

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

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 94, No. 4, DECEMBER, 1965

MANILA  
BUREAU OF PRINTING  
1967

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

By CHARLES P. ALEXANDER

*Amherst, Massachusetts*

(Received for publication, April 28, 1965.)

## SEVEN PLATES

At this time I am continuing the study of the important collections of Tipulidæ that were taken by Dr. Fernand Schmid in many parts of India, Pakistan, and Ceylon between 1953 and 1961. All species discussed herewith belong to the subfamily Tipulinæ, in the genera *Ctenacroscelis* Enderlein, *Nephrotoma* Meigen, and *Dolichochepea* Curtis.

### Genus CTENACROSCELIS Enderlein

*Ctenacroscelis* ENDERLEIN, Zool. Jahrb., Syst. 32 (1912) 1-2.

*Ctenacroscelis* EDWARDS, Stylops, part 7 1 (1932) 145-150.

The genotype is *Ctenacroscelis dohrnianus* Enderlein of Sumatra. A very characteristic group of chiefly Oriental crane flies, certain of the species being the largest members of the family so far discovered, with a wing expanse of approximately 100 millimeters or more. Such giants include *Ctenacroscelis brobdignagia* (Westwood), *C. dorsopleuralis* Alexander, *C. goliath* Alexander, *C. regius* Alexander, *C. rex* Alexander, and several others nearly as large.

*Ctenacroscelis* is best represented in the Oriental and eastern Palæarctic regions, with a few species in the Australasian, including one in Micronesia. A few further species occur in the Ethiopian region, including Madagascar and other satellite islands. Edwards (1932) recorded 17 species from India and Burma. At present 35 species are known to me from this area and more may well be discovered.

The genus is very close to the chiefly Neotropical genus *Holorusia* Loew and is maintained as being distinct with some difficulty.

**CTENACROSCELIS BIOCULATUS** sp. nov.

Plate 1, fig. 1.

Belongs to the *pallifrons* group, allied to *simplicitarsis*; mesonotal præscutum obscure yellow, with four pale brown stripes; wings subhyaline, not or scarcely patterned, stigma more yellowed; abdomen medium brown, outer segments brownish black; eighth sternite blackened, on either side of posterior

border with a conspicuous oval whitened area; male hypopygium with posterior border of the long tergite truncate.

*Male*.—Length, about 21 millimeters; wing, 22; antenna, about 3.2.

Frontal prolongation of head elongate, subequal to the remainder, light brown, narrowly gray pruinose above; nasus relatively short, tufted with yellow setæ; palpi light brown. Antennæ with proximal three segments obscure yellow, remainder brown; basal flagellar segments cylindrical, intermediate ones triangularly produced beneath; verticils very small, scarcely longer than the intermediate segments. Head light brown, vertical tubercle entire, more yellowed; a light gray spot between the antennal fossa and eye; posterior vertex with two vaguely darker parallel stripes.

Pronotum light yellow, the scutum tumid, narrowly darkened anteriorly. Mesonotal præscutum obscure yellow, with four pale brown stripes, the sides slightly darkened; posterior sclerites of notum yellow, scutal lobes with two poorly defined pale brown areas, scutellum with vague pale brown areas on either side of midline. Pleura yellow, with a more silvery bloom; dorsopleural region pale yellow. Halteres with stem pale brown, knob dark brown. Legs with all coxæ pale yellow; trochanters yellow; remainder of legs very light brown; claws of male simple. Wings subhyaline, not or scarcely patterned, stigma more yellowed; veins pale brown.

Abdomen medium brown, the outer segments brownish black, styli paler; intermediate tergites with very small transverse to oblique brown dashes on either side of the more yellowed midline, eighth sternite brownish black, near posterior border on either side with a very conspicuous whitened oval area, the lateral posterior border more narrowly whitened. Male hypopygium (Plate 1, fig. 1) with the tergite, *t*, elongate; outer lateral angles slightly produced, posterior border truncate, with abundant short setæ. Inner apical angle of basistyle, *b*, produced into a small lobe that is fringed with very long setæ. Outer dististyle, *d*, with tip obtuse; inner style pale, apex slightly enlarged, complex in structure, as shown; outer margin of proximal half with a fringe of long pale setæ, on lower margin before midlength the stem slightly dilated, with scattered small black setæ. Eighth sternite, *8s*, with subapical lobes conspicuous, with long setæ; midregion with divergent setæ, the more basal ones progressively smaller and weaker; sides of

apex with further very long yellow setæ; pale ocular appearing areas without major setæ.

*Habitat*.—Sikkim.

Holotype, male, Lingdok, 4,600 feet, May 7, 1959 (*Schmid*).

*Ctenacroscelis bioculatus* is closely allied to *C. simplicitarsis* Alexander, differing in slight details of the hypopygium and evidently so in coloration of the eighth sternite.

**CTENACROSCELIS ELOBATUS** sp. nov.

Plate 1, fig. 2.

Belongs to the *brobdignagius* group; size relatively large (wing of male over 300 millimeters); præscutal stripes dark gray, narrowly bordered by brown, dorsal pleural stripe conspicuous; femora yellow, tips broadly and abruptly black; wings relatively narrow, infuscated, more heavily so on anterior third, with brighter areas before cord, in outer end of cell M and near the wing base; abdominal tergites dark brown, lateral borders narrowly yellowish gray; male hypopygium with median notch of tergite narrow, eighth sternite with conspicuous lobes that are provided with long yellow setæ; inner dististyle without a basal lobe, its apex obtusely rounded.

*Male*.—Length, about 26 to 27 millimeters; wing, 32 to 34; antenna, about 4 to 4.2.

Frontal prolongation of head light brown, nasus elongate, terminating in an acute point; palpi black. Antennæ with scape and pedicel yellow, flagellum light brown; flagellar segments virtually cylindrical, setæ very small. Head with front and vertical tubercle light yellow, central area of posterior vertex obscure yellow, sides weakly darkened.

Cervical region yellowed above, sides dark brown. Pronotum light yellow, scutum weakly darkened medially. Mesonotal præscutum with lateral borders broadly light yellow; disk with four dark gray stripes that are narrowly margined by brown, more intense at anterior ends of the intermediate stripes and lateral edges of the lateral pair; scutal lobes almost uniformly dark gray; scutellum paler gray, parascutella obscure yellow; mediotergite gray, the lateral and posterior declivities more yellowed, pleurotergite with anapleurotergite infuscated behind, anterior and yellow, katapleurotergite clear yellow, its posterior border narrowly dark brown. Pleura yellow, with a broad brown dorsal stripe. Halteres dark brown, base of stem obscure orange. Legs with coxæ light yellow, anterior faces of fore pair very weakly darkened; trochanters yellow; femora yellow, tips broadly and abruptly

black, slightly more extensive on fore pair, including about the outer sixth of segment; tibiæ and tarsi light yellow, tips of individual segments narrowly darkened, outer two tarsal segments black; claws of male moderately long, bidentate, epicondyle large. Wings relatively narrow, infuscated, more heavily so on anterior third, including the prearcular field; relatively conspicuous more yellowed brightenings before anterior cord, in outer end of cell M adjoining vein Cu, and in bases of cubital and anal cells; a narrow darkened seam on m-cu, widened posteriorly; veins yellowish brown. Venation:  $R_1$  joining  $R_{2+3}$  immediately before fork; petiole of cell  $M_1$  subequal to or slightly longer than m; m-cu long, near outer end of  $M_{3+4}$ .

Abdominal tergites dark brown, lateral borders narrowly yellowish gray; sternites brownish yellow, clearer yellow on basal segments. Male hypopygium (Plate 1, fig. 2) with more than outer third of tergite, *t*, yellowed, posterior margin with a narrow median notch, shallower in one paratype; outer lateral setæ elongate, yellow, forming inconspicuous pencils, median area without setæ. Outer dististyle, *d*, nearly parallel-sided, approximately twice as long as broad, tip obtuse, with abundant pale punctures, base conspicuously blackened; inner style, *id*, without a basal lobe, stem stout, expanded on outer half before apex, the latter obtusely rounded. Eighth sternite, *8s*, with posterior border emarginate, lobes with conspicuous long setæ, the abundant more basal ones shorter and darker, narrowly lacking on midline.

*Habitat*.—Assam.

Holotype, male, Chattrik, Manipur, 1,500 feet, July 21, 1960 (*Schmid*). Paratopotypes, 2 males.

While being generally similar to *Ctenacroscelis dorsopleuralis surya* Alexander, the present fly differs in important hypopygial characters, especially of the dististyles, including the lack of a basal lobe on the inner style.

**CTENACROSCELIS HANSONI** Alexander.

Plate 1, fig. 3.

*Ctenacroscelis hansonii* ALEXANDER, Bull. Brooklyn Ent. Soc. 58 (1963) 6-8.

Holotype, male, Chingsao, Manipur, Assam, 5,400 feet, June 14, 1960 (*Schmid*).

Male hypopygium (Plate 1, fig. 3).

**CTENACROSCELIS LEPTOSTYLUS Alexander.**

Plate 1, fig. 4.

*Ctenacroscelis leptostylus* ALEXANDER, Bull. Brooklyn Ent. Soc. 58 (1963) 8-10.

Holotype, male, Ukhrul, Manipur, Assam, 6,000 feet, July 15, 1960 (*Schmid*).

Male hypopygium (Plate 1, fig. 4).

**CTENACROSCELIS MAKARA sp. nov.**

Plate 1, fig. 5.

Belongs to the *brobdignagius* group; size large (wing of male 40 millimeters); mesonotal præscutum browish yellow with four gray stripes that are narrowly bordered by darker brown; darkened pleural stripe narrow and inconspicuous; femora brownish yellow, tips rather narrowly dark brown; wings almost uniformly rich cinnamon brown; abdominal tergites cinnamon brown, lateral borders paler; male hypopygium with tergite shallowly emarginate; basal enlargement of inner dististyle conspicuous; posterior border of eighth sternite slightly produced medially into two very low lobes that are provided with weak yellow hair brushes.

*Male*.—Length, about 35 millimeters; wing, 40; antenna, about 5.

Frontal prolongation of head cinnamon brown, nasus elongate; basal segment of palpus dark brown, remainder black. Antennæ light brown, terminal segment black; flagellar segments virtually cylindrical, with very small insignificant verticils. Head light brown, front yellowed; vertical tubercle large and rounded, slightly impressed medially.

Pronotum dark brown medially, yellow on sides, the lower ends paler brown. Mesonotal præscutum with the reduced ground brownish yellow, with four gray stripes that are narrowly and vaguely bordered by brown; interspaces light brown, only the extreme margin clear yellow; no brightened central ground area at suture, as in *majesticus*; scutal lobes in front with two confluent gray areas, posteriorly cinnamon brown, the median region concolorous; scutellum light brown, cephalic edge of parascutella yellowed, lateral margin brown; center of mediotergite pale brownish gray, paling to light gray laterally and behind, the outer margins broadly light brown; pleurotergite chiefly yellowed, posterior end of anapleurotergite light brown. Pleura chiefly whitened, dorsopleural region light yellow, bordered beneath by a narrow and inconspicuous brown longitudinal stripe, widest on the cervical region, narrowed behind, ending at wing root. Halteres brown, base of stem fulvous. Legs with coxæ yellow, anterior face of fore pair

weakly darkened; trochanters yellow; femora brownish yellow, tips rather narrowly dark brown, more intense on dorsal surface; tibiae brownish yellow, tips more narrowly darkened; tarsi light brown, tips of individual segments slightly enlarged and darkened, outer segments more uniformly infuscated; claws long, bidentate, outer tooth obtuse, epicondyle present. Wings narrower than in *perobtusius*, almost uniformly rich cinnamon brown, stigma not differentiated; slightly yellowed streaks in cell R, outer end of M, center of 1st A and more extensively in base of 2ndA; veins cinnamon brown. Veins behind R virtually glabrous, R with narrow rows of small trichia virtually to base, sparse and scattered before arculus. Venation: Petiole of Cell  $M_1$  relatively short, from one-third to one-half m; m-cu before fork of  $M_{3+4}$ .

Abdominal tergites cinnamon brown, lateral borders paler; basal sternites paler brownish yellow with long scattered setae; outer segments including hypopygium, light brown. Male hypopygium (Plate 1, fig. 5) with tergite, *t*, shallowly emarginate, the lobes low; setae restricted to outer end of tergal plate, relatively short and black, lacking on midarea; a few longer lateral yellow setae forming weak pencils. Apex of basistyle on inner face with weak relatively sparse setae; no fingerlike lobe on inner face of basistyle, as in *fulvolateralis*. Outer dististyle, *d*, slightly more than twice as long as broad at mid-length, apex obtuse; inner style with a conspicuous enlargement at base, provided with conspicuous erect black setae, beyond this the stem narrowed, slightly dilated at outer third, apex irregularly spinulose or with a flattened disk, provided with a few very small setae near tip; base of style opposite the basal enlargement with relatively few but long black setae, not forming a dense brush on a basal lobe as in *fulvolateralis*. Eighth sternite, *8s*, with posterior border slightly produced medially, scarcely emarginate, forming two very low lobes that bear weak brushes of moderately long yellow setae.

*Habitat*.—Assam.

Holotype, male, Lakhan Khuman, Manipur, 3,000 feet, July 26, 1960 (*Schmid*).

*Ctenacroscelis makara* is best distinguished from other regional members of the *brobdignagius* group by the differently colored wings and especially by the structure of the male hypopygium, particularly the ninth tergite, outer dististyle, and eighth sternite. Other regional members of the group

of great size and having the eighth abdominal sternite more or less emarginate, include *C. dorsopleuralis* Alexander, *C. fulvo-lateralis* (Brunetti), *C. mara* Alexander, and *C. perobtus* Alexander, the last being the most similar species.

**CTENACROSCELIS NIGROFEMORATUS** sp. nov.

Plate 1, fig. 6

Belongs to the *albovittatus* group; mesonotum dark brown, pleura striped with brown and light yellow; antennæ with flagellum light orange, outer two segments darkened; femora brownish black, tibiæ and tarsi paler, brownish yellow to light brown, claws bidentate; wings broad, suffused with cinnamon brown, the base more blackened; veins unusually glabrous, cell  $M_1$  deep; abdomen almost uniformly orange fulvous; male hypopygium with ninth tergite deeply emarginate; outer dististyle very broad, inner style unusually slender on outer half; eighth sternite unmodified.

*Male*.—Length, about 23 to 27 millimeters; wing, 26 to 29; antenna, about 4.5 to 5.

Frontal prolongation of head uniformly dark brown, nasus small to very reduced; palpi black. Antennæ with scape and pedicel light to darker brown, the latter in cases more yellowed; flagellum light orange, outer two segments brown to brownish black; basal flagellar segment long-cylindrical, exceeding the scape; intermediate six segments short, their lower faces rounded, setæ short; outer two segments slender, subequal in length. Head above dark brown, more intense on central part, more fulvous surrounding the antennal fossæ, the extreme orbits pale; vertical tubercle low.

Cervical region brownish black medially and beneath, sides yellowed. Pronotal scutum brown, broadly light yellow on sides. Mesonotal præscutum dark brown, the four stripes slightly plumbeous, only a little darker than the interspaces, humeral region restrictedly blackened; scutum brown, each lobe with three more plumbeous areas that are bordered vaguely by brown, the median region behind suture with a conspicuous blackened depression; scutellum and mediotergite brownish gray, parascutella brownish yellow; mesonotum with unusually long and conspicuous erect setæ. Pleura conspicuously variegated, including a broad light yellow dorsopleural band, beneath which is an unusually broad darker brown longitudinal stripe extending from the cervical region to beneath the wing-root; ventral part of pleura paler brown, dorsal sternopleurite with a restricted pale area that is continued backward over



the pleurotergite and metapleura on to sides of first abdominal tergite; ventral sternopleurite darker, with abundant setæ. Halteres dark brown, base of stem narrowly yellowed. Legs with coxæ pale brown, the apices restrictedly pale yellow; trochanters dark yellow; femora brownish black, only the extreme bases vaguely brightened; tibiæ and tarsi brownish yellow to light brown, outer tarsal segments brownish black; terminal tarsal segment with a conspicuous hairy basal epicondyle; claws of male elongate, bidentate, basal spine acute, the outer one obtuse. Wings broad, very strongly suffused with cinnamon brown, base and prearcular field strongly more blackened, stigma scarcely darker than the ground; oblitative areas before and beyond stigma very restricted, especially the latter; veins yellow, those at wing base darker. Veins unusually glabrous, with minute trichia on veins C, R,  $R_1$  and  $Sc_2 + R_1$ . Venation: Cell  $M_1$  very deep, its petiole greatly reduced, approximately one-seventh to one-fourth m.

