

NEW OR LITTLE-KNOWN SPECIES OF ASIATIC TIPULIDAE (DIPTERA). III

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The crane flies discussed at this time all pertain to the subfamily Tipulinae. These particularly interesting species were collected by Dr. Fernand Schmid in Assam, virtually all being from Kameng, in the North East Frontier Agency, during 1961. I am greatly indebted to Dr. Schmid for these materials, the types being preserved in my personal collection.

TIPULINAE

Ctenophora (*Pselliophora*) *mecocera* n. sp.

Size small (wing about 11 mm.); general coloration of mesonotum polished dark brown to black, scutellum yellowed, pleura conspicuously variegated with whitish yellow and black; antennae of male very long, exceeding three-fourths the body or wing, flagellar branches relatively short, with long dark setae; in female, antennae very short, with nine or ten simple segments; tibiae black, bases broadly snowy white; wings of male subhyaline, virtually unpatterned except for the darkened prearcular field and small stigmal areas; in female, wing more extensively darkened; abdomen with proximal five segments yellow, remainder intensely black.

Male.—Length about 10-10.5 mm.; wing 11-11.5 mm.; antenna about 8 mm.

Female.—Length about 15 mm.; wing 11.5-12 mm.; antenna about 1.8-2.0 mm.

Male.—Frontal prolongation of head obscure yellow, with abundant long black setae, nasus elongate; proximal segments of palpi obscure yellow, the terminal one long, black. Antennae of unusual length, exceeding three-fourths the body or wing; scape and pedicel obscure yellow, first flagellar segment brownish black, stems of succeeding segments yellow, branches black; first flagellar segment with a subtriangular lobe at near two-thirds the length, branches of succeeding segments relatively short, as compared with *gracilicornis*, the longest approximately twice the stem, all with abundant long darkened setae. Head dark brown, genae paler.

Cervical region darkened above, yellowed on sides. Pronotal scutum broadly light yellow, sides and the scutellum black. Mesonotal praescutum and scutum polished dark brown to black, scutellum yellowed, posterior

¹Contribution from the Entomological Laboratory, University of Massachusetts.

sclerites black. Pleura variegated whitish yellow and black, the former including the dorsal sternopleurite, pteropleurite and meron, the latter the propleura, anepisternum, ventral sternopleurite and metapleura, dorso-pleural region light yellow. Halteres with stem dusky, base orange, outer half of knob yellow. Legs with coxae black; trochanters brownish testaceous; femora brown, darker outwardly; tibiae black, base broadly snowy white, including about the proximal fifth or sixth of segment; tarsi black. Wings (Fig. 1) subhyaline, unpatterned except for the small brown stigma and prearcular field, in cases with very narrow seams over cord and along vein *Cu* in cell *M*; veins brown. Venation: Petiole of cell M_1 subequal to *m*.

Abdomen with proximal five segments yellow, outer segments, including the hypopygium and its appendages intensely black; hypopygium relatively small. One paratype has the posterior borders of first and third tergites dark brown.

Female. — As in the male, differing in sexual characters. Antennae very short, with nine or ten segments, the outer two or three fused, terminal one pointed; first flagellar segment longer than the scape, succeeding segments with lower face slightly produced, rounded. Wings with cells *C* and *Sc* strongly yellowed, the amount of dark color much more extensive than in male, including the cells beyond cord, and, in a paratype, most of basal half of wing in cells *R* and *M*; Anal cells and *Cu* somewhat paler brown; the pale wing pattern appears as a broad band before cord, reaching the posterior border in cell M_4 . Petiole of cell M_1 shorter, in cases the cell sessile. Abdomen chiefly blackened, including all sternites and outer tergites, basal sternites variegated with reddish orange. A further female (from Thingsat, Manipur, altitude 3500 feet, September 10, 1960) differs still more notably but probably also belongs here. It has the antennal flagellum intensely black; abdomen black, the second segment and tergites three to five chiefly yellow.

Holotype. — ♂, Singkap, Manipur, Assam, 3800 feet, July 6, 1960 (Schmid). *Allotype*, ♀, Ninghti, Manipur, 1800 feet, July 29, 1960. *Paratypes*, ♂, with the allotype, July 30, 1960; 1 ♂, Yongphu, Manipur, 4500 feet, August 12, 1960; 1 ♀, Marou, Manipur, 4000 feet, August 14, 1960 (Schmid).

The most similar regional species is *Ctenophora* (*Pselliophora*) *gracilicornis* (Edwards), likewise from Assam. The antennae of the male are quite different, being much longer proportionately to the body length and with the branches shorter. The general coloration of the body and wings is distinct in the two species.

***Ctenophora* (*Dictenidia*) *manipurana* n. sp.**

Size small (wing of male less than 10 mm.); thorax yellow, praescutum and scutal lobes polished brownish black; antennae with outer flagellar

branches slender, each about two-thirds as long as the basal branch; femora yellowish brown, tips blackened; wings whitened, stigma oval, dark brown; wing cells without trichia; basal four abdominal segments yellow, tergites with a narrow brown central line; outer segments, including the large hypopygium, black.

Male. — Length about 8 mm.; wing 9.2 mm.; antenna about 4 mm.

Rostrum stout, yellow; palpi light brown, third segment more yellowed basally, terminal parts brown. Antennae with scape yellow, remainder medium brown; each flagellar segment with basal branch long and stout, the slender outer branch about two-thirds as long. Head polished brownish yellow, posterior vertex extensively dark brown.

Pronotum and pretergites yellow. Mesonotal praescutum uniformly polished brownish black, only the very restricted humeral region yellowed; scutal lobes similarly brownish black, the posterior lateral parts and median region yellowed; scutellum and postnotum yellow, posterior third of mediotergite weakly darkened. Pleura yellowed, vaguely more darkened on anepisternum and anterior pteropleurite; dorsopleural membrane light sulphur yellow. Halteres with stem brownish black, base narrowly yellowed, knob darker. Legs with coxae and trochanters light yellow; femora yellowish brown, tips blackened, more extensively so on posterior legs; tibiae yellowish brown, base more blackened, more extensive on posterior legs; tarsi brown. Wings whitened; stigma oval, dark brown; a vague small darkened cloud over anterior cord; extreme wing base yellowed; veins brown. No macrotrichia in wing cells. Venation: R_s straight, about one-half longer than R_{2+3} ; petiole of cell M_1 about one-half m ; $m-cu$ at fork of M_{3+4} .

Basal four abdominal segments yellow, tergites with a narrow brown central line; outer segments black, base of fifth segment obscure yellow. Hypopygium large; posterior border of tergite broadly emarginate, leaving conspicuous lobes that are densely provided with long black setae.

Holotype. — ♂, Chingsao, Manipur, Assam, 3800 feet, June 13, 1960 (Schmid).

The subgenus *Dictenidia* Brulle had not been recorded from India. The only other regional species is the larger *Ctenophora* (*Dictenidia*) *rhadinoclada* n. sp., described later.

Ctenophora (*Dictenidia*) *rhadinoclada* n. sp.

Size large (wing of male about 15 mm.); mesonotal praescutum yellow laterally, disk with three brown stripes; antennae of male with very long branches, some being nearly five times the length of the segment; knobs of halteres yellow; posterior femora dark brown with a broad yellow sub-terminal ring; tibiae black with a whitish yellow subbasal ring; wings brownish yellow, restrictedly patterned with darker, without trichia in the

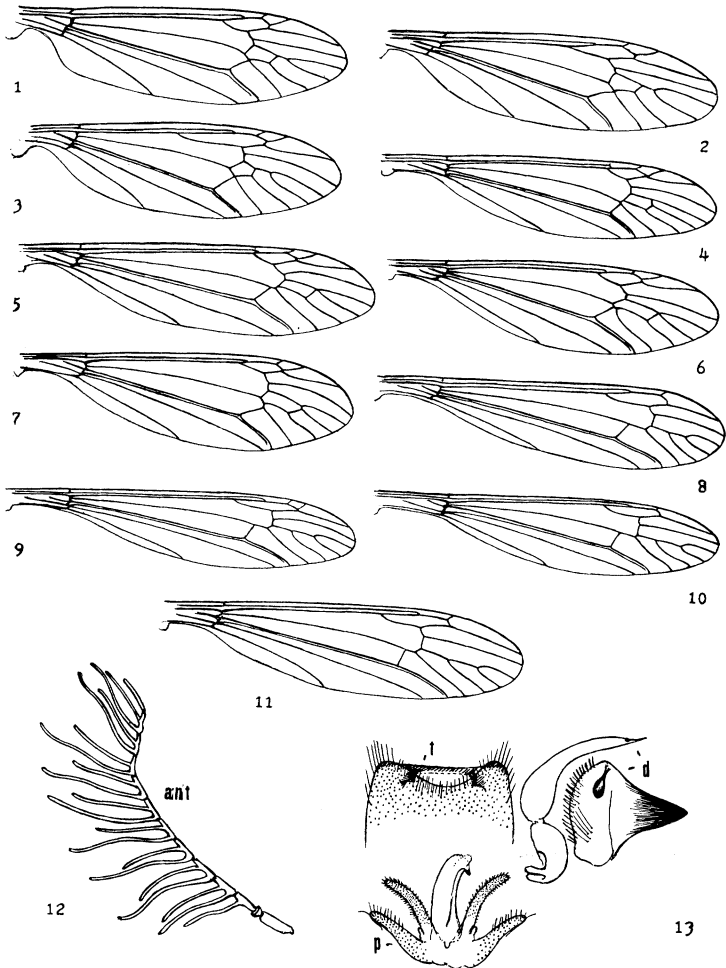
cells; basal abdominal tergites orange with three black stripes, outer segments black.

Male.—Length about 13-14 mm.; wing 14.5-15 mm.; antenna about 8-8.1 mm., longest branch about 3 mm.

Frontal prolongation of head obscure yellow, sides slightly infuscated; proximal segments of palpi brownish black, the long terminal segment pale. Antennae of male (Fig. 12) large and conspicuous, the length exceeding one-half the wing; scape and pedicel yellow; flagellar segments with base and branches black, the stem extensively yellow on the more proximal segments, the color becoming more restricted on outer segments with only the distal ends brightened, outer two or three segments black; first flagellar segment with a single branch that is about three times the segment; segments two to ten inclusive each with two branches, the basal one longer and stouter, the branches of the intermediate segments longest, nearly five times the stem; each segment with basal branch longer and stouter, about one-fourth to one-half longer than the outer one; terminal segment simple, slightly longer than the penultimate; whitened vestiture of the branches very short and inconspicuous, subequal in size on both branches. Front yellow, remainder of head orange.

Prothorax orange yellow. Mesonotal praescutum yellow laterally, disk with three brown stripes, the median one divided on posterior half, lateral stripes broad, crossing the suture and being confluent with the extensive brownish black scutal lobes, center of scutum narrowly pale; scutellum blackened, pale medially, parascutella orange yellow; postnotum orange yellow; scutellum with long erect yellow setae. Pleura light brownish fulvous, dorsal sternopleurite paler; dorsopleural membrane conspicuously light yellow. Halteres with stem and base of knob brown, base of stem and most of knob yellowed. Legs with coxae chiefly yellow, bases of fore and hind pairs weakly darkened; trochanters yellow; fore and middle femora brownish yellow, bases somewhat clearer yellow, tips narrowly blackened; tibiae and tarsi black; posterior femora dark brown with a broad yellow subterminal ring that is subequal to or slightly more extensive than the blackened apex; tibiae black with an obscure whitish yellow subbasal ring; tarsi black. Wings (Fig. 3) brownish yellow, the costal region somewhat clearer yellow; a restricted darker pattern that includes the stigma and smaller brown clouds at origin of *Rs* and over the anterior cord; a paler brown suffusion in cell *R* extending the entire length of cell, more extensive on basal third; distal ends of outer radial cells weakly darkened; veins brown. No macrotrichia in wing cells; veins beyond cord with trichia. Venation: *Rs* long, about two to two and one-half times *m-cu*; petiole of cell M_1 about one and one-half to nearly twice *m*; cell 1st M_2 small; *m-cu* more oblique than in *manipurana*.

Abdomen with proximal tergites orange yellow, segments two to six with three conspicuous black stripes, on the sixth segment larger and restricting the yellow; proximal five sternites orange, sixth sternite and



Text - Figures 1-13. — Fig. 1, *Ctenophora (Pselliophora) mecocera* n. sp., venation; Fig. 2, *Ctenophora (Dictenidia) manipurana* n. sp., venation; Fig. 3, *Ctenophora (Dictenidia) rhadinoclada* n. sp., venation; Fig. 4, *Nephrotoma condylophora* n. sp., venation; Fig. 5, *Nephrotoma dafta* n. sp., venation; Fig. 6, *Nephrotoma margaritae* n. sp., venation; Fig. 7, *Nephrotoma melanaspis* n. sp., venation; Fig. 8, *Dolichozepea (Nesozepea) creon* n. sp., venation; Fig. 9, *Dolichozepea (Nesozepea) melanorhipis* n. sp., venation; Fig. 10, *Dolichozepea (Nesozepea) polysara* n. sp., venation; Fig. 11, *Dolichozepea (Nesozepea) vyasa* n. sp., venation; Fig. 12, *Ctenophora (Dictenidia) rhadinoclada* n. sp., male antenna; Fig. 13, *Ctenophora (Dictenidia) rhadinoclada* n. sp., male hypopygium.

Symbols: *ant*, antenna; *d*, dististyle; *p*, phallosome; *t*, tergite.

remaining segments blackened. Male hypopygium (Fig. 13) with tergite, *t*, transverse, posterior border of dorsal plate shallowly emarginate, the border with abundant black setae, on each lateral lobe with a few longer black bristles; margin of ventral plate nearly straight, appearing as a narrow darkened band, at either end with a blackened tooth. Outer dististyle, *d*, with blade long and slender, the acute tip long; inner style with beak blackened, very powerful; tubular extension in region of the dorsal crest with stem short, subequal in length to the bulb. Phallosome, *p*, with the gonapophyses appearing as slender rods that are densely provided with short erect pale setae.

Holotype. — ♂, Jhum La, Kameng, North East Frontier Agency, Assam, 7800 feet, June 2, 1961 (Schmid). *Paratopotype*, ♂, June 2, 1961. *Paratype*, ♂, Talung Dzong, Kameng, 7000 feet, June 3, 1961 (Schmid).

Ctenophora (Dictenidia) rhadinoclada is entirely different from the small regional species, *C. (D.) manipurana* n. sp., which has unpatterned wings and short flagellar branches. In the present fly the longest branches are only a little shorter than the entire antenna of the smaller species. In central and eastern Asia there are other species of *Dictenidia* that have the wing cells glabrous as in the present fly, including *C. (D.) glabrata* (Alexander), of Szechwan, western China, *C. (D.) inaequipectinata* Alexander, of Formosa, *C. (D.) miyatakei* Alexander, of Shikoku, Japan, and *C. (D.) stalactitica* (Alexander), of Fukien, eastern China, all differing in characters of the antennae, wings and male hypopygium. All of these species have the male antennae and its branches shorter than in the present fly. The remaining Asiatic members of the subgenus have macrotrichia in the outer wing cells.

