

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

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SIX PLATES

At this time I am again considering species of crane flies that were taken in India, and chiefly in Assam and Sikkim, by Dr. Fernand Schmid. As has been indicated in earlier parts under this general title, as well as in other publications, the collections of Tipulidæ taken by Dr. Schmid in many parts of India have quite revolutionized our knowledge of this subject. I again express my deep thanks to him for his interest in collecting these often neglected flies and for the privilege of retaining the materials in my personal collection.

MANIPUR: The majority of the species discussed at this time are from mountainous sections of Manipur, in extreme eastern Assam and India, where Schmid spent most of the summer of 1960, collecting on the two highest mountains, Sirhoi Kashong and Hkayam Boum. The late Frank Kingdon-Ward, with Mrs. Jean Ward, were in Manipur from February 15 to December 15, 1948, and have provided a most valuable account of the region from the standpoint of a botanist and plant ecologist.¹

The Wards devoted especial attention to collecting on Sirhoi Kashong (written Sirhoi Kashong by Schmid), visiting the mountain on five separate occasions from early April until October, with especially productive trips in June and at mid-July. Their detailed account of the floral conditions are of special interest in the consideration of the Schmid crane-fly materials collected in the same localities on June 6-10 and July 11-13, 1960. The lower slopes of Sirhoi are not unlike other nearby parts of Manipur but above about 7,000 feet a change in the fauna and flora takes place, with many characteristic Himalayan elements appearing. In the alpine meadow that extends downward from the summit of the mountain for about 1,000 feet, or a distance of approximately a mile, to

¹ Kingdon-Ward, Frank. Plant hunter in Manipur (1952) 1-254, 12 plates, 1 map (Jonathan Cape, London).

the forested zone, more than 150 species of flowering plants were found, the great majority being herbaceous perennials, with about 100 additional species occurring elsewhere on the higher parts of the mountain. Characteristic plants in this alpine meadow, besides the dominant grasses and sedges, included three species of *Iris* and a magnificent new species of lily, named for Mrs. Ward as *Lilium Mackliniae*. The woody plants included no fewer than seven species of *Rhododendron*, together with species of *Spiraea*, *Pieris*, *Deutzia*, and others. The most characteristic genera of herbaceous plants included *Habenaria*, *Anemone*, *Thalictrum*, *Delphinium*, *Aconitum*, *Sedum*, *Swertia*, *Gentiana*, *Cynoglossum*, *Hypericum*, *Corydalis*, *Primula*, *Pedicularis*, and many others. The northern face of Sirhoi is covered with a broad-leaved forest, both evergreen and deciduous, comprised of oaks, birch, maple, magnolia, *Prunus*, *Pyrus*, *Ilex*, *Ligustrum*, *Taxus*, and others. In the above record of certain floral components found on this mountain one is impressed not only by the similarity to the flora in comparable high mountain meadows elsewhere in Eurasia but likewise in western North America, as in the Rocky Mountains, the Cascades and Sierra Nevadas. On Mount Rainier, in the Cascades of the State of Washington, for example, fully one-half of the above-listed herbaceous genera, but with distinct species, may be found.

Ward has provided a satisfactory account of the physical conditions presently found in Manipur as well as a detailed account of the changes in fauna and flora that are presumed to have occurred during and after the Pleistocene glaciation of some ten thousand years ago. His detailed account may be consulted (l.c., pp. 242-246).

PATRONYMICS IN THE EURASIAN SPECIES OF THE GENUS TIPULA

For more than the past half century I have made the practice of dedicating various species of crane flies to distinguished fellow workers in the family. In the present report, and in succeeding parts dealing with the crane flies of Asia, I expect to continue this practice by naming various species in honor of fellow workers, past and present, these to include workers on crane-fly taxonomy, morphology, ecology, biology and cataloguing. As a basis for so dedicating species of *Tipula* of the Eurasian fauna I am listing herewith the names of

workers on the Tipulidæ to whom species in the genus *Tipula*, or in allied Tipuline genera, have been dedicated:

- ALEXANDER, C. P.—*Tipula* (*Yamatotipula*) *alexandriana* Dietz, 1917; *Longurio alexanderi* (Edwards, 1923), as *Macromastix*.
- ALDRICH, J. M.—*Tipula* (*Vestiplex*) *aldrichiana* Alexander, 1929.
- BANGERTER, H.—*Tipula* (*Oreomyza*) *bangerteriana* sp. nov. (this report).
- BARNES, H. F.—*Tipula* (*Lunatipula*) *barnesiana* Alexander, in press.
- BELLARDI, LUIGI—*Tipula* (*Oreomyza*) *bellardiana* Alexander, 1926.
- BERGROTH, EWALD—*Tipula* (*Vestiplex*) *bergrothiana* Alexander, 1918; *Priocera bergrothi* (Williston, 1893).
- BEZZI, MARIO—*Longurio* (*Tanypremna*) *bezziana* (Alexander, 1921), as *Tipula*: *Tipula* (*Lunatipula*) *bezzii* Mannheims and Theowald, 1959.
- BIGOT, J. M. F.—*Tipula* (*Eumicrotipula*) *bigotiana* Alexander, 1920.
- BRETHES, JEAN—*Tipula* (*Eumicrotipula*) *brethesiana* Alexander, 1929.
- BRINDLE, ALAN—*Tipula* (*Oreomyza*) *brindleana* sp. nov. (this report).
- BROLEMANN, H. W.—*Tipula* *brolemanni* Pierre (1921).
- BRUNETTI, ENRICO—*Tipula* (*Bellardina*) *brunettiana* Alexander, 1920; *Tipula* (*Tipulodina*) *brunettiella* Alexander, 1923.
- BRYCE, DEREK—*Tipula* (*Vestiplex*) *bryceana* sp. nov. (this report).
- BYERS, G. W.—*Dolichopeza* (*Trichodolichopeza*) *byersiana* Alexander, 1962.
- CHEETHAM, C. A.—*Tipula* *cheethami* Edwards, 1924.
- CHISWELL, J. R.—*Tipula* (*Vestiplex*) *chiswellana* sp. nov. (this report).
- COCKERELL, T. D. A.—*Tipula* (*Acutipula*) *cockerelliana* Alexander, 1925.
- COQUILLETT, D. W.—*Tipula* (*Nippotipula*) *coquilleti* Enderlein, 1912; *Tipula* (*Vestiplex*) *coquilletiana* Alexander, 1924.
- CUTHBERTSON, ALEXANDER—*Dolichopeza* (*Dolichopeza*) *cuthbertsoniana* Alexander, 1945.
- CZIZEK, KARL—*Tipula* (*Tipula*) *Czizeki* de Jong, 1925.
- DIETZ, W. G.—*Tipula* (*Lunatipula*) *dietziana* Alexander, 1915.
- DOANTE, R. W.—*Tipula* (*Oreomyza*) *doanei* Dietz, 1914; *Tipula* (*Lunatipula*) *doaneiana* Alexander, 1919.
- EDWARDS, F. W.—*Longurio edwardsiana* (Alexander, 1920) as *Habromastix*; *Tipula* (*Oreomyza*) *edwardsella* Alexander, 1923; *Valdiviana edwardsiana* Alexander, 1929; *Nephrotoma edwardsiana* Alexander, 1956; *Tipula* (*Neppotipula*) *edwardsomyia* sp. nov. (this report). (Named for others: *Tipula edwardsi* Bellardi, 1859; *Nephrotoma edwardsi* Alexander, 1917).
- ENDERLEIN, GÜNTHER—*Tipula* (*Eumicrotipula*) *enderleiniana* Alexander, 1929.
- FOOTE, BEN A.—*Tipula* (*Yamatotipula*) *footeana* Alexander, 1961.
- FREEMAN, PAUL—*Nephrotoma freemani* Alexander, 1956.
- FREY, K. H. R.—*Tipula* (*Tipula*) *freyana* Lackschewitz, 1936.
- GIMMERTHAL, B. A.—*Tipula* *gimmerthali* Lackschewitz, 1925.
- HANDLIRSCH, ANTON—*Tipula* *handlirschiana* Alexander, 1931 (Baltic Amber).
- HARDY, D. E.—*Tipula* (*Platytipula*) *spenceriana hardyi* Alexander, 1943.
- HEMMINGSSEN, A. M.—*Tipula* (*Acutipula*) *hemmingseniana* Alexander, 1961.
- HUDSON, G. V.—*Longurio hudsoniana* (Alexander, 1922), as *Macromastix*.
- HUTTON, F. W.—*Longurio huttoni* (Edwards, 1923), as *Macromastix*.