Abdomen stout, almost uniformly orange fulvous, lateral tergal borders narrowly darkened; segments with short yellow setæ, longer on sternites. Males hypopygium (Plate 1, fig. 6) with tergite, *t*, long, its posterior border with a very narrow U-shaped emargination, apices of lobes obliquely obtuse; outer half of tergite, including the lobes, with very abundant short black setæ. Apex of basistyle broadly produced beyond point of insertion dististyles. Outer dististyle, *d*, very broad at base, virtually as wide as long, apex obtuse, surface with short yellow setæ; inner style expanded at base, outer half very slender, terminating in a small cap that is provided with microscopic setæ. Eighth sternite entire, without lobes; posterior border gently convex, margined with a dense fringe of relatively long light yellow setæ.

*Habitat*.—Assam.

Holotype, male, Sirhoi Kashong, Manipur, 6,000 feet, June 6, 1960 (*Schmid*). Paratopotypes, males, 6,000 feet, June 6–10, 1960; 7,500 feet, July 13, 1960. Paratypes, males, Hkayam Boum, Manipur, 8,500 feet, June 21–23, 1960; male, Loni, Manipur, 5,500 feet, June 16, 1960; male, Ukhrul, Manipur, 6,000 feet, July 15, 1960 (*Schmid*).

*Ctenacroscelis nigrofemoratus* is a very distinct fly, superficially being most like species such as *C. dives* (Brunetti) and *C. fumepennis* (Brunetti), differing markedly in coloration

of the body, legs and wings and especially in all details of structure of the male hypopygium.

**CTENACROSCELIS SIMPLICITARSIS** Alexander.

Plate 2, figs. 9, 10.

*Ctenacroscelis simplicitarsis* ALEXANDER, Bull. Brooklyn Ent. Soc. 58 (1963) 10-11.

Holotype, male, Phaileng, Mizo District, Lushai Hills, Assam, 3,500 feet, September 14, 1960 (*Schmid*).

Legs and male hypopygium (Plate 2, figs. 9, 10).

**CTENACROSCELIS SUFFLAVUS** Alexander.

Plate 2, fig. 11.

*Ctenacroscelis sufflavus* ALEXANDER, Ann. Mag. Nat. Hist. (12) 10 (1957) 99-100.

Holotype, male, Cinchona, Anamalai Hills, South India, 3,500 feet, May 1956 (*P. Susai Nathan*).

Male hypopygium (Plate 2, fig. 11).

**Genus NEPHROTOMA** Meigen

*Pales* MEIGEN, Nouv. Class. Mouch. (1800) 14 (nomen nudum); name suppressed by action of International Commission Zoological Nomenclature, 1963.

*Nephrotoma* MEIGEN, Illiger's Mag. 3 (1803) 262.

*Pachyrrhina* MACQUART, Hist. Nat. Ins., Diptera 1 (1834) 88.

Manheims, Bernhard, in Erwin Lindner's "Die Fliegen der Palaearktischen Region," Lief. 167 (1951) 32-59, figs. 10-26, pl. 6 (adult male); as *Pales* Meigen.

*Nephrotoma* is a major genus in the *Tipulidæ*, with very numerous species in the Holarctic, Oriental and Ethiopian regions, and relatively few representatives in the Neotropics and still fewer in the Australasian region. Several species occur in Madagascar but none in New Zealand or in most of Australia. More than 40 species presently are known from India, including those discussed in this report. Despite its great geographic range and evident antiquity *Nephrotoma* is a remarkably uniform genus and apparently does not subdivide into subgenera comparable to those found in *Dolichopeza* and *Tipula*. The type of *Nephrotoma* is *dorsalis* (Fabricius) of Europe.

**NEPHROTOMA ALTIGALEA** sp. nov.

Plate 1, fig. 7; Plate 2, fig. 12.

Allied to *consimilis*; general coloration of thorax yellow, the præscutum with three nacreous black stripes, scutal lobes with similar areas; more blackened marks opposite the lateral præscutal stripes and ends of the transverse suture; antennæ of male relatively long, flagellum black; legs black, femoral

bases narrowly brownish yellow; wings pale brown, stigma slightly darker brown; abdomen orange, tergites with three broken black stripes, hypopygium orange; male hypopygium with lateral tergal lobes very broad, outer crest of inner dististyle elongate, eighth sternite deeply divided, the emargination provided with unusually abundant long yellow setæ.

*Male*.—Length, about 12.5 to 13 millimeters; wing, 11.5 to 12.5; antenna, about 4.8 to 5.

Frontal prolongation of head light yellow, the elongate nasus and a major dorsal area on outer two-thirds dark brown; palpi light brown, outer segment chiefly orange. Antennæ of male elongate; scape yellow, pedicel dark brown, flagellum black; flagellar segments strongly incised, longer than the verticils. Head light yellow, strongly suffused with orange across anterior vertex, darkest adjoining the eyes; vertical tubercle high, simple; occipital brand small and inconspicuous, triangular in outline, pale brown.

Pronotum light yellow, sides of scutum and most of scutellum dark brown, pretergites light yellow. Mesonotal præscutum deep yellow, sides paling to whitish, disk with three polished nacreous black stripes; a deeper black area opposite anterior end of lateral stripe; scutal lobes nacreous black, the lateral ends of suture and broad outer sides of the lobes deeper black; scutellum brownish yellow; mediotergite orange yellow, pleurotergite similar, the katapleurotergite clearer yellow. Pleura light yellow, with more reddened areas on ventral anepisternum, sternopleurite and meron. Halteres with stem light brown, knob more yellowed. Legs with coxæ and trochanters orange yellow; femora black, the bases narrowly brownish yellow, on posterior legs including about the proximal fourth; tibiæ brownish black, tarsi black; claws of male toothed. Wings (Plate 1, fig. 7) pale brown, stigma and a very restricted seam over anterior cord slightly darker brown; veins brown. No trichia in stigma or wing cells. Venation:  $Sc_2$  opposite origin of Rs; petiole of cell  $M_1$  variable, from very short to longer than m; m-cu at fork of  $M_4$ .

Abdomen orange, restrictedly patterned with black, including a narrow transverse band across base of first tergite, remaining tergites with interrupted black areas, distinct on segments two to four, lacking on segment five, present on tergites six to eight, more extensive on outer segments; narrow broken black lateral

lines on tergites, extending from outer half of segment two to segment six, more or less interrupted at bases of segments, outwardly becoming paler and more oblique; hypopygium orange. Male hypopygium (Plate 2, fig. 12) with the tergite, *t*, unusually long, its greatest length subequal to the breadth; posterior border produced into two flattened lobes that are densely provided with blackened spicules, directed chiefly laterad; lobes obtuse at tips, separated by a linear split; lateral lobes darkened, very broad, slightly expanded outwardly, margins with about five or six spinoid spicules. Region of ninth sternite produced into a compressed yellow cushion that is densely provided with microscopic setulæ. Basistyle unmodified. Outer dististyle, *d*, unusually short, the length slightly less than three times the breadth across the basal third; marginal setæ short, those of disk and outer margin at base longer, all setæ yellow; inner style with beak relatively slender, lower beak low and obtuse, blackened; dorsal crest unusually high, sclerotized, glabrous; no modifications in region of the outer basal lobe other than a low flange with about three strong setæ, with two or three larger dark-colored marginal setæ, those of the disk pale yellow. Phallosome not clearly preserved; gonapophyses very small, pale. Eighth sternite, *8s*, large and sheathing, posteriorly divided into two obtuse halves by a profound median split, the inner margins of lobes with abundant unusually long and conspicuous curved yellow setæ, these shorter and directed cephalad at and near base of notch; a conspicuous depressed-flattened submembranous lobe in the sternal emargination; posterior border truncate, with a few long curved yellow setæ.

*Habitat*.—Kumaon.

Holotype, male, Tarak Tal, Pauri Garhwal, 7,540 feet, August 14, 1958 (*Schmid*). Paratypes, 2 males, Wan, Pauri Garhwal, 7,880 feet, August 20, 1958 (*Schmid*).

In its hypopygial structure, including the ninth tergite, the present fly is most similar to species such as *Nephrotoma consimilis* (Brunetti), differing conspicuously in the coloration of the body and legs but especially in the structure of the antennæ and hypopygium particularly the inner dististyle and the eighth sternite.

NEPHROTOMA BICRISTATA sp. nov.

Plate 1, fig. 8; Plate 2, figs. 13, 14.

Size medium (wing of male 10.5 millimeters); general coloration yellow, the præscutum with three black nacreous

stripes; scutum and scutellum black; wings subhyaline, stigma and cell Sc brown, cell 1st  $M_2$  small; abdomen yellow, outer segments more infuscated; male hypopygium with posterior border of tergite produced into intermediate spiculose lobes; outer dististyle darkened, elongate, outer half very slender, inner style with dorsal crest bifid; posterior border of eighth sternite with a broad U-shaped emargination.

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

Frontal prolongation of head obscure yellow, narrowly blackened above on outer three-fourths, including the nasus that is tufted with long setæ; palpi black. Antennæ with scape yellow; remainder broken. Head orange, the high vertical tubercle clearer orange; occipital brand small, triangular; a brown suffusion across anterior end of posterior vertex, paler and more extensive in center, brownish black on the orbits.

Pronotum obscure yellow, scutellum obscure yellow medially, side brownish black. Mesonotal præscutum with the ground obscure yellow, with three blackened nacreous stripes, the lateral pair with a blackened circular spot opposite its anterior end; scutum and scutellum black; mediotergite brown, the pleurotergite chiefly yellow; mediotergite with numerous small retrorse setæ. Pleura yellow, variegated by more redened areas on ventral anepisternum, sternopleurite and meron. Halteres light brown, base of knob slightly darker. Legs with coxæ and trochanters yellow; remainder of legs brownish black, femoral base narrowly yellowed; claws of male toothed. Wings (Plate 1, fig. 8) subhyaline, cell Sc and stigma brown; veins brown. About five trichia in cell  $M_1$ , stigmal trichia few. Venation: Rs short and straight, subequal to the slightly more arcuated basal section of  $R_{4+5}$ ; cell  $M_1$  short-petiolate; cell 1st  $M_2$  small; m-cu at base of  $M_4$  just beyond origin.

Abdomen yellow, outer segments more infuscated. Male hypopygium (Plate 2, figs. 13, 14) with the posterior border of tergite, *t*, produced into two large oval blades that are narrowly separated at midline; blades with abundant black retrorse spinoid setæ; a small lateral projection, also provided with a few spinules. Ninth sternite medially produced ventrad into a slender darkened lobe. Outer dististyle, *d*, darkened, elongate, the outer half very slender; inner style with beak slender; dorsal crest bifid, produced into two divergent narrow blades; region of outer basal lobe a darkened spine.

Gonapophyses small, oval, darkened. Eighth sternite, 8s, transverse; posterior border with a broad U-shaped emargination, lateral lobes with relatively few long incurved setæ, the inner angle of lobe rounded.

*Habitat*.—West Bengal.

Holotype, male, Labha, 5,000 feet, September 11, 1959 (*Schmid*).

*Nephrotoma bicristata* is most readily told from other generally similar species by the hypopygial structure, especially of the eighth sternite and both dististyles. The elongated outer style is much as in *N. attenuata* Alexander and *N. retenta* Alexander, while the emarginate eighth sternite is suggestive of *N. sternemarginata* Alexander. The bifid dorsal crest of the inner style in the present fly is distinctive.

NEPHROTOMA CURTITEREBRA sp. nov.

Plate 2, fig. 15; Plate 3, fig. 19.

General coloration yellow, the præscutum with three polished black stripes; head yellow, with a virtually complete darkened crossband on vertex; femora yellow; wings strongly yellowed, prearcular and costal fields more saturated yellow, veins dark brown, yellowed in the saturated parts; vein M <sup>3+4</sup> present, m-cu at or close to its fork, cell 2nd A long and narrow; abdominal tergites orange, conspicuously patterned with black, especially the lateral borders, subterminal segments blackened; ovipositor with cerci light yellow, short, compressed-flattened, tips obtuse.

*Female*.—Length, about 11 to 11.5 millimeters; wing, 12 to 13; antenna, about 2.7 to 2.8.

Frontal prolongation of head light yellow, narrowly more orange above, the outer end, with nasus, brown; palpi brown. Antennæ with scape obscure yellow, darker outwardly; pedicel brown, flagellum brownish black; flagellar segments shorter than the longest verticils. Head yellow, vertex more orange; a large brown spot on anterior vertex at narrowest point, virtually continuous to form a transverse band; occipital band broad but small and inconspicuous, nacreous, sending a slender point forward almost to the darkened band; vertical tubercle clear light yellow, deeply impressed on midline.

Pronotum polished yellow, the sides, with the propleura, dull brownish black. Mesonotal præscutum light yellow with three polished black stripes, very narrowly and vaguely bordered by darker; lateral stripes with an opaque spot at anterior end to appear outcurved; scutum yellow, each lobe virtually

covered by a single polished black area that is narrowly margined by more opaque, at the suture confluent with the lateral præscutal darkening; scutellum light brown, parascutella yellow; mediotergite yellow, vaguely darkened on central portion; pleurotergite yellow; mesonotum glabrous. Pleura yellow, extensively more fulvous on anepisternum, ventral sternopleurite and ventral meron. Halteres with stem light brown, knob dark brown. Legs with coxæ and trochanters yellow; femora yellow; tibiæ obscure yellow, extreme tips vaguely darker; tarsi black. Wings (Plate 2, fig. 15) strongly yellowed, prearcular and costal regions more saturated yellow; stigma yellow, a little more darkened outwardly; veins of disk dark brown, those of the saturated fields yellow. Stigma with about 20 trichia, none in outer wing cells. Venation:  $Sc_2$  ending shortly beyond origin of  $R_s$ ; cell  $M_1$  short-petiolate to sessile (in holotype); vein  $M_{3+4}$  present, m-cu thus beyond the fork of  $M$  at or just before the base of vein  $M_4$ ; cell 2nd A long and narrow.

Abdomen with basal tergites orange, beyond the second obscure yellow, heavily patterned with black, including broad lateral borders and narrower posterior margins, with a more or less evident transverse band before midlength of segment; sternites clearer yellow; subterminal segments more uniformly blackened; cerci clear light yellow, hypovalvæ darker. Ovipositor (Plate 3, fig. 19, lateral aspect) with cerci compressed-flattened, very short, the length about one-half greater than the diameter beyond base, tips obtuse; sparse pale setæ on lower three-fourths, including the tip; hypovalvæ darker, very narrow, tips pale, obtuse.

*Habitat*.—Sikkim.

Holotype, female, Nampung, 3,280 feet, May 8, 1959 (*Schmid*). Paratopotype, female, with the type.

Very few species of the genus have the m-cu crossvein beyond the fork of  $M$ , on or beyond  $M_{3+4}$ , as in the present fly. Other regional species having this character include *Nephrotoma ericarum* sp. nov. and *N. platysterna* sp. nov., both entirely different flies. The very short and broad cerci of the female have suggested the specific name.

**NEPHROTOMA ERICARUM** sp. nov.

Plate 2, fig. 16; Plate 3, fig. 20.

Allied to *distans*; præscutal stripes bluish nacreous, margined with velvety black, lateral borders not continuously darkened;

head with occipital brand nacreous, narrow, very broadly bordered by velvety black, sending a broad arm to margin of eye; central area of mediotergite broadly velvety black; pleura conspicuously patterned with light gray; longitudinal stripes of abdominal tergites interrupted; wings with m-cu beyond the fork of M; male hypopygium with the gonapophyses very pale, inner dististyle massive with both the beak and lower beak blackened.

*Male*.—Length, about 12.5 to 13 millimeters; wing, 12.5 to 13; antenna, about 3.7 to 3.8.

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

Frontal prolongation of head yellow, the dorsum broadly blackened, including the long nasus; palpi black. Antennæ black, apex of pedicel slightly yellowed; flagellar segments subcylindrical, basal enlargements small, verticils much shorter than the segments. Head yellow; occipital brand nacreous, narrowly triangular, the anterior end acutely pointed, very broadly bordered by velvety black, on anterior vertex including broad arms that reach the eyes; vestiture of head elongate, the ventral setæ very long, yellow.

