uniformly brownish black; legs dark brown, tarsi and apices of tibiæ whitened; wings strongly darkened; male hypopygium with posterior border of tergite trilobed, all lobes simply obtuse; inner dististyle with crest elevated, provided with strong setæ, rostrum slender; eighth sternite with setiferous apical lobes.

Male.—Length, about 9 millimeters; wing, 9.3; antenna, about 2.2.

Frontal prolongation of head dark brown, with long black setæ; palpi black. Antennæ short, as shown by the measurements; brownish black, pedicel and base of scape paler; flagellar segments progressively shorter outwardly, the last segment small and slender. Head dark brown, vertical tubercle abruptly yellowed, entire, front whitened; vestiture of vertex small and sparse.

Prothorax dark brown, scutellum more yellowed. Mesonotal præscutum and scutum almost uniformly brownish black, scutellum and postnotum slightly more pruinose to appear opaque; setæ of præscutum and scutellum small and sparse, of mediotergite longer and erect. Pleura dark brown, dorsopleural membrane dark brown. Halteres dark brown, base of stem restrictedly yellowed. Legs with coxæ and trochanters medium brown; femora and tibiæ dark brown, the former narrowly yellowed at bases; tarsi brown, paling to white at outer ends of basitarsi and remainder of tarsi. Wings (Plate 5, fig. 32) strongly darkened, the small stigma still darker brown; veins brown. Venation: Medial forks relatively deep, cell M_1 about one-half longer than its petiole; cell 2nd A relatively broad.

Abdomen, including hypopygium, dark brown. Male hypopygium (Plate 5, fig. 42) of the general type of *himalayæ*. Posterior border of tergite, *t*, blackened, trilobed, all lobes simply obtuse, the lateral pair with narrow cephalic extensions provided with sparse blackened points. Outer dististyle, *d*, slightly widened at near one-third the length, thence narrowed gradually, tip obtuse, surface with long coarse setæ that are directed laterad; inner style with region of posterior crest elevated into a rounded lobe provided with numerous black setæ, rostrum slender. Eighth sternite, *8s*, narrowed outwardly, with a low apical lobe on either side of a broader membranous central area, the lobes and sides with numerous setæ, the longest removed from the margin.

Habitat.—India (Manipur).

Holotype, male Chahong, Khunou, altitude 1,200 feet, July 24, 1960 (*Schmid*).

The most similar species are *Dolichopeza (Nesopeza) himalayæ* Alexander (*obscura* Brunetti, preoccupied) and *D. (N.) setilobata* sp. nov., all being readily told by the hypopygial structure. I am illustrating the hypopygium of *himalayæ* for comparison with the present fly (Plate 5, fig. 43), particular attention being directed to the tergite, inner dististyle and the virtually glabrous bladelike lobes of the eighth sternite.

DOLICHOPEZA (NESOPEZA) CAPITELLA sp. nov. Plate 5, fig. 33; Plate 6, fig. 44.

Allied to *volupta*; size medium (wing, about 9 millimeters); antennæ of male about one-half the body or wing; mesonotum cinnamon brown, the præscutum with four poorly indicated brownish yellow stripes; pleura yellowed, mesepisternum dark brown to form a broad transverse girdle; legs brownish yellow, tarsi and tips of tibiæ white; wings whitened, stigma dark brown; male hypopygium with posterior border of tergite trilobed, the median blade longer; ninth sternite with a complex development of lobes; basistyle terminating in an acute blackened point; inner dististyle complex, the dorsal crest high.

Male.—Length, about 8 to 8.5 millimeters; wing, 7.5 to 9; antenna, about 4 to 4.3.

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

Frontal prolongation of head brownish yellow, darker above, with long black setæ; palpi brown. Antennæ of male relatively long, approximately one-half the body or wing; scape, pedicel and base of first flagellar segment yellowed, remainder brownish black; flagellar segments long cylindrical, verticils small. Head above light brown, front more whitened.

Mesonotal præscutum with four brownish yellow stripes that are only slightly differentiated from the ground, the areas vaguely margined by pale brown; remainder of notum almost uniformly brownish yellow to pale cinnamon; mesonotum unusually glabrous, with very sparse yellow setæ on the præscutal interspaces and all remaining sclerites. Pleura yellowed, mesepisternum dark brown to form a broad transverse girdle. Halteres elongate, stem yellow, knob dark brown. Legs with all coxæ and trochanters yellow, femora brownish yellow, tips more infuscated; tibiæ light brown, tips white, on posterior pair including about the outer fifth of segment; tarsi snowy

white. Wings (Plate 5, fig. 33) whitened, a trifle more darkened beyond cord; stigma dark brown, conspicuous; veins dark brown. Venation: Medial forks relatively deep, cell M_1 about one-third to one-half longer than its petiole; cell 2nd A narrow.

Abdominal tergites brown, sternites more yellowed, subterminal segments dark brown to form a ring; hypopygium yellowish brown. Male hypopygium (Plate 6, fig. 44) with the tergite, *t*, black, posterior border trilobed, the longer median lobe a compressed flattened blade, lateral arms with the inner apical angle produced into a point. Basistyle, *b*, extended into a triangular blackened point, the adjoining margin of the ninth sternite with a low lobe, its mesal part bearing several strong yellow setæ. Outer dististyle, *d*, long and slender, outer margin with setæ, two or three at apex longer; inner style distinctive, as figured; beak slender, dilated at apex into an oval blade, lower beak more truncated; dorsal crest very high, pale, apex rounded, posterior part with several short black setæ. Ninth sternite, *9s*, on either side conspicuously modified, including a smaller dorsal capitate short-stemmed lobe, the head with abundant short spinoid yellow setæ, those at the ventral end longer; on inner part near base of the dorsal lobe with an elongate flange that is margined with conspicuous yellow setæ, the more dorsal ones very long and curved.

Habitat.—India (Manipur).

Holotype, male, Sihai Khulen, altitude 4,700 feet, June 25, 1960 (*Schmid*). Allotopotype, female. Paratopotype, 1 male.

The most similar regional species include *Dolichopeza* (*Nesopeza*) *pedicillata* sp. nov. and *D. (N.) schmidi* sp. nov., all three being readily distinguished by the hypopygial structure.

DOLICHOPEZA (NESOPEZA) DACTYLOPHORA sp. nov. Plate 5, fig. 34; Plate 6, fig. 45.