Nephrotoma condylophora n. sp.

General coloration yellow, mesonotal praescutum conspicuously patterned with brownish yellow and black; knobs of halteres yellow; femora yellow basally, tips broadly black, more extensive on fore legs; wings brownish yellow with a pale brown cloud at cord, cell M_1 broadly sessile; proximal six abdominal segments yellow with pale brown stripes, outer three segments black; male hypopygium with a slender blackened lobe on margin of inner dististyle.

Male. — Length about 15.5 mm.; wing 13.5 mm.; antenna about 6 mm.

Dorsal half of frontal prolongation of head light yellow, with a conspicuous brownish black area that includes the long nasus, ventral half

light brown; palpi with proximal two segments brown, outer segments brownish yellow to yellow. Antennae long; scape and pedicel yellow, flagellum black; flagellar segments beyond the first conspicuously incised, longer than their verticils. Head in front light yellow, orange behind, including a conspicuous vertical tubercle that is very vaguely emarginate; occipital brand triangular, very poorly delimited, extending a capillary pale line forward almost to summit of tubercle.

Pronotum obscure yellow. Mesonotal praescutum yellow, conspicuously patterned, including a median stripe that is brownish yellow on central part, the sides virtually confluent before suture, lateral stripes chiefly brownish yellow, vaguely darker at either end; a small isolated pale brown cloud opposite anterior end of lateral stripe; scutum yellow, lobes patterned, the larger posterior area ferruginous, anterior mark slightly darker, central area of scutum with a blackened line from apex of suture to midlength; posterior sclerites yellowed, mediotergite with scattered pale setae. Pleura yellow, variegated with pale ferruginous areas on anepisternum, ventral sternopleurite and ventral meron; dorsopleural membrane yellow. Halteres with stem yellow, base orange, knob blackened, its apex broadly yellow. Legs with coxae and trochanters yellow; femora yellow basally, tips broadly black, on fore legs including the outer three-fourths, on middle legs the outer half, on posterior femora about the outer fourth; tibiae brown, tips gradually passing into brownish black; tarsi black; claws of male toothed. Wings (Fig. 4) yellowed, the prearcular and costal fields clear light yellow; stigma darker brown, with abundant trichia; a pale brown cloud at cord, more expanded anteriorly; veins brown, more yellowed in the brightened parts. Venation: Cell M_1 broadly sessile, basal section of M_2 nearly as long as m ; $m-cu$ at or just beyond fork of vein M_4 .

Basal abdominal segments orange, tergites with a pale brown central stripe from second segment backward, narrowly interrupted at the incisures, lateral margins similarly darkened; sternites yellow; segments seven to nine black. Male hypopygium (Fig. 14) with tergite, t , transverse, posterior border with two large lobes provided with abundant black spicules, near the lateral margin with a separate blackened structure bearing a single long spur. Basistyle, b , at apex with a small flattened plate. Outer dististyle, d , nearly three times as long as broad across the basal third; inner style as figured, beak slender, lower beak much larger, blackened; posterior crest elevated into a slender blackened lobe, region of the outer basal lobe irregular in outline, with numerous strong setae. Gonapophysis, g , a small suboval yellow plate. Eighth sternite, $8s$, large, posterior border nearly truncate, the median region filled with pale membrane that is densely set with microscopic setulae, with long marginal setae adjoining the area and along the median furrow.

Holotype. — ♂, Bomdi La, Kameng, North East Frontier Agency, Assam, 8800 feet, June 16, 1961 (Schmid).

The male hypopygium has the structure of the hypopygium generally as in *Nephrotoma dutti* Alexander, of Pakistan and Kumaon, which otherwise differs in the coloration of the body and legs and in the details of structure of the hypopygium.

Nephrotoma dafla n. sp.

General coloration of thorax yellow, the praescutum with three blackened nacreous stripes, the lateral pair straight, pleura yellow; wings brownish yellow, stigma darker; abdomen with basal tergites orange yellow with a conspicuous central black stripe, sixth and succeeding segments black; male hypopygium with outer basal lobe of inner dististyle a long curved spine, beak slender; ninth sternite near midline with a long slender arm that terminates in a long spine; eighth sternite with posterior border produced into a broad rounded pale lobe provided with very small setae.

Male. — Length about 13 mm.; wing 13.5 mm.; antenna about 4.5 mm.

Frontal prolongation of head light yellow, infuscated above except at base, the center of this area paler; nasus very small, obtuse, surrounded by long setae; palpi medium brown, tip of terminal segment narrowly darker. Antennae with scape and pedicel orange yellow, flagellum black; flagellar segments with conspicuous basal enlargements, slightly exceeding their longest verticils in length. Front yellowed; vertex orange; a small brownish black spot between antennal bases, with two other areas near eye margin at base of tubercle; occipital band narrow, darkened.

Pronotal scutum orange yellow. Mesonotal praescutum clear light yellow with three polished blackish nacreous stripes that are very narrowly margined by black, central stripe narrowed behind, not reaching the suture, lateral stripes straight; scutum yellow, each lobe with two confluent blackened areas, median region at suture with an impressed blackened line; scutellum weakly infuscated, parascutella clearer yellow; postnotum weakly orange on central part and behind; notal vestiture very sparse, most evident on mediotergite. Pleura yellow. Halteres with stem obscure yellow, base orange, knob blackened, outer lateral part obscure yellow. Legs with coxae and trochanters orange yellow; remainder of legs broken. Wings (Fig. 5) brownish yellow, prearcular and costal fields clear orange yellow; stigma darker brown, the anterior end with relatively numerous trichia; cord narrowly paler brown, more expanded over anterior cord; yellowed areas before and beyond stigma; veins brown, yellow in the brightened fields. Venation: Cell M_1 with petiole punctiform; *m-cu* just before fork of *M*; cell *2nd A* narrow.

Basal abdominal segments orange yellow, tergites with a conspicuous central black stripe that begins at near one-fourth the length of second segment, narrowly broken at the incisures, lateral borders of segments weakly darkened; basal sternites clear yellow; sixth and succeeding segments black, the first with a yellow basal spot on both tergites and ster-

nites. Male hypopygium (Fig. 17) with the tergite, *t*, transverse, both the anterior and posterior borders nearly truncate, the former farther produced into stout subtriangular lateral lobes, the mesal point a stout spine, the remainder of mesal margin with several smaller points; median region of tergite with two contiguous small yellow rods, their lateral margins with about five similar blackened points. Ninth sternite, 9 *s*, with the thickened margin provided with numerous very long yellow setae; near midline at base on either side with a long slender arm that narrows gradually into a long spine, the surface microscopically ridged and corrugated, near apex these becoming more scabrous, the two spines together appearing lyriform and lying close to the phallosome. Outer dististyle, *d*, relatively short and broad, darkened, tip obtuse, upper margin thickened, especially at base; inner style blackened, beak long and very slender, lower beak lacking; region of outer basal lobe produced into a long curved spinelike lobe that narrows very gradually into a point, at its base with a smaller erect spine, the concave face of lobe with about six or seven strong setae. Phallosome, *p*, including the small triangular aedeagus and subtending apophyses, the latter appearing as straight subhyaline blades, the tips subacute. Eighth sternite, 8 *s*, broad, posterior border rounded, the median region with a wide rounded pale lobe, the diameter across base exceeding the length, the lobe with very small setae except on sides where they are longer; a concentration of very long yellow setae on sternite at base of lobe.

Holotype. — ♂, Jhum La, Kameng, North East Frontier Agency, Asaam, 7800 feet, June 2, 1961 (Schmid).

The specific name is that of a native tribe in Kameng. The modifications of the 9th sternite of the hypopygium are found likewise in *Nephrotoma euryglossa* Alexander and *N. glossophora* Alexander which differ in all other structures, including the tergite, dististyles and eighth sternite. Various other species of the genus, including the Nearctic *N. eucera* (Loew), *N. euceroidea* Alexander, and *N. occipitalis* (Loew), have the gonapophyses of the phallosome produced into horns that somewhat suggest the elongate arms of the ninth sternite of the present fly and the others listed.

Nephrotoma margaritae n. sp.

General coloration of mesonotum light yellow with three opaque brown stripes; legs black, femoral bases broadly yellow; wings brown, conspicuously variegated by clear yellow spots in cells on either side of cord; cell M_1 sessile to very short-petiolate, *m-cu* variable in position from before to shortly beyond the fork of *M*, cell 2nd *A* narrow; proximal five abdominal sternites yellow, tergites with three narrow black stripes, outer seg-

ments uniformly black; male hypopygium with inner dististyle and phallosome distinctive.

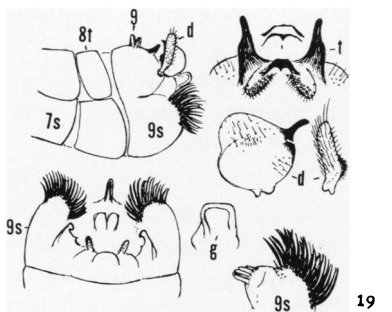
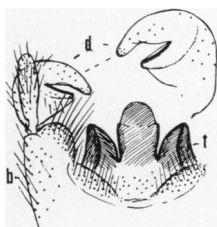
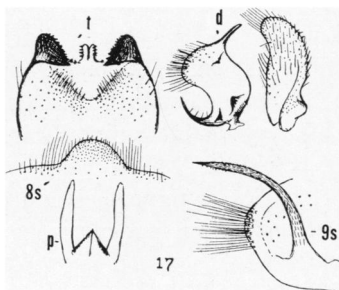
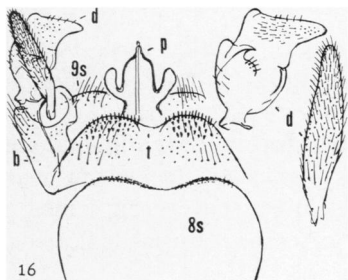
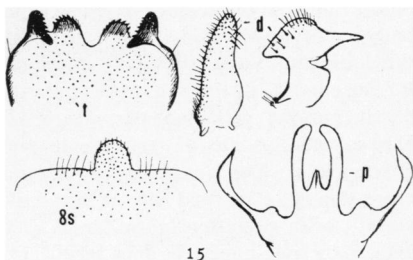
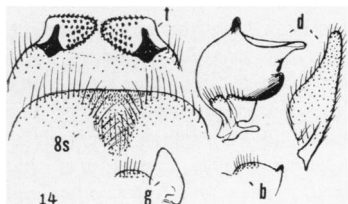
Male. — Length about 11-12 mm.; wing 12-13 mm.; antenna about 3.3-3.5 mm.

Female. — Length about 13 mm.; wing 15 mm.

Frontal prolongation of head yellow, vaguely darkened above near the small tubercle-like nasus, setae long, black; palpi with proximal two segments obscure yellow, third segment brownish yellow, fourth obscure orange yellow, its tip narrowly dark brown. Antennae relatively short; scape and pedicel yellow, flagellum black; flagellar segments with relatively small basal enlargements. Head clear yellow on front, with a small darkened central spot between the antennal bases; posterior part of head orange with a linear brown occipital band, narrowed anteriorly and extended to base of vertical tubercle; small brown clouds at margins of eyes opposite the tubercle; vestiture of head black.

Pronotal scutum light brown, scutellum yellow, the anterior border narrowly brown. Mesonotal praescutum light yellow with three opaque medium brown stripes, the median one with a capillary darker central line, lateral stripes straight; scutum with lobes extensively pale brown, more intense near suture, median area yellow with a weak central darkening, the depressed brown triangle at suture conspicuous; scutellum brown, parascutella more brownish yellow; mediotergite yellow, central half vaguely brownish yellow, pleurotergite obscure yellow; mesonotum virtually glabrous. Pleura yellow, patterned with pale brown on anepisternum and ventral sternopleurite, more conspicuously darkened on dorsal pteropleurite and along the interpleural suture, dorsopleural membrane light yellow. Halteres with stem light brown, narrowly obscure orange at base, apex of knob restrictedly light yellow. Legs with coxae and trochanters yellow; femora black, bases broadly yellow, slightly narrower on fore pair, on posterior legs including more than the proximal half, remainder of legs black; claws of male toothed. Wings (Fig. 6) medium brown, conspicuously variegated by clear yellow spots in cells on either side of cord, the apex broadly of the ground color, prearcular and costal fields yellow, stigma pale brown, with numerous trichia; veins pale brown, more yellowed in the brightened fields. Venation: Cell M_1 sessile to very short-petiolate; cell M_4 unusually long, broad at base, slightly constricted beyond midlength; *m-cu* variable in position, from before fork of *M* to beyond the fork, in this case leaving a short M_{3+4} ; cell 2nd *A* narrow.

Abdominal tergites clear yellow basally, segments three to five more obscure yellow to brownish yellow, proximal five sternites yellow; sixth and remaining segments intensely black; basal tergites with three narrow black stripes, the central area beginning on second segment, the laterals reaching base of abdomen. Ovipositor with cerci small and only feebly sclerotized, tips broadly obtuse, hypovalvae very reduced. Male hypopygium (Fig. 15) with the tergite, *t*, transverse, posterior border with four lobes, the lateral pair triangular, their inner margin with about eight



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Text - Figures 14-19. — Fig. 14, *Nephrotoma condylophora* n. sp., male hypopygium; Fig. 15, *Nephrotoma margaritae* n. sp., male hypopygium; Fig. 16, *Nephrotoma melanaspis* n. sp., male hypopygium; Fig. 17, *Nephrotoma dafla* n. sp., male hypopygium; Fig. 18, *Dolichopeza (Nesopeza) creon* n. sp., male hypopygium; Fig. 19, *Dolichopeza (Nesopeza) melanorhipis* n. sp., male hypopygium.

Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosome; *s*, sternite; *t*, tergite.

spinous points, inner pair of lobes broader, separated by a narrow U-shaped emargination, at apex with about six or seven points that are directed chiefly laterad. Outer dististyle, *d*, with basal half dilated, apex

obtuse; inner style distinctive, entirely black, beak long and nearly straight, body of style relatively small, its posterior end strongly produced, with three or four setae, those of anterior part delicate and more numerous. Phallosome, *p*, distinctive, the small triangular aedeagus subtended by two nearly parallel yellow blades, nearly straight, apices slightly incurved; at base of phallosome on either side with a conspicuous lateral arm that appears as a curved rod, basal third enlarged, stem very slender, outer end more dilated, narrowed into a terminal spine. Eighth sternite, 8 *s*, transversely oval, posterior border with a conspicuous semioval darkened lobe with numerous punctures that bear very small delicate setae, those of body of sternite much longer.

Holotype. — ♂, Jhum La, Kameng, North East Frontier Agency, Asaam, 7800 feet, May 13, 1961 (Schmid). *Allotopotype*, ♀, pinned with type. *Paratopotypes*, 3 ♂♂.

This very distinct crane fly is named for my dear wife and constant helpmate, Mabel Marguerite Alexander, for whom many other species of these flies and other insects have been named by myself and other students. A list of crane flies so dedicated is provided.