Pronotal scutum light yellow, sides pale brown, sides of scutellum narrowly blackened. Mesonotal præscutum orange yellow, with three bluish nacreous stripes that are narrowly margined with velvety black, the lateral pair straight, extreme margin of præscutum narrowly blackened; scutum yellow with two confluent bluish nacreous areas on each lobe, narrowly bordered by velvety black, contiguous with the lateral præscutal stripes; scutellum bluish nacreous, perascutella yellow; mediotergite light yellow, broadly velvety black medially, the posterior border with two separate light blue areas; the entire notum virtually glabrous. Pleura and pleurotergite yellow, conspicuously patterned with light gray areas, including the anepisternum, sternopleurite, posterior border om mesepisternum, ventral meron and lower pleurotergite; dorsopleural membrane orange. Halteres with stem obscure orange, knob brown. Legs with coxæ yellow, the fore pair more grayish at base; trochanters yellow; femora chiefly black, bases yellow, including the proximal third or less; tibiæ and tarsi black; claws small, simple. Wings (Plate 2, fig. 16) strongly tinged with light brown; stigma small, darker brown; a vague narrow darkened seam on anterior cord; veins brown. Stigma with about 15 trichia. Venation:  $Sc_2$  ending shortly beyond origin of  $Rs$ ;



cell  $M_1$  narrowly sessile; m-cu beyond fork of  $M$ ,  $M_{3+4}$  preserved as a short element.

Abdomen orange, the tergites with a narrow black median stripe, on each segment interrupted at base and more narrowly at apex, lateral tergal borders more narrowly blackened; sternites yellowed; segments six to nine blackened, the hypopygial styli yellowed. Male hypopygium (Plate 3, fig. 20) with tergite,  $t$ , transverse, slightly narrowed outwardly, posterior border very slightly emarginate forming two gently oblique lobes, the outer lateral angles obtuse, the entire surface with microscopic spicules; on ventral surface of each lobe with a suboval plate, its margin with larger spicules. Outer dististyle,  $d$ , relatively short, tip obtuse, length about two and one-half times the greatest width; inner style massive, the blackened region of the beak extensive, lower beak obtusely rounded; outer basal lobe a small blackened plate with a few scattered setæ. Phallosome,  $p$ , with gonapophyses appearing as long slender pale rods that are more than twice as long as the ædeagus. Eighth sternite,  $8s$ , with posterior border gently convex, the median area slightly produced into a low lobule provided with a few setæ.

*Habitat*.—Sikkim.

Holotype, male, Yagtang, 11,650 feet, in *Rhododendron* association, June 17, 1859 (*Schmid*). Allotopotype, female. Paratopotypes, 3 males.

The most similar regional species is *Nephrotoma distans* Edwards, of Tibet, which differs in various details of coloration and structure of the hypopygium, as given in the diagnosis. The distal position of m-cu is an uncommon character in the genus, as was indicated under the account of the preceding species.

NEPHROTOMA EURYGLOSSA sp. nov.

Plate 2, fig. 17; Plate 3, figs. 21, 22.

Mesonotal præscutum light yellow with three polished nacreous black stripes that are very narrowly bordered by dull black, lateral stripes not outcurved, scutellum and central area of mediotergite brown, parascutella and pleura yellow; legs black, femoral bases restrictedly yellowed; wings yellowish brown, stigma brown, with a paler brown seam over the cord; abdomen yellow, tergites with three conspicuous dark brown stripes, outer four segments brownish black; male hypopygium with tergal lobes extended into a point; inner

dististyle massive; phallosome with gonapophyses appearing as elongate blades; membrane between the eighth and ninth sternites with a short broad dusky lobe that is densely setuliferous.

*Male*.—Length, about 13 millimeters; wing, 10.5; antenna, about 3.1.

Frontal prolongation of head light yellow, the dorsum and relatively short nasus dark brown; palpi brown, first segment somewhat darker, apex of third segment yellow. Antennæ black, base of scape slightly paler; flagellar segments longer than their verticils, basal enlargements small and feebly indicated. Head yellow, including the obtuse vertical tubercle; occipital brand broad, nacreous, bordered by dark brown, at anterior end sending lateral arms to the eye.

Pronotum light yellow. Mesonotum light yellow with three polished nacreous blackened stripes that are very narrowly bordered by dull black, the median stripe reaching the suture behind; lateral stripes not outcurved; scutum yellow, each lobe with a major nacreous black area that reaches the suture, sides with a brownish black area; scutellum dark brown, parascutella yellow; postnotum chiefly yellow, mediotergite broadly medium brown, paler behind; præscutum and scutum glabrous, scutellum with short setæ, mediotergite with abundant long erect setæ. Pleura yellow. Halteres with stem and apex of knob yellowed, base of latter dark brown. Legs with coxæ and trochanters yellowed; femora blackened, bases restrictedly yellow, the amount subequal on all legs; tibiæ and tarsi black; claws of male toothed. Wings (Plate 2, fig. 17) yellowish brown; stigma oval, brown, with about seven trichia; a paler brown seam over cord, less evident on the posterior cord; veins brown. Venation:  $Sc_2$  ending shortly beyond origin of  $Rs$ ; cell  $M_1$  very short-petiolate to narrowly sessile;  $m-cu$  on  $M_4$  just beyond base.

Abdomen yellow, tergites with three conspicuous dark brown stripes, the median one continuous, lateral stripes more interrupted near bases of segments; sixth and succeeding segments brownish black; basal sternites clear light yellow. Male hypopygium (Plate 3, figs. 21, 22) with the tergite, *t*, transverse, posterior border with a broad emargination with a second narrower one at its base, each lobe thus formed extended into a slender point; margins of lobes oblique, with blackened spicules that are directed caudad, with a further ventral concent-

ration of points on either side, these directed cephalad and laterad, as shown; each lobe with very long delicate setæ. Ninth sternite not markedly modified. Outer dististyle, *d*, about three times as long as the greatest breadth, tip narrowly obtuse; setæ very long and conspicuous, the outer ones smaller; inner style distinctive, the beak blackened, very extensive, lower beak narrower; dorsal crest produced backward as nearly hyaline membrane, the margin obtuse; outer basal lobe farther produced, with a more sclerotized flange, the inner margin with a single strong spine. Gonapophysis appearing as a very powerful blade, dilated and incurved at midlength, ædeagus black. Eighth sternite, *8s*, transverse; posterior border very gently emarginate, setæ very numerous on outer two-thirds but not forming tufts or brushes; in the membrane between the eighth and ninth sternites a short broad dusky lobe, its apex farther produced into a narrower transverse lobe, the apex truncate, surface with abundant microscopic setulæ.

*Habitat*.—Sikkim.

Holotype, male, Lachung, 8,610 feet, July 3, 1959 (*Schmid*).

*Nephrotoma euryglossa* is allied to *N. glossophora* Alexander, the relationship being shown by certain structures of the hypopygium, particularly the tergite and gonapophyses. The two flies differ in coloration, stigmal trichiation, and in the details of the hypopygium, particularly the inner dististyle and the lobe of the eighth sternite.

**NEPHROTOMA HAMULIFERA** sp. nov.

Plate 2, fig. 18; Plate 3, figs. 23, 24.

Mesonotal præscutum yellow with three polished black stripes, the lateral pair with a dark brown area opposite anterior end; antennal flagellum black, segments scarcely incised; occipital brand virtually lacking; legs black, femoral bases narrowly yellowed; wings subhyaline, cell *Sc* and the stigma darkened, cell 1st *M*<sub>2</sub> small; abdomen almost uniformly orange, tergites one, seven and eight more brownish black; male hypopygium with posterior border of tergite produced into two oval spiculate blades, lateral plates flattened, subpalmate; outer dististyle very long, the outer half slender, inner style pale, the beak unusually long and slender, dorsal crest hyaline, outer basal lobe with a strong blackened hook lying far distad; gonapophyses oval; eighth sternite with a concentration of setæ on the obtuse apex.

*Male*.—Length, about 10.5 to 11 millimeters; wing, 11.2 to 11.5; antenna, about 4.5 to 4.7.

Frontal proloration of head light yellow, outer end dorsally dark brown, nasus black; palpi brown. Antennæ moderately long; scape orange, pedicel light brown, flagellum black; flagellar segments with very small basal enlargements, scarcely incised; segments longer than their verticils. Head orange, the large rounded vertical tubercle clearer orange; a small darkened cloud on orbits at narrowest point of vertex; occipital brand virtually lacking, represented only by a small weak infuscated area.

Prothorax light yellow medially, dark brown on sides. Mesonotal præscutum yellow with three polished black stripes that are not or scarcely margined, lateral pair with a large dark brown area at anterior end, not reaching the border; scutum yellow, each lobe with a very large blackened area that crosses the suture to the lateral præscutal stripe, continued posteriorly over the lateral portions of the lobes; scutellum obscure yellow; mediotergite clear yellow on more than anterior half, the posterior parts, with most of the pleurotergite, more obscure yellow, the dorsal katapleurotergite light yellow; setæ of mediotergite abundant, of moderate length, erect to porrect. Pleura yellow with more reddened areas on propleura, ventral anepisternum, sternopleurite and meron. Halteres light brown, base more brightened, knob dark brown. Legs with coxæ and trochanters light yellow; remainder of legs black, femoral bases narrowly yellowed, on fore legs including about the proximal fifth, on hind legs still narrower; claws of male toothed. Wings (Plate 2, fig. 18) subhyaline, stigma, including also cell Sc and adjoining costal cell brown; base of wing restrictedly yellowed; veins brownish black. Stigma with about a dozen trichia. Venation:  $Sc_2$  ending opposite origin of Rs, the latter straight, subequal to the basal section of  $R_{4+5}$ ; petiole of  $M_1$  varying from short to longer than m; cell 1st  $M_2$  small; m-cu on  $M_4$  some distance beyond the origin.

Abdomen almost uniformly orange, posterior borders of tergites very vaguely more darkened, more conspicuous on first segment; seventh and the narrow eighth tergite brownish black but not forming a ring; hypopygium orange. Male hypopygium (Plate 3, figs. 23, 24) with the tergite, *t*, relatively long, narrowed outwardly, posterior border produced into two oval blades that are separated by a narrow emargination, provided with numerous chiefly retrorse blackened spicules, more basally on either side with a flattened subpalmate darkened

plate, the inner margin with about eight blackened spicules. Basistyle unmodified. Outer dististyle, *d*, unusually long, distal half very slender, inner margin at base rounded, with a concentration of unusually long setæ, the outer vestiture small and weak; inner style pale with the beak unusually long and slender, straight, lower beak broad, truncate, only the outer margin darkened; dorsal crest produced into hyaline membrane, its outline as figured; region of outer basal lobe with a strong blackened hook lying far distad; two strong setæ nearer base of style. Phallosome, *p*, with gonapophyses appearing as small oval blades. Eighth sternite, *8s*, long, narrowed outwardly, apex obtusely rounded, with a concentration of long chiefly yellow setæ, the central group straight, the more lateral ones incurved; setæ on cephalic third of plate sparse or lacking.

*Habitat*.—Assam.

Holotype, male, Apong, Manipur, 2,430 feet, August 1, 1960 (*Schmid*).

Paratopotype, 1 male, pinned with type.

*Nephrotoma hamulifera* is most similar to species such as *N. bicristata* sp.nov., differing in details of the male hypopygium, especially the inner dististyle and eighth sternite.

**NEPHROTOMA INORATA** Alexander.

Plate 4, fig. 30.

*Nephrotoma inorata* ALEXANDER, Ann. Mag. Nat. Hist. (12) 4 (1951) 1096-1097.

The types were from the Rongtö Valley, southeastern Tibet, 6,500 feet, collected May 21, 1933, by Kingdon Ward and Kaulback.

What seems unquestionably to be the same species here is characterized as allotype.

*Male*.—Length, about 10 millimeters; wing, 11; antenna, about 3.5.

Fore femora blackened, with only the basal fourth brightened. Venation: Cell  $M_1$  short-petiolate to sessile; m-cu at fork of vein  $M_4$  or beyond. Male hypopygium (Plate 4, fig. 30) large, blackened. Ninth tergite, *t*, long, gently narrowed outwardly, lobes more yellowed, oblique, provided with sparse large blackened spicules, those on mesal lobule more numerous, the small lateral lobes each with a single spicule. Region of ninth sternite linear, cleft blackened, with microscopic blackened spicules. Outer dististyle, *d*, strongly narrowed on outer third; inner style massive, beak slender, lower beak blackened, obtusely rounded; dorsal crest glabrous, relatively low; no

modifications of region of outer basal lobe except several setæ. Phallosome, *p*, including the broad basal sheath of ædeagus and small oval gonapophyses. Eighth sternite, *8s*, unusually long, apex convex, provided with long incurved setæ, with a further concentration of short black setæ on either side of midline; median groove of outer half of sternite fringed with more delicate decussate setæ.

Allotype, male, Kurseong, Darjeeling District, 5,455 feet, August 8, 1958 (*Camillieri*). Other specimens from same locality, September 5, 1958.

Additional record—Gangtok, Sikkim, 5,570 feet, May 3, 1959 (*Schmid*).

**NEPHROTOMA KORPA** sp. nov.

Plate 3, fig. 25; Plate 4, fig. 31.

Mesonotal præscutum light yellow with three nacreous stripes, anterior and lateral margins with velvety black areas, postnotum orange; head with brown pattern additional to the occipital brand; knobs of halteres yellowed; legs brownish yellow; wings tinged with gray, stigma with numerous trichia; abdominal tergites yellow, trivittate with brownish black, outer three segments blackened; male hypopygium with lateral tergal arms appearing as slender glabrous rods; basistyle with an unblackened appendage; outer dististyle elongate, inner style with beak slender, outer basal lobe unarmed; eighth sternite with posterior border narrowly emarginate, with a small yellow lobe at base, margins of lobes rounded, with numerous strong black setæ.

*Male*.—Length, about 11 millimeters; wing, 12; antenna, about 3.8.

Frontal prolongation of head yellow, slightly darker above, including the nasus, the latter with long black setæ; palpi brownish black. Antennæ with scape obscure yellow, pedicel brown, flagellum black; proximal flagellar segments short, with conspicuous basal enlargements, outer segments longer. Head with vertical tubercle large, evenly rounded, orange yellow; posterior vertex obscure yellow with three brown spots at narrowest point, two at the orbits, the third at point of the long nacreous occipital brand which elsewhere is narrowly bordered by darker; genæ paling to whitish.

Pronotal scutum medially broadly pale yellow, sides and the scutellum light brown. Thorax of the unique type hallowed by the work of fungi and as here described probably more or less abnormal; light yellow, præscutum with three nacreous

stripes, the narrow cephalic border of median stripe and a large semioval area at anterior end of lateral stripe deep velvety black, the humeri outwardly paling to light yellow; scutum light yellow medially, each lobe with a single nacreous area, its posterior end blackened; suture intensely blackened at median point and on sides; scutellum slightly infuscated, parascutella yellowed; postnotum, including pleurotergite, orange, paler behind; mesonotum unusually glabrous, the vestiture reduced to a few tiny yellow setæ on scutellum and mediotergite. Pleura yellowed, slightly darker on anepisternum and ventral sternopleurite. Halteres yellow, base of knob blackened. Legs with coxæ and trochanters light yellow; remainder of legs brownish yellow, outer tarsal segments darker; claws of male strongly toothed. Wings (Plate 3, fig. 25) tinged with gray, cell Sc faintly darkened; stigma and veins brown. About 20 black macrotrichia in stigma but none in apical cells. Veins beyond cord with abundant black trichia, lacking on both basal sections of  $M_3$ , present on ends of M and 2nd A. Venation:  $Sc_2$  ending just beyond origin of Rs, the latter straight, a little longer than basal section of  $R_{4+5}$ ; cell  $M_1$  narrowly sessile; m-cu at fork of vein  $M_4$ ; cell 2nd A relatively narrow.

Abdomen yellow, tergites conspicuously trivittate with brownish black, sternites yellow; outer three segments uniformly blackened except for the styli. Male hypopygium (Plate 4, fig. 31) with posterior border of tergite, *t*, subtruncate to slightly convex, median region on either side of a narrow emargination elevated into small blackened lobes that are densely provided with unusually small black spinoid setae; more laterally on margin of either side with a slender entirely glabrous rod. Basistyle, *b*, on mesal face with a sclerotized but unblackened bilobed structure, the more posterior lobe obtuse, with a few setae. Outer dististyle, *d*, unusually long, expanded on more than basal half, outer end narrowed; inner style with beak long and slender, lower beak short and obtuse, blackened; dorsal crest long and very low, region of posterior crest more produced into a yellow glabrous blade; region of outer basal lobe with a few long black setae but not otherwise modified. Ædeagus small; gonapophysis, *g*, appearing as broadly oval plates. Eighth sternite, *8s*, large, posterior border narrowly emarginate with a small yellow setiferous lobe at base, margins of sternal lobes with numerous strong black setae.