- ISHIDA, HIROSHI—*Tipula* (*Schummelia*) *ishidana* sp. nov. (this report).
- ITO, SYUSIRO—*Tipula* (*Indotipula*) *itoana* Alexander, 1955; *Macgregoromyia itoi* Alexander, 1955.
- JACOBS, J. C.—*Tipula* (*Eumicrotipula*) *jacobsoniana* Alexander, 1929.
- JAENNICKE, J. F.—*Tipula* (*Eumicrotipula*) *jaennickeana* Alexander, 1929.
- JOHNSON, C. W.—*Tipula* (*Lunatipula*) *johnsoniana* Alexander, 1915.
- KERTÉSZ, KOLOMAN—*Tipula* (*Nippotipula*) *kertésziana* sp. nov. (this report).
- KIRBY, WILLIAM—*Tipula* (*Vestiplex*) *kirbyana* Alexander, 1918.
- LACKSCHWITZ, PAUL—*Tipula* (*Sivatipula*) *lackschewitziana* Alexander, 1928; *Tipula* (*Arctotipula*) *lackschewitzi* Mannheims, 1953; *Pronocera lackschewitzi* Mannheims, 1952.
- LINDNER, EBERHARD—*Tipula* (*Schummelia*) *lindneriana* sp. nov. (this report).
- LOEW, HERMAN—*Tipula* (*Lunatipula*) *loewiana* Alexander, 1915.
- LUNDSTRÖM, C. A.—*Tipula* (*Lunatipula*) *lundströmiana* Alexander.
- MAA, TSING-CHAO—*Tipula* (*Oreomyza*) *maaiana* Alexander, 1949.
- MACQUART, P. J. M.—*Tipula* *macquarti* Becker.
- MALLOCH, J. R.—*Tipula* (*Lunatipula*) *mallochi* Alexander, 1920.
- MANNHEIMS, BERNHARD—*Tipula* (*Acutipula*) *mannheimsiana* Alexander, 1953.
- MATSUMURA, S.—*Tipula* (*Oreomyza*) *matsumuriana* Alexander, 1924.
- MEIJERE, DE, J. C.—*Tipula* (*Acutipula*) *de-meijerei* Edwards, 1915.
- MIK, JOSEPH—*Tipula* *mikiana* Bergroth, 1888.
- NIELSEN, PEDER—*Tipula* (*Brithura*) *nielseniana* sp. nov. (this report).
- OSTEN SACKEN, C. R.—*Tipula* (*Yamatotipula*) *sackeniana* Alexander, 1918.
- PHILIPPI, R. A.—*Tipula* (*Eumicrotipula*) *philippiana* Alexander, 1920.
- PIERRE, CLAUDE—*Tipula* (*Yamatotipula*) *pierre* Tonnoir, 1921; *Tipula* (*Oreomyza*) *pierreana* sp. nov. (this report).
- PRESL, J. S.—*Tipula* *presliana* Alexander, 1931 (Baltic Amber).
- RIEDEL, M. P.—*Longurio riedeliana* (Alexander, 1920), as *Habromastix*, *Tipula* (*Acutipula*) *riedeli* Mannheims, 1952; *Tipula* (*Vestiplex*) *riedeliana* Mannheims, 1953.
- ROGERS, J. S.—*Dolichopeza* (*Oropeza*) *dorsalis rogersi* Alexander, 1922.
- SAVTSHENKO, E.—*Tipula* (*Lunatipula*) *savtschenkoi* Simova, 1960; *Tipula* (*Bellardina*) *savtschenkoi* Alexander, 1961, re-named *Tipula* (*Bellardina*) *savtschenkoana* nom. nov.
- SAY, THOMAS—*Tipula* (*Yamatotipula*) *sayi* Alexander, 1911.
- SCHINER, J. R.—*Tipula* *schineri* Lackschewitz, 1932; *Holorusia schineriana* Alexander, 1928.
- SCHMID, FERNAND—*Tipula* (*Bellardina*) *schmidiana* Alexander, 1961.
- SCUDDER, S. H.—*Tipula* *scudderiana* Alexander, 1931 (Baltic Amber).
- SÉGUY, EUGENE—*Tipula* (*Bellardina*) *séguyana* sp. nov. (this report).
- SIEBKE, J. H. S.—*Tipula* *siebkei* Zetterstedt, 1852.
- SINTENIS, FRANZ—*Tipula* (*Vestiplex*) *sintenis* Lackschewitz, 1936.
- SPEISER, P.—*Tipula* (*Tipula*) *speiseriana* Alexander, 1930.
- SPENCER, G. J.—*Tipula* (*Platytipula*) *spenceriana* Alexander, 1943.
- STACKELBERG, A. von.—*Tipula* (*Yamatotipula*) *stackelbergi* Alexander, 1933; *Tipula* (*Oreomyza*) *stackelbergiana* Lackschewitz, 1936.

- STAEGER, R. C.—*Tipula staegeri* Nielsen, 1922.
 STONE, ALAN—*Tipula* (*Formotipula*) *stoneana* Alexander, 1943; *Tipula* (*Trichotipula*) *stonei* Alexander, 1963.
 STROBL, GABRIEL—*Tipula strobli* Bergroth, 1908.
 TAKAHASHI, MITSUO—*Tipula* (*Acutipula*) *takahashiana* sp. nov. (this report).
 THEOWALD, BR.—*Tipula* (*Vestiplex*) *theowaldana* sp. nov. (this report).
 TOKUNAGA, MASAOKI—*Tipula* (*Angaratipula*) *tokunagana* sp. nov. (this report).
 VAILLANT, FRANÇOIS—*Tipula* (*Bellardina*) *vaillantiana* sp. nov. (this report); *Tipula vaillanti* Mannheims (in Savtshenko, 1961).
 WAHLGREN, E.—*Tipula wahlgreni* Lackschewitz, 1925.
 WESTWOOD, J. O.—*Tipula westwoodiana* Alexander, 1924.
 WINNERTZ, JOHANNES—*Tipula winnertzi* Egger, 1863.
 WINTHEM, W. VON—*Tipula winthemi* Lackschewitz, 1932.
 YERBURY, J. W.—*Tipula yerburyi* Edwards, 1924.
 ZETTERSTEDT, J. W.—*Tipula zetterstedti* Strobl, 1894.

In the present paper I am naming new species for Bangerter, Brindle, Bryce, Chiswell, Edwards, Ishida, Kertész, Eberhard Lindner, Nielsen, Pierre, Séguy, Mitsuo Takahashi, Theowald, Tokunaga and Vaillant, all of whom have made significant contributions to our knowledge of the Eurasian Tipulidæ. In succeeding parts under this same general title I expect to similarly honor still other of this group of dipterologists who have devoted their efforts to making known the crane flies of this vast area of the world.

PREOCCUPIED NAMES

As in the past I am indebted to Dr. Alan Stone for calling to my attention the preoccupied names.

Tipula (*Oreomyza*) *sciadoptera* nom. nov.; for *Tipula* (*Oreomyza*) *guttulifera* Alexander, Philip. Jour. Sci. 90 (1961) 436, nec *Tipula guttulifera* Zetterstedt, Ins. Lapponica, Diptera (1838) 840.

Gonomyia (*Lipophleps*) *nilgiriensis* nom. nov.; for *Gonomyia* (*Lipophleps*) *nilgiriiana* Alexander, Jour. N. Y. Ent. Soc. 69 (1961) 128, nec *Gonomyia* (*Protogonomyia*) *nilgiriiana* Alexander, Ann. Mag. Nat. Hist. (12) 3 (1950) 320.

NEPHROTOMA GLASSOPHORA sp. nov.

Plate 1, fig. 1; Plate 2, fig. 26.

Size below medium (wing of male 10 millimeters); mesonotal præscutum yellow, with three polished blue-black stripes that are very narrowly bordered by dull brownish black, scutellum brown, parascutella yellow; pleura yellow, variegated by orange-

brown; femora black, bases yellowed, posterior pair more extensively pale; wings brownish yellow, restrictedly patterned with darker; stigmal trichia numerous; abdominal tergites yellow, with three brownish stripes, outer segments blackened male hypopygium with outer tergal lobes truncate, lateral angles produced into a spine; eighth sternite extended into a long pale tonguelike lobe that is provided with strong black setæ.

Male.—Length, about 11.5 millimeters; wing, 10; antenna, about 3.5.

Frontal prolongation of head yellow, dorsally brownish black, divided by a narrow orange line, nasus black; palpi black. Antennæ with scape yellowed basally, apex brownish black, remainder of antenna black; flagellar segments only feebly incised, longer than the verticils. Head orange, vertical tubercle light yellow, weakly notched; occipital brand elongate blackened, bordered by brown, at anterior end sending a paler brown arm to a much darker brown orbital spot at narrowest point of vertex; head with abundant black setæ.

Pronotal scutum orange yellow, narrowly darkened on sides. Mesonotal præscutum yellow, with three polished blue-black stripes that are very narrowly bordered by dull brownish black, the lateral stripes with this more expanded but not reaching margin, extreme lateral border of præscutum and scutum narrowly blackened; scutum yellow, each lobe with a single elongated mark that is narrowly bordered by dull black, apex of suture impressed and blackened; scutellum brown, parascutella yellow; mediotergite yellow, central area extensively but vaguely suffused with brown, posterior border narrowly dark brown, pleurotergite chiefly yellow, light brown below; præscutal vestiture virtually lacking, setæ longer on scutellum, long and pale on mediotergite. Pleura yellow, with more orange brown areas on anepisternum and ventral sternopleurite and meron. Halteres with stem obscure yellow, knobs dark brown, apex paler. Legs with coxæ and trochanters yellow; fore and middle femora black, bases yellowed, posterior femora obscure yellow with about the outer fourth blackened; tibiæ and tarsi black; claws toothed. Wings (Plate 1, fig. 1) brownish yellow, prearcular and costal borders pale yellow; stigma dark brown, oval; a paler brown cloud over anterior cord, narrower on posterior cord and over distal section of Cu_1 ; veins brown, more yellowed in prearcular field. Stigma with

about 35 strong macrotrichia, none in outer wing cells. Venation: Cell M_1 broadly sessile; m-cu at fork of M.


Abdomen yellow, tergites with three conspicuous brownish black stripes, the central one narrowly interrupted on basal ring; segments six to nine blackened, dististyles yellowed. Male hypopygium (Plate 2, fig. 26) with the tergite, *t*, black, transverse, posterior border with a small oval median notch, lateral lobes obliquely truncated, extended into a strong spine, with numerous small spicules on outer and inner margins of lobe. Outer dististyle, *d*, elongate, broadest on basal fourth, narrowed to the obtuse tip. Inner dististyle very large, beak and outer beak extensive, outer basal lobe large, yellowed, without blackened points; dorsal crest behind produced into hyaline membrane provided with a single seta; on apical margin of style above the outer basal lobe with a major bristle. Gonapophysis, *g*, with outer half expanded into a flattened blade, apex broadly obtuse, surface of blade with abundant microscopic tubercles. Eighth sternite, *8s*, or the membrane between it and the ninth sternite, produced into a long pale depressed-flattened tongue or lobe, broadest at base, narrowed on outer half, apex narrowly obtuse, outer margins with numerous strong black setæ.

Habitat.—India (Assam).

Holotype, male, Hkayam Boum, Manipur, altitude 8,500 feet, June 23, 1960 (*Schmid*).

From other regional members of the genus in which the male hypopygium bears an elongate tonguelike lobe on the eighth sternite, *Nephrotoma glossophora* is distinct in all details of coloration of the body and structure of the male hypopygium. The sternal lobe likewise is found in the somewhat similar *N. perhorrida* Alexander, likewise from Assam, which has all details of the hypopygium quite different, such as the conspicuously produced basistyle.

NEPHROTOMA STERNEMARGINATA sp. nov. Plate 1, fig. 2; Plate 2, fig. 27.

Size small (wing of male 9 millimeters); mesonotal præscutum yellow, with four brown stripes, the lateral pair darker, straight; mediotergite with a -shaped darkening; pleura yellow, vaguely patterned with orange; no occipital brand; legs brownish yellow to light brown; wings weakly suffused, stigma darker brown; abdominal tergites yellow with three dark brown stripes, subterminal segments blackened to form

a ring, hypopygium yellow; posterior border of eighth sternite convexly rounded with a conspicuous median notch, the adjoining area glabrous.