Tanyderidae: *Protanyderus margarita* Alexander, 1948 (Nearctic: Utah). Tipulidae, Tipulinae: *Phacelodocera margaritae* Alexander, 1948 (Australasian: New Caledonia). *Ctenophora* (*Pselliophora*) *margarita* Alexander, 1965 (Neotropical: Mexico). *Tipula margarita* Alexander, 1918 (Nearctic: New York). Limoniinae: *Limonia* (*Discobola*) *margarita* (Alexander), 1924 (Palaeartic: Japan). *Pedicia* (*Pedicia*) *margarita* Alexander, 1929 (Nearctic: New York). *Hexatoma* (*Eriocera*) *margaritae* Alexander, 1954 (Neotropical: Brazil). *Rhabdomastix* (*Sacandaga*) *margarita* Alexander, 1940 (Nearctic: Tennessee). *Erioptera* (*Psiloconopa*) *margarita* Alexander, 1919 (Nearctic: Colorado). Other students in various orders of insects similarly have expressed their admiration and high regard by using the same specific name, including G. F. Edmunds (with R. K. Allen) in the Ephemeroptera, D. G. Denning in the Trichoptera, J. L. Sperry in the Lepidoptera, and K. M. Fender in the Coleoptera.

This crane fly is quite different from all other known species in its distinctively patterned wings and in the hypopygial structure, especially the inner dististyle and phallosome.

***Nephrotoma melanaspis* n. sp.**

Size medium (wing of male to 12 mm.); mesonotum with praescutum

and scutum virtually covered by a blackened shield that is comprised of three nacreous black praescutal stripes and opaque black interspaces, including the suture, the scutum similarly blackened, the lobes nacreous black; scutellum and a broad central stripe on mediotergite similarly blackened; pleura orange yellow; legs black, femoral bases narrowly yellow, claws simple; wings light brown, prearcular and costal fields more yellowed, *m-cu* beyond fork of M_{3+4} leaving a short vertical section of vein M_4 ; abdomen orange, lateral membrane dark brown, outer three segments brownish black; male hypopygium with the tergal lobes evenly obtuse, with blackened spinoid setae; eighth sternite very large, posterior border very gently emarginate, without major setae.

Male.—Length about 9.5-10 mm.; wing 11-12 mm.; antenna about 2.9-3 mm.

Frontal prolongation of head yellow, the region of the nasus with numerous black setae; palpi brownish black. Antennae with scape yellow, pedicel orange, flagellum brownish black; flagellar segments virtually cylindrical, without developed basal enlargements, longer than their verticils. Head with front whitish yellow, vertical tubercle clearer yellow; remainder of head orange with a vague darkening along posterior orbits; no clearly indicated occipital brand.

Pronotum orange yellow, with a microscopic darkened central spot at anterior margin of scutum. Mesonotal praescutum with disk covered by three polished nacreous black stripes and scarcely differentiated very narrow dull black interspaces to form a broad shield, cephalic border and a semicircular area opposite anterior end of lateral area more velvety black; scutum similarly almost uniformly black, confluent with the praescutal area across the darkened suture, the lobes polished nacreous black, the median area and lateral borders more velvety black but the whole area virtually appearing concolorous; scutellum black, parascutella and broad scutal callosities orange yellow; postnotum similarly orange with a broad central velvety black line on mediotergite, virtually as broad as the mark on scutellum, not quite attaining the posterior border; notum unusually glabrous, with a few short setae on scutellum and longer white ones on mediotergite. Pleura uniformly orange yellow. Halteres with stem brownish yellow, clearer yellow at base, knob pale brown with orange apex. Legs with coxae and trochanters orange; remainder of legs black, bases of femora narrowly yellowed; claws of male long, simple. Wings (Fig. 7) strongly tinged with light brown in type, paler in paratype, presumably due to a teneral condition; stigma oval, darker brown, provided with trichia; prearcular and costal fields clearer yellow; veins light brown, slightly more yellowed in the brightened parts. Venation: Cell M_1 narrowly sessile; *m-cu* beyond fork of M_{3+4} , leaving a short vertical section of M_4 ; cell 2nd *A* relatively narrow.

Abdomen orange, the lateral membrane and narrow adjacent borders of the sclerites dark brown; outer three segments brownish black, the hypopygial styli pale. Male hypopygium (Fig. 16) with the tergitae, *t*,

transverse, narrowed outwardly, posterior part with two low rounded lobes that are separated by a comparatively shallow emargination, the lobes unmodified in any manner, densely provided with relatively long black spinoid setae. Outer dististyle, *d*, narrow, the length about five and one-half times the greatest diameter; inner style with beak stout, lower beak not developed; summit of posterior crest produced into a small pale lobe, region of outer basal lobe modified into a low irregular ridge with a yellow curved point and several setae. Phallosome, *p*, lyriform, including small suboval gonapophyses that subtend the broad aedeagus. Eighth sternite, 8 *s*, very large, its area nearly three times that of the tergite, posterior border very gently emarginate, thickened, without a concentration of major setae.

Holotype. — ♂, Jhum La, Kameng, North East Frontier Agency, Assam, 7800 feet, June 2, 1961 (Schmid). *Paratype*, ♂, Talung Dzong, Kameng, 7000 feet, June 3, 1961 (Schmid).

This small species of *Nephrotoma* is told readily by the coloration of the thorax, especially the conspicuously blackened shield on the mesonotum. Other distinctive features include the venation of the medial field, with *m-cu* placed far distad on vein *M*₄, and the hypopygial structure, especially the evenly rounded lobes of the ninth tergite with no indication of accessory lobules as are common in the genus. The resemblance to species of *Tipula* in the subgenus *Schummelia* is noteworthy, involving not only the essentials of venation but likewise the hypopygial structure.

Dolichopeza (Nesopeza) creon n. sp.

General coloration of thorax light brown; antennae of male relatively long, approximately one-half the body; legs brown, tip of basitarsus and remaining tarsal segments white; wings strongly infuscated, stigma darker brown; male hypopygium with tergal lobes smooth, without spicules.

Male. — Length about 7.5-8 mm.; wing 7-8.5 mm.; antenna about 2.8-4 mm.

Frontal prolongation of head short, obscure brownish yellow, with long black setae; mouthparts, including palpi, black. Antennae of holotype male relatively long, approximately one-half the body, much shorter in paratype, as shown by measurements; scape and pedicel obscure yellow, flagellum brownish black; flagellar segments long-cylindrical, verticils about one-half the segments, remainder of surface with dense short setae. Front yellowed; vertex light brown.

Thorax almost uniformly light brown, the praescutal stripes scarcely differentiated, scutellum darker brown; very sparse short setae on praescutum, longer on mediotergite. Halteres elongate, brownish white, knob long, darker brown, stem with conspicuous coarse setae. Legs with fore

coxae brown, middle and posterior pairs, with the trochanters, more yellowed; femora, tibiae and most of basitarsi brown, tip of latter and remainder of tarsi white. Wings (Fig. 8) strongly infuscated, the oval stigma still darker brown; veins brown, coarse. Venation: Medial forks relatively shallow, cell M_1 about twice its petiole; *m-cu* more than one-half its own length before fork of *M*; cell *2nd A* narrow.

Abdomen very vaguely bicolored, bases of segments brown, the outer half darker brown. Male hypopygium (Fig. 18) with tergite, *t*, blackened, posterior border trilobed, all lobes smooth, without spicules, central lobe broad, tip obtuse. Outer dististyle, *d*, about four times as long as broad; inner style with beak long but relatively broad, tip obtuse. Region of basistyle, *b*, and base of tergal plate with abundant long yellow setae. Ninth sternite unmodified.

Holotype. — ♂, Bombi La, Kameng, North East Frontier Agency, Assam, 8800 feet, June 17, 1961 (Schmid). *Paratopotype*, ♂, June 19, 1961.

In its general coloration, including the wings, and in the venation, the present fly is most similar to *Dolichozepe* (*Nesopeza*) *orchestes* Alexander, of Sikkim, distinguished primarily by the quite different male hypopygium.

Dolichozepe (*Nesopeza*) *melanorhipis* n. sp.

Size medium (wing of male 10 mm.); mesonotum obscure orange, praescutum with a more yellowed central stripe; tips of tibiae whitened, basitarsi slightly darkened, the tips and remaining tarsi white; wings strongly infuscated; male hypopygium with ninth sternite on either side bearing a conspicuous fan-shaped group of modified blackened setae.

Male. — Length about 10 mm.; wing 10 mm.; antenna about 4 mm.

Frontal prolongation of head small, pale brown, setae long and conspicuous; palpi brown. Antennae slightly less than one-half the wing; scape and pedicel yellow, flagellum black, base of first segment slightly paler; flagellar segments cylindrical, much longer than their verticils. Head brownish fulvous, front and orbits pale yellow.

Pronotum brownish orange. Mesonotum obscure orange, praescutum with a somewhat more yellowed central stripe that is divided at midline by a capillary darker vitta. Pleura orange yellow, clearer yellow ventrally. Halteres elongate, stem yellowed, knob brownish black. Legs with coxae and trochanters yellow; femora brownish yellow, darker at tips; tibiae brown, apices whitened, narrowest on midlegs; basitarsi weakly more darkened, tips and remainder of tarsi white. Wings (Fig. 9) strongly infuscated, the stigma still darker; veins brown. Venation: *R*₅ about one-third longer than *R*₂₊₃; free tip of *Sc*₂ and *R*₁₊₂ pale but evident; outer medial forks of moderate length, cell M_1 about one-half longer than its petiole; *m-cu* longer than outer section of *M*; cell *2nd A* narrow.

Abdominal segments dark reddish brown, their posterior borders darker, outer segments brownish black, ninth sternite more yellowed. Male hypopygium (Fig. 19) with the tergite, *t*, small, including a pair of blackened rods, the intervening space broadly U-shaped, at the midline with a very small blackened shield that is produced into an acute point (see subfigure); cephalad of the arms with a pair of cylindrical lobes that are directed dorsad (as shown in upper diagram), on microscope slide appearing appressed and directed cephalad, its inner margin with abundant microscopic setae from conspicuous punctures. Ninth sternite, 9 *s*, distinctive, large, on either side with an extensive fan-shaped group of stout flattened setae, black, about 25 in number on either side, curved gently outwardly, more mesally on sternite with a separate group of five or six fused short reddish spines with obtuse tips, forming a compact mass. Outer dististyle, *d*, short, the length about five times the breadth, apex obliquely truncated, on margin before midlength more dilated into a low tubercle that bears dense black setulae and fewer setae; inner style as figured, the slender blackened beak upcurved, separated from the low obtuse lower beak by a narrow emargination, dorsal crest paler, obtusely rounded. Gonapophyses, *g*, appearing as a pair of stout sclerotized structures that slightly protrude from the genital chamber, their apices very obtuse. Eighth sternite, 8 *s*, transverse, posterior border nearly truncate, setae relatively sparse, scattered.

Holotype. — ♂, Talung Dzong, Kameng, North East Frontier Agency, Assam, 7000 feet, June 3, 1961 (Schmid).

Dolichopeza (Nesopeza) melanorhipis is entirely different from other regional members of the subgenus in the hypopygial structure, the most conspicuous single feature being the striking black fans on the ninth sternite which suggested the specific name.

Dolichopeza (Nesopeza) polysara n. sp.

Belongs to the *volupta* group; mesonotal praescutum pale brown with four more yellowed stripes, pleura obscure yellow; antenna about one-half the length of wing; tibia light brown, tip whitened, basitarsi dirty white, the tips and remainder of tarsi snowy white; wings whitish hyaline, stigma brown, conspicuous; intermediate abdominal tergites bicolored, sub-terminal segments blackened to form a ring; male hypopygium with beak of inner dististyle strongly elevated, gradually narrowed outwardly; ninth sternite on either side with three lobes that bear conspicuous setal fringes.

Male. — Length about 10 mm.; wing 9.2 mm.; antenna about 5 mm.

Frontal prolongation of head short, testaceous yellow; palpi light brown. Antennae of male long, about one-half the wing; scape and pedicel yellow, flagellum black; flagellar segments long-cylindrical, progressively shorter outwardly, verticils much shorter than the segments. Head above cinnamon brown, the front and genae more yellowed.

Pronotum yellowed. Mesonotal praescutum with the ground pale

brown, with four more yellowed stripes, the intermediate pair on anterior half separated by a capillary darker brown vitta; posterior sclerites of notum orange yellow; notal vestiture sparse and scattered, yellow. Pleura obscure yellow, ventral parts of posterior sclerites paler yellow. Halteres with stem yellow, knob brownish black. Legs with coxae and trochanters light yellow; femora light brown, bases more yellowed, tips very vaguely more darkened; tibiae light brown, extreme bases paler, tips whitened; basitarsi dirty white, the apices and remainder of tarsi snowy white. Wings (Fig. 10) whitish hyaline, the outer cells vaguely more darkened outwardly; stigma brown, conspicuous; veins dark brown. Venation: Medial forks moderately deep, cell M_1 only a little longer than its petiole; *m-cu* nearly its own length before fork of *M*.

Abdomen with first tergite brownish yellow, succeeding segments bicolorated, their bases obscure yellow, apices broadly brown, on the intermediate segments involving about the outer half, subterminal segments black to form a ring, hypopygium yellow. Male hypopygium (Fig. 25) with the posterior border of tergite, *t*, laterally produced into blackened plates, the outer angle of each farther produced into a slender spine; median region of tergite extended into two long-oval darkened blades. Ninth sternite, 9 *s*, complicated by lobes and three distinct groups of setae on either side; dorsal lobe suboval, with abundant but relatively short setae, ventral lobe much larger, elongate, its lower part with a concentration of yellow setae, the more apical ones longest; between the two lobes a narrow flange with a darkened border that bears a compact fringe of unusually long setae throughout its length, the outer end of each seta bent strongly ventrad. Basistyle at apex adjoining the tergite with a stout blackened point. Outer dististyle, *d*, relatively narrow, the diameter only about one-seventh the length, basal third twisted; inner style with beak blackened, long and slender, strongly elevated, gradually narrowed outwardly, tip obtuse; lower beak blackened, short and stout, subquadrate in outline, on its face with a group of long setae; dorsal crest unusually large and erect, subequal in length to the base of style, with relatively sparse vestiture. Eighth sternite unmodified.

Holotype. — ♂, Moshing, Kameng, North East Frontier Agency, Assam, 7800 feet, June 7, 1961 (Schmid).

Dolichopeza (Nesopeza) polysara is a member of a group of Oriental species that center about *D. (N.) volupta* Alexander, including also *D. (N.) capitella* Alexander, *D. (N.) pedicillata* Alexander, *D. (N.) rahula* Alexander, and *D. (N.) thiasophila* Alexander, all of Assam and Sikkim, all most readily distinguished among themselves by hypopygial characters. The present fly has the beak of the inner dististyle unusually erect and very slender, narrowed very gradually outwardly to the obtuse tip.

Dolichopeza (Nesopeza) vyasa n. sp.

Size medium (wing of male 7.5 mm.); general coloration of thorax brownish gray, variegated with yellow, especially on pleura; antennae of male long, exceeding one-half the wing; femora yellow, tips narrowly dark brown, tibiae and tarsi yellow; wings weakly infuscated, tip narrowly darkened; abdomen long, dark brown, intermediate segments with a conspicuous obscure yellow ring at near midlength, outer segments darkened, hypopygium yellow; male hypopygium of simple construction, posterior border of tergite trilobed, lateral lobes with short spinoid setae; inner style with a basal setiferous lobe that terminates in a single blackened spinoid seta.