*Habitat*.—Sikkim.

Holotype, male, Namnasa, 10,000 feet, July 1, 1959 (*Schmid*). The specific name, *korpa*, is a local religious name suggested among others by Dr. Schmid. The most similar species appears to be *Nephrotoma muktesarensis* Alexander, of Kumaon, which differs in details of coloration of the body, legs and wings, and in the structure of the male hypopygium, including the tergite, lobe of the basistyle, and the number of blackened setæ of the lobes of the eighth sternite. The dististyles of the two species are generally alike. As stated, the internal tissues of the body of this fly, and any others from Sikkim taken by Doctor Schmid, had been destroyed by action of fungi and it cannot be stated what the condition might be in the living insect.

**NEPHROTOMA LONGISTERNATA** sp. nov.

Plate 3, fig. 26; Plate 4, figs. 32, 33.

Size medium (wing of male 10 millimeters); general coloration yellow and black; præscutal stripes nacreous black narrowly bordered by black; scutellum black; knobs of halteres dark brown; wings weakly infuscated, stigma darker brown; male hypopygium with ninth sternite produced caudad into an elongate lobe; phallosome with ædeagus small, setuliferous, gonapophyses appearing as slender curved rods; posterior border of eighth sternite produced into a pale depressed median lobe.

*Male*.—Length, about 10 to 10.5 millimeters; wing, 10 to 11.5; antenna, about 2.5 to 3.

*Female*.—Length, about 12.5 to 13 millimeters; wing, 11.5 to 12.

Frontal prolongation of head light yellow, blackened above, including the elongate nasus, this provided with long coarse black setæ; palpi light brown, basal segment yellowed. Antennæ black, scape light brown; flagellar segments feebly incised, the basal enlargements poorly developed. Front and vertical tubercle light yellow, posterior part of head orange with very abundant black setæ, more yellowed behind; occipital brand subnitidous, broadly triangular, narrowly bordered by dark brown, at its anterior end sending a band to the eye, broadest on the orbits.

Pronotum light yellow, slightly darkened on sides. Mesonotal præscutum light yellow, with three polished nacreous black stripes, these narrowly bordered by dull black, opposite anterior end of lateral stripe paler brown and extended toward



the lateral margin; scutum light yellow, each lobe with a single major nacreous black area, bordered internally and over the suture by black, the area extended laterad to wing base, the lateral edge of scutal lobe not so bordered; scutellum black, parascutella abruptly yellow; central area of mediotergite pale brown, more intense anteriorly, posterior border with two confluent brownish black areas; præscutum and scutum glabrous, scutellum with short black setæ, mediotergite with longer pale vestiture; pleurotergite yellow, weakly infuscated behind. Pleura yellow, vaguely more darkened on ventral anepisternum and sternopleurite. Halteres with stem dull orange, knob dark brown. Legs with coxæ and trochanters yellow; fore femora black, basal third yellowed, remaining femora yellowish brown, tips narrowly blackened; tibiæ and tarsi brownish black to black; claws of male with a small acute tooth. Wings (Plate 3, fig. 26) weakly infuscated, stigma darker brown; veins brown. Stigmal trichia about 20. Venation; Petiole of cell  $M_1$  punctiform or lacking.

Abdominal tergites yellow, with three light brown stripes, subterminal segments blackened to form a ring; hypopygium yellow. Male hypopygium (Plate 4, figs. 32, 33) with posterior border of tergite, *t*, produced into two triangular lobes that are separated by a comparable V-shaped notch; lobes with abundant small black spicules, distributed as shown in figure. Basistyle without modified mesal armature. Outer dististyle, *d*, nearly three times as long as the greatest width; inner style with the decurved beak obtuse, black; outer basal lobe with a blackened flange, including a short acute tooth. Ninth sternite, *9s*, produced caudad into an elongate lobe, its tip obtuse, clothed with numerous very long pale setæ. Phallosome, *p*, with ædeagus small, densely setiferous; gonapophyses more than three times as long, appearing as slender curved rods, the obtuse tip a little expanded. Eighth sternite, *8s*, transverse, with scattered small setæ over most of the surface; posterior border nearly truncate, extended into a pale depressed flattened median lobe.

*Habitat*.—Sikkim.

Holotype, male, Namnasa, 9,500 feet, July 13, 1959 (*Schmid*).

Allotype, female, Lachung, 8,610 feet, July 5, 1959. Paratopotypes, males and females, with the type. Paratypes, 2 males, 1 female. Chateng, 8,700 feet, June 12, 1959; males, Zema, 9,100 feet, June 14, 1959 (*Schmid*).

*Nephrotoma longisternata* is readily told from other regional species having somewhat similar body coloration by the hypopygial structure, especially the long-produced ninth sternite, conspicuous lobe on eighth sternite and the setuliferous ædeagus. *N. glossophora* has the lobe of the eighth sternite somewhat the same but differs in all other hypopygial details.

**NEPHROTOMA PERALTICRISTA** sp. nov.

Plate 3, fig. 27; Plate 4, fig. 36.

General coloration of thorax yellow, præscutum with three brownish black stripes, the central one more reddened medially, lateral stripes straight; median area of scutum dark brown; posterior vertex and occiput with a linear blackened line; fore and middle femora black, bases narrowly yellowed; wings brownish yellow, restrictedly patterned with brown, including a seam at cord and the paler wing tip; proximal five segments of abdomen orange yellow, outer segments black; male hypopygium with inner dististyle distinctive, outer crest very long, with marginal setæ only; outer basal lobe a blackened hock; gonapophyses elongate, the lateral blade microscopically tuberculate on outer margin; membrane between eighth and ninth sternites with a large glabrous lobe or appendage.

*Male*.—Length, about 14 millimeters; wing, 13.5; antenna, about 4.5.

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

Frontal prolongation of head above broadly blackened, including nasus, sides yellowish brown; palpi black. Antennæ with scape and pedicel yellowed, the latter clearer, flagellum black; flagellar segments moderately incised, slightly longer than their verticils. Head orange, more yellowed on front; a narrow central black line on posterior vertex, slightly dilated behind at the occipital brand.

Cervical region and pronotal scutum medium brown, sides of scutellum yellowed. Mesonotal præscutum obscure yellow with three brownish black stripes, the central one narrowly reddened medially, lateral stripes straight, without lateral darkenings; scutum yellow, each lobe with a single large brown area, the median region together with the center of the suture dark brown forming a Y-shaped area; scutellum and postnotum dark testaceous yellow, the mediotergite with a short darkened longitudinal line on either side of a broad central ground area, anapleurotergite darkened; mesonotal præscutum and scutum glabrous. Pleura obscure yellow, more or less patterned with more reddened areas. Halteres with stem obscure yellow, knob

brownish black, apex a little yellowed. Legs with coxæ and trochanters yellow; fore and middle femora black, bases narrowly yellowed, posterior femora brown, the tips narrowly blackened, including about the outer seventh; tibiæ and tarsi black; claws of male toothed. Wings (Plate 3, fig. 27) brownish yellow, prearcular field and cell C clearer yellow, cell Sc slightly darker; stigma dark brown, with numerous trichia; a broad paler brown seam crosses the wing from stigma to posterior margin along vein  $Cu_1$ , with a narrower similar darkening over  $M_4$ ; wing tip broadly paler brown; veins brown. Macrotrichia of veins relatively small but very numerous. Venation:  $Sc_2$  ending just beyond origin of Rs, longer in female; cell  $M_1$  very short-petiolate; veins  $M_{1+2}$ ,  $M_3$  and  $M_4$  arising close together, m-cu immediately beyond base of  $M_4$ ; cell 2nd A long and narrow.

Abdomen with proximal five segments orange yellow, outer segments blackened, the posterior borders narrowly yellowed. Ovipositor with cerci relatively small, pale yellow, straight; hypovalvæ enlarged at bases, the slender outer blades pale. Male hypopygium (Plate 4, fig. 36) with tergite, *t*, very long, subequal to its width; posterior border subtruncate, on either side of ventral surface with two rounded lobes set with several short blackened spicules, the outer marginal end of lobes with slightly longer spicules. Ninth sternite with long yellow setæ. Outer dististyle, *d*, relatively long, about four times the greatest width, outer end narrowed; inner style distinctive, beak very slender, lower beak very broadly obtuse, blackened; outer crest very long, hyaline, comprising about one-third the total length of style, glabrous except for a marginal fringe of about 20 short stout setæ; outer margin of style opposite the beak with a group of long black setæ; outer basal lobe a slender black hook, its point directed inwardly. Gonapophysis, *g*, appearing as a very long arm, the outer third dilated into an oval blade, outer margin with microscopic tubercles. Ædeagus small, triangular in outline. Eighth sternite, *8s*, slightly narrowed outwardly, apex gently emarginate, provided with long chiefly darkened setæ; median region between the eighth and ninth sternites with a very large glabrous pale yellow appendage, the lateral margins infolded.

*Habitat*.—Sikkim.

Holotype, male, Zema, 8,900 feet, May 24, 1959 (*Schmid*). Allotopotype, female.

The male hypopygium of the present fly is so distinct that it requires little comparison with any other regional species. The most distinctive features are found in the inner dististyle, gonapophyses and eighth sternite. The most similar species include *Nephrotoma glossophora* Alexander and *N. platysterna* sp. nov.

**NEPHROTOMA PLATYSTERNA** sp. nov.

Plate 3, fig. 29; Plate 4, fig. 37.

General coloration yellow, præscutum with three nacreous black stripes, each scutal lobe with a similar area, all conspicuously bordered by dull black, including the whole suture; postnotum and pleura uniformly yellow; femora yellow, tips narrowly and abruptly black; wings strongly tinged with brown, cell  $M_1$  short-petiolate, m-cu beyond fork of  $M$ ; abdomen orange, tergites with three dark stripes, the lateral pair black and conspicuous; male hypopygium with outer dististyle broadest on outer half; eighth sternite with posterior border produced caudad into a broad depressed-flattened lobe.

*Male*.—Length, about 11.5 millimeters; wing, 11; antenna, about 4.2.

Frontal prolongation of head light yellow, slightly more orange above, nasus short, with very long black setæ. Antennæ relatively long; scape and pedicel orange, first flagellar segment light brown, remaining segments black; flagellar segments much exceeding their verticils, basal enlargements small. Head orange, vertical tubercle more yellowed, low and rounded; a weak infuscation on orbits; occipital brand very small and poorly differentiated.

Pronotal scutum yellow medially, conspicuously dark brown in front, paler brown on sides, scutellum chiefly light yellow, especially laterally. Mesonotal præscutum with three polished nacreous black stripes that are broadly margined with dull black, including the interspaces and a large circular area opposite the anterior half of the lateral stripes, virtually reaching the margin; scutum yellow medially, each lobe with a single major nacreous black area that is bordered by dull black, including the suture and conspicuous outer borders; scutellum pale brownish yellow, parascutella clearer yellow; postnotum orange, katapleurotergite more yellowed; notum unusually glabrous, including a few microscopic setulæ on scutellum and sparse slightly longer pale setæ on mediotergite. Pleura yellow. Halteres infuscated, base of stem orange. Legs with coxæ and trochanters yellow; femora yellow, tips narrowly and

abruptly black (fore and middle legs broken); tibiae light brown, tips and the tarsi black; claws of male toothed. Wings (Plate 3, fig. 29) strongly tinged with brown, prearcular and costal fields slightly more yellowed, cell Sc darker; stigma pale brown; veins brown, paler in the brightened fields. Stigmal trichia about 15 in number. Venation: Sc<sub>2</sub> ending about opposite one-fifth Rs; petiole of cell M<sub>1</sub> nearly one-half m; m-cu beyond fork of M, M<sup>3+4</sup> present but very short, about twice the basal section of M<sub>4</sub>.

Abdominal tergites orange, with a continuous broad black lateral stripe extending from base of second segment; a narrower and less conspicuous median stripe, interrupted at posterior margins of segments; seventh and succeeding segments uniformly black with the exception of the appendages. Male hypopygium (Plate 4, fig. 37) with posterior border of tergite, *t*, with a deep V-shaped notch, the inner margins of the lobes with sparse black spicules and setae; ventral arm with a narrow inwardly directed pale blade near outer margin of lobe; near base of each lobe with a stout flattened dark outwardly directed blade, its outer margin with a row of spicules. Ninth sternite with abundant long black setae. Outer dististyle, *d*, elongate, narrowed on basal half, outer part dilated into a narrow blade; inner style compact, beak triangular, lower beak broadly obtuse; outer margin of style with very long yellow setae; dorsal crest short-oval, glabrous; outer basal lobe blackened, provided with about a dozen setae. Phallosome, *p*, including the long slender aedeagus and nearly equal gonapophyses, these pale, dilated at near midlength, the outer half produced into a narrow blade. Eighth sternite, 8s, transverse, posterior border directly produced into a broad depressed-flattened darkened lobe, narrowed outwardly, apex truncated, outer margin and apex with numerous black setae.

*Habitat*.—Sikkim.

Holotype, male, Karponang, 8,100 feet, August 22, 1959 (*Schmid*).

*Nephrotoma platysterna* is quite distinct from other regional species that have the eighth sternite produced into a conspicuous setiferous lobe, including *N. glossophora* Alexander and *N. perhorrida* Alexander, both of which are quite distinct in coloration, venation and especially in all details of the male hypopygium. The distal position of m-cu is much as in *N. distans*

Edwards, of Tibet, which differs in body coloration and in all details of structure of the male hypopygium.

**NEPHROTOMA SUBUMBONIS** sp. nov.

Plate 4, fig. 28; Plate 5, figs. 38, 39.

Mesonotal præscutum yellow with three polished black stripes; antennæ relatively long, nearly one-half the wing; legs brownish yellow, tarsi black; wings subhyaline, stigma pale brown; abdomen orange, tergites trivittate with black, subterminal segments blackened; male hypopygium with mesal face of basistyle produced into a blackened rod that is bilobed at apex; outer dististyle short and broad, the length about twice the basal diameter; gonapophyses smooth.

*Male*.—Length, about 11 millimeters; wing, 11; antenna, about 4.8.

Frontal prolongation of head light yellow, the outer third of dorsum, including the short nasus, black; mouthparts orange; basal segment of palpi yellow, remainder dark brown to black. Antennæ relatively long, as shown by the measurements; scape light yellow, pedicel and first flagellar segment light brown, remainder of flagellum black; flagellar segments longer than their verticils, incised, the basal enlargements conspicuous. Head orange, the rounded vertical tubercle clearer yellow, with a small brown spot on either side.

Prothorax light yellow, laterally with a small vague infuscation. Mesonotal præscutum light yellow with three polished black stripes that are very narrowly to scarcely bordered by more velvety black; extreme anterior end of central stripe with a median velvety black line; a circular blackened area opposite anterior end of lateral stripe, not reaching the border, lateral ends of suture similarly blackened; scutum yellow, each lobe with a single polished black area that is narrowly bordered by velvety black, broader outwardly; posterior sclerites of notum clear light yellow, scutellum medium brown; posterior border of mediotergite with a pair of vaguely indicated more orange spots; scutellum and mediotergite with numerous very small setæ. Pleura light yellow, ventral sternopleurite and meron more fulvous. Halteres infuscated, base of stem yellowed. Legs with coxæ and trochanters orange; remainder of legs brownish yellow, tarsi black; claws of male toothed. Wings (Plate 4, fig. 28) subhyaline, stigma pale brown; veins brown. Stigma with about nine trichia. Venation:  $Sc_1$  lacking; cell  $M_1$  sessile; m-cu at fork of  $M_4$ .

Abdominal tergites orange, beyond the first segment conspicuously trivittate with black, the central stripe narrowly interrupted at posterior borders of segments; segments seven and eight blackened to form a narrow ring; remainder of hypopygium light yellow. Male hypopygium (Plate 5, figs. 38, 39) with the tergite, *t*, transverse, spiculose, armature of posterior border sparse; each intermediate plate with about 15 to 20 spicules; lateral tergal arms blackened; with two or three points; no median projection. Ninth sternite, *9s*, with a short-oval lobe that is covered with horn-colored setulae. Basistyle, *b*, on mesal face with a blackened rod, tip bilobed. Outer dististyle, *d*, unusually short and broad, dilated near base, the greatest width about one-half the length; inner style without a dorsal crest or modified outer basal lobe; lower beak low, obtuse. Phallosome with gonapophyses, *g*, sclerotized, blackened, surface smooth, longer than the aedeagus. Eighth sternite, *8s*, large, posterior border nearly truncate but the lobes appearing broadly obtuse because of pale central membrane; vestiture unusually sparse and insignificant, each lobe with a few short setae.