Size medium (wing of male over 8 millimeters); mesonotal præscutum almost covered by broad dull orange stripes, the midline darker, posterior sclerites medium brown, pleura light yellow with a transverse brown girdle on mesepisternum; tarsi and tips of tibiæ whitened; wings whitish hyaline, stigma dark brown; abdomen ringed with yellow and black; male hypopygium with dorsal crest of inner dististyle produced into a long fingerlike rod that narrows to the acute tip.

Male.—Length, about 8.5 millimeters; wing, 8.2; antenna, about 5.

Frontal prolongation of head brownish black; palpi blackened. Antennæ of male long, exceeding one-half the wing; scape, pedicel and base of first flagellar segment testaceous yellow, outer segments dark brown, long-cylindrical, about three times their longest verticils. Head medium brown, genæ light gray.

Pronotum brown, sides light yellow. Mesonotal præscutum almost covered by broad dull orange stripes, the midline nacreous, shiny, narrowed to a point and blackened anteriorly; posterior sclerites, including the scutal lobes, medium brown, parascutella, pleurotergite and broad lateral borders of the mediotergite paler brown; mesonotum unusually glabrous, mediotergite with only one or two short black setæ. Pleura light yellow with a conspicuous brown girdle on mesepisternum from præscutal margin to midline of the sternum, meron similarly darkened, the pale ground including the propleura, pteropleurite and metapleura. Halteres elongate, stem whitened, knob black. Legs with all coxæ and trochanters light yellow; femora light brown, paler basally, tips narrowly brownish black; tibiæ very pale brown, tips whitened, very narrowly on fore and middle legs, more extensively on posterior pair where about the outer fifth is included; tarsi snowy white. Wings (Plate 5, fig. 34) whitish hyaline, the cells beyond cord vaguely tinted with darker; stigma dark brown, conspicuous; veins blackened, very conspicuous. Venation: Medial forks relatively deep, cell M_1 about one-third longer than its petiole; cell 2nd A narrow.

Abdominal segments conspicuously ringed with yellow and black, bases of tergites broadly yellow with slightly narrower blackened posterior rings; segments seven and eight uniformly brownish black, ninth segment yellow. Male hypopygium (Plate 6, fig. 45) with the blackened tergal armature as shown, *t*, caudal margin microscopically toothed, the median extension as viewed from above narrow. Outer dististyle, *d*, elongate, broadest at near midlength; inner style distinctive, beak slender; the whole region of the dorsal crest produced into a long fingerlike rod, broadest at base, narrowed gradually to the acute tip.

Habitat.—India (Manipur).

Holotype, male, Singkap, altitude 3,800 feet, August 16, 1960 (*Schmid*).

Dolichopeza (Nesopeza) dactylophora is entirely different from other regional species in the structure of the inner dististyle of the male hypopygium.

DOLICHOPEZA (NESOPEZA) EUTHYSTYLA sp. nov. Plate 5, fig. 35; Plate 6, fig. 46.

Size small (wing of male about 8 millimeters); mesonotum light brown, pleura obscure yellow, conspicuously patterned with dark brown, the transverse band on mesepisternum interrupted on the dorsal sternopleurite; fore coxæ dark brown, posterior pair yellow, remainder of legs light brown, tarsi and tips of tibiæ whitened; wings white, stigma dark brown, conspicuous; male hypopygium simple in construction, without modifications of the inner dististyle or ninth sternite; tergite with the oval lateral lobes spiculate, the median region glabrous; inner dististyle with beak long and slender, straight.

Male.—Length, about 7.5 millimeters; wing, 8.1; antenna, about 1.

Frontal prolongation of head light yellow, with long black setæ on dorsum; palpi brownish black. Antennæ relatively long, about one-half the wing; scape brownish yellow, pedicel clearer yellow, flagellum brown; flagellar segments about three times their verticils, terminal segment very small. Front and antennal fossæ yellowed, remainder of head light cinnamon brown.

Pronotum brownish yellow, sides dark brown. Mesonotum almost entirely light brown, the præscutal stripes not or scarcely differentiated. Pleura obscure yellow, conspicuously patterned with dark brown, including the propleura, anepisternum, ventral sternopleurite and dorsopleural membrane paler brown, including the pteropleurite and metapleura whitened. Halteres elongate, stem obscure yellow, clearer basally, knob black. Legs with fore and middle coxæ dark brown, tips pale, posterior coxæ clear yellow; trochanters yellow; femora light brown, more yellowed basally, tips darker brown; tibiæ light brown, their tips and the tarsi whitened. Wings (Plate 5, fig. 35) whitened, stigma dark brown, conspicuous; veins brownish black. Venation: Medial forks moderately deep, cell M_1 about one-fifth longer than its petiole; cell 2nd A narrow.

Abdominal tergites brownish yellow, patterned with dark brown, more distinctly on posterior border, the basal ring less so; sternites yellowed, outer segments more extensively dark brown, including the hypopygium. Male hypopygium (Plate 6, fig. 46) of simple generalized structure, the inner dististyle

and ninth sternite unmodified. Ninth tergite, *t*, on either side with an oval lobe that is provided with stout blackened spicules; median region a low glabrous lobe. Outer dististyle, *d*, about five times as long as broad, with moderately long setæ, the apical ones long but pale and very slender; inner style very simple, including a long slender straight beak and a low obtuse lower beak; dorsal crest not developed.

Habitat.—India (Assam).

Holotype, male, Bandarkhar, Cachar, altitude 500 feet, May 9, 1960 (*Schmid*).

The most similar species is *Dolichopeza* (*Nesopeza*) *microdonta* sp. nov., which likewise has the male hypopygium only slightly modified, differing in the structure, particularly of the tergite.

DOLICHOPEZA (NESOPEZA) MICRODONTA sp. nov. Plate 5, fig. 36; Plate 6, figs. 47, 48.

Allied to *volupta*; general coloration of mesonotum brown, præscutal stripes more cinnamon brown; pleura brown, pteropleurite pale yellow; legs brown, tips of tibiæ and all tarsi white; wings whitish hyaline, stigma dark brown; abdominal segments brownish yellow, posteriorly ringed with dark brown, subterminal two segments uniformly blackened; male hypopygium with midregion of tergite with strong lateral and three or four microscopic teeth; ninth sternite with a median lobe; inner dististyle simple, beak long; no modifications in region of dorsal crest or the outer basal lobe.