Male.—Length, about 10 to 11 millimeters; wing, 9 to 10.5; antenna, about 4 to 4.5.

Female.—Length, about 11 to 12 millimeters; wing, 10.5 to 11.

Frontal prolongation of head short, orange, yellow beneath; nasus long, yellow, with very long black setæ; palpi light brown. Antennæ of male relatively long; scape and pedicel light yellow, flagellum black, segments feebly incised, slightly exceeding the longest verticils. Head orange, more yellowed in front, apparently without an occipital brand; vertical tubercle rounded, entire.

Pronotum light yellow above, weakly darkened on sides. Mesonotal præscutum yellow, clearer on sides, disk with four opaque brown stripes, the lateral pair straight, darker, median line weakly darkened; scutum yellow, each lobe with two confluent black areas, the anterior one less than one-half as large as the posterior; scutellum orange; mediotergite yellow, with a \perp -shaped darkening, the stem slightly paler than the cross bar, this not reaching the lateral borders; vestiture of notum virtually lacking. Pleura yellow, vaguely patterned with orange on the ventral anepisternum. Halteres brownish black, base of stem narrowly yellowed. Legs with all coxæ light yellow, trochanters slightly darker yellow; femora brownish yellow, tips not or scarcely darkened; tibiæ light brown, tarsi a little darker, passing into black; claws toothed. Wings (Plate 1, fig. 2) weakly suffused; stigma oval, darker brown; veins brown. Stigmal trichia few, about eight or nine in number, none in outer wing cells. Venation: Cell M_1 narrowly to more broadly sessile; m-cu just beyond fork of M on vein M_4 .

Abdominal tergites yellow, with three dark brown stripes, the median one narrowly interrupted at posterior borders of segments; sternites light yellow; seventh and eighth segments in male blackened; central part of eighth sternite yellowed; hypopygium yellow. Ovipositor with cerci compressed-flattened, tips obtuse. Male hypopygium (Plate 2, fig. 27) with the tergite, t , narrowed outwardly, terminating in two lobes that are provided with black spicules; no lateral spines or extensions; lobes provided with dense short yellow setæ. Region of ninth sternite on either side with an elongate-triangular dark brown area. Outer dististyle, d , moderately broad, narrowed to the obtuse

tip. Inner dististyle with the beak unusually slender, lower beak broadly rounded, both beaks blackened; dorsal crest lacking but the region of the beak produced backward as a flattened blade, the posterior end very broadly obtuse; no spines or lobes in region of the outer basal lobe. Phallosome, *p*, with the small apophyses distinctive, appearing as very small pale horns, with a ventral oval pale plate. Eighth sternite, *8s*, distinctive, large, posterior margin convex, the median region with a deep U-shape emargination, the lobes and surrounding region entirely glabrous, the sparse more lateral setæ small and appressed.

Habitat.—India (Assam).

Holotype, male, Thangrain, Khasi-Jaintia, altitude 3,000 feet, April 22, 1960 (*Schmid*). Allotype, female, Dawki, Khasi-Jaintia, altitude 200 feet, April 8, 1960. Paratypes, 1 male, 3 females, with the allotype.

Nephrotoma sternemarginata is quite different from other regional members of the genus that have the lateral præscutal stripes straight, in the unusual characters of the male hypopygium, including the tergite, inner dististyle, phallosome and especially the distinctive eighth sternite which has suggested the specific name. The much larger *N. kaulbacki* Alexander, from high altitudes in eastern Tibet, has the eighth sternite somewhat the same but differs in all other details of hypopygial structure. I have provided figures of the hypopygium of this latter species and of several Indian members of the genus [*Rec. Indian Mus.* 50 (1952) 321–357].

NEPHROTOMA UMBONIS sp. nov.

Plate 1, fig. 3; Plate 2, fig. 28.

Size medium (wing of male 11.5 millimeters); mesonotal præscutum light yellow with four polish blue-gray stripes that are very narrowly bordered by dull black, including a larger area at anterior end of lateral stripe, pleura and postnotum light yellow; wings tinged with yellow, stigma pale brown; cell *M*₁ very broadly sessile; abdominal tergites yellow, patterned longitudinally with brown, segments seven and eight brownish black, hypopygium yellow; male hypopygium large, posterior border of tergite with three central lobes that are provided with blackened spicules, with additional blackened lateral blades; region of ninth sternite strongly elevated into a darkened suboval shield-shaped area; inner dististyle a simple yellow blade, without dorsal crest; gonapophyses darkened, appearing

as slender rods, apex of each a small rounded head with surface microscopically roughened; eighth sternite unmodified.

Male.—Length, about 12.5 millimeters; wing, 11.5; antenna, about 4.

Frontal prolongation of head broken; palpi light brown. Antennæ with scape and pedicel fulvous, first two flagellar segments light brown, succeeding segments black; flagellar segments moderately incised, longer than their verticils. Head clear light yellow, the rounded vertical tubercle and area behind it orange brown, the adjoining orbital region narrowly darker brown; no distinct occipital brand; vestiture of head short and inconspicuous, blackened, lacking on midregion.

Pronotum light yellow, anterior face of scutum infuscated. Mesonotal præscutum light yellow with four polished blue-gray stripes that are very narrowly bordered by dull black, more evident at anterior ends of intermediate stripes and especially at anterior part of lateral stripes but not quite reaching the margin; scutum light yellow, each lobe with a single blue-gray area, connected across the suture with lateral præscutal stripes by velvety black; scutellum weakly darkened, parascutella and postnotum light yellow; vestiture of notum very small and sparse, including the scutellum and mediotergite. Pleura and pleurotergite light yellow, ventral anepisternum and sternopleurite vaguely more orange. Halteres with stem yellow, knob weakly darkened. Legs with coxæ and trochanters yellow; fore femora extensively darkened, bases pale, middle and hind femora brownish yellow, clearer basally, tips narrowly darkened, tips blackened; tibiæ light brown, apices darker; tarsi black; claws toothed. Wing (Plate 1, fig. 3) tinged with yellow, prearcular and coastal regions clearer yellow; stigma pale brown; veins brown. Stigma with about 20 trichia, none in other cells. Venation: Cell M_1 very broadly sessile; m-cu at point of departure of vein M_4 .

Abdominal tergites yellow, patterned longitudinally with brown, segments seven and eight brownish black; hypopygium large, yellow. Male hypopygium (Plate 2, fig. 28) with the tergite, *t*, transverse, yellow, the central area of posterior border produced into three lobes that are provided with spicules, with a further more blackened lateral blade, its cephalic inner angle provided with a very few similar points. Region of ninth sternite, *9s*, produced into an elevated suboval structure, heavily blackened to form a conspicuous shield-shaped area.

Basistyle, *b*, with mesal face at base of dististyles produced into an irregular structure, as figured. Outer dististyle, *d*, relatively narrow, tip obtuse. Inner dististyle a simple yellow blade provided with sparse long yellow setæ; beak simple; no dorsal crest; outer basal lobe a small blade provided with a few scattered setæ. Phallosome, *p*, with gonapophyses darkened, appearing as slender rods, narrowed outwardly, the small heads oval, surface microscopically roughened. Eighth sternite darkened, posterior border convexly rounded, median area pale but not otherwise modified.

Habitat.—India (Assam).

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

Nephrotoma umbonis is generally similar to species such as *N. consimilis* (Brunetti), differing from all regional allies in the hypopygial structure, including the tergite, ninth sternite, both dististyles and the gonapophyses, all of which present distinctive features.

TIPULA (BRITHURA) NIELSENIANA sp. nov.

Plate 1, fig. 4; Plate 3, fig. 29.

Size large (wing of male over 20 millimeters); mesonotal præscutum dark brown laterally, disk with four lighter brown stripes; femora light brown with a narrow virtually terminal yellow ring, preceded by a subequal brown annulus; wings brown, variegated by sparse pale spots; costa dilated opposite the dark brown stigma, this broadly encircled by yellow, the color extended backward through cell 1st M_2 ; male hypopygium with the tergite only moderately arched or elevated, medially produced into two flattened disklike blades; basistyle produced apically into a point; region of ninth sternite only moderately produced.

Male.—Length, about 25 to 27 millimeters; wing, 21 to 22.5 millimeters; antenna, about 5.8 to 6.

Female.—Length, about 32 millimeters; wing, 26.

Frontal prolongation of head brown, nasus elongate, with short setæ; palpi dark brown, terminal segment black. Antennæ dark brown, pedicel more orange; scape very long, flagellar segments cylindrical, with a delicate silvery bloom, basal enlargements small, longest verticils nearly twice the segments. Head dark brown, orbits narrowly paler; vertical tubercle conical.

Pronotum above dark brown, paler brown on sides. Mesonotal præscutum with the ground dark brown, especially the

lateral borders; disk with four lighter brown stripes that are narrowly and insensibly bordered by darker; scutal lobes extensively light brown, bordered by darker; scutellum and postnotum grayish brown, parascutella and katapleurotergite paler brown, anteriorly with a silvery sheen; vestiture of mesonotum long and conspicuous, lacking on pleurotergite. Pleura brown, variegated by paler brownish gray areas; metapleura yellowed; propleura and sternopleurite with long setæ. Halteres with stem light brown, base orange, knob dark brown, the extreme tip brightened. Legs with coxæ and trochanters brown, the former with long setæ; femora light brown, tip with a narrow virtually terminal obscure yellow ring, preceded by a subequal brown annulus; tibiæ and tarsi light brown, outer three segments blackened; claws of male with a strong acute tooth at near midlength. Wings (Plate 1, fig. 4) brown, variegated by sparse pale spots, prearcular and costal regions more yellowed; stigma subcircular, dark brown, extended into the dilated costal swelling, behind the stigma extensively yellowed, reaching the posterior end of cell 1st M_2 , including the broad bases of all outer radial cells and nearly the anterior half of cell R; irregular pale marks in cell M, including an outer more whitened one, pale areas in cubital and anal cells reduced; veins yellowed. Macrotrichia of veins small, on outer end of R_s , R_{2+3} , R_3 , outer half of R_{4+5} and outer branches of M. Venation: Sc_1 strongly preserved, as in the subgenus; cell 1st M_2 pentagonal; petiole of cell M_1 shorter than m.