Male. — Length about 11.3-11.5 mm.; wing 7.5-8 mm.; antenna about 4 mm.

Frontal prolongation of head brown, proximal segments of palpus obscure yellow, terminal segment elongate, darker. Antenna of male long, exceeding one-half the wing; basal segments yellow, flagellum brown; flagellar segments elongate, each with a single small verticil at near three-fourths the length and with abundant short pale setae throughout the length. Head brown.

Pronotum dark grayish brown. Mesonotum chiefly dark brownish gray, praescutum light gray with three dark brown stripes, the central one broad anteriorly, strongly narrowed behind; scutum brownish gray, each lobe with a single brown area, lateral borders yellowed. Pleura chiefly dark gray, vaguely patterned with brownish yellow on dorsal sternopleurite, posterior sclerites, including the pteropleurite, meron, metapleura and pleurotergite yellowed; dorsopleural membrane light yellow. Halteres dark brown, base of stem abruptly light yellow. Legs with coxae dark brown, sparsely pruinose; trochanters yellow; femora light yellow, tips narrowly and abruptly dark brown; tibiae brownish yellow, tarsi pale yellow. Wings (Fig. 11) weakly infuscated, costal border more brownish yellow; wing tip from cell R_2 to M_4 narrowly more darkened; stigma dark brown, conspicuous, the enclosed veins pale, remaining veins brown. Venation: Free tip of Sc_2 somewhat shorter than R_2 ; medial forks shallow, cell M_1 only a little longer than its petiole, *m-cu* about one-third its length before fork of M .

Intermediate abdominal segments dark brown, each with a narrow but conspicuous obscure yellow ring at near midlength, outer segments more uniformly brown; hypopygium yellow. Male hypopygium (Fig. 26) simple in structure; posterior border of tergite, *t*, produced into three blackened lobes, the lateral pair short and broad, with relatively sparse short conical spinoid setae; central lobe long, relatively narrow, tip membranous. Ninth sternite unmodified. Basistyle, *b*, with unusually small setae, with no concentration of longer setae in the region of sternite as in some other species. Other dististyle, *d*, relatively long and narrow, the length about seven times the diameter; inner style with beak prolonged, lower beak very obtuse, at its base with a lobe that is provided with long yellow setae, the terminal one stout and blackened.

Holotype. — ♂, Nafra, Kameng, North East Frontier Agency, Assam, 4000 feet, June 24, 1961 (Schmid), *Paratopotype*, ♂, June 26, 1961.

Dolichopeza (Nesopeza) vyasa is most similar to species such as *D. (N.) ballator* Alexander and *D. (N.) neoballator* Alexander, differing in details of coloration and in hypopygial structure. *D. (N.) noctipennis* Alexander likewise is somewhat alike but differs evidently in the presence of macrotrichia in the outer wing cells.

Tipula (Brithura) imperfecta Brunetti

Tipula imperfecta Brunetti, Rec. Indian Mus. 9:260-261, 1913.

Brithura conifrons Edwards, Ann. Mag. Nat. Hist. (8) 18:263-264, Fig. 10 (♂ hypopygium), Fig. 11 (venation), 1916.

Tipula imperfecta Edwards, Rec. Indian Mus. 26:306, 1924; synonymizes *conifrons* with *imperfecta* following comparison of types.

This species is of particular importance in being the type of the subgenus *Brithura* Edwards. The unique type of *imperfecta* is a female from the Darjiling district, India, altitude 1000 to 3000 feet, taken in April 1912. In this specimen the *r-m* crossvein is lost through vein R_{4+5} reaching vein M_{1+2} behind. The type of *conifrons* is a male, taken on Arisan, Formosa, altitude 8000 feet, in October 1912 by Nitobe.

The writer has reported the species from western China while the records given below further bridge the distribution of the original two species listed above.

Assam: Rahung, Kameng, North East Frontier Agency, 7000 feet, July 17, 1961 (Schmid), ♂. Dirang Dzong, Kameng, 5300 feet, July 18, 1961 (Schmid).

The darkened subterminal ring occurs on the fore and middle legs only, the posterior femora being unicolorous or virtually so. The wing venation is shown (Fig. 20). The major light yellow mark in outer half of cell *M* and posteriorly into cell *Cu* suggests the united figures 8 and 0, as indicated by Edwards. The darker yellow prearcular region includes the axillary border of cell 2nd *A*.

Male hypopygium (Fig. 27) with the median area of posterior border of tergite, *t*, produced. Apex of basistyle, *b*, with a brush of long yellow setae. What would appear to represent the outer dististyle, *d*, is much larger than the inner style, the beak long-produced, as is shown by Edwards (in reference cited), near its base with an area comprised of numerous microscopic black spicules; outer margin with an erect slender rod,

its tip slightly enlarged. Posterior border of eighth sternite, 8 *s*, gently convex, with an uninterrupted brush of long golden yellow setae; seventh sternite with nearly the same contour, the setae black.

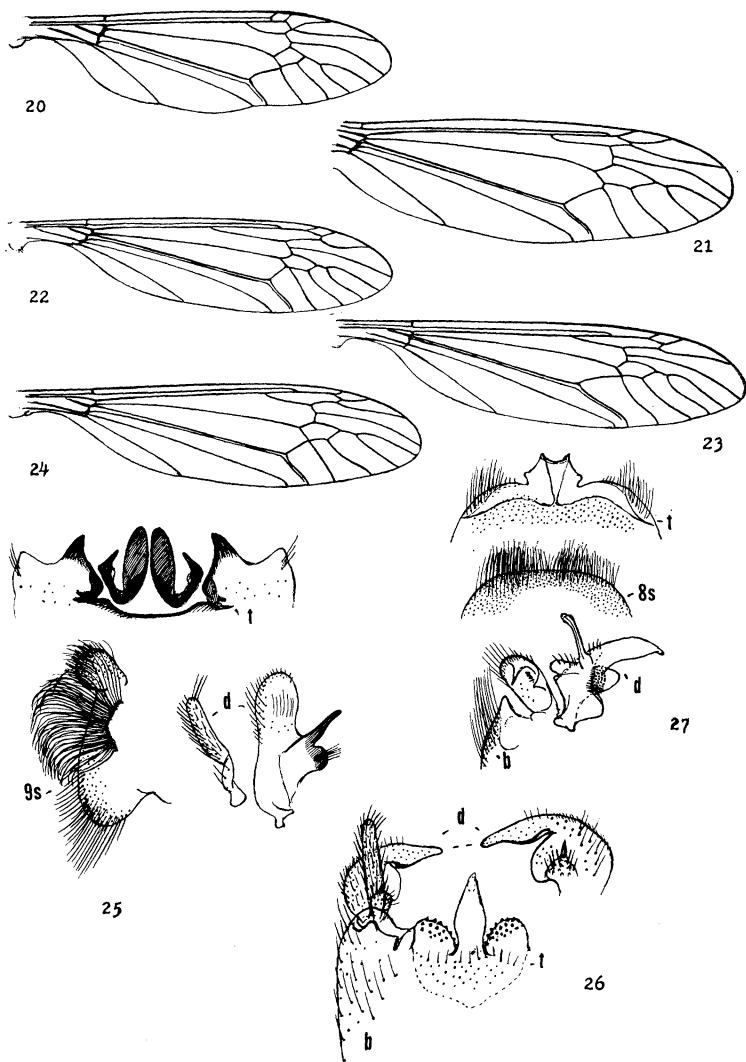
Tipula (Sinotipula) rondaniana n. sp.

Allied and generally similar to *hobsoni*; male hypopygium with posterior border of ninth tergite produced into two slender widely separated points, the intervening emargination with a smaller secondary notch; outer dististyle with apical lobes unequal, one very long and slender; basal plate extended into a short point; face of style with a small sclerotized plate that is extended into a spine.

Male. — Length about 25 mm.; wing 25 mm.; antenna about 6 mm.

Frontal prolongation of head orange, elongate, subequal to the remainder, nasus present; palpi with first and last segments brown, the intermediate pair obscure yellow. Antennae with the elongate scape light brown, remainder of organ orange yellow excepting the blackened terminal segment; flagellar segments with basal enlargements very slightly developed, shorter than their verticils. Head with the conspicuous vertical tubercle brown, slightly darker than the remainder of posterior vertex, the sides of the latter light gray pruinose; median region of tubercle relatively narrow, separated from the lower lateral parts by a suture; genae with long conspicuous black setae, those of vertex very small and sparse.

Pronotum brown, the sides abruptly light yellow, scutum elevated. Mesonotal praescutum, scutum and scutellum rich cinnamon brown, the praescutal stripes and centers of scutal lobes slightly more yellowed; mediotergite paler brown, the posterior third and the pleurotergite yellowed, the disk of the former gray pruinose; vestiture of praescutum and scutum short and sparse, of the scutellum and mediotergite long and delicate. Pleura orange, dorsal sternopleurite more pruinose; dorsopleural membrane conspicuously orange yellow. Halteres pale yellow. Legs with coxae orange; trochanters light brown; femora obscure brownish yellow, tibiae and tarsi clearer yellow, outer tarsal segments darkened; claws of male only slightly curved, with an appressed basal tooth. Wings (Fig. 21) strongly fulvous, very weakly patterned with pale brown and yellow, the former appearing as a broad seam over bases of the medial cells, narrower over *m-cu*, and as conspicuous clouds in cells *M* and *Cu* at near midlength, the latter area smaller; further brown areas at origin of *Rs* and at ends of R_{4+5} and all outer medial branches, the latter being separated by clear yellow marginal spots in the cells; other yellow areas on either side of origin of *Rs*, as a subbasal band across outer radial cells, near outer end of cell *M* adjoining vein *Cu*, and in cells *Cu* and *1st A* basad of the darkening in the former cell; whitened obliterative areas before stigma and across vein M_{1+2} in cells *R* and *1st M*₂; veins yellowed, scarcely more darkened in the infuscated areas. Venation: *Sc* long, the fused Sc_2 and R_1 very short, less than the free tip of Sc_2 ; *m* oblique, outer



Text - Figures 20-27. — Fig. 20, *Tipula (Brithura) imperfecta* Brunetti, venation; Fig. 21, *Tipula (Sinotipula) rondaniana* n. sp., venation; Fig. 22, *Tipula (Emodotipula) goetghebuerana* n. sp., venation; Fig. 23, *Tipula (Schummelia) halidayana* n. sp., venation; Fig. 24, *Tipula (Acutipula) triscopula*, n. sp., venation; Fig. 25, *Dolichozepe (Nesopeza) polysara* n. sp., male hypopygium; Fig. 26, *Dolichozepe (Nesopeza) vyasa* n. sp., male hypopygium; Fig. 27, *Tipula (Brithura) imperfecta* Brunetti, male hypopygium.

Symbols: *b*, basistyle; *d*, dististyle; *s*, sternite; *t*, tergite.

end of cell $1st\ M_2$ pointed; petiole of cell M_1 about one-third m ; $m-cu$ beyond origin of M_4 , basal section of the latter perpendicular.

Abdomen, including the large subglobular hypopygium, orange. Male hypopygium (Fig. 28) with the tergite, t , transverse, the posterior border convex, farther produced into two slender sclerotized points, their tips obtuse, separated from one another by a distance of approximately eight times their diameter at midlength; median emargination broad and shallow, with a smaller U-shaped notch, the lateral ends of the latter very slightly produced; margin of tergite beneath more thickened, at midregion of ventral surface produced into a narrow transverse sclerotized plate, the lateral angle extended into a slender spine, the intervening emargination very shallow, microscopically roughened. Ninth sternite, $9\ s$, with a pair of large darkened lobes that are densely clothed with long appressed setae and microscopic setulae. Region of basistyle, b , with long yellow setae. Outer dististyle, d , large, shaped as figured, the distal end with a broader triangular setuliferous lobe and a long slender rod; base of style with a broad flattened plate, its outer end terminating in a short point; face of style with a small sclerotized plate that is extended into a spine (shown in subfigure); inner style long and narrow, with a longitudinal row of black setae, apex with a strong recurved spine. Eighth sternite very extensive, posterior border convex, simple, with abundant yellow setae of moderate length.

In *hobsoni* (Fig. 29) the tergal lobes, t , are much broader, tips subtruncate, separated from one another by a distance about equal to three times their diameter; median emargination U-shaped, without a secondary notch; ventral spines slender; no accessory plate on face of style. Lobes of ninth sternite smaller. Dististyles, d , as figured; outer style with two slender rods, the basal plate extended into two shorter acute points.

Holotype. — ♂, Bomdi La, Kameng, North East Frontier Agency, Assam, 8800 feet, July 15, 1961 (Schmid).

The species is dedicated to Camillo Rondani (1808-1879), distinguished Italian student of the Diptera and some other groups of insects. The Tipulidae were included in his *Dipterologiae Italicae prodromus* 1 (1856): 179-188.

Although it is generally similar to *Tipula* (*Sinotipula*) *hobsoni* Edwards, the present fly is quite distinct in hypopygial structure, especially the tergite and outer dististyle, as described and figured. The former species was described from Tibet and is known also from Sikkim where it occurs at high altitudes in the *Rhododendron* associations.

Tipula (*Sinotipula*) *wardi* Edwards

Tipula wardi Edwards, Ann. Mag. Nat. Hist. (10) 1:686-687, 1928.

The type was from Doshong La, Tsangpo Valley, in southeastern Tibet, altitude 10,500 feet, collected by the botanist and plant hunter, F. Kingdon Ward, on June 26, 1924.

This conspicuous and attractive fly now is known to be widely distributed in the higher Himalayas. The records below provide an indication of its range as presently known.

KUMAON. — Ukhal, Pauri Garhwal, 9500 feet, May 16, 1958 (Schmid).

NEPAL. — Near Pangpoche, about 3900 meters, May 29-June 5, 1961

(Heinz Janetschek); Deutschen Forschungsunternehmens

Nepal — Himalaya 1961.

SIKKIM. — Bakkim, 6890 feet, April 12, 1959 (Schmid).

Chachu, in *Rhododendron* association, 9500-9950 feet, May 17-21, 1959 (Schmid).

Chunjom, 6800 feet, April 23, 1959 (Schmid).

Churong, in *Rhododendron* association, 12,460 feet, April 18, 1959 (Schmid).

Donkung, 15,750 feet, June 22, 1959 (Schmid).

Gey, in *Rhododendron* association, 12,000-13,200 feet, May 19-20, 1959 (Schmid).

Kalep, 12,100 feet, June 18, 1959 (Schmid).

Lachen, 8900 feet, June 13, 1959 (Schmid).

Tangshing, in *Rhododendron* association, 12,200 feet, April 17, 1959 (Schmid).

Tikipchu, in *Rhododendron* association, 13,800 feet, April 19, 1959 (Schmid).

Yedang, in *Rhododendron* association, 10,600 feet, May 25, 1959 (Schmid).

NORTHEAST

BURMA. — Adung Valley, 12,000 feet, July 1, 1931 (Kingdon Ward and Lord Cranbrook); metatype in Alexander Collection through exchange with Edwards.