*Habitat*.—Assam.

Holotype, male, Chattrik, Manipur, 1,500 feet, July 21, 1960 (Schmid).

*Nephrotoma subumbonis* is most nearly allied to *N. umbonis* Alexander, which differs chiefly in the details of structure of the hypopygium, including especially the tergite, ninth sternite and gonapophyses.

#### Genus DOLICHOPEZA Curtis

*Dolichopeza* CURTIS, British Ent. (1825) 62.

*Leptina* MEIGEN, Syst. Besch. 6 (1830) plate 65, fig. 10.

*Apeilesis* MACQUART, Dipt. exot., suppl. 1 (1846) 8.

#### Special regional reports:

- ALEXANDER, C. P. Ruwenzori Expedition 1934–35, 1, No. 7, Tipulidae (1956) 188–197, figs. 54–61 (Tropical Africa).  
 ALEXANDER, C. P. Diptera (Nematocera) Tipulidae (1956) 188–197, figs. 54–61 (Tropical Africa).  
 ALEXANDER, C. P. Diptera (Nematocera) Tipulidae. In South African Animal Life 10 (1964) 281–293, figs. 29–44 (South Africa).  
 BYERS, G. W. The crane fly genus *Dolichopeza* in North America. Univ. Kansas Science Bull. 42 (1961) 665–924, 244 figs., 13 maps (Nearctic region; an outstanding monograph).  
 MANNHEIMS, BERNHARD. In Erwin Lindner's Die Fliegen der Paläarktischen Region, Lief. 167 (1951) 20–24, figs. 8, 9, 9a, plate 1 (adult male) (Western Palæarctic).

*Dolichopeza* comprises a major genus with scores of species found in all biotic regions, including Madagascar and New Zealand, but virtually lacking in the Neotropical with only a single subgenus (*Megistomastix*) that is restricted to the Greater Antilles. The greatest concentration both of subgenera and species is in the Oriental region.

The presently recognized subgenera are as follows:

- Afrodolichopeza* ALEXANDER, as *Dolichopeza* (*Afrodolichopeza*), Ruwenzori Expedition 1934-35 (1956) 189-190. Type, *amitra* Alexander. Ethiopian.
- Dolichopeza* CURTIS, British Entomology (1825) 62. Type, *albipes* Ström (as *silvicola* Curtis). Holarctic, Ethiopian, Oriental, Australasian (including New Zealand).
- Eudolichopeza* ALEXANDER, as *Dolichopeza* (*Eudolichopeza*), Ruwenzori Expedition 1934-35 (1956) 196. Type, *lipophleps* Alexander. Ethiopian.
- Eunesopeza* ALEXANDER, as *Dolichopeza* (*Eunesopeza*), Philip. Jour. Sci. 54 (1934) 435. Type, *defecta* Edwards. Oriental: Borneo.
- Megistomastix* ALEXANDER, Psyche 19 (1912) 63-64. Type, *portoricensis* Alexander. Neotropical: Greater Antilles, excluding Jamaica.
- Mitopeza* EDWARDS, Ann. Mag. Nat. Hist. (8) 17 (1916) 349-350. Type, *nitidirostris* Edwards. Oriental.
- Nesopeza* ALEXANDER, Canad. Ent. 46 (1914) 157. Type, *gracilis* de Meijere. Eastern Palearctic, Oriental.
- Oropeza* NEEDHAM, 23rd Rept. State Entomologist for 1907, N. Y. State Mus. Bull. 124 (1908) 211. Type, *sayi* Johnson (as *annulata* Say, preoccupied).
- Prodolichopeza* ALEXANDER, as *Dolichopeza* (*Prodolichopeza*), Verhandl. Naturf. Ges. Basel 74 (1963) 213. Type, *malagasya* Karsch. Ethiopian (Madagascar).
- Sinoropeza* ALEXANDER, as *Dolichopeza* (*Sinoropeza*). Philip. Jour. Sci. 56 (1935) 543-544. Type, *pluricoma* Alexander. Eastern Palearctic, Oriental.
- Trichodolichopeza* ALEXANDER, as *Dolichopeza* (*Trichodolichopeza*), Ann. South Afr. Mus. 17 (1917) 157. Type, *hirtipennis* Alexander. Ethiopian, including Madagascar.

The male hypopygium in *Dolichopeza* (*Nesopeza*).

In the subgenus *Nesopeza* the details of structure of the male hypopygium provide unusually strong characters for the separation of the many species. The ninth tergite (Plate 5, figs. 44-46; Plate 6, figs. 47-49; Plate 7, figs. 56-60) is small, its posterior border sclerotized and blackened, commonly trilobed and with a posterior extension (cephalad) on either side. The basistyle and ninth sternite are fused, the latter in many cases being extensive and provided with outgrowths or appen-



dages that bear elaborate modified setæ in brushes or pencils, these being of great importance in the differentiation of species. In some other species that appear to be closely allied, the ninth sternite is much reduced in size and virtually without lobes and setæ such as described. Likewise the inner dististyle is unusually diverse in the various species having noteworthy modifications especially in the size and conformation of the dorsal crest and the outer basal lobe.

**DOLICHOPEZA (MITOPEZA) CRASSISTYLA** sp. nov. Plate 4, fig. 34; Plate 5, fig. 40.

General coloration of mesonotum dark brown, the præscutum with four virtually confluent paler brown stripes; antennæ brownish black; wings strongly blackened, stigma darker brown, preceded and followed by cream colored areas; no macrotrichia in cells;  $Sc_2$  ending just beyond origin of the short oblique Rs, cell 2nd A relatively broad; male hypopygium with outer dististyle a stout mitten-shaped structure.

*Male*.—Length, about 10 millimeters; wing, 11: antenna, about 3.5.

Frontal prolongation of head dark brown above, obscure yellow beneath; palpi black. Antennæ brownish black, pedicel slightly paler; flagellar segments long-cylindrical, with very short verticils; terminal segment very reduced. Head brown, more yellowed on posterior genæ; vertical tubercle relatively high, cinnamon brown.

Pronotum dark brown. Mesonotum with the ground dark brown, præscutal disk with four virtually confluent paler brown stripes; scutal lobes pale brown, bordered internally by dark brown, leaving a narrow paler central vitta; scutellum and postnotum pale brown, parascutella more yellowed; scutellum with numerous short setæ, remainder of notum virtually glabrous. Pleura brown, including the dorsopleural region. Halteres light brown, knob blackened. Legs with coxæ and trochanters brown; remainder broken. Wings (Plate 4, fig. 34) strongly blackened, prearcular and costal regions, with the outer radial field, slightly darker; stigma long-oval, dark brown, preceded and followed by cream-colored areas; veins brown. Veins beyond cord, together with R and M, with macrotrichia, lacking in the cells. Venation:  $Sc_2$  ending just beyond origin of the short oblique Rs, the latter about one-half  $R_{2+3}$  or slightly longer than the basal section of  $R_{4+5}$ ; cell 1st  $M_2$  long-suboval; m-cu about one-third its length before fork of M; cell 2nd A relatively broad.

Abdomen brown, the basal segment more obscure yellow; hypopygium yellowish brown. Male hypopygium (Plate 5, fig. 40) with the tergite, *t*, deeply emarginate, each lobe terminating in a glabrous rounded blade, the dorsal surface with two groups of black setæ, those of the longer basal row elongate and slender, of the outer group shorter and stouter. Outer dististyle, *d*, very stout, mitten-shaped, the enlargement on inner margin with longer setæ; inner style smaller, terminating in a glabrous fingerlike lobe.

*Habitat*.—India (Northeast Frontier Agency).

Holotype, male, Dirong Dzong, Kameng, 6,500 feet, July 20, 1961 (*Schmid*).

*Dolichopeza* (*Mitopeza*) *crassistyle* is quite distinct from other Indian species, including *D.* (*M.*) *amisca* Alexander, *D.* (*M.*) *kanagareji* Alexander, and *D.* (*M.*) *longicornis* Brunetti in the venational details and structure of the male hypopygium.

**DOLICHOPEZA (OROPEZA) VARIITIBIATA** sp. nov. Plate 4, fig. 35; Plate 5, fig. 41.

Thorax brown, the præscutum with slightly paler yellowish brown stripes; fore tibiæ whitened, tips brownish black, remaining tibiæ brownish black, all tarsi white; wings strongly infuscated; male hypopygium with posterior border of tergite with a central lobe and more lateral acute spines.

*Male*.—Length, about 12 millimeters; wing, 12; antenna, about 3.8.

Frontal prolongation of head short, globose, light brown; palpi brownish black. Antennæ relatively long; scape obscure yellow, pedicel clear yellow, flagellum dark brown; flagellar segments nearly cylindrical, much longer than the verticils; terminal segment more than one-third the penultimate. Head with front yellowish brown, vertex grayish brown, the low vertical tubercle pale; center and sides of posterior vertex with vague darker lines.

Pronotum light brown. Mesonotal præscutum brown with a still paler central more yellowish brown stripe, the sublateral areas poorly indicated; scutum light brown; scutellum and mediotergite dark brown, the latter with unusually long and numerous erect yellow setæ. Pleura brown. Halteres elongate, pale brown, the large knobs brownish black. Legs with coxæ light brown; trochanters obscure yellow; femora light brown or yellowish brown, the tips more blackened; fore tibiæ dirty white, the bases narrowly clearer white, tips narrowly black; remaining tibiæ brownish black, bases whitened, tips a little

darker; all tarsi snowy white. Wings (Plate 4, fig. 35) with a strong brown tinge, stigma still darker, preceded and followed by conspicuous creamy yellow areas; oblitative area across cell 1st  $M_2$  restricted; veins pale brown, those in outer radial field stouter and darker, paler yellow in the creamy areas. Venation: Rs slightly oblique, a little exceeding the basal section of  $R_{4+5}$ ; petiole of cell  $M_1$  subequal to M.

Abdomen dark brown, transversely more yellowed across the central parts of tergites, hypopygium dark brown. Male hypopygium (Plate 5, fig. 41) with the tergite, *t*, narrowly transverse, the posterior border with a rectangular blackened median lobe, its margin slightly trilobulate; on either side of this with an acute spine and still more laterally with a low lobe bearing several very long setæ. Outer dististyle, *d*, elongate, the length about four times the diameter; inner style larger, at apex with a triangular blackened point or flange. Phallosome, *p*, including very broad yellow gonapophyses, their expanded tips directed inwardly; between these arms a conspicuous depressed-flattened yellow shield-shaped plate, its apex shallowly emarginate, with a low lobe at either side, provided with long pale yellow setæ.

*Habitat*.—Assam.

Holotype, male, Chingsao, Manipur, 3,800 feet, June 13, 1960 (*Schmid*).

I am still uncertain as to the identity of *Dolichopeza* (*Oropeza*) *albitarsis* (Brunetti) described from the Darjeeling District, eastern Himalaya, described as having the thoracic dorsum uniformly brownish yellow, with the pleura still paler and more grayish, and with the wings pale yellowish gray.

**DOLICHOPEZA (NESOPEZA) GARUDA** sp. nov.

Plate 5, figs. 42, 44, 45.

Allied to *volupta*; size relatively large (wing of male 9 millimeters); antennæ long, slightly exceeding one-half the wing; mesonotum light brown, the intermediate præscutal stripes more yellowed; pleura with a transverse brown girdle; femora brownish yellow, tips narrowly brownish black, tarsi and tips of tibiæ whitened; wings subhyaline, stigma dark brown; abdominal segments brownish yellow, posterior borders brownish black, the amount of the latter increasing on outer segments, five to eight blackened to form a broad ring; male hypopygium with tergal armature complex; outer dististyle elongate, inner style with region of dorsal crest relatively small.

*Male*.—Length, about 8.5 millimeters; wing, 9; antenna, about 4.8.

Frontal prolongation of head dark brown above, yellowed on sides; palpi light brown, outer two segments paler. Antennæ long, slightly exceeding one-half the wing; scape obscure yellow, pedicel very pale yellow, flagellum dark brown, first segment narrowly brightened basally; flagellar segments long-cylindrical, the intermediate segments about three times their verticils; terminal segment very small. Head fulvous brown, front and genæ more yellowed.

Pronotum narrowly brown above, yellowed on sides. Mesonotal præscutum light brown with more yellowed intermediate stripes that are separated by a narrow darker brown line; posterior sclerites of notum brownish yellow, mediotergite slightly darker, pleurotergite light brown. Pleura light yellow, the mesepisternum dark brown to form a transverse girdle, meron similarly darkened. Halteres with stem white, knob blackened. Legs with all coxæ and trochanters clear light yellow; femora brownish yellow, clearer yellow basally, tips narrowly brownish black; tibiæ very pale brown, tips narrowly whitened, more extensive on posterior tibiæ where about the outer fifth is included; tarsi snowy white. Wings (Plate 5, fig. 42) subhyaline, the extreme base yellowed, cells beyond cord very slightly more darkened; stigma dark brown, conspicuous; veins brown. Venation: Medial forks moderately deep; cell  $M_1$  about one-fifth longer than its petiole; cell 2nd A narrow.

Abdominal tergites brownish yellow, posterior borders brownish black, the amount increasing on outer segments, five through eight uniformly blackened to form a broad ring; basal sternites light yellow, somewhat more restrictedly patterned with darker as in the tergites; hypopygium yellow. Male hypopygium (Plate 5, figs. 44, 45) with the tergal arms, *t*, conspicuous, a lower pair appearing as an elongate blackened rod, tip dilated, margin microscopically roughened; upper tergal lobes roughened and with a row of long yellow setæ; median tergal lobe short, with a row of yellow setæ, beneath farther extended into darkened membrane, the tip bilobed. Ninth sternite, *9s*, with complex lobes and vestiture (shown diagrammatically in separate figure made before mounting on slide, Plate 5, fig. 44). Outer dististyle, *d*, relatively long and slender, inner style with beak long-extended, region of posterior crest small.

*Habitat*.—Assam.

Holotype, male, Nongjrong, United District of Mikir and North Cachar Hills, 2,700 feet, April 25, 1960 (*Schmid*).

*Dolichopeza* (*Nesopeza*) *garuda* is most readily told from the other numerous regional species that are allied to *volupta* by the hypopygial characters.

**DOLICHOPEZA (NESOPEZA) KASHONGENSIS** sp. nov.

Plate 5, fig. 43; Plate 6, fig. 48.

Size medium (wing of male 10 millimeters); general coloration of mesonotum fulvous yellow; femora yellowish white, the tips narrowly infuscated, tarsi and tips of tibiae white; wings suffused with brown, prearcular and costal cells darker brown, with further darkened clouds and seams; male hypopygium with central region of tergite a depressed-flattened black plate, its posterior margin produced into three points; outer dististyle dilated at near midlength, inner style massive.

*Male*.—Length, about 9.5 millimeters; wing, 10; antenna, about 4.2.

Frontal prolongation of head testaceous yellow; palpi medium brown. Antennæ of male moderately long, less than one-half the wing; scape and pedicel yellow, flagellum brownish black; flagellar segments long-cylindrical, the more proximal segments exceeding twice the verticils, these longer and more numerous on outer segments. Head brownish yellow, vaguely more grayish on orbits and occipital region.

Pronotum light brown, paler laterally. Mesonotal præscutum obscure yellow with scarcely differentiated more yellowed stripes; scutal lobes and scutellum more yellowed than the deeper fulvous yellow posterior sclerites; mediotergite with sparse yellow setæ. Pleura yellow, the mesepisternum only slightly darker, scarcely forming a transverse band. Halteres with stem dirty yellow, knob dark brown. Legs with coxæ and trochanters yellow; femora obscure yellowish white, tips narrowly and gradually infuscated; tibiae obscurely whitened, tips narrowly clear white, tarsi snowy white. Wings (Plate 5, fig. 43) with a brownish suffusion, the prearcular and costal fields darker brown; less evident pale brown clouds in outer radial field and as seams over anterior cord and m-cu, the latter narrow; veins brown. Venation: Sc<sub>2</sub> ending about opposite three-fourths Rs, Sc<sub>1</sub> preserved; medial forks relatively deep, cell M<sub>1</sub> about one-half longer than its petiole; cell 2nd A moderately wide.