Abdominal tergites light orange brown, brighter sublaterally, narrowly bordered by blackened areas on anterior part, more gray pruinose on posterior portion of each segment; basal sternites orange brown, fifth to eighth darker; hypopygium large, bright brownish orange, not darkened as in *crassa*. Male hypopygium (Plate 3, fig. 29) with posterior border of the arched tergite, *t*, gently emarginate, the central area produced into two compressed-flattened subcircular blades that are directed caudad, the central part of the produced area with golden yellow setæ; surface of tergite with relatively short yellow setæ, not forming groups or brushes. Tergite and basistyle-sternite fused on cephalic portion, the region of basistyle produced into a triangular point. Ninth sternite, $9s$, oblique, the central region strongly elevated into sclerotized ridge, its anterior or upper end further produced into a shiny knob. Dististyles, *d*, heavily sclerotized, irregular in outline,

as figured, the outer style larger; inner style with two separate areas of blackened setæ on disk and longer yellow ones near outer basal part. Eighth sternite, 8s, unarmed, with short setæ.

Habitat.—India (Assam).

Holotype, male, Sirhoi Kashong, Manipur, altitude 7,500 feet, June 9, 1960 (*Schmid*). Allotopotype, female, pinned with type. Paratopotypes, 5 ♂ 2 ♀, altitude 6,000 to 7,500 feet, June 6, 1960 (*Schmid*).

This striking fly is named in honor of my long time friend and colleague, Peder Nielsen, of Silkeborg, Denmark, Dean of the European students of the Tipulidæ. It is quite distinct from the other regional species by the structure of the hypopygium and by details of coloration of the body and wings. The most similar species is *Tipula* (*Brithura*) *crassa* (Edwards) (synonym, *graveleyi* Brunetti), which has the hypopygium entirely distinct. The male genitalia of the allied Indian species of *Brithura* have been described and figured by Edwards [Ann. Mag. Nat. Hist. (8) 18 (1916) 262–265, figs. 10–12].

TIPULA (BELLARDINA) SÉGUYANA sp. nov. Plate 1, fig. 5; Plate 3, figs. 30, 31.

General coloration of body dull black; abdominal segments two to four fiery orange; appendages black; wings almost uniformly blackened.

Male.—Length, about 18 to 19 millimeters; wing, 14.5 to 15.5; antenna, about 4.5 to 4.6.

Female.—Length, about 23 to 24 millimeters; wing, 18 to 18.5.

Head, including all appendages, black; nasus small.

Thorax entirely dull black; mesonotum with conspicuous erect black setæ, longest on mediotergite. Halteres blackened, extreme base of stem vaguely paler. Legs uniformly black. Wings (Plate 1, fig. 5) strongly and almost uniformly blackened, prearcular and costal regions more saturated; stigma oval, brownish black; restricted obliterative areas involving the veins before stigma, end of Rs and basal sections of M_{1+2} and M_3 ; veins brown, some more blackened, including those beneath the stigma. Veins unusually glabrous, beyond cord including R_{2+3} and bases of R_3 and R_{4+5} ; a very few trichia on petiole of cell M_1 and base of vein M_1 . Venation: r-m at or just before fork of Rs; vein R_{4+5} strongly decurved

to wing tip; petiole of cell M_1 subequal to or shorter than m ; $m-cu$ at or close to fork of M_{3+4} , in cases just before the fork.

Abdomen black, tergites two to four and sternites two and three fiery orange, lateral tergal borders narrowly blackened, posterior margin of fourth tergite more broadly blackened. Ovipositor with genital shield and cerci blackened. Male hypopygium (Plate 3, fig. 30, 31) with the tergite, t , small, posterior margin nearly truncate, with abundant black setæ; ventral surface with a median compressed-flattened yellow blade. Dististyles, d , as figured, very unequal, the large outer style more or less oval in outline, slightly bilobed outwardly; inner style small, distal margin produced into an outer acute spine and an inner slightly stouter point, near tip with a few very long setæ; inner margin with a longer yellow knob provided with numerous black setæ. Phallosome, p , with the gonapophyses very slender, shorter than the ædeagus. Eighth sternite, $8s$, large, its area five or more times that of the tergite; posterior border narrowed terminating in two widely separated lobes, the base of the emargination with a further U-shaped notch.

Habitat.—India (Assam).

Holotype, male, Tairenpokpi, Manipur, altitude 4,000 feet, May 31, 1960 (*Schmid*). Allotype, female, pinned with type. Paratypes, 1 male, Sirhoi Kashong, Manipur, altitude 7,500 feet, June 9, 1960 (*Schmid*); 1 female, Chingsao, Manipur, altitude 3,800 feet, June 13, 1960 (*Schmid*).

This striking fly is dedicated to Dr. Eugène Séguy, Director of the Museum National d' Histoire Naturelle, Paris, distinguished student of the Diptera and long-time personal friend. The only allied species is *Tipula* (*Bellardina*) *phædina* Alexander, of northern India and western China, which is distinct in the entirely different coloration of the body and wings and in hypopygial structure. The subgeneric position of *phædina* has been placed in question. I described it in *Brithura* Edwards (1927) and it was transferred to *Nippotipula* Matsumura by Edwards (1932) and retained therein by Alexander (1935). It seems more logical to place these two flies in *Bellardina* Edwards, which now is known to include many diverse elements in eastern Asia and in the New World. It seems probable that the still poorly known *Tipula pluto* Brunetti will likewise be found to be related to *phædina* and *séguyana*.

TIPULA (BELLARDINA) VAILLANTIANA sp. nov. Plate 1, fig. 6; Plate 3, fig. 32.

Belongs to the *marmoratipennis* group; size medium (wing of male 17 millimeters); mesonotal præscutum grayish white, with four brownish gray stripes that are narrowly bordered by dark brown; a continuous brown central stripe on posterior notum; femora brownish yellow, tips inconspicuously brown, claws simple; wings whitened, with a pale brown marbled pattern, including a major postarcular darkening; Rs unusually short, a trifle less than twice R_{2+3} ; male hypopygium with lateral tergal lobes subcircular, densely provided with spicules; outer dististyle narrow, shaped like a boomerang, inner style bearing a lateral blackened hook; eighth sternite terminating in two widely separated slender lobes that terminate in brushes of long yellow setæ.

Male.—Length, about 14 millimeters; wing, 17; antenna, about 3.

Frontal prolongation of head yellow above, light gray distally and on nasus, sides narrowly darkened; palpi brown, terminal segment brownish orange. Antennæ short; scape and pedicel yellow, flagellum brownish yellow, outer segments brown; segments shorter than the verticils. Front and anterior vertex silvery white, remainder brownish yellow, center of vertex with a light brown vitta; setæ of dorsum lacking on midline, short laterally, black long and abundant on genæ.

Pronotal scutum light brown, restrictedly variegated with yellow, scutellum yellow. Mesonotal præscutum with ground grayish white, disk with four brownish gray stripes that are narrowly but conspicuously bordered by darker brown, anterior ends slightly darker; scutum grayish white, each lobe with two confluent brown areas, narrowly and inconspicuously bordered by darker brown; scutellum and mediotergite light brown, light gray pruinose, with a conspicuous brownish black central stripe. Pleura and pleurotergite yellow, restrictedly patterned with brown on propleura and dorsal anepisternum; dorsopleural membrane obscure yellow. Halteres with stem yellow, knob brown, apex pale. Legs with coxæ and trochanters yellow; femora brownish yellow, tips inconspicuously brown; tibiæ and tarsi brown passing into black; claws simple. Wings (Plate 1, fig. 6) narrow, long-petiolate; ground whitened, with a pale brown marbled pattern on disk, including areas in outer ends of cells R and M, bases of cells M_1 and 2nd M_2 , and marginal clouds on all longitudinal veins

with the exception of R_{4+5} ; a major postarcular brown darkening; cell C brownish yellow, Sc pale brown; stigma light yellow, brown at either end; veins brownish yellow, darker in the patterned parts. Longitudinal veins beyond cord chiefly glabrous, present on outer three-fourths of R_{4+5} and on M_1 and M_2 ; a long series of trichia on basal fourth of 1st A and on the very long prearcular section of the vein. Venation: Rs unusually short, a trifle less than twice R_{2+3} ; petiole of cell M_1 shorter than m.

Abdomen obscure yellow, outer segments more darkened, hypopygium brownish yellow. Male hypopygium (Plate 3, fig. 32) with posterior border of ninth tergite, t , elevated, central part nearly truncate, with numerous blackened spicules; lateral tergal arms subcircular, with dense spicules. Outer dististyle, d , relatively narrow, shaped like a boomerang, tipped with a few black spicules, on face of outer half with a low flange that bears about eight to ten blackened setæ, the outer ones small and spiculoid; outer margin of style with long delicate yellow setæ. Inner dististyle irregular in conformation, as shown. Eighth sternite sheathing, terminating in two widely separated slender lobes provided with brushes of long yellow setæ.

Habitat.—India (Assam).

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

The species is named for Dr. François Vaillant, of Montbonnot-Saint-Martin, Isère, France, student of the taxonomy and biology of the crane flies of Europe and Algeria. The most similar species is *Tipula* (*Bellardina*) *stylostena* Alexander of the western Himalayas, which has somewhat similar narrow wings, differing in the long Rs and in all details of structure of the male hypopygium, particularly the tergite and both dististyles. Previously the species of the *marmoripennis* group had been placed in the subgenus *Lunatipula* but do not appear to belong there. I am now referring these species to *Bellardina* but it seems possible that a new subgeneric group will be required for their reception.

TIPULA (NIPPOTIPULA) EDWARDSOMYIA sp. nov. Plate 1, fig. 7; Plate 3, figs. 33, 34.

Size medium (wing of male up to 19 millimeters); mesonotal præscutum with four dark brown stripes that are separated by three narrow equidistant yellow interspaces; pleura variegated dark brown and paler, katapleurotergite narrowly

silvery; femora brownish yellow with a nearly terminal darker ring, claws simple; wings light brown, variegated with dark brown and whitened areas; abdomen deep reddish brown, hypopygium dark brown; ninth tergite bilobed; outer dististyle oval, its mesal edge produced into a small glabrous blade.

Male.—Length, about 26 to 27 millimeters; wing, 17.5 to 19; antenna, about 6 to 6.2.