Tipula (*Emodotipula*) *goetghebuerana* n. sp.

General coloration of praescutum yellow with four brownish gray

stripes that are narrowly bordered by brown; femora darkened outwardly, tips black, preceded by a more extensive clearer yellow ring; wings pale yellow, disk marbled with pale brown; male hypopygium unusually small; outer dististyle a very stout club, its apex with very few blackened spinoid setae, inner style smaller, extended into a blackened beak, outer margin of style with a pencil of long black setae; eighth sternite unmodified, posterior border with numerous long yellow setae, without lateral lobes.

Male.—Length about 16-17 mm.; wing 19-20 mm.; antenna about 4-4.4 mm.

Frontal prolongation of head yellow with a narrow lateral dark brown line, nasus slightly darker, tufted with longer yellow setae; palpi obscure yellow. Antennae relatively short; scape and pedicel clear light yellow, proximal two flagellar segments slightly duller yellow, remaining segments brown, with very long verticils, the basal enlargements small. Head yellow, the low rounded vertical tubercle paler yellow; vertex with a narrow brownish black central stripe extending from behind the tubercle to the occiput, sides of genae paler brown.

Pronotum yellow, with a central pale brown area. Mesonotal praescutum yellow with four brownish gray stripes that are narrowly and incompletely bordered by brown, including the inner margin of lateral stripes and outer border of intermediate stripes; scutum yellow, each lobe with a single extensive brownish gray area, the cephalic part margined by brown; posterior sclerites of notum yellow with a conspicuous brownish black central stripe extending from posterior part of scutum to abdomen; mesonotal vestiture very long and conspicuous, pale yellow. Pleura yellow, vaguely patterned with pale brown on anepisternum; sternopleurite with long pale setae. Halteres with stem yellow, knob broken. Legs with coxae and trochanters light yellow; femora yellow basally, outer half weakly darkened, tips conspicuously black, preceded by a more extensive clearer yellow ring; tibiae and tarsi brown; claws simple. Wings (Fig. 22) with the ground pale yellow, the prearcular and costal fields brighter yellow; disk with an extensive pale brown pattern that is more extensive than the ground, the latter areas almost entirely before the cord, including the broad bases of cells *R* and *M* with the exception of a restricted darkening at arculus; a conspicuous pale area at cord, centering in cell *1st M*₂; veins brown, more brownish yellow in the costal field. The paratype has the darkened wing pattern more conspicuous. Anterior branches of *Rs* glabrous, distal section of *R*₄₊₅ with numerous trichia except on the proximal sixth; further numerous trichia on most of veins *M*₁ and *M*₂; a sparse series on outer third of vein *2nd A*. Venation: *Rs* long; petiole of cell *M*₁ shorter than *m*; *m-cu* shortly before fork of *M*₃₊₄; inner end of cell *1st M*₂ pointed.

Abdomen yellow, tergites with a conspicuous central brown stripe on proximal four segments, remainder of abdomen uniformly brownish black. Male hypopygium (Fig. 30) unusually small and unmodified; in the diagram that shows the lateral aspect, the protruding pale compressed-flat-

tened blade from the region of the ninth sternite evidently represents the base of the aedeagus. Ninth tergite, *t*, with the more ventral lateral armature terminating in an oval head set with abundant short blackened pegs, the central more dorsal arm transversely shield-shaped, its posterior border with low lateral lobes and a less protuberant median area, all three provided with slightly longer and more pointed blackened pegs; sides of tergite with very long setae. Basistyle, *b*, unusually glabrous except at outer end. Outer dististyle, *d*, a very stout club, its inner apical margin with sparse blackened spinoid setae, outer margin with microscopic retrorse setulae, diameter across apex of club almost equal to the length; inner style smaller, extended into a blackened beak, tip obtuse, outer margin at base with a few black setae; base of style on outer surface with a compact brush or pencil of long black setae. Phallosome, *p*, expanded, shield-shaped, as figured, the aedeagus slender. Eighth sternite, 8 *s*, unmodified, posterior border nearly truncate, without lateral lobes, fringed with numerous long yellow setae.

Holotype. — ♂, Shergaon, Kameng, North East Frontier Agency, Assam, 6400 feet, May 9, 1961 (Schmid). *Paratype*, ♂, Bomdi La, Kameng, 8800 feet, June 16, 1961 (Schmid).

The species is named for M. Goetghebuer, co-author with André L. Tonnoir of the *Catalogue of the Tipulidae of Belgium* (1919-1921: addition, 1924).

Other regional members of the subgenus, including especially *Tipula* (*Emodotipula*) *hemmingseni* Alexander, *T. (E.) marmoratipennis* Brunetti, and *T. (E.) hintoniana* Alexander, have the hypopygial structure very different.

Tipula (*Schummelia*) *halidayana* n. sp.

Size large (wing of female 19 mm.); head light yellow, vertex with a narrow brownish black central vitta; antennal flagellum bicolored; mesonotal praescutum with disk dark brown, lateral borders clear yellow, pleura brown with a restricted yellow pattern; knobs of halteres clear yellow; femora with outer ends blackened, the extreme apex white, tibiae and tarsi black; wings strongly darkened, restrictedly patterned with paler; stigma long, dark brown, *Rs* relatively long, exceeding R_{2+3} , *m-cu* very long, oblique; abdominal tergites dark brown, their bases whitened.

Female. — Length about 18 mm.; wing 19 mm.; antenna about 3.5 mm.

Frontal prolongation of head relatively long, somewhat shorter than the remainder, light yellow above, including the small nasus, sides weakly more darkened; palpi light brown, terminal segment black. Antennae with scape and pedicel clear light yellow, first flagellar segment brownish black, the outer fourth brownish yellow, succeeding segments conspicuously bicolored, bases black, remainder yellow, only the terminal segment uni-

formly black; flagellar segments (in female) slightly longer than their verticils. Head clear light yellow, with a short capillary brownish black central line on the small compressed vertical tubercle.

Pronotum light yellow above, sides light brown. Mesonotal praescutum with disk virtually covered by four confluent dark brown stripes, separated only near the suture; humeral and lateral borders abruptly clear light yellow; posterior sclerites of notum paler brown, parascutella and pleurotergite more yellowed. Pleura with the restricted ground yellow, extensively patterned with light brown on propleura, anepisternum, sternopleurite and pteropleurite, with a small darker brown spot on dorsopleural membrane adjoining the anepisternum. Halteres with stem brownish black, whitened at base, knob clear light yellow. Legs with fore coxae brown, mid-coxae yellow, base slightly darkened, posterior coxae and all trochanters yellowed; femora brown, bases yellowed, blackened toward outer ends, the extreme apex and the base of tibia white; remainder of tibiae and the tarsi black. Wings (Fig. 23) with the ground strongly darkened, restrictedly variegated by pale areas; cells *C* and *Sc* more yellowed, especially the latter; cell *R* uniformly darkened except for a small whitened spot at origin of *Rs* and a section of the whitened obliterative band before cord; cell *M* with a whitened area near base that is continued backward into cell *1st A* and a larger mark near outer end; a white marginal area in cell *1st A* at end of vein *2nd A*, the latter conspicuously bordered by brown; beyond the cord the pale areas more restricted, including the bases of cells *R*₂, *M*₁ and *2nd M*₂; arculus narrowly but conspicuously whitened; obliterative band whitened, extending from *C* into base of cell *M*₃; stigma elongate, dark brown, subequal in length to *Rs*; veins brown, yellowed in the brightened areas. Venation: *Rs* relatively long, exceeding *R*₂₊₃; *m-cu* very long, oblique in position, cell *M*₄ at base extensive.

Abdominal tergites dark brown, bases narrowly more whitened; sternites obscure brownish yellow, their basal rings clearer yellow, lateral margin with a weak darkened line; genitalia fulvous. Ovipositor with cerci very slender, straight.

Holotype. — ♀, Talung Dzong, Kameng, North East Frontier Agency, Assam, 7000 feet, March 26, 1961 (Schmid).

The species is named for Alexander Henry Haliday (1807-1870), critical student of the British Diptera, including the Tipulidae. For an account of Haliday's life, with portrait, Osten Sacken's *Record of my life work in Entomology* (Cambridge, Massachusetts, 1903) may be consulted.

Among the numerous regional members of the subgenus the present fly is most similar in general appearance to the smaller *Tipula* (*Schummelia*) *ishidana* Alexander (wing of female 15 mm.) and to the larger *T. (S.) nobilior* Alexander (wing of fe-

male 22 mm.), the latter being the largest known member of the subgenus. Both of these species differ evidently in the coloration of the body, legs and wings, and in the venation. The very long oblique vein *m-cu*, elongate stigma, and bicolourous antennae of the present fly are to be noted.

Subgenus INDRATIPULA Sg. novum

Frontal prolongation of head with nasus; vertex flattened above, without a developed tubercle; anterior vertex broad, subequal to the visible diameter of the eye as seen from above (in *needhamana*) to about one-half more extensive in *comstockana*. Tibial spur-formula 1 - 1 - 2. Wings with naked squama. Male hypopygium (Fig. 31) with posterior border of tergite, *t*, blackened, produced into powerful inwardly directed lateral lobes, median region slightly produced. Outer dististyle, *d*, distinctive, appearing as a foot-shaped structure, the anterior part produced into a pointed club, in *needhamana*, or extended into a long spine; inner style a massive simple plate, without a developed lower beak or outer basal lobe. Phallosome, *p*, unusually simple in organization, including the slender straight aedeagus and small basal membranous apophyses.

Type of subgenus. — *Tipula (Indratipula) needhamana* Alexander. Indohimalayan.

Tipula (Indratipula) comstockana n. sp likewise belongs here. When describing *needhamana* (Asia series, Part 61, Philippine Journal of Science, Vol. 95:381-383, 1968) I had referred it to the subgenus *Indotipula* Edwards with considerable question. The somewhat remarkable outer dististyle is quite different from the condition found either in *Indotipula* or *Schummelia* Edwards which appear to be the most nearly allied subgeneric groups.

Tipula (Indratipula) comstockana n. sp.

Allied to *needhamana*; general coloration of thorax dull orange, praescutum with four entire brownish black stripes; antennae long, only slightly less than one-half the wing; wings strongly fulvous, variegated by yellowed areas, *m-cu* long and oblique; proximal four abdominal segments orange yellow, restrictedly patterned with black, outer segments black; male hypopygium with the outer dististyle foot-shaped, its outer end produced into a long spine.

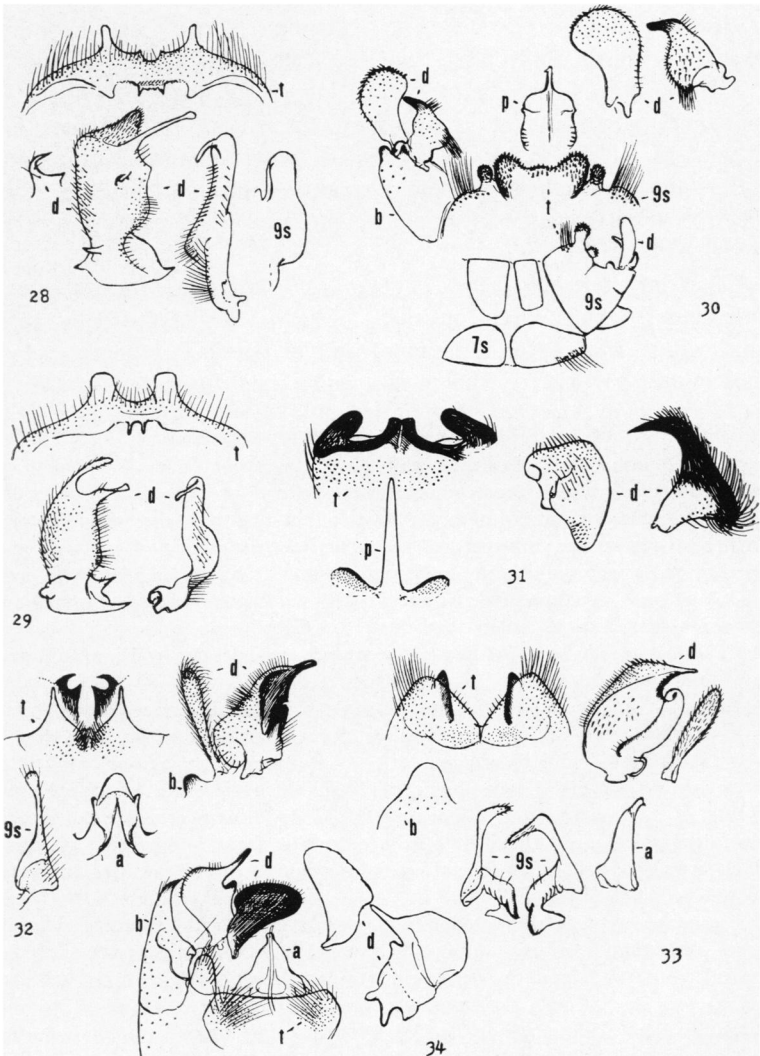
Male. — Length about 17 mm.; wing 20 mm.; antenna about 9.5 mm.

Frontal prolongation of head dull yellow, nasus short; palpi light brown. Antennae very long, only a little less than the wing; scape and pedicel yellow, first flagellar segment brownish yellow, darkened outwardly, tip black, remainder of organ black; flagellar segments elongate, basal en-

largements very small, verticils short, about one-third to one-fourth the segment. Head dull brownish orange, yellow pollinose, with indications of a pale brown central stripe on vertex.

Pronotum brown medially, sides broadly dull orange. Mesonotal prae-scutum orange with four entire opaque brownish black stripes, the lateral pair straight; posterior sclerites of notum dull orange, each scutal lobe with two nearly confluent brownish black areas, with a further brown spot on lateral part above the wing root. Mesonotum with setae very small and inconspicuous, light yellow, most evident on scutum. Pleura almost uniformly dull orange, the ventral sternopleurite and meron more reddened; dorsopleural membrane obscure yellow. Halteres obscure yellow. Legs with coxae and trochanters yellow; femora light brown, tips rather narrowly but conspicuously black, the amount subequal on all legs; tibiae and tarsi brownish black; claws slender, with a small acute subbasal tooth. Wings strongly fulvous, prearcular and costal fields light yellow; stigma pale brown, scarcely darker than the ground; oblitative areas before cord, before stigma, outer end of cell *R* and in base of cell *1st M*₂, the latter two connected; less conspicuous yellowed areas near base of cells *2nd M*₂ and *M*₄, most of cell *M* and the broad bases of cubital and anal cells; veins brown, more yellowed in the brightened fields. Outer radial veins with numerous macrotrichia, very sparse on *M*₁, lacking on remaining outer veins. Venation: *m-cu* very long and oblique, more than in *needhamana*, about three-fourths the distal section of *Cu*₁.