Male.—Length, about 9.5 to 10 millimeters; wing, 8.8 to 9.3; antenna, about 3.4 to 3.5.

Frontal prolongation of head yellowish white to pale yellow; palpi brown. Antennæ moderately long, exceeding one-third the wing; scape and pedicel yellowed, flagellum dark brown; outer segments nearly twice their verticils. Head cinnamon brown, genæ yellowed.

Pronotum brown. Mesonotum light brown, præscutum with four poorly indicated cinnamon brown stripes, the pale central interspace broader behind. Pleura brown, the pteropleurite and metapleura pale yellow. Halteres elongate, stem brownish yellow, clearer yellow basally, knob brownish black. Legs with fore coxæ brown, remaining coxæ and all trochanters yellow; femora brown, bases yellowed; tibiæ brown, tips whitened, tarsi snowy white. Wings (Plate 5, fig. 36) whitish hyaline, stigma dark brown, conspicuous; veins brown. Venation: Medial forks moderately deep, cell M_1 subequal to or a little longer than its petiole.

Abdominal tergites brownish yellow, the posterior borders broadly dark brown, sternites light yellow, outer margins more narrowly darkened, the amount of dark color increasing on the outer segments, seven and eight uniformly blackened to form a conspicuous ring; hypopygium yellow. Male hypopygium (Plate 6, figs. 47, 48) with each side of tergite, *t*, produced into a ventral circular blade that is provided with relatively few small blackened spicules, more dorsally on either side with a large acute black spine that is directed mesad, the intervening emargination broad and shallow, its border with three or four acute spines. Region of ninth sternite, *9s*, with a conspicuous pale median lobe that is directed caudad and slightly ventrad, tipped with a few setæ. Outer dististyle, *d*, moderately long, about four times the breadth; inner style unusually simple, the beak slender, long-produced, lower beak lacking; no outgrowths or modifications in regions of the posterior crest or outer basal lobe.

Habitat.—India (Assam).

Holotype, male, Nongjni, Khasi-Jaintia Hills, altitude 3,750 feet, April 19, 1960 (*Schmid*). Paratypes, 1 male, Dawki, Khasi-Jaintia, altitude 300 feet, April 8, 1960; 1 male, Um-langshor, altitude 4,100 feet, April 19, 1960 (*Schmid*).

Dolichopeza (Nesopeza) microdonta is quite distinct from the now numerous regional members of the subgenus that are allied to *volupta* in the details of the male hypopygium, particularly the tergite, ninth sternite and inner dististyle.

DOLICHOPEZA (NESOPEZA) PARJANYA sp. nov. Plate 5, fig. 37; Plate 6, fig. 49.

Allied to *microdonta*; general coloration of mesonotum light cinnamon yellow, pleura clearer yellow, unpatterned; femora brownish yellow, tibiæ yellow, their tips and the tarsi white; male hypopygium with posterior border of tergite heavily blackened, the lateral lobes with small obtuse spiculate points, with a larger tooth at their base on the connecting bridge; ninth sternite with a strong lobe that is tufted with relatively few long yellow setæ; eighth sternite with posterior border vaguely trilobed, the lateral pair larger with long yellow setæ.

Male.—Length, about 8 millimeters; wing, 8.5; antenna, about 3.8.

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

Frontal prolongation of head yellow; palpi yellowish brown. Antennæ of male less than one-half the wing; flagellar verticils longer and more conspicuous in females than in male; scape,

pedicel and base of first flagellar segment yellow, remainder of organ brownish black. Head light cinnamon brown.

Thoracic dorsum almost uniformly light cinnamon yellow, præscutal stripes very poorly indicated, slightly more yellowed; notal vestiture light yellow, sparse. Pleura yellowed, without a transverse darkened girdle as common in the group. Halteres of moderate length, stem whitened, knob black. Legs with coxæ and trochanters light yellow; femora brownish yellow, tips very vaguely more darkened; tibiæ yellow, their tips and all tarsi snowy white. Wings (Plate 5, fig. 37) faintly darkened, stigma oval, darker brown; veins brownish black. Venation: Median forks of moderate depth, cell M_1 about one-third to one-half longer than its petiole.

Abdominal tergites yellowish brown, the posterior borders dark brown, basal sternites more yellowed, in male the subterminal segments darkened to form a ring. Male hypopygium (Plate 6, fig. 49) with the tergite, *t*, blackened, forming a broad central arch, with lateral lobes that are directed caudad in unmounted specimens, on microscope slides bent cephalad, as shown; lobes with several small obtuse spiculose points, at base on margin of the arch with a single strong spine on either side. Ninth sternite, *9s*, short, on ventral surface with a stout lobe that is tufted with relatively few but very long yellow setæ. Basistyle, *b*, not produced. Outer dististyle, *d*, relatively narrow, tip broadly obtuse; inner style short and stout, the enlarged head with irregular protuberances, including two larger outer horns. Eighth sternite, *8s*, broad, posterior border truncate but vaguely trilobed, the more prominent lateral lobes with more than 15 long yellow setæ, the less produced median area with about a dozen much smaller setæ.

Habitat.—India (Manipur).

Holotype, male, Huiahu, altitude 3,800 feet, July 2, 1960 (*Schmid*). Allotopotype, female, pinned with type. Paratopotype, 1 female.

The most similar regional species is *Dolichozeza* (*Nesozeza*) *microdonta* sp. nov., which has the hypopygial structure quite distinct, including especially the tergite, inner dististyle, and both the eighth and ninth sternites.

DOLICHOZEZA (NESOZEZA) PEDICILLATA sp. nov. Plate 5, fig. 38; Plate 7, fig. 5.

Allied to *volupta*; size medium (wing about 9 millimeters); antennæ of male long, slightly exceeding one-half the wing;

mesonotum light cinnamon brown, præscutum with a capillary silvery median line, pleura yellow, the mesepisternum and ventral meron dark brown; legs light brown, tarsi and narrow tips of tibiæ white; wings whitened, stigma dark brown; abdominal tergites bicolored yellowish brown, apices of segments broadly black, on subterminal segments forming a broad ring; male hypopygium with apex of basistyle produced into a thin flattened blade; beak of inner dististyle short, subconical, dorsal crest very large, yellow, the margin with abundant fimbriations; ninth sternite with a complex armature of lobes on either side, the dorsal capitate lobe long-stemmed, all lobes with abundant modified setæ.