Abdominal tergites brown, the posterior borders brownish black, the central region of each segment vaguely paler; sternites chiefly light yellow, the posterior borders dark brown; segments seven and eight more uniformly blackened to form a ring; hypopygium obscure yellow. Male hypopygium (Plate 6, fig. 48) very distinct from other regional species. Ninth tergite, *t*, produced caudad into a depressed-flattened black plate, the lateral angles produced, median region protruding as a narrow point that extends backward (cephalad) to near midlength of the plate as a carinate ridge, at its anterior end produced into a point; on either side of the plate beneath with an elongate blackened lobe, provided with numerous small blackened spicules. Ninth sternite, *9s*, with a short stout curved arm that is tipped with a compact group or pencil of very long yellow setæ which are expanded at tip into an obtuse blade that appears to form a compact unit, as shown. Outer dististyle, *d*, dilated at near midlength, the width at this point about one-third the length; inner style massive, unusually glabrous; beak obtuse, lower beak rounded, with numerous short yellow setæ; on body of style beneath the dorsal crest with a lower lobe that is covered with abundant short setulæ.

*Habitat*.—Assam.

Holotype, male, Sirhoi Kashong, Manipur, 6,000 feet, June 7, 1960 (*Schmid*).

*Dolichopeza* (*Nesopeza*) *kashongensis* is entirely different from other regional species in the hypopygial structure, particularly the ninth tergite, ninth sternite and both dististyles.

**DOLICHOPEZA (NESOPEZA) LONGISETOSA** Alexander.

Plate 5, fig. 46.

*Dolichopeza* (*Nesopeza*) *longisetosa* ALEXANDER, Jour. N.Y. Ent. Soc. 67 (1959) 229-230.

Holotype, male, Simbhanjang Pass, Nepal, 8,197 feet, June 24, 1957 (*E. I. Coher*). Male hypopygium (Plate 5, fig. 46).

**DOLICHOPEZA (NESOPEZA) MANIPURENSIS** sp. nov.

Plate 6, figs. 47, 49, 50.

Size, medium (wing about 10 millimeters); general coloration of thorax cinnamon brown, pleura more yellowed ventrally; antennæ of male exceeding one-half the wing; legs light brown, tarsi and tips of tibiæ snowy white; wings weakly infuscated, stigma darker; abdominal segments more or less bicolored; male hypopygium with lateral tergal arms unequally bispinous, median plate glabrous.

*Male*.—Length, about 7 to 7.5 millimeters; wing, 9.5 to 10; antenna, about 5 to 5.5.

*Female*.—Length, about 7.5 to 8 millimeters; wing, 9.5 to 10; antenna, about 2.6 to 2.8.

Frontal prolongation of head brownish yellow; palpi brown. Antennæ of male exceeding one-half the wing; proximal segments brownish yellow, flagellum dark brown; flagellar segments long-cylindrical, with conspicuous dense white setæ and longer black verticils that are less than one-third the segments. Head light cinnamon brown.

Thoracic dorsum almost uniformly cinnamon brown, without clearly differentiated pattern; pleura brownish yellow above, clear yellow ventrally. Halteres with stem whitened, knob brownish black. Legs with all coxæ and trochanters yellow; femora and tibiæ light brown, tips of the latter and all tarsi snowy white. Wings (Plate 6, fig. 50) weakly infuscated, stigma darker brown, oval; veins brown. Venation: Medial forks relatively deep, cell  $M_1$  from about one-third to nearly one-half longer than its petiole; cell 2nd A relatively narrow.

Basal abdominal segments in some specimens conspicuously bicolored, tergites obscure yellow with posterior borders broadly brownish black, sternites chiefly yellow, the borders much more narrowly darkened, segments seven and eight uniformly brownish black to form a ring, hypopygium chiefly yellow. In some other specimens the tergites are more uniformly darkened. Male hypopygium (Plate 6, figs. 47, 49) with the lateral tergal arms, *t*, unequally bispinous, the outer spine shorter and stouter; median tergal area with a glabrous blackened plate, its border truncate; outer margin of tergite between the arms with dense short yellow setæ; blackened lateral lobes of tergite with very few setiferous tubercles. Ninth sternite, *9s*, produced ventrad into flattened yellow plates that bear numerous long yellow setæ. Outer dististyle, *d*, short and broad, widest near base; inner style with beak and lower beak widely divergent, the former flattened elevated blade; base of lower beak with several long setæ; dorsal crest scarcely indicated, with a few long setæ posteriorly.

*Habitat*.—Assam.

Holotype, male, Sirhoi Kashong, Manipur, 7,500 feet, July 12, 1960 (*Schmid*). Allotopotype, female, July 13, 1960. Paratopotypes, several of both sexes, with the types, July 12 to

13, 1960. Paratype, 1 male, Pushing, Manipur, 4,800 feet, July 17, 1960 (*Schmid*).

*Dolichopeza (Nesopeza) manipurensis* is quite distinct from several other generally similar species in the slightly darkened wings and especially in the hypopygial structure, particularly the tergite and inner dististyle. The structures shown in figure 47 are diagrammatic and show the general arrangement of the parts before mounting on a microscope slide.

**DOLICHOPEZA (NESOPEZA) NEOBALLATOR** sp. nov. Plate 6, fig. 51; Plate 7, fig. 56.

Allied to *ballator*; general coloration of mesonotal præscutum yellow, the brown ground virtually restricted to the humeri; antennæ of male short, less than one-half the wing; femora light yellow, tips brownish black, tibiæ and tarsi white; wings light brown, conspicuously patterned with dark brown, including the prearcular and costal fields and the broad distal ends of outer radial cells; male hypopygium with all tergal lobes low, basistyle not produced, outer dististyle slightly pointed at apex.

*Male*.—Length, about 8 millimeters; wing, 8; antenna, about 3.

Frontal prolongation of head light brown, palpi darker brown. Antennæ of male relatively short, less than one-half the wing; proximal three or four segments yellowed, outer segments slightly darker; longest verticils of proximal flagellar segments about four-fifths as long, on outer segments subequal to or exceeding the segments. Front light yellow; anterior vertex light brown with a central orange vitta; posterior vertex paler, orbits narrowly gray.

Pronotum brown. Mesonotal præscutum with three broad contiguous yellow stripes restricting the brown ground to the broad humeri; scutum and parascutella more orange, scutellum and mediotergite light brown. Pleura yellowed, dorso-pleural region slightly more darkened; pteropleurite paler, propleura, ventral sternopleurite and meron weakly darkened. Halteres very long, stem yellow, knob dark brown. Legs with fore coxæ brown, remaining coxæ and all trochanters yellow; femora light yellow, tips rather broadly brownish black; tibiæ and tarsi white, unpatterned. Wings (Plate 6, fig. 51) light brown, conspicuously patterned with darker brown, including the prearcular and costal fields and broad apices of cell  $Sc_2$  and  $R_3$ ;



a narrower seam in bases of cells  $R_3$  and  $R_5$  at the anterior cord; stigma darker brown; veins pale brown, darker in the patterned areas. Venation: Free tip of  $Sc_2$  ending about opposite the base of the slightly extended  $R_2$ ; medial forks shallow.

Abdominal tergites beyond the first conspicuously bicolored, yellowed basally, apices dark brown, basal and outer segments more uniformly light brown; basal sternites yellow, narrowly darkened before tips; hypopygium yellow. Male hypopygium (Plate 7, fig. 56) with posterior border of tergite,  $t$ , emarginate, with a low transverse glabrous central projection; lateral lobes broad, blackened, the cephalic bladelike extension likewise blackened, with a few very large tubercles. Outer dististyle,  $d$ , appearing pointed at tip; inner style with beak relatively stout.

*Habitat*.—Assam.

Holotype, male, Langdang, Manipur, 5,300 feet, June 5, 1960 (*Schmid*).

The three species, *Dolichopeza* (*Nesopeza*) *ballator* Alexander, of Sikkim, *D. (N.) subballator* sp.nov., of Manipur, and the present fly all have a general resemblance as shown particularly by the wing pattern but are unusually distinct in the antennæ and the structure of the male hypopygium. The male sex remains unknown for *ballator* which in the female differs only slightly in the coloration of the body and wings.

**DOLICHOPEZA (NESOPEZA) PERLONGISETA** sp. nov. Plate 6, fig. 52, Plate 7, fig. 57

Allied to *thiasophila*; size small (wing of male 7.5 millimeters); mesonotal præscutum with disk covered by four brownish yellow stripes; pleura yellow, with major brown areas; tarsi and the narrow tips of tibiæ whitened; wings nearly hyaline, stigma dark brown; male hypopygium with posterior border of tergite with three blackened blades, the median lobe longer; inner dististyle with beak slender, twisted at outer end; ninth sternite with lobes that bear a group of very long yellow setæ that are about three times as long as the lobe itself.

*Male*.—Length, about 8 millimeters; wing, 7.5; antenna, about 4.

Frontal prolongation of head brown, more yellowed laterally; palpi brownish black. Antennæ long, slightly exceeding one-half the length of wing; scape, pedicel and proximal end of

first flagellar segment obscure yellow, outer segments brown; flagellar segments long-cylindrical, much exceeding thier longest verticils, with further dense white setulæ that are about one-third as long as the verticils. Head with front yellowed, vertex and occiput brown.

Mesonotal præscutum with disk covered by four brownish yellow stripes that are scarcely differentiated from the pale brown ground, the intermediate pair divided by a narrow silvery vitta that is vaguely bordered by brown; posterior sclerites of notum somewhat darker brown. Pleura yellow with major brown markings on mesepisternum, the pteropleurite paler. Halteres elongate, stem whitened, knob black. Legs with coxæ and trochanters pale yellow; femora pale brown, darker outwardly, bases more yellowed; tibïæ faintly dusky, the narrow base and slightly broader tip white; tarsi whitened. Wings (Plate 6, fig. 52) nearly hyaline, the large stigma dark brown, conspicuous; veins dark brown. Venation:  $Sc_2$  ending about opposite three-fourths Rs; medial forks moderately deep, cell  $M_1$  about one-half longer than its petiole; m-cu slightly less than its own length before fork of M; cell 2nd A narrow.

Abdomen long, basal segments bicolored, bases obscure yellow with approximately the outer half blackened; subterminal three segments blackened to form a ring, hypopygium yellowed. Male hypopygium (Plate 7, fig. 57) with posterior border of tergite, *t*, with three blackened blades, lateral pair broader, on inner margin with an acute spine, median lobe large, jutting caudad beyond the laterals. Ninth sternite, *9s*, with elongate lobes that bear a terminal group of yellow setæ of unusual length, those at apex about three times as long as the lobe, the more proximal ones shorter, their apices bent and twisted into a tangle. Outer dististyle, *d*, long and slender, setæ relatively short; inner style with beak slender, twisted at outer end; dorsal crest very high, flattened, subrectangular, pale, covered by microscopic setulæ, the posterior outer angle with about six long setæ.

*Habitat*.—Sikkim.

Holotype, male, Dikchu, 2,200 feet, August 13, 1959 (*Schmid*).

*Dolichopeza* (*Nesopeza*) *perlongisetæ* is readily told from other species that are generally similar, including *D. (N.) thiasophila* Alexander, by the characters of the male hypopygium. The exceedingly long setæ on the ninth sternite are noteworthy.

**DOLICHOPEZA (NESOPEZA) RAHULA** sp. nov. Plate 6, fig. 53; Plate 7, figs. 58, 59.

Closely related to *thiasophila* and *volupta*, differing chiefly in the structure of the inner dististyle of the male hypopygium.

*Male*.—Length, about 7.5 millimeters; wing, 8; antenna, about 4.2.

Frontal prolongation of head testaceous brown; palpi dark brown. Antennæ long, slightly exceeding one-half the wing; scape and pedicel brownish yellow, flagellum black; flagellar segments long-cylindrical, nearly three times their verticils, with a further dense short white pubescence or setulæ. Head brown.

Pronotum light brown. Mesonotum almost uniform light brownish yellow, præscutum with a capillary dark brown central vitta. Pleura pale yellow, the mesepisternum dark brown except along the posterior border to form a broad transverse stripe, meron darkened; remainder of pleura pale, including chiefly the propleura and pteropleurite. Halteres very long, stem whitened, knob black. Legs with coxæ and trochanters pale yellow; femora light brown, the bases restrictedly yellow; tibiæ brown, the bases narrowly, tips more extensively whitened; tarsi snowy white. Wings (Plate 6, fig. 53) whitened, stigma dark brown, conspicuous, cells beyond cord vaguely more darkened; veins brownish black. Venation: cell  $M_1$  about one-half longer than its petiole; cell 2nd A relatively narrow.

Abdominal segments bicolored, yellow, with less than the outer half of each segment dark brown; segments six to eight black, forming a conspicuous ring, the large ninth segment orange. Male hypopygium (Plate 7, fig. 58) generally as in *volupta*; ninth tergite, *t*, with the lateral blackened plates narrow, the inner edge at outer end produced mesad into a point; central projection small. Lobes of ninth sternite, *9s*, broad, with concentrations of long scabrous setæ at each outer angle. Outer dististyle, *d*, relatively short, broader and slightly arcuated on proximal half; inner style with crest semicircular in outline; beak strongly curved or deflexed, with a small basal projection.

*Habitat*.—Sikkim.

Holotype, male, Nampung, 3,280 feet, August 16, 1959 (*Schmid*).

There are several closely related species in this group of the subgenus that are generally similar in appearance but differ in the hypopygial structure, especially of the inner dististyle. The nearest described ally is *Dolichozeza* (*Nesopeza*)

*volupta* Alexander and I have illustrated the inner style for comparison with the present fly (Plate 7, fig. 59), based on the holotype from Kumaon. It now seems probable that the paratypes from Sikkim assigned to this species do not belong here.

**DOLICHOPEZA (NESOPEZA) SIMPLEX** sp. nov. Plate 6, fig. 55; Plate 7, fig. 60.

Size relatively large (wing of male 10 millimeters); mesonotum cinnamon brown, pleura yellowed, conspicuously patterned with brown; tips of tibiæ whitened, broadest on posterior legs, the tarsi snowy white; wings whitened, outer cells vaguely more darkened, stigma dark brown, conspicuous; basal abdominal tergites bicolored, dark brown with an obscure yellow ring beyond base of each segment, subterminal segments brownish black to form a ring; male hypopygium with body of inner dististyle yellowed, with hundreds of microscopic curved spinules; beak very long and slender, lower beak reduced; ninth sternite with a strong curved arm that narrows outwardly into a long blackened rod or spine.

*Male*.—Length, about 10 millimeters; wing, 10; antenna, about 4.8.

Frontal prolongation and front of head clear light yellow, mouthparts and palpi brownish black. Antennæ with scape and pedicel obscure brownish yellow, flagellum dark brown, segments long-cylindrical, on the more proximal segments about three times their verticils. Head with most of vertex dark cinnamon brown, the occiput and low vertical tubercle more yellowed.

Cervical region medium brown; pronotum darker brown, the scutellum yellowed on sides. Mesonotal præscutum cinnamon brown, including the scarcely differentiated stripes, the midline of anterior half with a capillary brown vitta; posterior sclerites duller cinnamon yellow, the posterior borders of scutal lobes weakly darkened; mesonotum virtually glabrous. Pleura obscure yellow on anterior mesepisternum and pteropleurite, the propleura, posterior mesepisternum and meron, with the katepipleurotergite, darker brown. Halteres elongate, stem obscure yellow, knob blackened. Legs with fore coxæ dark brown, midcoxæ yellow, narrowly darkened at bases, hind coxæ and all trochanters light yellow; femora brownish black, bases yellowed, including the proximal third or fourth; tibiæ pale brown, tips white, broadest on posterior pair where about the outer sixth is included; fore and middle legs with basitarsi

brownish white, outer segments snowy white, on posterior legs all tarsi white. Wings (Plate 6, fig. 55) whitened, cells beyond cord vaguely more darkened, stigma brown; veins dark brown, conspicuous. Venation: medial forks relatively deep, cell  $M_1$  nearly twice its petiole; cell 2nd A moderately wide.

Abdominal tergites bicolored, dark brown, with an obscure yellow ring beyond base, segments seven and eight uniformly darkened to form a ring; sternites and hypopygium yellowed. Male hypopygium (Plate 7, fig. 60) with median region of tergite,  $t$ , broad, each lateral angle elevated into a low blackened knob; lateral lobes of tergite with relatively few small blackened spicules. What appears to be a development of the ninth sternite,  $9s$ , beneath is a conspicuous curved arm that narrows on outer half into a blackened rod or spine. Outer dististyle,  $d$ , about five times as long as broad, setæ conspicuous; inner style distinctive, the body a subcylindrical yellow structure, the entire surface with small curved spinous extensions, their total number in the hundreds; beak very long and slender, with about five long setæ on outer margin of basal half; lower beak reduced to a small blackened tubercle.

*Habitat*.—Assam.