Frontal prolongation of head dark brown, without nasus; palpi brownish black, terminal segment black. Antennæ with scape and pedicel brownish yellow, flagellum black; flagellar segments moderately incised, subequal to or a little shorter than the longest verticils. Head yellowed, vertex with a conspicuous central brown stripe, sides of vertex paler brown, slightly gray pruinose on genæ.

Pronotum medially broadly brownish black, sides yellow. Mesonotal præscutum with four dark brown stripes, the intermediate pair narrow, laterals slightly wider, merging with further dark brown areas to appear much broader, the three narrow intervening obscure yellow stripes subequal and about equally spaced; narrower and more clearly defined than in *anastomosa*; lateral præscutal borders more extensively light yellow; scutal lobes dark brown, median area very narrowly yellow; scutellum brownish gray, more infuscated at base, parascutella darkened; mediotergite dark brown on anterior half, posteriorly with two nearly confluent yellow areas; pleurotergite dark brown, the elevated katapleurotergite lined longitudinally with silvery, the lower margin more yellowed; mesonotum with abundant long erect setæ, as in the subgenus. Pleura chiefly dark brown, more intensely so on the propleura and anepisternum, the dorsal edge blackened; sternopleurite paler brown, narrowly lined with whitish yellow; meron and metapleura chiefly pale yellow; mesepisternum with abundant long yellow setæ. Halteres with stem light brown, knob dark brown. Legs with coxæ light brown, more yellowed apically; trochanters obscure yellow; femora brownish yellow, with a nearly terminal darker brown ring; tibiæ light brown, tips darker; tarsi black; claws simple. Wings (Plate 1, fig. 7) light brown, variegated with dark brown and whitened areas; stigma dark brown; slightly paler brown areas in bases of cells R and M, origin and fork of Rs, outer end of cell 1st M₂ and outer ends of radial cells; conspicuous whitened marks before and beyond

stigma and across base of cell 1st M_2 small pale marginal spots in cells R_5 to M_3 , with two others in cell 1st A; cells C and Sc deeper yellow; veins light brown, more yellowed in the brightened fields. Macrotrichia on R_{2+3} , all but base of R_{4+5} , M_1 and sparsely on M_2 ; Rs with abundant trichia, sparsely on outer end of M. Venation: Petiole of cell M_1 subequal to or shorter than m; m-cu at from one-half of two-thirds M_{3+4} .

Abdomen elongate, deep reddish brown, hypopygium dark brown. Male hypopygium (Plate 3, fig. 33) with the tergite, *t*, small, posterior border with a U-shaped notch forming two rounded lobes that are densely provided with short dark-colored setæ; on ventral surface with two flattened plates that are produced medially into a blade. Dististyles, *d*, not greatly unequal in size, the outer style about one-half more extensive than the inner, oval in outline mesal edge produced into a small glabrous blade, its tip obtuse; disk with setæ and microscopic blackened spicules, longer and more conspicuous apically near the beak; inner style with the beak slender, the outer portion or heel obtuse, margin with dense blackened setæ and a few longer bristles. Gonapophyses appearing as slender rods, the slightly dilated tips obtuse. Eighth sternite with apical margin simple or virtually so.

Habitat.—India (Assam).

Holotype, male, Tairenpokpi, Manipur, altitude 4,000 feet, May 31, 1960 (Schmid). Paratype, male, Marou, Manipur, altitude 4,000 feet, August 14, 1960 (Schmid).

This fine crane fly is named for the late Fred Wallace Edwards, outstanding students of the Nematoceros Diptera of the World. It is evidently the same fly that was recorded as being *Tipula* (*Nippotipula*) *anastomosa* Edwards from Shillong, Khasi Hills, Assam [Stylops 1 (1932) 239]. Edwards records this specimen, a female, as having been reared from a pupa found in April, 1924, by T. B. Fletcher, occurring in moss beneath a stone. The discovery of the male sex by Schmid indicates a species that is entirely distinct from *anastomosa*, the hypopygial characters of the two flies being quite distinct.

I have illustrated the male hypopygium of *anastomosa* for comparison, this being based on a metatype received in exchange from Edwards, taken at Bukit Kutu, Selangor, 3,500 feet, April 18, 1926 by H. M. Pendlebury [Stylops 1 (1932) 239;

Bull. Raffles Mus., Singapore, Straits Settlements 7 (1932) 56]. The actual type was from Kedah Peak, Kedah, Federated Malay States, altitude 3,200 feet, December, 1915, taken by C. Boden Kloss [Jour. Fed. Malay States Mus. 14 (1928) 132]. Male hypopygium (Plate 3, fig. 34) with the ninth segment cylindrical, tilted upward at an angle to the eighth sternite. Ninth tergite, *t*, relatively small, narrow, median region slightly produced, obtuse; lateral angles produced caudad and a little inwardly as more flattened blades provided with setæ; mid-area at base of tergite with a few very long setæ. Dististyles, *d*, very dissimilar, the outer style at least three times as extensive as the inner, appearing as a flattened blade, apex narrowed; disk with numerous blackened spicules, more concentrated and conspicuous on a basal lobe; inner style terminating in a flattened blade. Eighth sternite, *8s*, sheathing, posterior border emarginate, lateral lobes with pale glabrous membrane, in the notch with a bilobed membranous structure.

TIPULA (NIPPOTIPULA) KERTÉSZIANA sp. nov. Plate 1, fig. 8; Plate 4, figs. 35, 36.

Size large (wing of male 29 millimeters); mesonotal præscutum yellow with four narrow brown stripes that are very narrowly and insensibly bordered by darker brown; pleura yellow with a broad dark brown longitudinal stripe; legs brownish yellow, femora unpatterned; wings broad, yellow, handsomely patterned with dark and paler brown; abdomen light cinnamon brown, outer segments slightly darker; male hypopygium with ventral part of tergite produced caudad into a powerful compressed blade; outer dististyle large, bilobed, inner style a slender blackened rod.

Male.—Length, about 37 millimeters; wing, 29; antenna, about 7.8.

Frontal prolongation of head brownish yellow, tufted with sparse long yellow setæ, nasus lacking; palpi light brown, terminal segment passing into black. Antennæ with scape and pedicel light yellow, flagellum dark brown; flagellar segments relatively short, moderately incised; verticils yellow, about one-third longer than the segments. Head yellow; vertical tubercle lacking.

Pronotum yellow, with three brown areas, the central one very broad, laterals very small. Mesonotal præscutum yellow with four narrow brown stripes that are very narrowly and insensibly bordered by darker; scutum yellow, each lobe with

four brown areas that are narrowly bordered by darker brown, lateral callosities darkened; scutellum brownish yellow, parascutella clear yellow; mediotergite light brown, posterior half with two subcircular more yellowed areas without setæ; pleurotergite with anapleurotergite dark brown, the protuberant katepaleurotergite light yellowish silvery; mesonotum with very long erect yellow setæ. Pleura obscure yellow, with a broad dark brown dorsal stripe, the ventral sternopleurite more weakly darkened; dorsopleural region clear light yellow; conspicuous yellow setæ on propleura, dorsal sternopleurite and metapleura. Halteres light yellow, more greenish before the knobs. Legs with coxæ yellow, with long yellow setæ, outer face darkened; trochanters yellow; femora brownish yellow, not or scarcely darkened; tibiæ and tarsi brownish yellow, with yellow setæ, terminal segment darkened; claws toothed. Wings (Plate 1, fig. 8) broad, yellow, handsomely patterned with dark and paler brown, the darker areas at arculus, origin of R_s , at and near fork of R_s , cord and outer end of cell 1st M_2 ; marginal darkenings from cell R_2 to the axilla, interrupted by yellow in outer ends of cells R_5 , 1st A and narrowly in the medial cells; a broad seam along vein 2nd A in cell 1st A, axilla narrowly darkened; stigma oval, paler brown; veins dark brown in the patterned areas, more brownish yellow in the ground. Venation: Basal section of R_{4+5} short; petiole of cell M_1 nearly one-half m; m-cu at near midlength of M_{3+4} .

Abdomen elongate; light cinnamon brown, lateral borders of both tergites and sternites narrowly light gray, hypopygium slightly more darkened. Male hypopygium (Plate 4, figs. 35, 36) large, subglobular; tergite and sternite chiefly fused, the tergal sutures extending about to midlength; basistyle and sternite fused. Tergite, *t*, narrowed outwardly, apical margin virtually truncate, with a very small setiferous lobe at each lateral angle; from ventral surface of tergite protrudes caudad a powerful heavily sclerotized compressed blade, narrowed outwardly to a point. Dististyles, *d*, very unequal; outer style very large, bilobed, upper lobe densely covered with long silken setæ on outer face, apex with abundant blackened spicules, the tip a small sclerotized point; lower lobe subequal in size, outer surface and margin with dense yellow setæ and abundant blackened spicules, the cephalic angle produced into a lobe; inner style a slender blackened rod from a dilated setiferous base, the structures of the two sides of the organ

apparently slightly asymmetrical. Gonapophyses very long and slender. Eighth sternite unmodified except for a small tubercle on either side.

Habitat.—India (Assam).

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

This fine species or *Tipula* is named in honor of Koloman Kertész, distinguished student of the Diptera, whose "*Catalogus Dipteriorum*" has been the single most important work for any student of the World Tipulidæ. It is quite different from all other Asiatic members of the subgenus, especially in the hypopygial structure but including also the body, wing and leg coloration. The elongate blade that extends from the ninth tergite of the hypopygium is entirely distinctive.

TIPULA (SCHUMMELIA) COSTOLUTEA sp. nov. Plate 1, fig. 9; Plate 4, fig. 37.

Allied to *argentacea*; mesonotal præscutum yellow with four brown stripes that are slightly bordered by darker brown; a darkened central line on scutum and scutellum, katapleurotergite silvery; pleura yellow with a dorsal brown longitudinal stripe; halteres obscure yellow; wings weakly tinged with brown, restrictedly patterned with darker brown and whitened areas, prearcular region and costal field light yellow; cell M_1 very deep; male hypopygium with tergite broad, emarginate medially, each lobe with a small fingerlike lobule; ninth sternite with two very conspicuous darkened lobes that are directed dorsad, densely covered with short setulæ; outer dististyle very long and slender, fully five times as long as its greatest diameter, provided with long setæ, including a series of exceedingly long bristles on outer margin; inner dististyle with the two beaks widely separated.

Male.—Length, about 12.5 millimeters; wing, 12; antenna, about 4.