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

Frontal prolongation of head and palpi light brown. Antennæ of male elongate, slightly exceeding one-half the wing; scape, pedicel and base of first flagellar segment obscure yellow, the remainder black; flagellar segments elongate, verticils relatively long, the longest exceeding one-third the segment. Head light brown.

Pronotum light brown medially, paling to yellow on sides. Mesonotum almost uniformly light cinnamon brown, præscutal stripes scarcely indicated except by a capillary silvery median line; notal vestiture short and very sparse. Pleura yellow, the mesepisternum dark brown to form a broad girdle, meron similarly darkened. Halteres elongate, stem white, knob brownish black. Legs with coxæ and trochanters pale yellow; femora light brown, bases more yellowed, tips vaguely darker; tibiæ light brown, tips whitened, very narrow on fore and middle legs, more extensive on posterior tibiæ; tarsi snowy white. Wings (Plate 5, fig. 38) whitened, cells beyond cord vaguely more darkened; stigma dark brown, conspicuous; veins brown. Venation: Medial forks moderately deep, cell M_1 about one-third longer than its petiole; cell 2nd A relatively narrow.

Abdominal tergites bicolored, yellowish brown, apices broadly black, the dark color more extensive on outer segments, seven and eight uniformly blackened to form a broad ring; basal sternites light yellow, their posterior borders very narrowly darkened; hypopygium obscure yellow. Male hypopygium (Plate 7, fig. 50) of the general type of *capitella* but with all details distinct. Ninth tergite, *t*, blackened, margin produced

into a narrow blade and paired flattened plates, only their margins with microscopic roughenings. Ninth sternite, *9s*, with armature distinctive, mostly as in *capitella* and *schmidi*; dorsal capitate lobe with the pedicel elongate, apex with abundant short spinulæ; ventral lobes larger, more or less emarginate to appear bilobulate, each lobule with abundant long setæ, those of the smaller lobule straight, of the larger one curved; at base of sternal armature with a further lobe that is fringed with numerous scabrous setæ. Basistyle, *b*, produced caudad into a thin flattened blade, apex obtuse, surface with very sparse setæ. Outer dististyle, *d*, slender, narrowed to the subacute tip, outer setæ long; inner style distinctive; beak a short dilated subconical blade, lower beak large, dorsal crest very large, exceeding in area the remainder of style, appearing as a pale yellow flattened blade that is directed dorsad and slightly as a pale yellow flattened blade that is directed dorsad and slightly forward, the outer margin with abundant pale fimbriations, with a few blackened normal setæ on outer margin near base.

Habitat.—India (Manipur).

Holotype, male, Phaiphengmun, altitude 2,157 feet, August 29, 1960 (*Schmid*). Paratopotype, male, pinned with type.

The closest relatives of the present fly include *Dolichopeza* (*Nesopeza*) *capitella* sp. nov., and *D.* (*N.*) *schmidi* sp. nov., which similarly have the modified lobes of the ninth sternite of the hypopygium and a high pale dorsal crest on the inner dististyle. All of these species differ evidently in the details of structure of these various parts.

DOLICHOPEZA (NESOPEZA) SCHMIDI sp. nov. Plate 5, fig. 39; Plate 7, figs. 51, 52.

Allied to *volupta*; size medium (wing of male 10 millimeters); general coloration of præscutum orange fulvous, posterior sclerites somewhat darker; antennæ of male nearly one-half the wing; legs brown, tarsi and tips of tibiæ white, the latter more extensive on posterior legs; wings subhyaline, stigma dark brown, veins brownish black; abdominal tergites light brown, not or scarcely bicolored, basal sternites light yellow, subterminal segments blackened, hypopygium yellow; male hypopygium with the basistyle produced caudad into a powerful flattened black blade; ninth sternite with lobes very strongly developed provided with groups of setæ.

Male.—Length, about 10 millimeters; wing, 10; antenna, about 4.5.

Frontal prolongation of head yellow, with black setæ; palpi light brown, terminal segment darker. Antennæ long, nearly one-half the wing; scape, pedicel and base of first flagellar segment yellow, remainder of flagellum dark brown; segments nearly three times their longest verticils. Head light fulvous, paler on genæ.

Pronotum light brown, more yellowed on sides. Mesonotal præscutum with four orange-fulvous stripes, the ground almost concolorous, with a capillary darker brown central stripe on anterior third in the type, longer, almost attaining the suture, in the paratype; posterior sclerites of notum brownish fulvous; sparse very small yellow setæ on præscutal interspaces and the mediotergite. Pleura yellowed on propleura, pteropleurite and metapleura, more fulvous brown on mesepisternum, anterior dorsopleural region and ventral meron. Halteres elongate, stem dirty white, knob brownish black. Legs with all coxæ and trochanters light yellow; femora brown, somewhat darker outwardly; tibiæ brown, tips snowy white, narrow on fore and middle legs, more extensive on posterior tibiæ where the outer fifth or sixth is included; tarsi white, somewhat obscured on fore and middle pairs, clearest on posterior legs. Wings (Plate 5, fig. 39) subhyaline, stigma dark brown, veins brownish black. Venation: Medial forks moderately deep, cell M_1 from about 1.75 to 2 times its petiole; cell 2nd A relatively broad.

Abdominal tergites light brown, only vaguely more darkened posteriorly, not appearing bicolored; basal sternites light yellow, subterminal two segments blackened to form a ring; hypopygium yellow. Male hypopygium (Plate 7, fig. 51, 52) with the tergal border, *t*, small, heavily blackened, lateral arms unequally bilobed; a small obtuse paler median lobe that is tipped with long setæ. Ninth sternite, *9s*, with lobes very strongly developed, including a broad subquadrate ventral extension that is provided with groups of long yellow setæ and a dorsal more slender lobe with expanded tip, fringed with relatively short setæ. Basistyle, *b*, produced caudad into a powerful flattened black blade, the tip slightly expanded, apical border oblique. Outer dististyle, *d*, long and slender, dusky, outer half with coarse setæ from blackened punctures; inner style large, the beak slender, upturned, the dorsal and especially the posterior crests greatly produced and expanded, yellow, the latter with a group of about 10 to 12 strong setæ.