Abdomen with proximal four segments orange yellow, posterior borders of tergites two and three narrowly but conspicuously black, sublaterally with a narrow blackened line on tergites three and four and outer third of two, the lateral margins broadly of the ground color; posterior borders of sternites narrowly blackened; outer segments, including hypopygium, black, the lateral tergal borders paler. Male hypopygium (Fig. 31) generally as in *needhamana*, differing only in details. Ninth tergite, *t*, massive, the posterior end more or less depressed into a transverse yellowed saucer, with abundant setae on the ridge of the latter; border at either end with a strong lateral blackened lobe that is directed mesad, the broad intervening margin appearing as a narrow blackened bar, at midline slightly produced into two contiguous black lobes. Basistyle unarmed. Dististyles, *d*, terminal, outer style blackened, stem stout, expanded outwardly into a foot-shaped structure, its heel slightly produced, with long curved black setae, the longer foot portion extended into a decurved spine; inner style a simple massive plate with only the stout beak well differentiated, with no developed lower beak, lobes or crests. Phallosome, *p*, very generalized in structure, including the long slender aedeagus and weak basal apophyses that include outer narrow rods merging into pale setuliferous membrane. Eighth sternite large, posterior border convexly rounded, with three groups of setae, the median area with these stouter.



Text - Figures 28-34. — Fig. 28, *Tipula (Sinotipula) rondaniana* n. sp., male hypopygium; Fig. 29, *Tipula (Sinotipula) hobsoni* Edwards, male hypopygium; Fig. 30, *Tipula (Emodotipula) goetghebuerana* n. sp., male hypopygium; Fig. 31, *Tipula (Indratipula) comstockana* n. sp., male hypopygium; Fig. 32, *Tipula (Vestiplex) acudorsata* n. sp., male hypopygium; Fig. 33, *Tipula (Vestiplex) czizekiana* n. sp., male hypopygium; Fig. 34, *Tipula (Vestiplex) hadrostyla* n. sp., male hypopygium.

Symbols: a, aedeagus; b, basistyle; d, dististyle; s, sternite; t, tergite.

Holotype. — ♂, Bombi La, Kameng, North East Frontier Agency, Assam, 8800 feet, June 17, 1961 (Schmid).

The species is dedicated to John Henry Comstock (1849-1931), outstanding student of entomology, discoverer, with James G. Needham, of the Universal System of wing venation, commonly called the Comstock-Needham system. I was privileged to have been one of Comstock's students at Cornell University between 1909 and 1917.²

The only related species is *Tipula (Indratipula) needhamana* Alexander, which differs in details of coloration of the body, legs and wings, the shorter antennae, and in details of the male hypopygium, particularly the tergite and outer dististyle.

***Tipula (Vestiplex) acudorsata* n. sp.**

General coloration of thorax yellowed, praescutum with four medium brown stripes, pleura and pleurotergite yellow, weakly patterned with brown; antennae of male relatively long, about one-third the wing; femora brownish black, the subterminal pale ring poorly indicated; wings light brown, patterned with large light yellow areas, chiefly before the cord; abdomen with proximal four segments yellow, tergites with a conspicuous brown central stripe, outer segments brownish black; male hypopygium with dorsal tergal lobes glabrous, narrowed into slender rods; appendage of ninth sternite expanded at outer end.

Male. — Length about 16.5 mm.; wing 18.5 mm.; antenna about 6 mm.

Frontal prolongation of head yellow dorsally, including the long nasus, sides infuscated; palpi brownish black. Antennae of male long; proximal three segments yellow, remainder of flagellum black, the basal enlargements of the second and third segments more intense; segments longer than their verticils. Head dull orange, orbits more yellowed; a narrow dark brown central vitta extending from summit of the vertical tubercle to the occiput.

Pronotum light brown, golden pollinose, scutum with a brown central area. Mesonotal praescutum yellow with four medium brown stripes, lateral borders behind the foveae more restrictedly pale brown; scutum yellow, each lobe with two separate brown areas; scutellum and mediotergite yellow with a vague central darkened line, more evident on the latter; vestiture of notum light yellow, long and conspicuous, especially on the scutellum and mediotergite. Pleura and pleurotergite yellow, the anepisternum, ventral sternopleurite, meron and dorsal pteropleurite darkened; dorsopleural membrane yellowed. Halteres with stem yellow, knob

² Comstock, John Henry, *The wings of insects*, pp. 430, 427 figs., 10 pls. (Ithaca, New York). Herrick, Glenn W., and Ruby Green Smith. *The Comstocks of Cornell: John Henry Comstock and Anna Botsford Comstock*, pp. 286, 7 pls. (Comstock Publishing Associates, Ithaca, N.Y.)

brownish black, its apex restrictedly paler. Legs with coxae and trochanters yellow; femora brownish black; bases narrowly yellowed, more extensive on fore pair, with a vague obscure yellow subterminal brightening; tibiae and tarsi brownish black; claws of male toothed. Wings with the ground light brown, with large light yellow areas, chiefly before the cord, on proximal third of wing exceeding the ground areas, less extensive on central third; beyond the cord with a short area in bases of cells R_2 and R_3 , disconnected from the obliterative brightening in cells $1st M_2$ and base of M_3 ; prearcular and costal fields brighter yellow; stigma brown, only slightly darker than the ground; veins brown. Venation: R_s nearly twice $m-cu$; cell M_1 deep, its petiole slightly exceeding one-half m .

Abdomen with proximal four segments yellow, tergites with a conspicuous brown central stripe on second and succeeding segments, sub-lateral stripes narrowly brown, merging outwardly with the narrow gray margins, sternites yellow; segments five to nine brownish black. Male hypopygium (Fig. 32) with the dorsal tergal lobes, t , glabrous, broad at base, narrowed into slender rods, tips nearly acute, at base with a group of long black setae on either side that are decussate at the midline; ventral tergal armature black, conspicuous, each plate with two strong teeth that are separated by a U-shaped emargination. Ninth sternite, 9 s , with appendage a slender rod, gradually dilated outwardly, tip obtuse, margin, especially at base, with long yellow setae. Basistyle, b , with outer angle produced into a stout black lobe, tip obtuse, inner angle unarmed. Outer dististyle, d , long, outer half slightly expanded, the length exceeding five times the greatest width; inner style with beak slender, blackened, lower beak low; region of dorsal crest with a concentration of long black setae; outer basal lobe a broad very obtuse blade with long yellow setae. Phallosome, p , with lateral shoulders.

Holotype. — ♂, Rahung, Kameng, North East Frontier Agency, Assam, 7000 feet, July 16, 1961 (Schmid).

Tipula (Vestiplex) acudorsata is quite distinct from other generally similar species in its hypopygial characters, particularly the tergal armature where the dorsal lobes are narrowed outwardly into slender rods with nearly acute tips.

Tipula (Vestiplex) czizekiana n. sp.

General coloration of mesonotum gray, praescutum with four stripes, the anterior ends of intermediate pair light gray; antennae relatively short; femora brownish yellow, tips broadly black, tibiae and tarsi black; wings marbled with light yellow and brown; proximal four abdominal segments orange, intermediate tergites with lateral borders light gray, narrowly margined internally by black; male hypopygium with long conspicuous setae on tergal lobes and eighth sternite; appendage of ninth sternite bent at a

right angle near apex; basistyle outwardly produced into a flattened plate, the tip obtuse; aedeagus unusually narrow.

Male. — Length about 15 mm.; wing 16 mm.; antenna about 3.5 mm.

Frontal prolongation of head above brownish yellow, including the long nasus, slightly more darkened on sides and beneath; palpi brownish black. Antennae relatively short; scape orange, pedicel light yellow, flagellum black; basal enlargements of flagellar segments small, verticils short. Head buffy yellow; vertex with a conspicuous brown central stripe, extending from vertical tubercle to center of posterior vertex.

Pronotal scutum gray with three brown areas, scutellum brownish yellow. Mesonotal praescutum light gray with four stripes, the intermediate pair gray on anterior third, dark brown behind, the lateral borders darker brown, sublateral stripes brown, bordered by darker, more broadly so on the internal part; scutum light gray, each lobe with two separated brown areas; scutellum and mediotergite yellowish gray with a central darker brown vitta, parascutella, posterior border of mediotergite and anapleurotergite yellowish brown, katapleurotergite light yellow pollinose. Pleura light gray, restrictedly patterned with brownish black on propleura and dorsal anepisternum. Halteres brownish yellow, knob brownish black, apex of knob yellowed. Legs with coxae yellowed, fore pair gray pruinose; trochanters yellow; femora brownish yellow, tips broadly and conspicuously black, preceded by a vaguely indicated clearer yellow ring; tibiae and tarsi black; claws of male toothed. Wings with the restricted ground light yellow, with a light and darker brown pattern; darker areas in bases of cells *R* and *M*, origin of *Rs*, cord and in cell *M* adjoining vein *Cu* beyond midlength and near outer end; stigma brown; paler brown washes elsewhere on disk, including most cells beyond cord; prearcular field and cell *C* clear light yellow; a whitened spot at proximal end of stigma, widely separated from the remainder of the obliterative area in cell *1st M*₂ and adjoining cells; cell *2nd A* chiefly pale, the central third washed with brown. Venation: *Rs* more than twice *m-cu*.

Proximal four abdominal segments orange, basal tergite with vague indications of a central darkening, succeeding tergites with a narrow black sublateral stripe, the extreme margins light gray, beginning on posterior half of second segment; tergite five broadly orange at base, blackened apically and sublaterally, tergites six to nine black, lateral margins broadly gray; outer sternites dull black, slightly pruinose; eighth sternite with a group of long yellow setae. Male hypopygium (Fig. 33) with dorsal lobes of tergite, *t*, broadly rounded, provided with long yellow setae; ventral armature including narrow erect black plates, their mesal surface microscopically corrugated. Ninth sternite, *9 s*, with the appendage yellow, near apex bent at a right angle, the outer end with a few scattered setae; the appendage of the two sides tend to be slightly asymmetrical. Basistyle, *b*, apically produced into a broad flattened plate, apex obtuse, surface unusually glabrous. Outer dististyle, *d*, short, its length about six times the greatest width; inner style large, chiefly yellowed, beak slender, lower beak

a broad flattened plate, its apex obtusely rounded; dorsal crest with abundant pale setae; surface of disk of style with sparse microscopic spinoid setae, the more posterior setae slightly longer. Aedeagus, *a*, unusually narrow, near apex produced laterad into a small point.

Holotype. — ♂, Domkho, Kameng, North East Frontier Agency, Assam, 6900 feet, May 11, 1961 (Schmid). *Paratopotypes*, 4 ♂♂.

The species is named for Karl Czizek (1871-1925), Czechoslovakian student of the Tipulinae whose two most important papers were the *Tipulidae Moravicae (Die Mährischen Schnacken)*, Zeitsch. Mahr. Landesmus., I Teil 11; 1-90, 13 figs., 1911; II Teil 13:53-178, 41 figs., 2 pls., 1913.

The closest ally of the present fly is the larger *Tipula (Vestiplex) zayulensis* Alexander, of southeastern Tibet, which differs further in details of the male hypopygium, most evidently the straight simple appendages of the ninth sternite but including also the obtuse beak of the dististyle and broader aedeagus. Various other regional species of *Vestiplex* have long conspicuous setae on the tergal lobes and with long setae on the eighth sternite, the latter being especially long and conspicuous in the present fly.

Tipula (Vestiplex) hadrostyla n. sp.

Allied to *himalayensis*, differing chiefly in the shape and size of the outer dististyle of the male hypopygium, this being expanded outwardly into a massive blackened head, the length and greatest breadth of style being approximately equal.

Male.—Length about 17-18 mm.; wing 15-18 mm.; antenna about 4.8-5 mm.

Frontal prolongation of head obscure yellow, including the nasus which is tufted with long yellow setae, sides of prolongation darkened; palpi brown, incisures paler, terminal segment blackened. Antennae of male relatively long; scape and pedicel yellow, flagellum black, the extreme tips of the proximal four or five segments yellowed; basal enlargements of segments small, verticils shorter than the segments. Head yellow, vertical tubercle paler; posterior vertex with faint indications of a capillary brown central vitta.

Pronotum yellowed. Mesonotal praescutum yellow with four darker stripes, the intermediate pair brownish yellow, narrowly bordered internally by chestnut, lateral stripes darker brown, their margins still darker; posterior sclerites of notum yellowed, each scutal lobe with two contiguous slightly darker areas that are bordered internally by light brown; mediotergite with a barely indicated capillary reddish central line. Pleura yel-

low, propleura slightly darker. Halteres with stem yellowed, knob dark brown, the apex obscure yellow. Legs with coxae and trochanters yellowed; femora black, the extreme base paler, with a conspicuous obscure yellow subterminal ring about its own length before tip; tibiae and tarsi black; claws of male with an erect nearly basal spine. Wings pale brown, patterned with cream-yellow spots, before the cord including a common area beyond the base in cells *R* and *M*, with others before and beyond origin of *Rs*, near outer end of cell *M*₁, and extensively in the cubital and anal cells, the most extensive including the bases of all three of the latter cells; beyond the cord with a broad band extending from *C* across bases of outer radial cells, 1st *M*₂ and into bases of cells *M*₃ and *M*₄; stigma pale brown, confluent with a similar area over the anterior cord; prearcular field conspicuously orange yellow, cells *C* and *Sc* uniformly pale brown; veins brown, more yellowed in the prearcular and costal fields. Venation: *Rs* long, over one and one-half times *m-cu*; petiole of cell *M*₁ and *m* subequal.

Basal abdominal segments yellow, tergites on either side with a narrow nearly marginal brown line; outer segments black, the base of segment five yellowed. Male hypopygium (Fig. 34) with the tergite, *t*, transverse, posterior border very gently concave, without evident lateral lobes, the ends of the plate with numerous very long setae; no apparent lower tergal lobes. Ninth sternite with an oval darkened lobe provided with long yellow setae. Basistyle produced into a powerful rod that narrows into a stout black spine. Outer dististyle, *d*, blackened, greatly enlarged outwardly, across the apex being approximately as broad as long, this exceeding the transverse width of the inner style, the latter with beak very slender, as figured.

Holotype. — ♂, Bomdi La, Kameng, North East Frontier Agency, Assam, 8800 feet, June 17, 1961 (Schmid). *Paratype*, ♂, Bilo La, Kameng, 6000 feet, June 10, 1961 (Schmid).

Tipula (Vestiplex) hadrostyla is closely allied and similar to *T. (V.) himalayensis* Brunetti, a common and widespread species throughout the Himalayas, differing evidently in the somewhat remarkable outer dististyle of the hypopygium.

***Tipula (Vestiplex) immsiana* n. sp.**

Size above medium (wing of male 19 mm.); mesonotum yellowed, praescutum with four light brown stripes that are margined with darker; femora brown, tips brownish black, without a distinct yellowed subterminal ring; wings light brown, handsomely variegated by light yellow areas, chiefly before the cord; abdomen with proximal six segments dull orange, outer segments black; male hypopygium with dorsal tergal lobes broadly rounded; appendage of ninth sternite a simple straight rod; inner disti-

style a large subtriangular yellow blade; aedeagus slender, without lateral shoulders.

Male. — Length about 17 mm.; wing 19 mm.; antenna about 4.8 mm.

Frontal prolongation of head, including nasus, dull orange; palpi with proximal three segments obscure yellow, terminal segment black. Antennae with scape and pedicel yellow, flagellum black, the first segment a trifle paler; basal enlargements small, verticils shorter than the segments. Head orange, slightly darker on genae.