Holotype, male, Nongjni, Khasi-Jaintia, 3,750 feet, April 19, 1960 (*Schmid*).

*Dolichopeza* (*Nesopeza*) *simplex* is very distinct from other generally similar species, such as *D. (N.) lætipes* Alexander, in the structure of the male hypopygium, particularly the inner dististyle. The long curved arm considered as being borne by the ninth sternite occurring also in *lætipes* and some other species and was earlier provisionally considered as perhaps representing gonapophyses but this is not the case.

**DOLICHOPEZA (NESOPEZA) SUBBALLATOR** sp. nov. Plate 6, fig. 54; Plate 7, fig. 61.

Allied to *ballator*; antennæ of male elongate, nearly two-thirds the wing; mesonotal præscutum very light brown with a narrow darker brown central line; tibiæ and tarsi white; wings tinged with brown, conspicuously patterned with still darker brown; free tip of  $Sc_2$  before level of  $R_2$ ; male hypopygium with tergite very large, fused with the basistyle and produced into conspicuous elongate blackened arms, the median area a depressed-flattened lobe.

*Male*.—Length, about 8 millimeters; wing, 8.5; antenna, about 5.2.

Frontal prolongation of head dark brown; palpi black. Antennæ elongate, about two-thirds the wing; scape and pedicel small, yellow, flagellum dark brown, the first segment paler at base; flagellar segments long-cylindrical, with small weak verticils and very short setulæ. Head light buffy brown; vertex nearly parallel-sided.

Pronotum brown. Mesonotal præscutum very light brown with a narrow darker brown central line, lateral stripes broader but pale and ill-defined; scutum light brown with a large brown area near mesal edge of each lobe; scutellum and postnotum medium brown. Pleura light brown; dorso-pleural region and pteropleurite paler. Halteres very long, stem yellow, knob brownish black. Legs with coxæ and trochanters yellow; femora light brown, tips narrowly darker; tibiæ dirty white, tarsi clear white. Wings (Plate 6, fig. 54) tinged with brown, conspicuously patterned with darker brown, including the prearcular field, cells C and Sc, stigma, bases of outer radial cells along anterior cord and broadly in cells Sc<sub>2</sub> and R<sub>3</sub>; m-cu more narrowly seamed with brown, outer medial branches very vaguely darkened; somewhat clearer areas before and beyond stigma; veins pale brown, darker in the more heavily patterned fields. Longitudinal veins beyond cord with abundant trichia. Venation: Free tip of Sc<sub>2</sub> before level of R<sub>2</sub>; R<sub>2+3</sub> subequal to or a little longer than m-cu.

Basal abdominal segments light brown, more yellowed basally, segments six to eight darker brown, seventh and eighth tergites with posterior borders narrowly pale, more conspicuous on the seventh; outer sternites and hypopygium more uniformly darkened. Male hypopygium (Plate 7, fig. 61) very distinctive, especially the tergite, *t*, median lobe broadly depressed-flattened, apex truncate with long setae, sides of tergite produced into elongate blackened arms, the inner margin before apex more produced; tergite at least partially fused with the basistyle. Ninth sternite, *9s*, with two relatively small oval lobes with long setæ. Outer dististyle, *d*, short and stout, apex obtuse; inner style with beak large, triangular, apex obtuse; lower beak obtuse, not blackened.

*Habitat*.—Assam.

Holotype, male, Pushing, Manipur, 4,800 feet, July 17, 1960 (*Schmid*).

There are various species allied to *Dolichopeza* (*Nesopeza*) *ballator* Alexander and having the same general distinctive

wing pattern but with the antennæ and male hypopygia quite distinct. Only the female sex is known in *ballator* and differs from the present fly in slight features of coloration and venation. The male hypopygium, when it becomes known, presumably will furnish strong characters for species separation, as in other members of the group.

## ILLUSTRATIONS

[Legend: a, aedeagus; b, basistyle; c, cercus; d, dististyle; g, gonapophysis; h, hypovalva; id, inner dististyle; od, outer dististyle; p, phallosome; s, sternite; t, tergite.]

### PLATE 1

- FIG. 1. *Ctenacroscelis bioculatus* sp.nov.; male hypopygium.  
 2. *Ctenacroscelis elobatus* sp.nov.; male hypopygium.  
 3. *Ctenacroscelis hansonii* Alexander; male hypopygium.  
 4. *Ctenacroscelis leptostylus* Alexander; male hypopygium.  
 5. *Ctenacroscelis makara* sp.nov.; male hypopygium.  
 6. *Ctenacroscelis nigrofemoratus* sp.nov.; male hypopygium.  
 7. *Nephrotoma altigalea* sp.nov.; venation.  
 8. *Nephrotoma bicristata* sp.nov.; venation.

### PLATE 2

- FIG. 9, 10. *Ctenacroscelis simplicatarsis* sp.nov.; male hypopygium.  
 11. *Ctenacroscelis sufflavus* Alexander; male hypopygium.  
 12. *Nephrotoma altigalea* sp.nov.; male hypopygium.  
 13, 14. *Nephrotoma bicristata* sp.nov.; male hypopygium.  
 15. *Nephrotoma curtiterebra* sp.nov.; venation.  
 16. *Nephrotoma ericarum* sp.nov.; venation.  
 17. *Nephrotoma euryglossa* sp.nov.; venation.  
 18. *Nephrotoma hamulifera* sp.nov.; venation.

### PLATE 3

- FIG. 19. *Nephrotoma curtiterebra* sp.nov.; ovipositor, lateral.  
 20. *Nephrotoma ericarum* sp.nov.; male hypopygium.  
 21, 22. *Nephrotoma euryglossa* sp.nov.; male hypopygium.  
 23, 24. *Nephrotoma hamulifera* sp.nov.; male hypopygium.  
 25. *Nephrotoma korpa* sp.nov.; venation.  
 26. *Nephrotoma longisternata* sp.nov.; venation.  
 27. *Nephrotoma peralticrista* sp.nov.; venation.

### PLATE 4

- FIG. 28. *Nephrotoma subumbonis* sp.nov.; venation.  
 29. *Nephrotoma platysterna* sp.nov.; venation.  
 30. *Nephrotoma inorata* Alexander; male hypopygium.  
 31. *Nephrotoma korpa* sp.nov.; male hypopygium.  
 32, 33. *Nephrotoma longisternata* sp.nov.; male hypopygium.  
 34. *Dolichocheza* (*Mitopeza*) *crassistylus* sp.nov.; venation.  
 35. *Dolichocheza* (*Oropeza*) *variitibialis* sp.nov.; venation.  
 36. *Nephrotoma peralticrista* sp.nov.; male hypopygium.  
 37. *Nephrotoma platysterna* sp.nov.; male hypopygium.



## PLATE 5

- FIG. 38, 39. *Nephrotoma subumbonis* sp.nov.; male hypopygium.  
40. *Dolichopeza* (*Mitopeza*) *crassistyla* sp.nov.; male hypopygium.  
41. *Dolichopeza* (*Oropeza*) *variitibiata* sp.nov.; male hypopygium.  
42. *Dolichopeza* (*Nesopeza*) *garuda* sp.nov.; venation.  
43. *Dolichopeza* (*Nesopeza*) *kashongensis* sp.nov.; venation.  
44, 45. *Dolichopeza* (*Nesopeza*) *garuda* sp.nov.; male hypopygium.  
46. *Dolichopeza* (*Nesopeza*) *longisetosa* Alexander; male hypopygium.

## PLATE 6

- FIG. 47. *Dolichopeza* (*Nesopeza*) *manipurensis* sp.nov.; male hypopygium.  
48. *Dolichopeza* (*Nesopeza*) *kashongensis* sp.nov.; male hypopygium.  
49. *Dolichopeza* (*Nesopeza*) *manipurensis* sp.nov.; male hypopygium.  
50. *Dolichopeza* (*Nesopeza*) *manipurensis* sp.nov.; venation.  
51. *Dolichopeza* (*Nesopeza*) *neoballator* sp.nov.; venation.  
52. *Dolichopeza* (*Nesopeza*) *perlongiseta* sp.nov.; venation.  
53. *Dolichopeza* (*Nesopeza*) *rahula* sp.nov.; venation.  
54. *Dolichopeza* (*Nesopeza*) *subballator* sp.nov.; venation.  
55. *Dolichopeza* (*Nesopeza*) *simplex* sp.nov.; venation.

## PLATE 7

- FIG. 56. *Dolichopeza* (*Nesopeza*) *neoballator* sp.nov.; male hypopygium.  
57. *Dolichopeza* (*Nesopeza*) *perlongiseta* sp.nov.; male hypopygium.  
58. *Dolichopeza* (*Nesopeza*) *rahula* sp.nov.; male hypopygium.  
59. *Dolichopeza* (*Nesopeza*) *volupta* Alexander; male hypopygium.  
60. *Dolichopeza* (*Nesopeza*) *simplex* sp.nov.; male hypopygium.  
61. *Dolichopeza* (*Nesopeza*) *subballator* sp.nov.; male hypopygium.

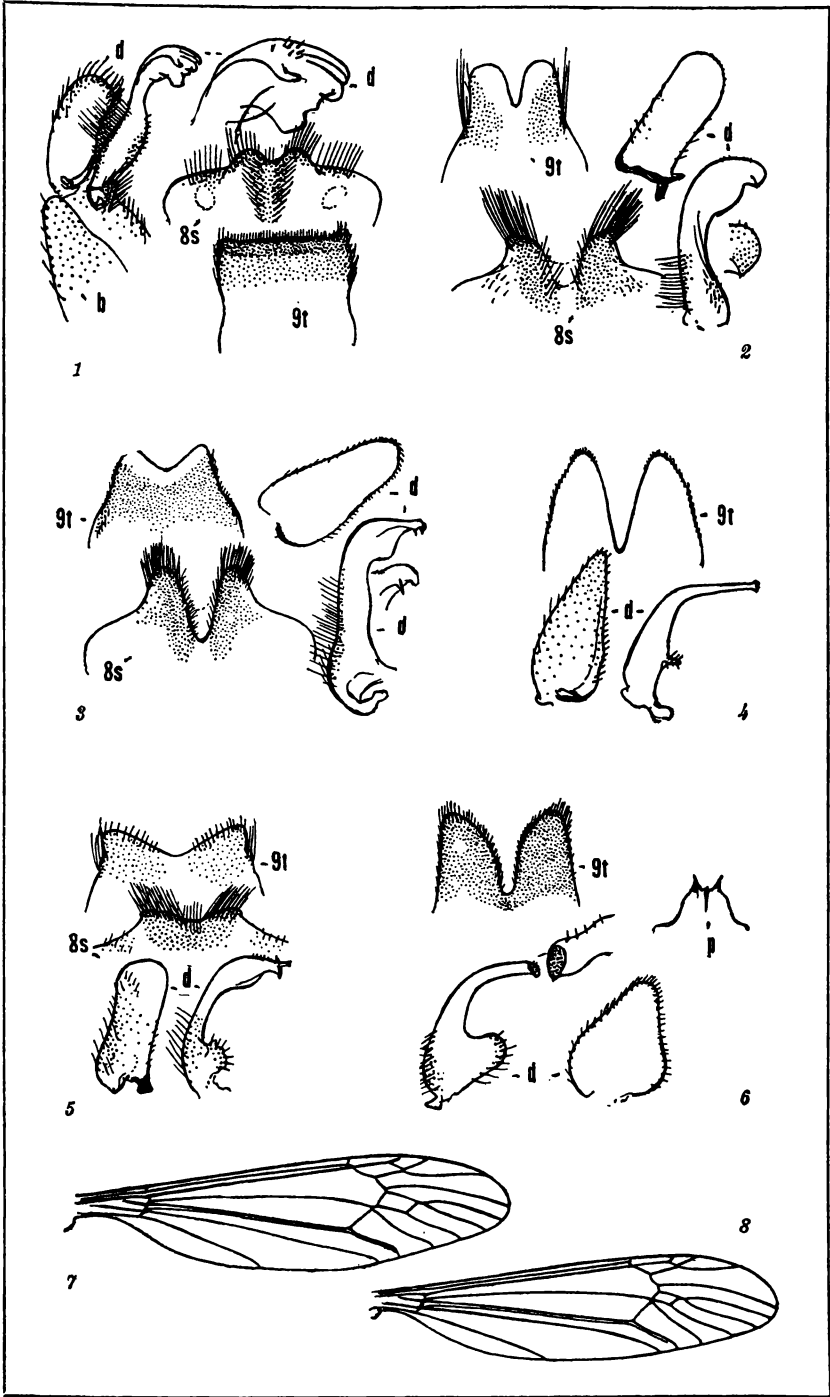


PLATE 1.

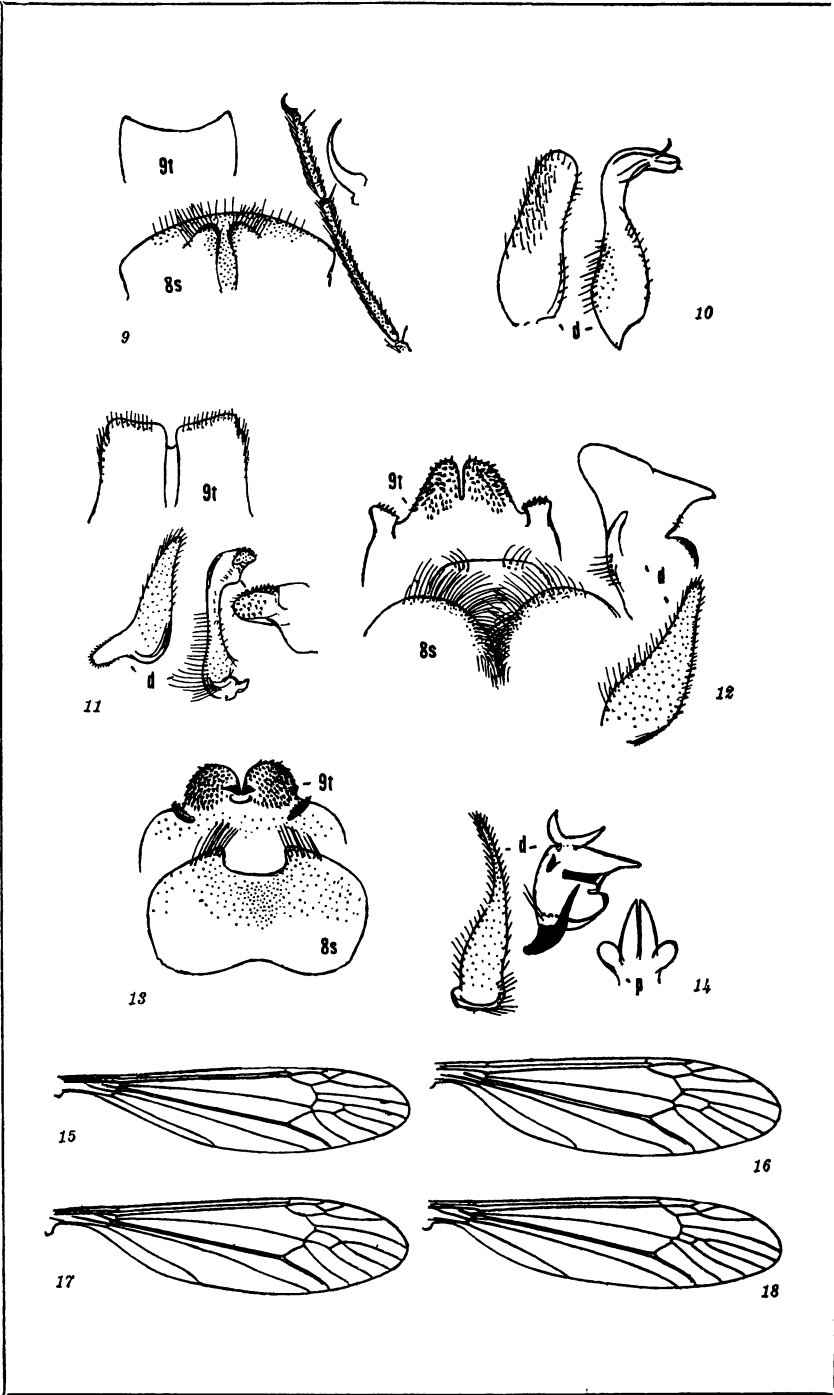
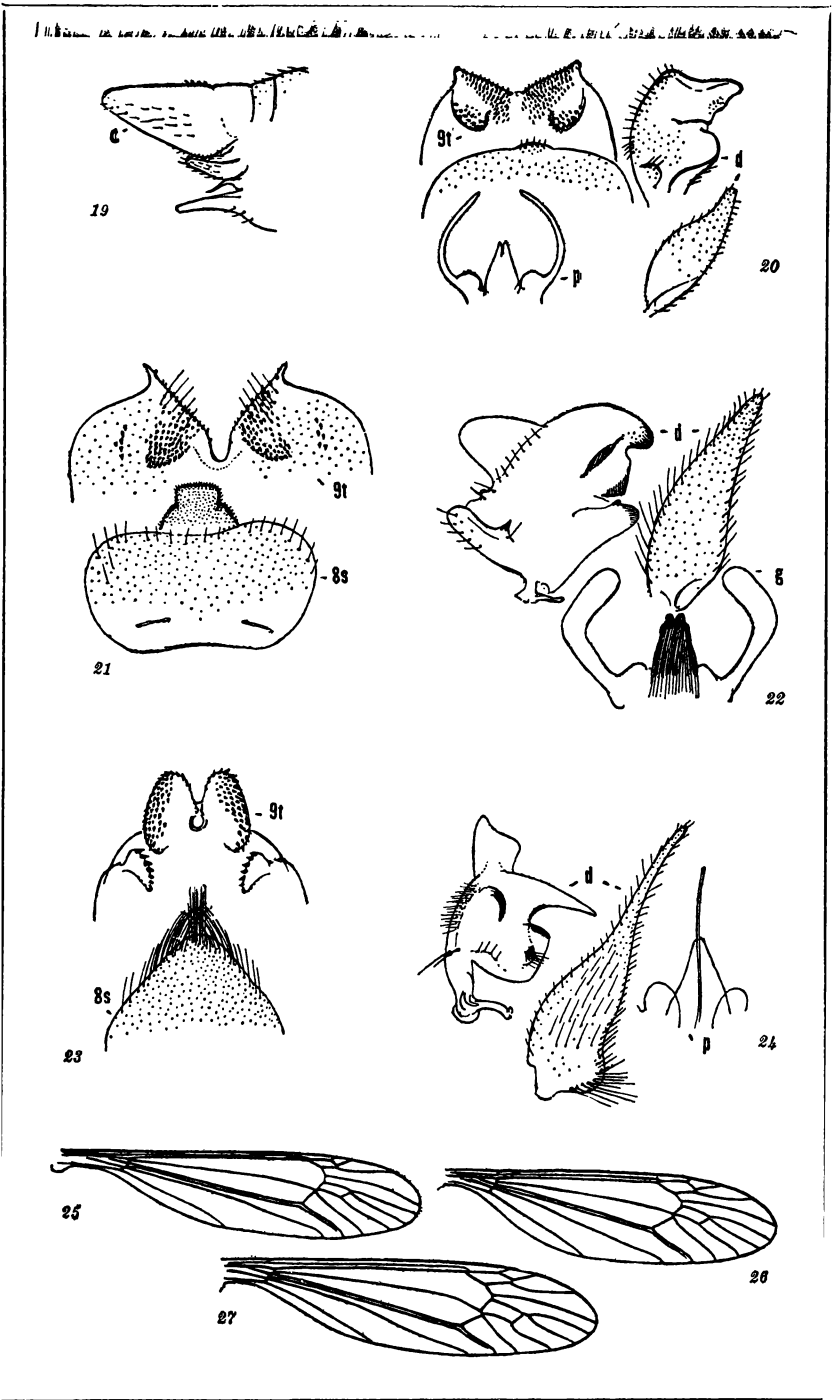