Habitat.—India (Manipur).

Holotype, male, Sirhoi Kashong, altitude 7,500 feet, June 9, 1960 (*Schmid*). Paratopotype, 1 male.

The species is dedicated to the collector, Dr. Fernand Schmid, distinguished student of the Trichoptera of the World and author of two papers that concern the Tipulidæ.⁶

The species is told readily by the hypopygial structure, particularly the unusual development of the basistyles but also the inner dististyle and ninth sternite.

DOLICHOPEZA (NESOPEZA) SETILOBATA sp. nov. Plate 5, fig. 40; Plate 7, fig. 53.

Allied to *himalayæ*; general coloration of head and thorax medium brown; antennæ short; legs brown, outer tarsal segments whitened; wings strongly infuscated, stigma small, darker brown; male hypopygium with tergal plate blackened, posterior border trilobed, lateral lobes narrow, their tips emarginate, median lobe long, obtuse; inner dististyle with beak stout, dorsal crest high, with a group of long black setæ on anterior point of summit; eighth sternite terminating in two rounded lobes with long black setæ.

Male.—Length, about 11 millimeters; wing, 11; antenna, about 2.5.

Frontal prolongation of head brown; palpi black. Antennæ short, if bent backward not reaching the base of halteres, brown; first flagellar segment elongate, about twice the second, succeeding segments progressively shorter. Head brown, front more silvery.

Thorax almost uniformly medium brown, without clearly defined præscutal stripes; notal vestiture relatively long and abundant, especially on præscutum and mediotergite, the former whitened. Halteres moderately long, dark brown. Legs with coxæ brown; trochanters obscure yellow; femora and tibiæ brown, basitarsi brown, paler outwardly, outer tarsal segments whitened. Wings (Plate 5, fig. 40) strongly infuscated, stigma darker brown, relatively small; veins brown. Venation: Medial forks relatively deep, cell M_1 about twice its petiole; cell 2nd A broad.

⁶ Schmid, Fernand. Notes sur quelques Limnobiides de genre *Dasymolophilus*. Mitteil. Schweizerischen Ent. Gesell. (Bull. Soc. Ent. Suisse) 22 (1949) 237–242, 22 figs. (types in the Alexander Collection).

Schmid, Fernand. Quelques Dipteres nematoceres nouveaux ou interessants (Thaumaleides et Limnobiides). Bull. Inst. Roy. Sci. Nat. Belgique, No. 10 34 (1958) 1–23, 41 figs. (*Dasymolophilus jelenæ* Schmid-Jugoslavia).

Abdominal tergites, including the hypopygium, dark brown, basal sternites more brownish yellow, the apex narrowly darker. Male hypopygium (Plate 7, fig. 53) with the tergal plate, *t*, blackened, posterior border trilobed, lateral lobes narrow, emarginate to form two lobules, the inner or mesal one more slender, median lobe projecting beyond level of the lateral pair, obtusely rounded in holotype, more triangular in the paratype. Outer dististyle, *d*, broadest before midlength; inner style with beak stout, dorsal crest high, the summit with a group of long black setæ on the anterior part, posterior end of crest membranous. Eighth sternite, *8s*, narrowed posteriorly, terminating in two-rounded lobes that are separated by a small U-shaped emargination, the lobes with abundant long black setæ, the apical ones decussate across the midline.

Habitat.—India (Manipur).

Holotype, male, Singkap, altitude 3,800 feet, August 17, 1960 (*Schmid*). Paratype, male, Marou, altitude 4,000 feet, August 14, 1960.

The species is allied to *Dolichozeza* (*Nesozeza*) *asura* sp. nov. and *D. (N.) himalayæ* Alexander, differing conspicuously in all details of the hypopygium, including the tergite, inner dististyle and eighth sternite. Figures of these related species are shown on Plate 5, figs. 42–43.

DOLICHOPEZA (NESOPEZA) SIMPLICISSIMA sp. nov. Plate 5, fig. 41; Plate 7, figs. 54, 55.

Allied to *volupta*; size small (wing of male 8 millimeters); general coloration of thorax pale brown; antennæ of male about two-fifths the wing; tarsi and tips of tibiæ white; wings subhyaline, stigma brown; male hypopygium with ninth sternite unusually small and unmodified; posterior border of tergite with a broad U-shaped emargination, with a stout blackened tooth at either end; ninth sternite with a flattened yellow blade that terminates in a concentration of flattened yellow bristles; outer dististyle unusually broad, inner style with beak long and very slender, with no developed crests or outer basal lobe.

Male.—Length, about 8 millimeters; wing, 8; antenna, about 3.4.

Frontal prolongation of head yellow, with long black setæ; palpi brownish black. Antennæ moderately long, about two-fifths the wing; scape and pedicel obscure yellow, flagellum brown; flagellar segments long-cylindrical, more than three times their verticils. Front yellow, vertex light brown.

Pronotum yellowish brown. Mesonotum almost uniformly very pale brown, præscutal stripes barely differentiated; notum with a few delicate yellow setæ on scutellum and mediotergite. Pleura very pale brown, pteropleurite and meron more whitened. Halteres elongate, stem very light brown, knob blackened. Legs with coxæ and trochanters pale yellow, the fore coxæ vaguely darker; femora pale brown, bases more yellowed, tips gradually more darkened; tibiæ pale brown, tips snowy white, slightly more extensive on posterior legs where nearly the outer fourth is included; basitarsi dirty white, posterior pair and remainder of tarsi snowy white. Wings (Plate 5, fig. 41) subhyaline, stigma oval, brown; veins dark brown. Venation: Rs relatively long, nearly three times R_{2+5} ; medial forks relatively deep, cell M_1 about one-half longer than its petiole; cell 2nd A narrow.

Abdominal tergites light brown, posterior borders narrowly and indistinctly darker brown; sternites yellow, with more evident brown margins on the more proximal segments; subterminal segments uniformly brownish black, hypopygium obscure yellow. Male hypopygium (Plate 7, figs. 54, 55) with posterior border of tergite with a broad U-shaped emargination, with a stout blackened tooth at either end; an extensive ventral plate, its margin with numerous blackened spicules, more abundant on the cephalic portion. Ninth sternite, *9s*, unusually reduced in size, unmodified, smaller than the tergite; a flattened yellow blade, its inner apical angle with a scooplike concentration of modified setæ, the lowermost of which are broadly flattened. Outer dististyle, *d*, darkened, unusually broad, widest at about one-third the length; inner style with beak long and very slender with no developed crests or outer basal lobe.