Frontal prolongation of head above yellow, including nasus, darker on sides; palpi with proximal three segments brown, tips paler, terminal segment black. Antennæ with three proximal segments yellow, the pedicel lighter, succeeding segments very insensibly bicolored, the small basal enlargement slightly darker than the apex; verticils shorter than the segments. Head yellow, vertex with a brown central stripe, narrowed behind on the occiput and cervical region; vertical tubercle with a capillary still darker vitta.

Ponotum brown medially, yellow on sides. Mesonotal præscutum yellow, with four brown stripes, the intermediate pair more grayish brown, all slightly bordered by darker brown, posterior interspaces clearer yellow; scutal lobes pale brown medially, with a central brown line that continues backward over the otherwise yellow scutellum, parascutella brown; mediotergite yellow, with a vague pale brown clouding on either side of midline; pleurotergite yellow, the katapleurotergite light silvery; setæ of scutellum and mediotergite black, conspicuous. Pleura yellow, with a broad brown dorsolongitudinal stripe that passes beneath the halteres. Halteres obscure yellow throughout. Legs with all coxæ and trochanters light yellow; femora light brown, tips broadly blackened, remainder of legs black; claws toothed. Wings (Plate 1, fig. 9) weakly tinged with brown, prearcular region and cells C and Sc light yellow; a restricted darker and pale pattern, the dark including the elongate stigma and brown seams on M, Cu and 2nd A; whitened areas before and beyond stigma, across base of cell 1st M₂, with other brightenings in outer end of cell M, two in cell 1st A and one in 2nd A; veins brown, more brownish yellow in the brightened fields. Venation: Rs shorter than m-cu; cell M₁ very deep, the petiole very short, about one-third m; m-cu just before fork of M₃₊₄.

Abdomen brownish yellow, basal tergites clearer yellow, the sides light brown, being a continuation of the thoracic pleural stripe; basal sternites yellow; hypopygium slightly darker. Male hypopygium (Plate 4, fig. 37) with the tergite, *t*, transverse; posterior border with a deep U-shaped notch, lobes broad, on either side produced into a small fingerlike lobe. Ninth sternite, *9s*, with two very conspicuous darkened lobes that are directed dorsad, densely covered with short setulæ; no blackened setæ as in some related species. Apex of basistyle, *b*, produced beyond the insertion of the dististyles as a flattened subquadrate blade, the angles obtuse. Outer dististyle, *d*, very long and slender, the length fully five times the greatest diameter near base; outer setæ long, the more proximal ones short; outer margin with a series of about 15 very long bristles, the longest nearly one-half as long as the style itself. Inner style massive, subquadrate, both beaks blackened, widely separated, the lower one shorter and obtuse, outer end rounded. Eighth sternite with posterior border gently convexly rounded, with relatively sparse vestiture and without lobes.

Habitat.—India (Assam).

Holotype, male, Serrarim, Khasi-Jaintia, altitude 5,500 feet, October 7, 1960 (Schmid).

Tipula (*Schummelia*) *costolutea* is readily told from other species that are related to *T. (S.) argentacea* Alexander, *T. (S.) argentsigma* Alexander, *T. (S.) atrosetosa* Alexander, *T. (S.) tanyrhina* Alexander, and others, by the pattern of the wings and structure of the male hypopygium. The very long and slender outer dististyle, with modified setæ, and the massive lobes of the ninth sternite are noteworthy.

TIPULA (SCHUMMELIA) DURGA sp. nov.

Plate 1, fig. 10; Plate 4, fig. 38.

Size medium (wing of male 11.5 millimeters); mesonotal præscutum with four brown stripes that are narrowly bordered by slightly darker brown; median region of scutum and scutellum darkened, mediotergite brown, with a central yellow line; pleura light yellow with a dorsal brown stripe; legs dark brown; wings pale brown, variegated by whitened areas; veins with unusually long and abundant macrotrichia on virtually all veins, including crossveins r-m, m and m-cu; m-cu just beyond midlength of M_{3+4} ; abdominal tergites brown, sternites yellowed; male hypopygium with tergite broad, posterior border emarginate, with weak blackened denticles; inner dististyle with beak very slender; eighth sternite unmodified.

Male.—Length, about 11.5 millimeters; wing, 11.5; antenna, about 3.

Frontal prolongation of head above, including the long nasus, clear light yellow, nasus tufted with long yellow setæ; sides of prolongation dark brown, paling to yellow beneath; palpi brownish black. Antennæ with scape and pedicel whitened, with a slight greenish tinge; succeeding segments darkened, tinged with green, basal enlargements scarcely indicated but segments narrowed outwardly; verticils unilaterally distributed, a little shorter than the segments. Front and area surrounding the antennal bases light yellow; posterior vertex obscure yellow, broadly brown medially; vertex with abundant short black setæ.

Pronotum yellow, median region of scutum and sides of scutellum, with the anterior pretergites, infuscated. Mesonotal præscutum with four brown stripes that are narrowly bordered by slightly darker brown, sides broadly light yellow, interspaces infuscated in front, becoming more yellowed behind; scutal lobes dark brown, median area darkened; scutellum yellow, center broadly brown, parascutella brown; mediotergite

brown with a narrow but conspicuous central yellow line that does not reach the posterior border, pleurotergite yellow, posterior end of katapleurotergite dark brown; sparse but conspicuous erect setæ on mediotergite, scutellum and præscutal interspaces. Pleura light yellow with a dorsal brown stripe from the cervical region backward across the propleura, covering most of the anepisternum, the lower dorsopleural membrane narrowly darker brown; a restricted pale brown cloud on center of sternopleurite. Halteres with stem pale brown, base and apex of knob light yellow, base of the latter pale brown. Legs with coxæ and trochanters yellow; remainder of legs dark brown, bases of femora narrowly yellowed, the dark color produced chiefly by very abundant black setæ; claws toothed. Wings (Plate 1, fig. 10) pale brown, variegated by whitened areas before and beyond stigma, across base of cell 1st M_2 , near outer end of cell M , and marginally in the anal cells; less evident whitenings near outer ends of cells R_3 to M_3 ; stigma large, brown; veins brown. Veins with unusually long and abundant macrotrichia, these including all longitudinal veins beyond arculus and also all veins comprising the cord and outer end of cell 1st M_2 , that is, crossveins $r-m$, m and $m-cu$; a series of trichia on the prearcular anal vein. Venation: R_s subequal to R_{2+3} ; cell M_1 long, its petiole about one-half m ; $m-cu$ just beyond midlength of M_{3+4} .

Abdominal tergites brown, incisures paler, sternites yellowed, hypopygium brownish yellow. Male hypopygium (Plate 4, fig. 38) with the tergite, t , transverse, posterior border broadly emarginate, narrowly thickened; lateral lobes obtuse, glabrous; median region very slightly elevated; a small ventral inwardly-directed blackened tooth or lobule on inner base of each lobe; a detached unpaired structure that appears to pertain to the tergite is shaped like a bowling pin, yellow, densely covered with short yellow setæ. Apex of basistyle, b , produced slightly beyond point of insertion of dististyles. Outer dististyle, d , moderately long, about equal to the inner style, relatively narrow, its length about five times the greatest width, provided with long setæ. Inner style with beak very slender, the lower beak beneath terminating in an acute black tooth, the margin between the two points narrowly blackened, with a subtending narrow blackened lower ledge that is provided with a few strong setæ; outer surface of style with long yellow setæ. Phallosome, p , with ædeagus slender, blackened, with very

narrow subtending flanges; gonapophyses appearing as fleshy setiferous cushions. Eighth sternite with posterior border truncate to very insensibly convex, glabrous, the sparse small setæ removed from the margin.

Habitat.—India (Assam).

Holotype, male, Borghat, Khasi-Jaintia, altitude 200 feet, December 21, 1959 (*Schmid*).

Tipula (*Schummelia*) *durga* is generally similar to species such as *T. (S.) continuata* Brunetti, *T. (S.) hampsoni* Edwards, *T. (S.) xanthopleura* Edwards, and others, differing in the venation and trichiation of the wings and in the hypopygial structure. Attention is called to the unusual degree of trichiation of the wing veins in several of these species, including not only the longitudinal veins but also crossveins r-m and m, and in cases also m-cu.

TIPULA (SCHUMMELIA) ISHIDANA sp. nov.

Plate 1, fig. 11.

Female.—Length, about 15 millimeters; wing, 15; antenna, about 3.

Frontal prolongation of head light yellow above, including the short nasus, sides dark brown beneath; basal three segments of palpi greenish brown, terminal segment black. Antennæ with scape and pedicel light yellow, first flagellar segment dark brown, remaining segments bicolored, black basally, the broad tips yellow, terminal segment small, uniformly darkened. Head yellow; anterior vertex with a narrow dark brown mark extended forward on to the very low vertical tubercle; sides of genæ weakly darkened, orbits yellow; setæ of vertex small and inconspicuous.

Pronotum medially clear light yellow, sides very slightly darkened. Mesonotal præscutum with sides broadly light yellow, disk with four brown stripes that are narrowly bordered by slightly darker brown, interspaces dusky; scutum restrictedly yellow medially behind, lobes brown, the areas bordered by darker brown; scutellum testaceous yellow medially, the sides and centers of parascutella medium brown; mediotergite brown, a broad central stripe and the posterior border more yellowed; pleurotergite obscure yellow, the elevated katapleurotergite silvery white. Pleura yellow, patterned with dark brown on propleura, ventral sternopleurite and lower pteropleura; it is possible that the anepisternum likewise is more or less darkened, this region having been destroyed in pinning. Halteres dusky,

base of stem narrowly greenish yellow, apex of knob broadly light yellow. Legs with coxæ and trochanters yellow; femora brownish yellow, outer ends narrowly blackened, the extreme genua greenish yellow; tibiæ and tarsi black. Wings (Plate 1, fig. 11) with cells basal of cord chiefly brown, variegated by restricted cream yellow spots, including a complete narrow oblitative band from the prestigmal area across cells R and 1st M_2 into bases of cells M_3 and M_4 ; other areas at origin of Rs, arculus, two small marks in cell M, the outer one passing into cell Cu; a small pale spot in cell 1st A in base and a larger marginal one near vein 2nd A; beyond cord the outer radial cells chiefly darkened, base of cell R_2 yellow; cell M_1 chiefly pale; outer end of cell 1st M_2 and veins narrowly seamed with brown, including also vein 2nd A, most of cell M and the axillary region; stigma elongate, dark brown; cells C and Sc more brownish yellow; veins brown, those in costal region more yellowed. Most veins beyond arculus with long conspicuous trichia, including r-m, m and m-cu. Venation: Rs relatively long, exceeding R_{2+3} and subequal to or a little shorter than the very long m-cu; petiole of cell M_1 longer than m; m-cu at or just beyond fork of M_{3+4} .