PLATE 2.



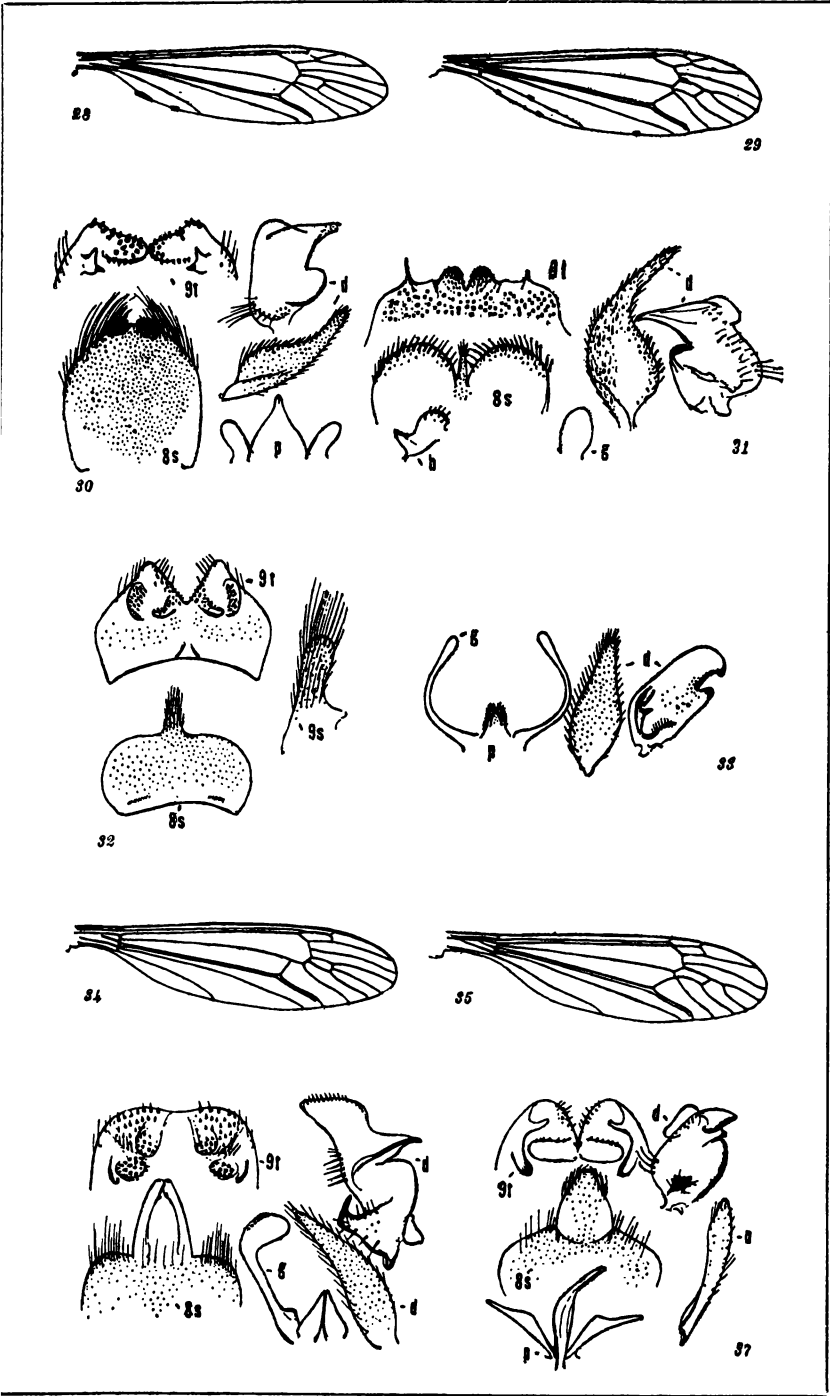


PLATE 4.

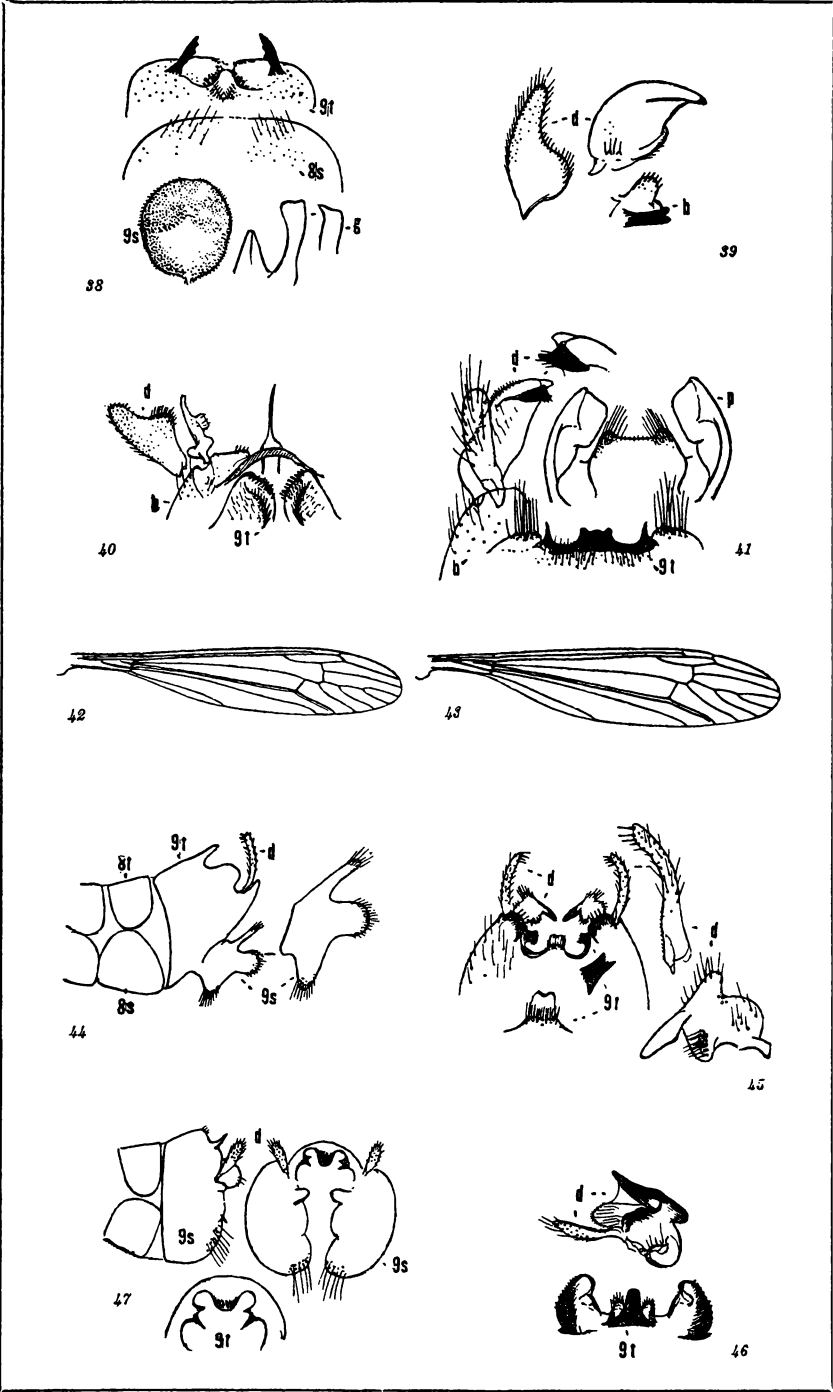
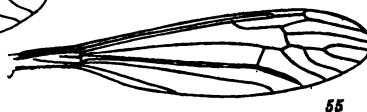
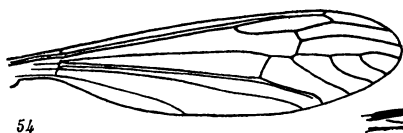
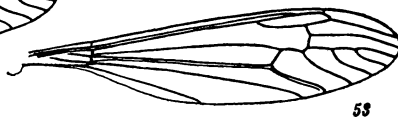
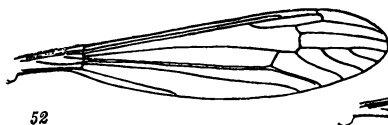
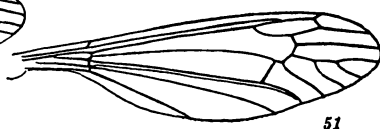
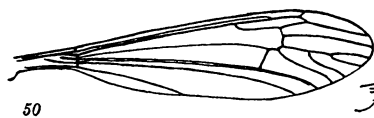
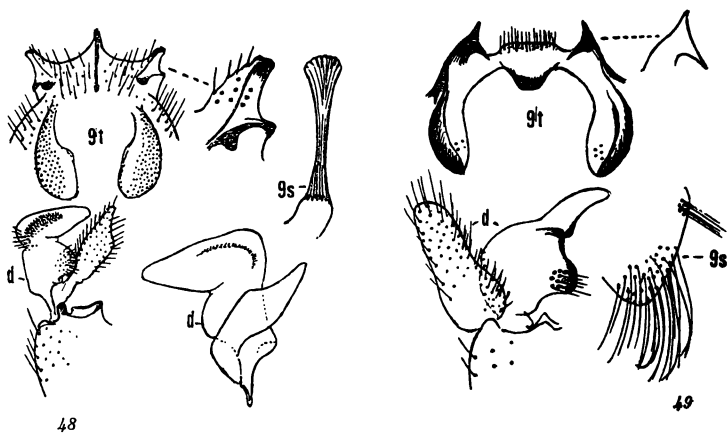


PLATE 5.



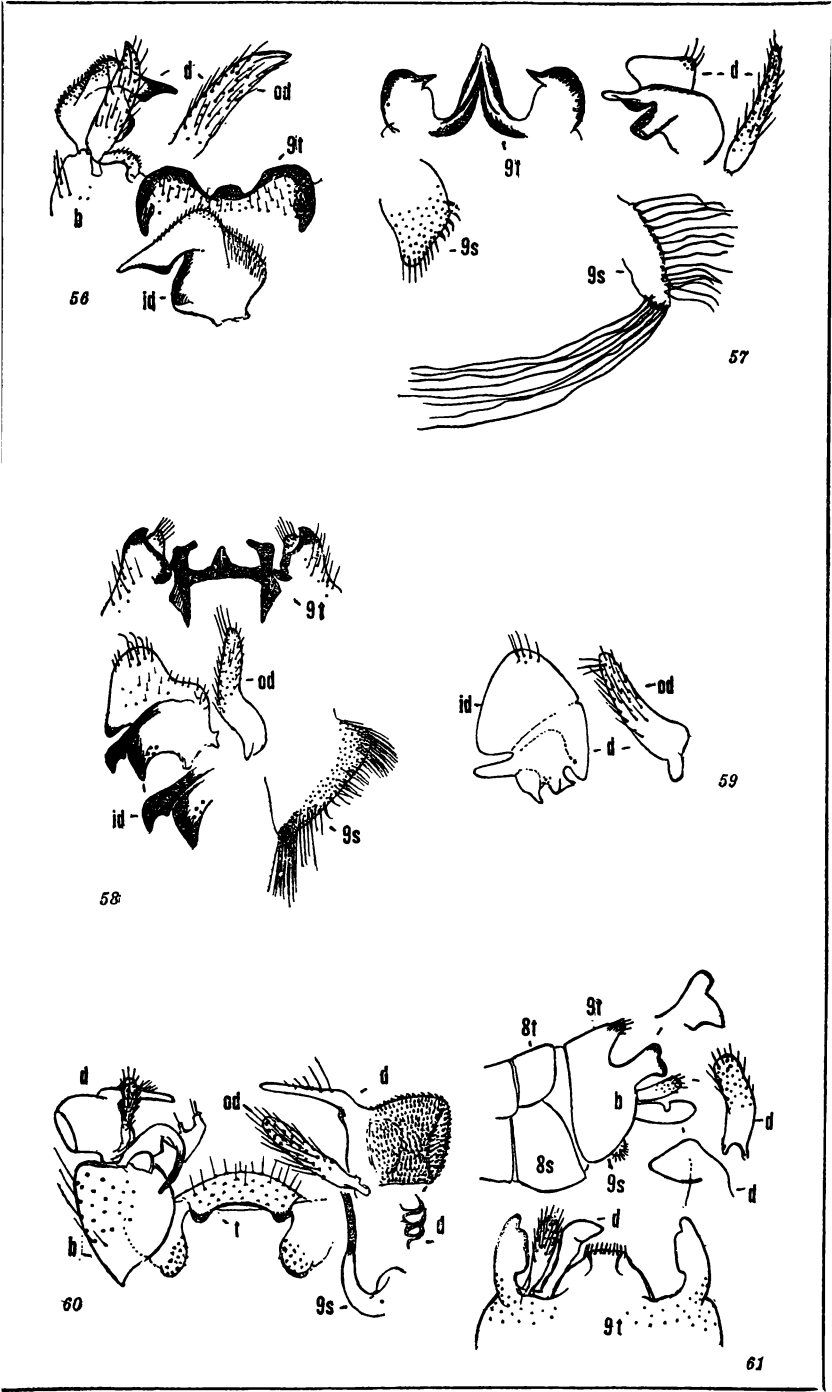


PLATE 7.