Habitat.—India (Assam).

Holotype, male, Serrarin, United Khasia and Jaintia Hills, altitude 5,500 feet, October 7, 1960 (*Schmid*).

Dolichopeza (Nesopeza) simplicissima shows the greatest reduction and simplification of the sternal region of the hypopygium of any regional member of the *volupta* group so far discovered. Similarly the inner dististyle is unusually simple without dorsal crest or outer basal lobe.

ILLUSTRATIONS

[Legend: *b*, basistyle; *d*, dististyle; *p*, phallosome, *s*, sternite; *t*, tergite.]

PLATE 1

- FIG. 1. *Tipula* (*Nippotipula*) *masakiana* sp.nov.; venation.
2. *Tipula* (*Emodotipula*) *hemmingseni* sp.nov.; venation.
3. *Tipula* (*Emodotipula*) *hintoniana* sp.nov.; venation.
4. *Tipula* (*Nobilotipula*) *brolemanniana* sp.nov.; venation.
5. *Tipula* (*Nobilotipula*) *wardleana* sp.nov.; venation.
6. *Tipula* (*Schummelia*) *tonnoirana* sp.nov.; venation.
7. *Tipula* (*Vestiplex*) *schummelana* sp.nov.; venation.
8. *Tipula* (*Vestiplex*) *wahlgrenana* sp.nov.; venation.
9. *Tipula* (*Tipulodina*) *brevigladia* sp.nov.; venation.
10. *Tipula* (*Tipulodina*) *felicita* sp.nov.; venation.
11. *Tipula* (*Tipulodina*) *mcclureana* sp.nov.; venation.
12. *Tipula* (*Tipulodina*) *susainathani* sp.nov.; venation.
13. *Tipula* (*Indotipula*) *needhamana* sp.nov.; venation.
14. *Tipula* (*Indotipula*) *wulpiana* sp.nov.; venation.

PLATE 2

- FIG. 15. *Tipula* (*Nippotipula*) *masakiana* sp.nov.; male hypopygium.
16. *Tipula* (*Emodotipula*) *hemmingseni* sp.nov.; male hypopygium, lateral (diagrammatic).
17. *Tipula* (*Emodotipula*) *hemmingseni* sp.nov.; male hypopygium.
18. *Tipula* (*Emodotipula*) *hintoniana* sp.nov.; male hypopygium.
19. *Tipula* (*Nobilotipula*) *wardleana* sp.nov.; male hypopygium.
20. *Tipula* (*Schummelia*) *tonnoirana* sp.nov.; male hypopygium.

PLATE 3

- FIG. 21. *Tipula* (*Vestiplex*) *dobrotworskyana* sp.nov.; male hypopygium, diagrammatic.
22. *Tipula* (*Vestiplex*) *dobrotworskyana* sp.nov.; male hypopygium.
23. *Tipula* (*Vestiplex*) *schummelana* sp.nov.; male hypopygium.
24. *Tipula* (*Vestiplex*) *wahlgrenana* sp.nov.; male hypopygium.
25. *Tipula* (*Tipulodina*) *brevigladia* sp.nov.; male hypopygium.

PLATE 4

- FIG. 26. *Tipula* (*Tipulodina*) *felicita* sp.nov.; male hypopygium.
27. *Tipula* (*Tipulodina*) *mcclureana* sp.nov.; male hypopygium.
28. *Tipula* (*Tipulodina*) *susainathani* sp.nov.; male hypopygium.
29, 30. *Tipula* (*Indotipula*) *needhamana* sp.nov.; male hypopygium.
31. *Tipula* (*Indotipula*) *wulpiana* sp.nov.; male hypopygium.

PLATE 5

- FIG. 32. *Dolichozeza* (*Nesopeza*) *asura* sp.nov.; venation.
33. *Dolichozeza* (*Nesopeza*) *capitella* sp.nov.; venation.
34. *Dolichozeza* (*Nesopeza*) *dactylophora* sp.nov.; venation.
35. *Dolichozeza* (*Nesopeza*) *euthystyla* sp.nov.; venation.

36. *Dolichopeza* (*Nesopeza*) *microdonta* sp.nov.; venation.
37. *Dolichopeza* (*Nesopeza*) *parjanya* sp.nov.; venation.
38. *Dolichopeza* (*Nesopeza*) *pedicillata* sp.nov.; venation.
39. *Dolichopeza* (*Nesopeza*) *schmidi* sp.nov.; venation.
40. *Dolichopeza* (*Nesopeza*) *setilobata* sp.nov.; venation.
41. *Dolichopeza* (*Nesopeza*) *simplicissima* sp.nov.; venation.
42. *Dolichopeza* (*Nesopeza*) *asura* sp.nov.; male hypopygium.
43. *Dolichopeza* (*Nesopeza*) *himalayæ* Alexander; male hypopygium.

PLATE 6

- FIG. 44. *Dolichopeza* (*Nesopeza*) *capitella* sp.nov.; male hypopygium.
45. *Dolichopeza* (*Nesopeza*) *dactylophora* sp.nov.; male hypopygium.
46. *Dolichopeza* (*Nesopeza*) *euthystyla* sp.nov.; male hypopygium.
47, 48. *Dolichopeza* (*Nesopeza*) *microdonta* sp.nov.; male hypopygium.
49. *Dolichopeza* (*Nesopeza*) *parjanya* sp.nov.; male hypopygium.

PLATE 7

- FIG. 50. *Dolichopeza* (*Nesopeza*) *pedicillata* sp.nov.; male hypopygium.
51, 52. *Dolichopeza* (*Nesopeza*) *schmidi* sp.nov.; male hypopygium.
53. *Dolichopeza* (*Nesopeza*) *setilobata* sp.nov.; male hypopygium.
54, 55. *Dolichopeza* (*Nesopeza*) *simplicissima* sp.nov.; male hypopygium.