Abdomen with basal tergites obscure yellow, outer segments brownish black; incisures and especially the bases of the segments narrowly paler, sternites more obscure yellow. Ovipositor with cerci long and slender, straight.

Habitat.—India (Assam).

Holotype, female, Hkayam Boum, Manipur, altitude 8,500 feet, June 22, 1960 (*Schmid*).

I take pleasure in dedicating this attractive fly to Hiroshi Ishida, student of the Japanese Nematoceros Diptera, and author of the very valuable and useful Catalogue of the Japanese Tipulidæ, 1955 to date. It is related to various other species in the Himalayan fauna, all having a conspicuous silvery area on the thoracic katapleurotergite, such species including *Tipula* (*Schummelia*) *argentacea* Alexander, *T. (S.) argentsigna* Alexander, and others. Compared with all of these it is readily told by the coloration of the body and especially by the striking pattern of the wings.

TIPULA (SCHUMMELIA) LINDNERIANA sp. nov. Plate 1, fig. 12; Plate 4, fig. 39.

Size small (wing of male 10 millimeters); mesonotal præscutum with three very broad yellowed stripes, scutellum brownish yellow, pleura light yellow; femora obscure yellow, tibiæ and tarsi black, claws of male simple; wings light brown,

patterned with darker brown on m-cu and distal section of Cu_1 ; cell 1st M_2 irregularly pentagonal, m being the shortest element, m-cu shortly before fork of M; male hypopygium with tergite produced caudad into a median lobe, its apex expanded and emarginate, with abundant setulæ; phallosome with gonapophyses appearing as flattened glabrous blades that are longer than the ædeagus.

Male.—Length, about 11 millimeters; wing, 10; antenna, about 3.8.

Frontal prolongation of head above yellow, slightly darkened on sides; nasus represented by a tubercle that is provided with a few very long black setæ; palpi brownish black. Antennæ relatively long; scape and pedicel light yellow, flagellum brownish black; segments feebly incised, all verticils dorsal, the longest subequal to or a trifle longer than the segments. Head orange; posterior vertex on either side with a light brown area, including a group of black setæ that are lacking on midline; setæ of genæ elongate; vertical tubercle very low.

Pronotal scutum darkened on central portion, narrowly pale medially, scutellum and pretergites yellow. Mesonotal præscutum with three very broad yellowed stripes, the lateral borders and interspaces vaguely more infuscated; scutum brownish yellow, lobes darker, each with an anterolateral group of about six black setæ; scutellum brownish yellow, parascutella darker brown; mediotergite yellowed medially, sides more infuscated, pleurotergite similarly darkened, more yellowed behind; præscutum nearly glabrous, with a few weak setæ on interspaces, mostly behind, mediotergite with very long erect black setæ. Pleura light yellow, dorsopleural region weakly darkened. Halteres brown, base of stem narrowly yellowed. Legs with coxæ and trochanters light yellow; femora obscure yellow, tips very narrowly and insensibly darkened; tibiæ; and tarsi black; claws long, simple. Wings (Plate 1, fig. 12) light brown, prearcular and costal fields slightly more yellowed, cell Sc darker; stigma darker brown; darkened seams over m-cu and distal section of Cu_1 , other veins beyond cord less evidently darkened; cream colored areas before and beyond stigma and across base of cell 1st M_2 and into adjoining cells; veins brown, those in costal field, together with 2nd A, more brownish. Veins chiefly with long macrotrichia, lacking on m-cu, r-m and basal sections of R_{4+5} . Venation: Sc_2 ending just beyond origin of Rs, the latter shorter than m-cu which is

just before fork of M; m short, about one-fifth to one-sixth the petiole of cell M₁; cell 1st M₂ irregularly pentagonal in outline, m being the shortest element.

Basal abdominal tergite yellow, narrowly blackened on sides; succeeding tergites obscure yellow, extensively clouded with brown, basal sternites yellow; subterminal segments, especially the eighth, blackened to form a narrow ring; hypopygium brownish yellow. Male hypopygium (Plate 4, fig. 39) as it appears mounted on a microscope slide; tergite, *t*, transverse, narrowed outwardly, posterior border emarginate, the central region produced into a conspicuous structure that is expanded at the pale apex, its outer margin again concave, the sides and border with abundant pale setulæ; lateral tergal lobes much shorter, glabrous, appearing as low flat darkened blades. Outer dististyle, *d*, short and broad, the length about four times the diameter, tip obtuse. Inner style with beak relatively slender, lower beak broadly rounded, both blackened; posterior angle rounded, with darkened setæ; surface of style with several pale circular areas without setæ, nearer the beaks with a group of five slightly differentiated setæ from large circular punctures; lower beak fringed with short erect setulæ, beak glabrous. Phallosome, *p*, with gonapophyses appearing as flattened yellow glabrous blades, their tips obtuse to truncate; ædeagus a little shorter, before apex produced into a conspicuous point. Eighth sternite unmodified.

Hatitat.—India (Assam).

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

I name this species for Eberhard Lindner, critical student of the biology of the western Palaearctic Tipulidæ. The most similar regional species is *Tipula* (*Schummelia*) *drovidiana* Alexander, of South India, which differs in coloration of the body, antennæ and legs, and in the structure of the male hypopygium, especially the tergite and phallosome.

TIPULA—SIVATIPULA subgen. nov.

Antennæ of male very long, subequal to the body; flagellar segments very long, basal enlargements not or scarcely indicated; segments with about six or seven long strong verticils, with additional abundant erect pale pubescence. Nasus present; vertical tubercle scarcely developed. Legs with tibial spur formula 1-2-2; claws of male toothed. Wings with squama naked;

outer wing veins with small but abundant macrotrichia. Venation; R_{1+2} entire; Rs longer than m-cu; cell 2nd A narrow. Male hypopygium large; ninth tergite and sternite fused; median region of sternite very extensive, more or less protuberant to subcarinate. Dististyles, including the outer style, of irregular conformation.

Type of subgenus. *Tipula* (*Sivatipula*) *mitocera* Alexander, India: Eastern Himalayas. Other included species: *T.* (*S.*) *althena* Alexander (Thailand); *T.* (*S.*) *bhishma* sp. nov. (India: Assam); *T.* (*S.*) *flicornis* Brunetti (India: Eastern Himalayas); *T.* (*S.*) *lackschewitziana* Alexander (Formosa); *T.* (*S.*) *parvaurecula* Alexander (China: Fukien); *T.* (*S.*) *suensoniana* Alexander (China: Chekiang).

The included species had been referred provisionally to the subgenus *Acutipula* Alexander but appear to represent a distinct group. The structure of the antennæ, details of structure of the male hypopygium, and trichiation of the wing squama and veins differ from the type found in *Acutipula*.

TIPULA (SIVATIPULA) BHISHMA sp. nov.

Plate 1, fig. 13; Plate 4; fig. 10.

Size small (wing of male to 15 millimeters); male antennæ about as long as body, flagellar segments with sparse long black verticils and abundant long pale erect setæ; mesonotal præscutum brown with four more yellowed stripes, posterior sclerites of notum light brown, pleura and pleurotergite light yellow; wings weakly darkened, cells C and Sc, with the stigma, darker brown; abdomen brownish yellow with a conspicuous black subterminal ring, hypopygium orange; ninth tergite of hypopygium with powerful lateral arms that are tipped with abundant blackened pegs, ventral surface with two groups of black setæ; dististyles unequal, the larger outer style with a fingerlike marginal lobe near base; region ninth sternite with dense brushes of long rufous setæ; posterior border of eighth sternite truncate.

Male.—Length, about 12.5 to 13 millimeters; wing, 13.5 to 15; antenna, about 12 to 12.5.

Frontal prolongation of head above, with the nasus, yellow, light brown on sides; palpi with basal segments brown, terminal segment somewhat paler. Antennæ of male elongate, subequal to body; scape brown, pale basally, pedicel small, yellow, flagellum black; flagellar segments very long-cylindrical, with small basal enlargements; verticils long, about one-third the segment, about six in number and well scattered over each

segment; abundant pale erect setæ that are about two-thirds as long as the verticils. Head brownish gray, front yellowed, orbits brownish yellow; no developed vertical tubercle.

Pronotum brownish yellow, darker laterally, especially in front. Mesonotal præscutum with ground brown, with four more yellowed stripes, the intermediate pair more evident, brightened anteriorly; scutal lobes dark brown, their centers somewhat brightened; scutellum and mediotergite light brown, yellow pollinose; vestiture of præscutum virtually lacking, those present microscopic, longer on scutum and especially the scutellum. Pleura and pleurotergite light yellow. Halteres with stem dusky, knob slightly darker. Legs with coxæ and trochanters yellow; femora obscure yellow, tips weakly darkened, tibiæ and tarsi darker brown; claws with a single tooth. Wings (Plate 1, fig. 13) weakly darkened, cells C and Sc, with the stigma, darker brown; restrictedly obliterative areas before stigma and in base of cell 1st M_2 ; veins brown. Longitudinal veins beyond cord with abundant macrotricia, before cord also on Rs and outer ends of M, Cu and anals, more especially the last. Venation: Rs slightly longer than m-cu; petiole of cell M_1 longer than m, in cases to twice this length; cell 2nd A narrow.

Basal abdominal tergites brownish yellow, restrictedly patterned with darker brown; basal sternites clear yellow; subterminal segments blackened, to form a ring, including segment seven and tergite six, the eighth segment and hypopygium orange. Male hypopygium (Plate 4, fig. 40) with the tergite, *t*, elongate, narrowed outwardly posterior border gently convex, fringed with very long setæ; lateral tergal arms slightly expanded outwardly, tips truncate, with abundant blackened spicules or elongate pegs; ventral surface of tergite with a Ω -shape plate, its lateral arms with compact groups of black setæ. Region of ninth sternite with dense brushes of long rufous setæ. Dististyles, *d*, diverse in form, outer style larger, a flattened blade, the obtusely rounded apex darkened, inner margin near base produced into a slender fingerlike rod; inner margin with strong yellow setæ; outer part at near midlength with a blackened flange. Inner style smaller, generally parallel-sided, tip subtruncate, near apex with numerous long yellow setæ.