Pronotal scutum yellowish gray, vaguely patterned with light brown. Mesonotal praescutum yellowed, with four light brown stripes that vaguely are bordered by darker brown, central interspace brownish gray; posterior sclerites of notum gray to yellowish gray, each scutal lobe with two disconnected brown areas, mediotergite with a capillary brown central vitta; vestiture of mediotergite long, yellow. Pleura chiefly yellow, vaguely darkened on anepisternum and ventral sternopleurite and meron; dorso-pleural membrane light brown. Halteres with stem light brown, base of knob brownish black, apex light yellow. Legs with coxae obscure yellow, trochanters clearer yellow; femora brown, yellowed basally, tips brownish black, not or scarcely more brightened subterminally as in several species; tibiae and tarsi black; claws of male toothed. Wings light brown, with a handsome light yellow pattern that is chiefly before cord where it is subequal in amount to the ground; beyond cord the cells chiefly of the ground, the yellow color including a band that crosses the bases of the outer radial cells, center of $1st M_2$ and the bases of the adjoining medial cells; central part of outer half of cell R_5 yellowed; stigma medium brown; prearcular and costal fields light yellow; veins brownish yellow. Venation: R_s slightly more than twice $m-cu$; petiole of cell M_1 subequal to or shorter than m .

Abdomen with proximal six segments dull orange, tergites with a brown central stripe, widened on outer segments, three distal segments blackened, the styli yellowed. Male hypopygium (Fig. 35) with dorsal lobes of tergite, t , very broadly rounded, setae relatively short and sparse; ventral armature including a long-oval yellow blade on either side, interconnected across midline by a narrowly blackened bridge, on either side of midline produced into a small black point. Ninth sternite, $9s$, with appendage a relatively small yellow blade that narrows very gradually to the subacute tip; setae unusually long, yellow, distributed virtually over the whole length. Basistyle unarmed. Outer dististyle, d , relatively broad, about four times as long as the greatest width; inner style a large subtriangular yellow blade, the beak flattened, lower beak virtually lacking; outer basal lobe produced into a rounded knob. Aedeagus, a , unusually slender, gradually narrowed outwardly, the apex a small hooklike plate, no lateral shoulders present.

Holotype. — ♂, Talung Dzong, Kameng, North East Frontier Agency, Assam, 7600 feet, June 5, 1961 (Schmid). *Paratopotype*, ♂.

The species is dedicated to Augustus Daniell Imms (1880-1949) distinguished student of entomology, including the Tipulidae. While on the staff of Muir Central College, Allahabad, India, Imms collected several new species belonging to the genus *Tipula* at various stations in Kumaon in 1910, these being included in Brunetti's monographic treatment of the family in 1912.

The distinctive inner dististyle of the male hypopygium is somewhat as in *Tipula (Vestiplex) bhutia* Alexander but all other features of the hypopygium, as well as the general coloration of the body, legs and wings, are quite distinct.

***Tipula (Vestiplex) siebkeana* n. sp.**

General coloration of thorax yellow pollinose, praescutum with four brown stripes; antennae relatively long, flagellar segments black; femora black with a broad yellow subterminal ring; wings broad, with an attractive marbled light yellow and pale brown pattern; proximal four abdominal segments yellow, the outer ones blackened; male hypopygium with dorsal tergal armature consisting of rounded glabrous plates; appendage of ninth sternite straight; basistyle with two small spines, the outer one larger; inner style with beak slender, long-extended, lower beak a small blackened point; aedeagus with conspicuous slender lateral shoulders.

Male.—Length about 17-18 mm.; wing 17-19 mm.; antenna about 4.5-6 mm.

Frontal prolongation of head yellowed, including the long nasus, sides restrictedly darkened; palpi with proximal three segments brownish yellow, terminal segment brownish black. Antennae of male relatively long, shortest in the holotype; scape and pedicel yellow, first flagellar segment obscure yellow, remainder black, segments longer than their verticils, basal enlargements small. Head yellowed, darker on genae and sides of posterior vertex; a narrow dark brown vitta on median area of vertex.

Pronotum yellow pollinose, with three brown spots. Mesonotal praescutum yellow pollinose, with four brown stripes, the internal borders of the intermediate stripes paler; scutum yellow, each lobe with two brown areas; scutellum and postnotum brown, heavily yellow pollinose. Pleura grayish, yellow pollinose, especially on posterior sclerites; dorsopleural membrane buffy. Halteres with stem yellowed, base of knob brownish black, apex yellow. Legs with coxae grayish yellow; trochanters yellow; femora black, bases very narrowly yellow, all with a broad yellow subterminal ring that is subequal in extent to the blackened tip; tibiae and tarsi black; tibial spurs conspicuously scabrous, claws of male small, simple. Wings broad, with a handsome marbled pattern of light yellow and pale brown, the yellow exceeding the darker color in cells before cord, beyond the cord the bases of cells R_2 and R_3 brightened, in cases with a smaller spot in base of cell R_5 , the outer half of cell more

extensively yellowed; prearcular and costal fields more orange yellow; veins light brown, more yellowed to orange in the brightened fields. Venation: *Rs* about twice *m-cu*.

Abdomen with proximal four segments yellow, tergites with three narrow brown stripes, the central one broader and paler, interrupted at the posterior borders, sublateral stripes narrow, subequal in width to the light gray margins; basal sternites yellow, lateral borders narrowly pale; fifth tergite blackened, yellow basally, outer segments black. Male hypopygium (Fig. 36) with the dorsal armature of tergite, *t*, consisting of rounded glabrous plates that are separated by a broad emargination that is more than twice the diameter of either plate; ventral armature lying beneath the dorsal plates, including a blackened corrugated structure that is produced mesad into a small spine. Appendage of ninth sternite, 9 *s*, with the semi-detached darkened base with long yellow setae, the appendage nearly straight, subequal in length to its more dilated base, the slender portion narrowed very gradually to the subacute tip, margin with scattered yellow setae, longer and more numerous basally. Basistyle, *b*, with outer spine about twice the small inner point. Outer dististyle, *d*, relatively short and broad, apex obtuse, the length about five times the greatest breadth; inner style with beak narrow, long-extended, tip obtuse, lower beak a small blackened point; outer basal lobe broadly rounded, with long yellow setae. Aedeagus, *a*, with conspicuous slender lateral points or shoulders.

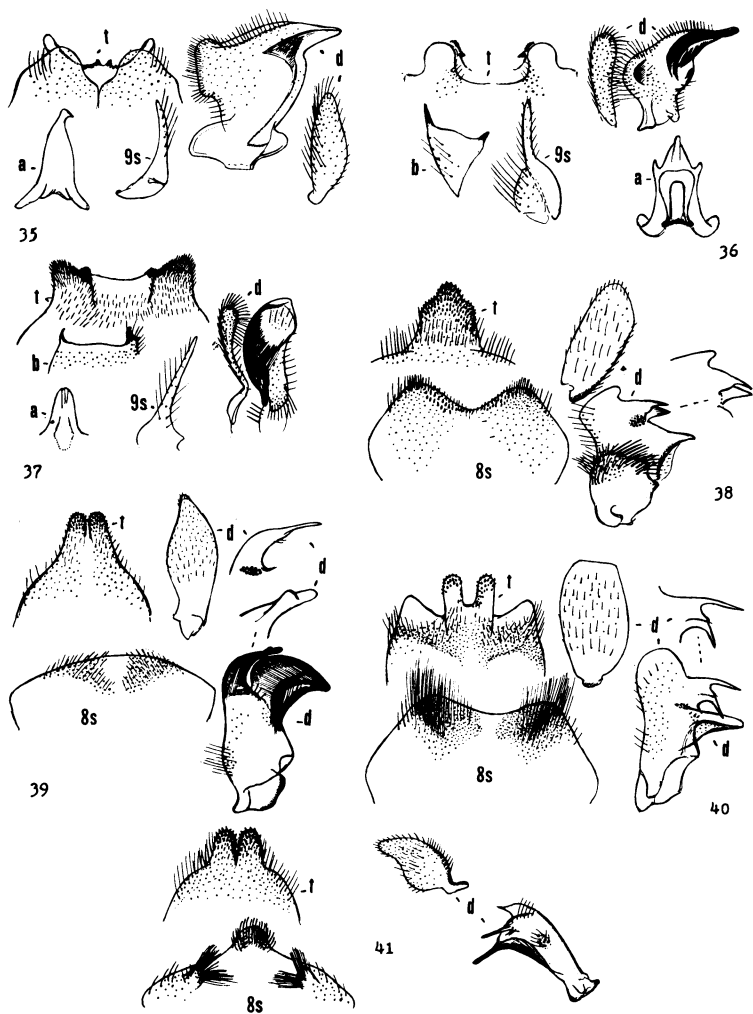
Holotype. — ♂, Jhum La, Kameng, North East Frontier Agency, Assam, 9000 feet, May 31, 1961 (Schmid). *Paratopotypes*, 7 ♂♂ on three pins.

The species is named for Johan Heinrich Spalckhauer Siebke (1816-1875), Norwegian student of the European Diptera, including the Tipulidae.

The most similar regional species is *Tipula (Vestiplex) inaequidentata* Alexander, which differs evidently in all details of the male hypopygium, particularly the tergite and appendage of the ninth sternite.

Tipula (Vestiplex) tillyardana n. sp.

Size large (wing of male 20 mm.); antennae relatively short, proximal three segments orange, remainder of flagellum darkened; mesonotal praescutum grayish yellow with four brown stripes; femora brownish black, tips black, preceded by a vaguely yellowed ring; wings medium brown, variegated by pale yellow and restricted darker brown areas; proximal six abdominal segments dull orange patterned with brown, outer segments brownish black; male hypopygium with dorsal tergal lobes conspicuous, provided with dense black setae; appendage of ninth sternite a long



Text-Figures 35-41. — Fig. 35, *Tipula (Vestiplex) immisiana* n. sp., male hypopygium; Fig. 36, *Tipula (Vestiplex) siebkeana* n. sp., male hypopygium; Fig. 37, *Tipula (Vestiplex) tillyardana* n. sp., male hypopygium; Fig. 38, *Tipula (Acutipula) basispinosa* n. sp., male hypopygium; Fig. 39, *Tipula (Acutipula) mogul* n. sp., male hypopygium; Fig. 40, *Tipula (Acutipula) lhabu* n. sp., male hypopygium; Fig. 41, *Tipula (Acutipula) triscopula* n. sp., male hypopygium.

Symbols: a, aedeagus; b, basistyle; d, dististyle; s, sternite; t, tergite.

straight rod, its tip subacute; inner dististyle distinctive, appearing essentially as a darkened oval body, the region of the beak short-triangular, yellowed.

Male. — Length about 19 mm.; wing 20 mm.; antenna about 3.1 mm.

Frontal prolongation of head above obscure yellow, including the long nasus, sides light brown, lower surface light yellow; palpi dark brown, terminal segment black, extreme tip reddened. Antennae relatively short; proximal three segments orange, pedicel more yellowed, proximal flagellar segments weakly bicolored, base darkened, remainder light brown, outer segments passing into uniform brownish black; segments moderately incised, subequal to their longest verticils. Head obscure yellow, with a large brown spot on posterior vertex, narrowed behind, genae vaguely darkened.

Pronotum grayish yellow. Mesonotal praescutum grayish yellow with four stripes, the narrower intermediate pair gray on anterior half, darker behind, narrowly bordered by still darker brown, lateral stripes brown, their internal border darker brown, humeral region brown; scutum grayish yellow, each lobe with two confluent brown areas; scutellum and mediotergite grayish yellow with a central darkening, clearly defined anteriorly, more diffuse behind. Propleura dark brown, mesopleura gray, lighter on dorsal sternopleurite and pteropleurite, meron darkened ventrally; dorsopleural membrane extensively buffy, vaguely darkened at the spiracle. Halteres with stem light brown, base of stem and apex of knob yellowed, the latter dark brown at base. Legs with coxae grayish yellow, fore pair darker basally; trochanters yellow; femora brownish black, bases more yellowed, tips black, preceded by a narrower vaguely yellowed ring; tibiae and tarsi black; claws with a small subbasal spine. Wings with the ground medium brown, conspicuously variegated by pale yellow spots and restricted darker brown areas, the most conspicuous of the latter in bases of cells *R* and *M* and over the anterior cord; yellow markings before cord chiefly in cells *R*, *R*₁, and *M*, beyond cord appearing as an oblique band extending from *C* into base of cell *M*₃; stigma scarcely darker than remainder of ground; prearcular field light orange, costal area less evidently brightened, veins brown. Venation: *Rs* about twice *m-cu*; cell 1st *M*₂ with both ends pointed.

Abdomen with proximal six segments dull orange, the tergites with a median brown stripe and narrower more blackened sublateral lines, the extreme borders light gray, the darkened pattern becoming more extensive on outer segments; segments seven to nine uniformly brownish black. Male hypopygium (Fig. 37) with the tergite, *t*, transverse, dorsal armature consisting of two widely separated lobes with obliquely truncated tips, their surface with dense short black setae; ventral armature including a small black triangular lobe, its margin microscopically roughened. Ninth sternite, 9 *s*, with its appendage a long straight rod from a more expanded base, narrowed very gradually outwardly to the subacute tip, surface with relatively sparse long yellow setae, chiefly on outer margin.

Basistyle, *b*, with a small blackened spine at outer angle and a slightly larger similar structure at the inner region, the latter with microscopic points and a few very long setae. Outer dististyle, *d*, relatively long, narrow at base, outwardly expanded very gradually into a spatula that is provided with numerous coarse setae; inner style distinctive, including a darkened oval body, the region of the usual beak short-triangular, yellowed; no lower beak but at base of the oval structure with a blackened projection that has an obtuse lobe directed outwardly and a more acute spine directed basad. Aedeagus, *a*, without lateral shoulders.

Holotype. — ♂, Shergaon, Kameng, North East Frontier Agency, Assam, 6100 feet, May 5, 1961 (Schmid).

I dedicate this species to Robin John Tillyard (1881-1937), one of the outstanding students of entomology. Tillyard made important additions and emendations to the Comstock-Needham system of wing venation. As concerns the Tipulidae the most important paper on this subject was *The Panorpoïd Complex*. Part 3: The wing-venation. Proc. Linn. Soc. New South Wales 44:533-718, 5 pls., 78 figs., 1919.

The most similar regional species is *Tipula (Vestiplex) wahlgrenana* Alexander, of Kumaon, in the western Himalayas, which has the hypopygial structures somewhat similar but with all details distinct. The inner dististyle of the present fly is quite distinctive. In *wahlgrenana* the antennae are much longer and the flagellum is bicolored throughout.

Tipula (Acutipula) basispinosa n. sp.

Size medium (wing of male 23 mm.); mesonotal praescutum broadly light yellow in front and laterally, the disk striped with brown; lateral margins of postnotal mediotergite and the anapleurotergite conspicuously pale yellow, pleura orange; wings brown, conspicuously patterned with whitened areas, prearcular field light yellow; basal abdominal segments orange yellow, the outer four brownish black; male hypopygium with a single tergal lobe, its posterior border weakly trilobulate, with abundant small spinoid setae; inner dististyle with body provided with abundant very long reddish setae, margin of outer basal lobe above the slender beak produced into two acute points; eighth sternite with posterior border shallowly marginate, the vestiture sparse.