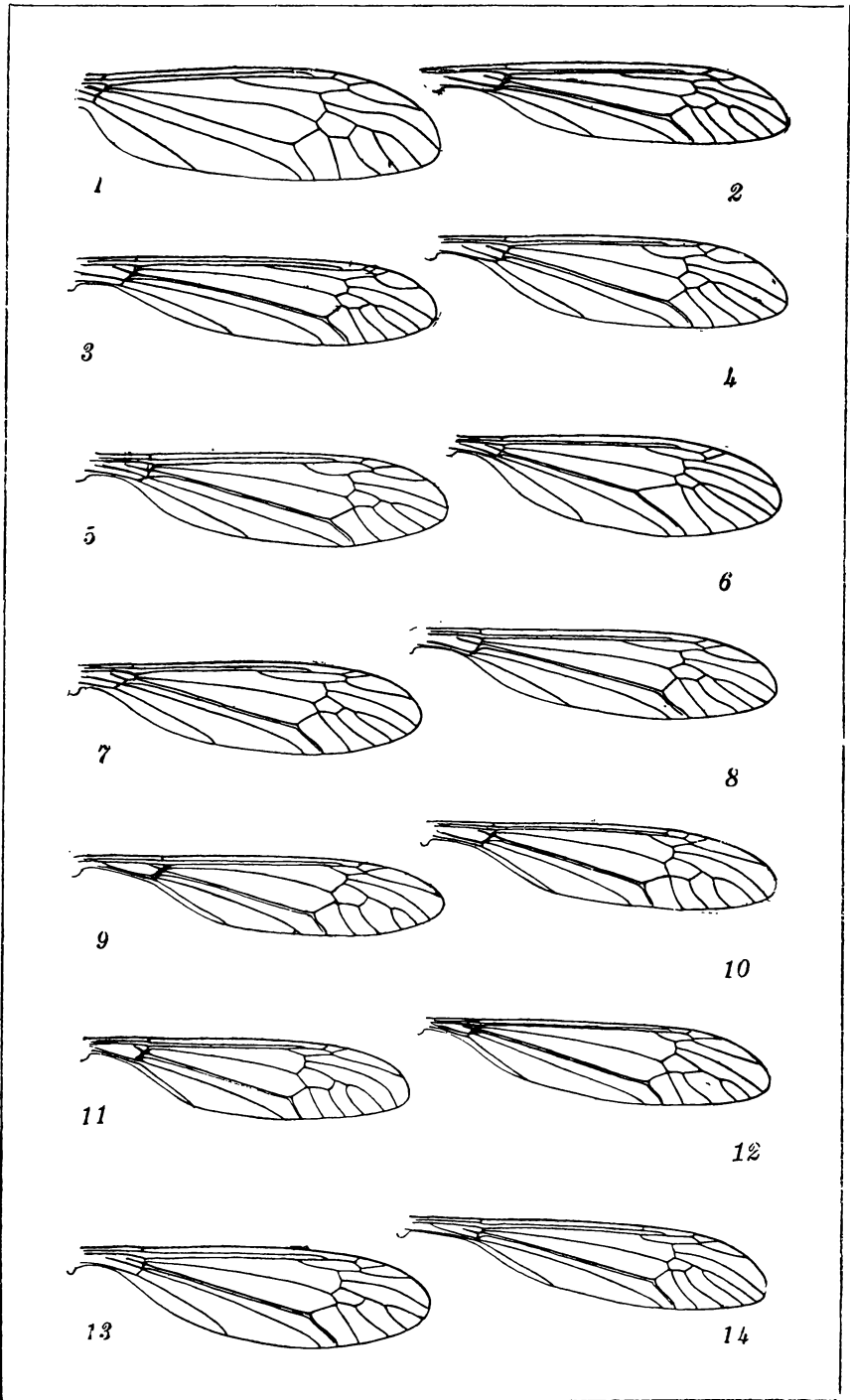
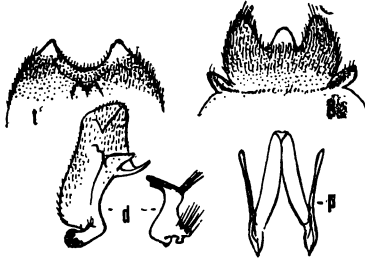
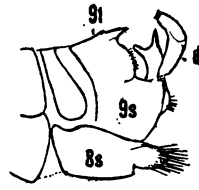


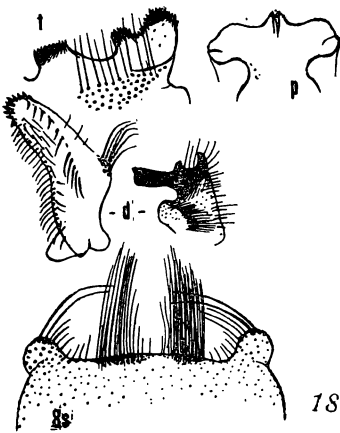
PLATE I.



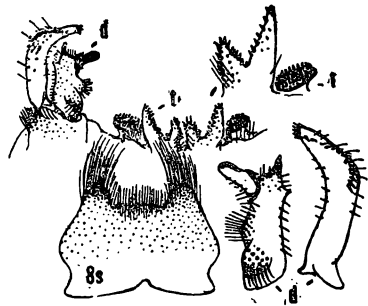
15



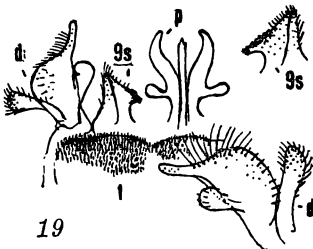
16



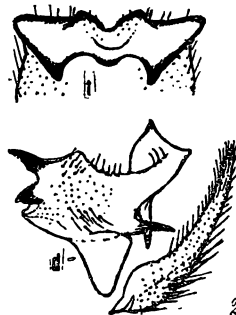
18



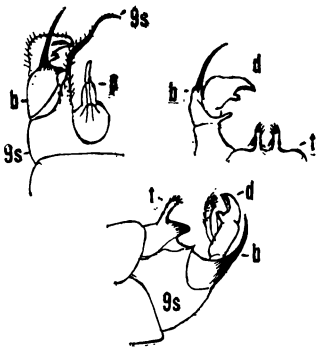
17



19

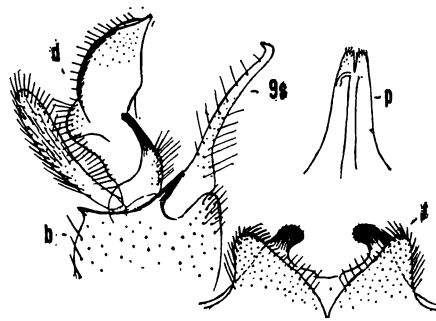


20

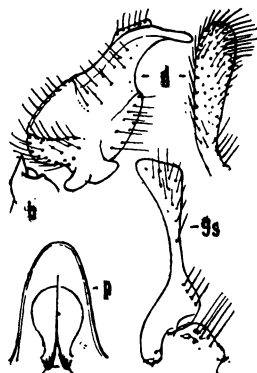


21

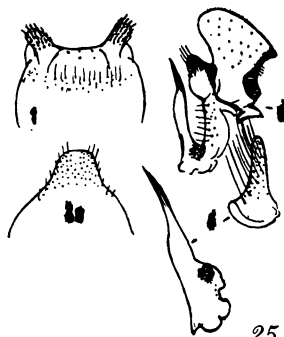
22



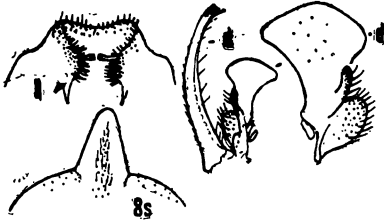
24



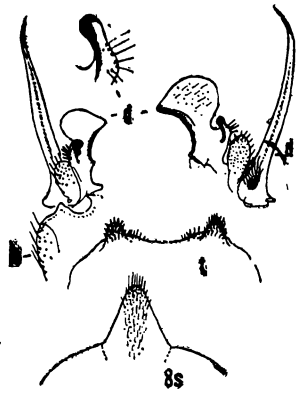
23



25



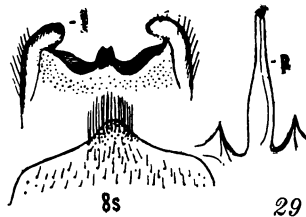
26



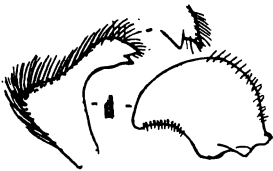
27



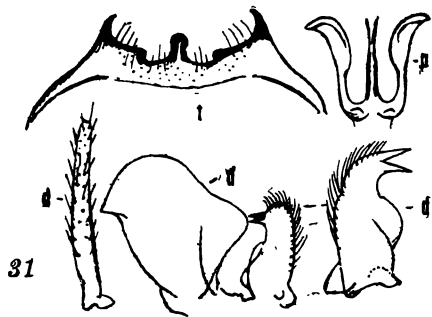
28



29



30



31



32



33



34



35



36



37



38



39



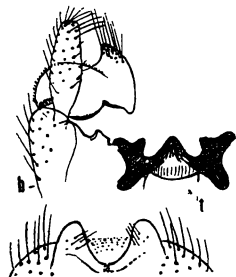
40



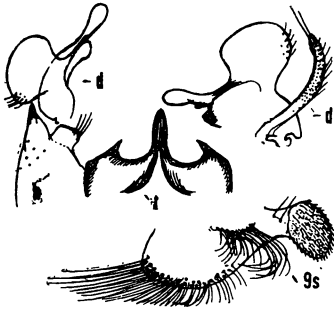
41



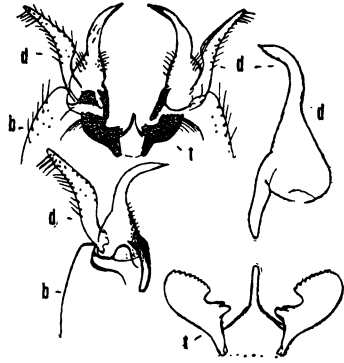
42



43



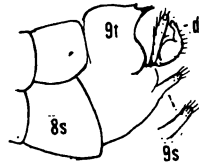
44



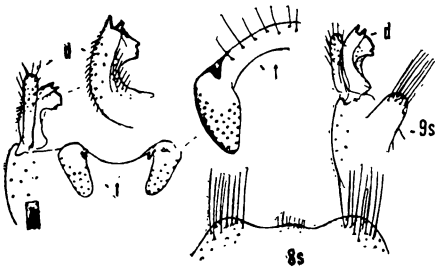
45



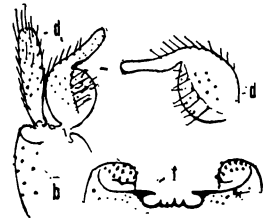
46



47

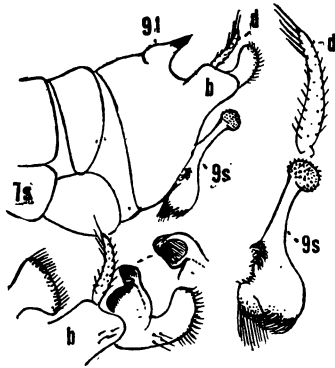


48

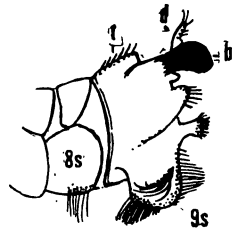


49

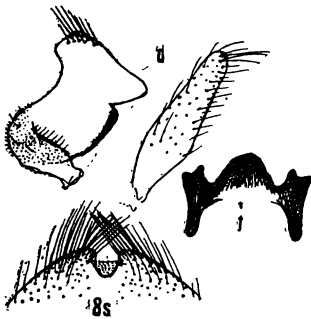
T



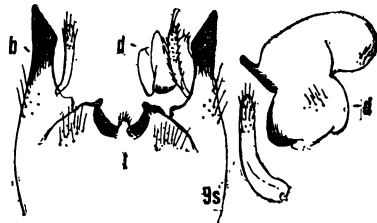
50



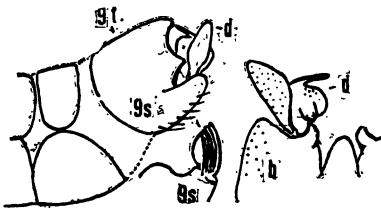
51



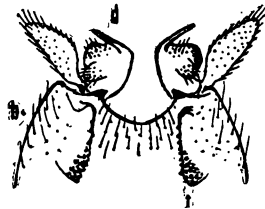
53



52



54



55