Male. — Length about 22 mm.; wing 23 mm.; antenna about 3.3 mm.

Frontal prolongation of head subequal in length to the remainder, light brown above, including the slender nasus, lower half obscure brownish yellow; palpi black. Antennae small; scape and pedicel yellow, flagellum more obscure yellow; verticils longer than the segments. Head above

brownish gray, paler in front and on genae; posterior vertex more blackened between and behind the eyes.

Cervical region orange. Pronotum clear light yellow. Mesonotal praescutum anteriorly and on sides broadly light yellow, disk with two narrow intermediate brownish gray stripes that are margined narrowly with pale brown, the stripes convergent behind, lateral stripes more solidly light brown, interspaces brownish gray, region of suture darker brown; scutal lobes testaceous brown, vaguely patterned with paler, sides of lobes and the parascutella darker brown; scutellum light brown, vaguely pale on central part; mediotergite brown centrally, the broad lateral margins and anapleurotergite conspicuously very pale yellow, katapleurotergite more brownish yellow; mesonotum unusually glabrous, with very sparse yellow setae on praescutum, scutellum and mediotergite. Pleura chiefly orange, dorsopleural membrane light orange yellow. Halteres black, base of stem more orange. Legs with coxae and trochanters yellowed; legs long, femora brown, bases more yellowed, tips darker brown; remainder of legs dark brown; claws of male relatively small, bidentate, basal spine more slender. Wings with the ground brown, darker on outer half, prearcular field light yellow; a restricted darker pattern that includes marks at origin of *Rs* and above *Sc*, stigma, outer end of cell *M*, and a conspicuous mark before midlength of cell *Cu*, the latter with very extensive whitened areas on either side; obliterative band at cord white, very conspicuous, crossing cell *1st M*₂, basal half of cell *M*₄ whitened, with more restricted similar areas in bases of cells *M*₁ and *2nd M*₂, confluent with a larger comparable mark in outer half of cell *R*₅; veins brown, whitened in the obliterative band, yellow in the prearcular field. Venation: *Rs* subequal to *m-cu*; petiole of cell *M*₁ subequal to *m*.

Basal abdominal segments dull orange yellow, tergites with a slightly darker central stripe; outer segments, including six to nine, tergite five and sides of sternite five brownish black. Male hypopygium (Fig. 38) with posterior border of tergite, *t*, produced into a broad yellow lobe, its posterior margin weakly trilobulate, including a more prominent central extension and low lateral shoulders, all with small black spinoid setae, base of lobe with long yellow setae. Outer dististyle, *d*, about two and one-half times as long as broad, apex obliquely truncate; inner style with beak slender, proximal part of style adjoining the beak, with numerous long reddish spinoid setae; outer basal lobe distinctive, appearing as a large yellow plate, the margin above the beak with two acute points, the more basal one stouter, the sensory area at their base. Eighth sternite, *8 s*, large, transverse, outer half narrowed, posterior border shallowly emarginate; lobes with only a few yellowed setae of moderate length, the more mesal part of each lobe with microscopic black setae.

Holotype. — ♂, Shergaon, Kameng, North East Frontier Agency, Assam, 6400 feet, May 8, 1961 (Schmid).

Tipula (Acutipula) basispinosa is quite distinct from all other species, especially in the hypopygial characters. The wing pattern and structure of the ninth tergite are much as in the smaller *T. (A.) echo* Alexander, of Sikkim, but other hypopygial features are quite distinct. Both species have the long spinoid setae on the body of the inner style but in the present fly these are lacking on the outer basal lobe.

***Tipula (Acutipula) lhabu* n. sp.**

Size above medium (wing of male 20 mm.); mesonotum almost uniformly medium brown, pleura yellow, the ventral half clearer; wings patterned with pale brown; proximal abdominal tergites yellow, sides blackened, sternites yellow, outer segments brownish gray; male hypopygium with outer dististyle truncate at tip, inner style with beak stout, outer basal lobe with a bispinuous extension above the beak; setal brushes of eighth sternite conspicuous.

Male.—Length about 18 mm.; wing 20 mm.; antenna about 3 mm.

Frontal prolongation of head subequal to the remainder, brown above, including the long nasus, lower half more brownish yellow; palpi brownish black. Antennae relatively short, about twice the prolongation; scape and pedicel yellow, proximal flagellar segments weakly darkened basally, stem more yellowish brown; basal enlargements very small, verticils exceeding the segments. Head brown, faintly pruinose, antennal fossae and narrow posterior orbits more yellowed.

Pronotal scutum light brown, scutellum obscure orange. Mesonotum almost uniformly medium brown, the four praescutal stripes barely indicated by faintly darker margins; anterior and lateral borders of praescutum narrowly and conspicuously black, posterior margin at suture with a V-shaped darkening; scutum darker brown, posterior callosities and parascutella obscure yellow, scutellum light brown; mediotergite grayish brown, posterior fourth more yellowed; anapleurotergite grayish brown, katapleurotergite dark brown on dorsal half, the remainder yellow; mesonotal vestiture pale, sparse and inconspicuous, slightly longer on scutellum. Pleura yellow, clearer on ventral half, dorsopleural region more obscure orange. Halteres brown, base of stem vaguely paler. Legs with all coxae and trochanters light yellow; femora yellowish brown, tips narrowly more darkened, bases vaguely yellowed; tibiae and tarsi light brown; claws of male with outer tooth blackened, the small slender basal spine reddish. Wings relatively narrow, pale brown, prearcular and costal fields darker; pale brown clouds near outer end of cell *M* and at midlength of cell *Cu*; vague pale areas before cord, across bases of outer medial cells, and before and beyond the darkened discal clouds; stigma narrow, darker brown; veins brown. Venation: Petiole of cell M_1 longer than *m*.

Basal abdominal tergites light brown, lateral borders conspicuously

blackened, the areas continued from the darkening on pleurotergite; basal sternites light yellow; outer segments more brownish gray. Male hypopygium (Fig. 40) with posterior border of tergite with two relatively slender lobes, spicules sparse. Ninth sternite with an oval darkened lobe provided with long setae. Mesal face of basistyle with comparable long setae. Outer dististyle, *d*, pale, about twice as long as broad, apex truncate, setae small and sparse; inner style with beak stout, straight, apex narrowly obtuse; outer basal lobe high, tip rounded, with a conspicuous prolongation above the beak, at near midlength this divided into two slender spines, the outer one narrower. Eighth sternite, 8 *s*, large, posterior border gently concave to form low lateral lobes that bear brushes of long yellow setae, the row continues obliquely mesad, with shorter dark colored setae.

Holotype. — ♂, Lifakpo, Kameng, North East Frontier Agency, Assam, 3100 feet, May 29, 1961 (Schmid).

The specific name, *lhabu*, meaning 'Son of the God' was one of several names suggested to me by Dr. Schmid, to whom I express my appreciation.

The most similar regional species include *Tipula (Acutipula) coeana* Alexander and *T. (A.) mannhemsiana* Alexander, which differ among themselves in details of coloration of body and wings and in hypopygial structure, especially the inner dististyle.

Tipula (Acutipula) mogul n. sp.

Size very large (wing of male 30 mm. or more); legs very long, in the male the total length about 10 centimeters; mesonotal praescutum with four brown stripes on disk, the sides light gray; posterior sclerites of notum brown and orange, pleura clear orange; wings light brown, conspicuously patterned with whitened and darker brown areas; abdominal segments two to four chiefly brownish orange, outer segments dull black; male hypopygium with tergal lobe shallowly divided into two spinulose lobules; inner dististyle with beak large, outer basal lobe a powerful glabrous arm; vestiture of eighth sternite sparse and weak.

Male. — Length about 25-28 mm.; wing 30-32 mm.; antenna about 4.5-5 mm.; hind leg of holotype, femur 20 mm.; tibia 25 mm.; basitarsus 38 mm.; remainder of tarsus 21 mm.; total leg 104 mm.

Frontal prolongation of head nearly as long as remainder, dark chestnut brown, the long nasus darker; palpi black. Antennae with scape and pedicel brownish yellow, flagellar segments bicolored, the basal enlargement brownish black, remainder brownish yellow, the outermost segments more uniformly darkened; proximal flagellar segments with relatively short subequal verticils, those of outer ones longer. Head laterally dark chestnut brown, the center of vertex and expanded occipital area brown.

Pronotal scutum light brown, yellowed laterally, scutellum yellowed. Mesonotal praescutum light gray on sides, disk darker with four brownish gray stripes that are bordered by still darker brown, the cephalic and lateral margins of praescutum narrowly brownish black; posterior sclerites chiefly dark brownish gray, parascutella and broad posterior and lateral borders of mediotergite orange; pleurotergite brown dorsally, katapleurotergite yellowed. Pleura clear light orange, including the dorso-pleural membrane. Halteres brownish black. Legs very long, especially in the male, as shown by the measurements; coxae orange yellow to more obscure yellow, trochanters yellow; femora brown, bases more yellowed, tips brownish black; tibiae brown, tips very narrowly more darkened; basitarsi light brown, outer segments black; claws of male toothed. Wings with the ground light brown in the holotype, darker in the paratypes; conspicuous whitened areas at cord and before and beyond the darkened mark in cell *Cu*, more extensive in the paratypes; smaller pale areas in bases of outer medial cells, more extensive and continuous in the paratypes.

Abdomen with basal tergite gray medially, blackened sublaterally, margins broadly orange; segments two to four obscure brownish orange, narrowly darker medially and more conspicuously blackened on sides, proximal sternites light yellow; segments five to nine blackened, pruinose to appear dull dark gray. Male hypopygium (Fig. 39) with the tergal lobe, *t*, relatively short, at apex divided into two short lobules that bear dense black spicules at tips. Outer dististyle, *d*, relatively small, slightly expanded at near midlength, about twice as long as broad, vestiture sparse and microscopic; inner style with beak very stout, cleaverlike; outer basal lobe appearing as a powerful arm lying close to body of style, gradually narrowed outwardly, slightly twisted before tip, in the holotype with apex obtuse, in the paratypes extended into a slender straight spine (as shown in subfigure). Eighth sternite, *8s*, with posterior border very slightly convex, in type with very sparse yellow setae; in the paratype the central area of border is somewhat more produced, its margin truncated, on either side with somewhat longer more abundant setae.

Holotype. — ♂, Talung Dzong, Kameng, North East Frontier Agency, Assam, 7600 feet, June 5, 1961 (Schmid). *Paratopotype*, ♂, pinned with type. *Paratypes*, 3 ♂♂, Bilo La, Kameng, North East Frontier Agency, 5800-6000 feet, June 9-10, 1961 (Schmid).

Tipula (Acutipula) mogul is one of the largest known members of the subgenus, exceeding in size species such as *T. (A.) fulvipennis* de Geer or *T. (A.) princeps* Brunetti. Only a few known species have the wing length exceeding 30 millimeters, including among others *T. (A.) lambertoniana* Alexander and *T. (A.) pomposa* Bergroth, of the Ethiopian fauna. The structure

of the male hypopygium of the present fly is distinctive, especially the inner dististyle. The paratypes differ in slight regards from the type, in the coloration of the wings and in hypopygial characters, including the outer basal lobe of the inner dististyle, as described and figured, and in the longer vestiture of the eighth sternite. It is possible that these may represent a second very closely related species.

***Tipula (Acutipula) triscopula* n. sp.**

Size medium (wing of male about 15 mm.); general coloration of praescutum light brown with four scarcely differentiated stripes that are best indicated by narrow more darkened borders, pleura yellow; femora light brown, tips blackened; wings yellowish brown, patterned with darker brown and white, the latter including a band before cord, extended outwardly across the bases of the outer medial cells; proximal four abdominal segments brownish yellow, outer segments black; male hypopygium with beak of inner dististyle very slender; eighth sternite with three separate tubercles along posterior border, each with a tuft or brush of long black setae.

Male.—Length about 12-12.5 mm.; wing 15-16 mm.; antenna about 4 mm.

Frontal prolongation of head shorter than the remainder, brownish yellow, narrowly darker above, including the stout nasus; first segment of palpus brown, remainder brownish black. Antennae with scape yellow, pedicel paler yellow, proximal two flagellar segments brown, outer ones blackened; basal enlargements of flagellar segments very inconspicuous, the latter longer than their verticils. Head with front and cephalic part of anterior vertex light yellow, posterior vertex dark brown, the orbits conspicuously dull orange.

Pronotal scutum light brown, scutellum yellow. Mesonotal praescutum with the ground light brown, disk with four scarcely differentiated stripes, the intermediate pair delimited by very narrow slightly darker borders, lateral stripes more evident; margin of praescutum narrowly more darkened, especially in front; at suture, the praescutum with a small yellow median spot, with a more extensive brownish black subtending line; scutum brown, median area narrowly more yellowed, behind extended laterad, parascutella paler brown, mediotergite with a broad dark brown triangular area that is bordered behind by pale yellow, the posterior margin darker yellow, pleurotergite pale brown, the katapleurotergite more yellowed. Pleura yellow. Halteres brown, base of stem narrowly obscure yellow. Legs with coxae and trochanters yellow; femora light brown, tips blackened, tibiae and tarsi brownish black; claws of male toothed. Wings (Fig. 24) yellowish brown, darker beyond cord, prearcular and costal fields more yellowed; stigma pale brown; darker brown areas at outer end of cell *M* and before midlength of cell *Cu*, these markings with conspicu-

ous whitened areas on either side; a conspicuous whitened band before cord, extending from *C* into cell *1st M*₂, narrowly interrupted at the latter by pale brown seams on *M*₁₊₂ and *M*₃₊₄; bases of cells *M*₁ to *M*₃ similarly pale to form a narrow band; veins brown. Venation: *Rs* about one-half longer than *R*₂₊₃; petiole of cell *M*₁ subequal to *m*.

Proximal four abdominal segments brownish yellow, the sublateral parts narrowly darkened, the surface with abundant short dark setulae; basal sternites clear yellow; outer five segments black, lateral borders of tergites five and six gray, eighth sternite vaguely pruinose. Male hypopygium (Fig. 41) with posterior border of tergite, *t*, narrowed outwardly into two approximated lobes that are provided with short black spinoid setae. Ninth sternite with a pencil of very long dark colored setae. Outer dististyle, *d*, pale, narrowed and arcuate on distal third, tip obtuse; inner style with beak black, very slender; outer basal lobe bifid, including a more basal slender black spine and an outer pale blade that is extended into a narrow point, both spines directed outwardly, as is the beak. Eighth sternite, 8 *s*, distinctive, posterior border convexly rounded, bearing three separate tubercles, each with a tuft or brush of long black setae.

Holotype. — ♂, Bomdi La, Kameng, North East Frontier Agency, Assam, 8800 feet, July 15, 1961 (Schmid). *Paratopotype*, 1 ♂.

Tipula (Acutipula) triscopula is unusually distinct in hypopygial characters, particularly the inner dististyle and eighth sternite. Other regional species having a somewhat similar appearance include *T. (A.) echo* Alexander and *T. (A.) hemming-seniana* Alexander, both with the hypopygial structure distinct.