Eighth sternite with posterior border truncate, with relatively few long marginal setæ, more concentrated at the midregion.

Habitat.—India (Assam).

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

Tipula (*Sivatipula*) *bhishma* is readily told from all other species by the small size and especially in the structure of the male hypopygium, as the unusual ninth tergite.

TIPULA (ANGARATIPULA) TOKUNAGANA sp. nov. Plate 1, fig. 14; Plate 4, fig. 41.

General coloration of the entire body dark gray, præscutum with four poorly differentiated brown stripes; body conspicuously hairy; antennæ black throughout; legs dark brown; wings broad, weakly darkened, prearcular and costal fields more brownish yellow; abdomen almost uniformly dark gray, lateral borders narrowly paler gray; male hypopygium with the tergite narrowly transverse, posterior border very gently emarginate, produced medially; outer dististyle nearly parallel-sided, apex obtusely rounded.

Male.—Length, about 11.5 to 13 millimeters; wing, 13 to 14.5; antenna, about 3.5 to 3.6.

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

Frontal prolongation of head gray; nasus elongate, tufted with long black setæ; palpi black. Antennæ black throughout; basal enlargements of flagellar segments conspicuous. Head dark gray, vertex with a blackened central line; conspicuous erect black setæ on either side of vertex; no vertical tubercle.

Pronotal scutum dark gray, central area with long erect black setæ, scutellum glabrous. Mesonotal præscutum dark gray, with four poorly differentiated brown stripes, anteriorly the intermediate pair separated by a capillary blackened vitta; posterior sclerites of notum gray, scutal lobes with vague more brownish areas; setæ of mesonotum long and conspicuous, including the præscutal interspaces, central area of scutum, scutellum, mediotergite and anapleurotergite. Pleura dark gray, chiefly glabrous. Halteres blackened. Legs with coxæ and trochanters dark gray, with conspicuous setæ; femora dark brown, tips darker, bases slightly brightened; tibiæ and tarsi dark brown; claws small, simple. Wings (Plate 1, fig. 14) broad, weakly darkened, prearcular and costal fields more brownish yellow; stigma small, pale brown, barely indicated; small obliterative areas before stigma and across base of cell 1st M_2 ; veins brown, more brownish yellow in the brightened fields. Veins unusually glabrous, beyond cord with trichia on distal section of R_{4+5} . Venation: Cell M_1 nearly sessile, its petiole punctiform; m-cu close to outer end of M_{3+4} ; veins

M₄ and distal section of Cu₁ nearly parallel to one another; cell 2nd A broad.

Abdomen almost uniformly dark gray, lateral tergal borders narrowly paler gray; hypopygium concolorous, only the styli brightened; vestiture of tergites beyond the basal one short and pale, of sternites much longer, pale, erect. Male hypopygium (Plate 4, fig. 41) with the tergite, *t*, blackened, transverse, narrow, posterior border very gently emarginate, the median region slightly produced, more or less bilobed; on ventral surface of tergite with a broad pale membrane that is densely covered with short black setulæ, this structure presumably representing the proctiger. Outer dististyle, *d*, nearly parallel-sided, about five times as long as broad, apex obtusely rounded; inner margin with sparse long setæ, those at apex and on disk very small, pale and inconspicuous. Inner style with beak elongate, narrowed gradually to the obtuse tip; lower beak small, with a subtending slightly larger subtriangular lobe; outer margin fringed with long pale setæ. Ædeagus, *a*, very broad at base, subtriangular in outline, apex a decurved compressed blade.

Habitat.—India (Sikkim).

Holotype, male, Mugutang, altitude 14,750 feet, May 7, 1959 (*Schmid*).

Allotype, female Dolmasampa, altitude 14,700 feet, June 5, 1959.

Paratype, 2 males, with the allotype.

This species is named in honor of Masaaki Tokunaga, distinguished student of the taxonomy and morphology of Asiatic and Australasian Nematoceros Diptera. *Tipula* (*Angarati-pula*) *tokunagana* is quite distinct from all species hitherto discovered in southern and eastern Asia, being entirely different in the general coloration of the body and appendages and in the details of structure of the male hypopygium. The unusual development of setæ on the head and thorax presumably is an adaptation to the high altitudes frequented by the species.

TIPULA (ACUTIPULA) TAKAHASHIANA sp. nov. Plate 1, fig. 15; Plate 5, fig. 42.

Size relatively large (wing of male 19 millimeters); mesonotal præscutum olive yellow with four more brownish gray stripes that are broadly margined with darker brown; pleura yellow, dorsopleural region pale brown; antenna with proximal three

segments yellow, remainder black; femora obscure yellow, tips broadly black; wings pale brown, restrictedly patterned with darker, including the costal region, outer radial field and markings in cells M and Cu; male hypopygium with the inner dististyle dilated at apex, produced into two unequal spines; eighth sternite broad, posterior border with two conspicuous lobes that are densely fringed with very long yellow setæ, the median area farther produced into a large subtriangular lobe that is densely covered by short yellow setæ.

Male.—Length, about 17 millimeters; wing, 19; antenna, about 4.8.

Frontal prolongation of head dark orange; nasus very long, tipped with a dense brush of black setæ; palpi dark brown. Antennæ with proximal three segments yellow, remainder black; flagellar segments with small basal enlargements, longest verticils exceeding the segments. Head brownish gray, with a narrow central dark brown line that does not reach the occiput; anterior vertex slightly more pruinose, with a small rounded knob on either side behind the antennal fossæ.

Pronotal scutum brownish yellow, scutellum light orange yellow. Mesonotal præscutum olive yellow, with four more brownish gray stripes that are broadly margined with darker brown; scutum yellow, each lobe with two brownish gray areas that are narrowly bordered by dark brown; scutellum brown with a vague darker central line; mediotergite pale brown, golden pollinose, more clearly so behind; præscutum with very sparse setæ, these long and conspicuous on mediotergite. Pleura yellow, dorsopleural region pale brown. Halteres dark brown. Legs with coxæ and trochanters pale yellow; femora obscure yellow, tips broadly black; tibiæ black, extreme bases pale; tarsi black; claws toothed. Wings (Plate 1, fig. 15) pale brown, outer radial field, stigma and cell C darker, cell Sc dark brown; darkened areas in outer end of cell M and at near one-third Cu, the latter preceded and followed by more whitened areas, the last extended into cell M; further brightenings before stigma, across base of cell 1st M_2 and distally across bases of cells M_1 , 2nd M_2 , M_3 and M_4 ; veins brown. Outer medial veins glabrous, radial veins with trichia; bases of both anal veins with conspicuous trichia. Venation: Petiole of cell M_1 subequal to m ; cell 1st M_2 pentagonal.

Basal four abdominal segments yellowed, the basal tergite patterned with brown; fifth and succeeding segments black;

eighth sternite broadly yellowed medially at base. Male hypopygium (Plate 5, fig. 42) with the tergite, *t*, darkened, posterior end yellowed, produced into two compressed blades set with blackened spicules, more dense on apical and ventral edges. Outer dististyle, *d*, pale, irregular in outline, at near midlength about two-thirds as broad as long, the apex narrowed; setæ yellow, with scattered dark-colored bristles on disk, apical setæ longer. Inner style long, sclerotized, beak and lower beak blackened; apex beyond the beak expanded in to an oval head, the inner margin produced into two unequal spines; sensory area placed at base of the expanded head. Eighth sternite, *8s*, broad, posterior border subtruncate, with a deep whitened median incision, the lobes subapically with a dense fringe of very long yellow setæ; median region with a large subtriangular lobe that is densely covered by short yellow setæ.

Habitat.—India (Assam).

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

I am pleased to name this fly for Mitsuo Takahashi, of the National Institute of Health, Tokyo, student of the taxonomy of the Japanese Tipulidæ. The wing pattern of *Tipula* (*Acutipula*) *takahashiana* suggests that of various other regional members of the subgenus, including the commonest species, *T. (A.) quadrinotata* Brunetti. The structure of the hypopygium is distinctive, particularly the inner dististyle and the very different eighth sternite, this latter feature slightly resembling that of *T. (A.) princeps* Brunetti, and otherwise entirely distinct species.

TIPULA (INDOTIPULA) APICIDILATA sp. nov. Plate 1, fig. 16; Plate 5, fig. 43.

Mesonotal præscutum yellow, with four light brown stripes, scutellum yellow; pleura yellow with a transverse light brown stripe crossing the anterior mesopleura; flagellar segments long-cylindrical, basal enlargements very small; wings with petiole of cell *M*₁ very short, cell 2nd *A* narrow; male hypopygium with apex of outer dististyle strongly dilated, inner style with outer basal lobe a strong curved spine.

Male.—Length, about 11 to 11.5 millimeters; wing, 14 to 15; antenna, about 4 to 4.1.

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

Frontal prolongation of head above light yellow, including the elongate nasus, lower half weakly darkened; palpi black. Antennæ with scape and pedicel obscure yellow, flagellum

black; flagellar segments long-cylindrical with very small basal enlargements, longest verticils subequal to the segments. Head with front yellow, vertex brownish yellow, with a capillary dark brown central vitta; no vertical tubercle.

Cervical region and pronotum light brown, sides yellow. Mesonotal præscutum yellow with four light brown stripes that are narrowly bordered by slightly darker brown, the stripes slightly more yellowed posteriorly, lateral margins of præscutum broadly yellow; scutum with lobes brown, central area obscure yellow, with a vaguely darkened median vitta; scutellum yellow, parascutella more brownish yellow; mediotergite yellow, on anterior two-thirds with a faintly indicated pale brown line on either side of a capillary ground vitta, posterior third of segment yellow; pleurotergite yellow, weakly darkened posteriorly; notum unusually glabrous, setæ of præscutal interspaces and scutellum very sparse. Pleura light yellow, with a light brown transverse stripe extending from the dorsopleural region at the anterior spiracle across the anterior anepisternum to the sternopleurite. Halteres dusky, knob darker brown. Legs with coxæ and trochanters light yellow; femora light brown, tips narrowly dark brown; remainder of legs medium brown; claws hairy, bidentate, the outer tooth stouter. Wings (Plate 1, fig. 16) weakly infuscated, prearcular and costal regions slightly darker; stigma elongate, darker brown; small oblitative areas before stigma and across base of cell 1st M_2 ; veins brown. Outer radial and medial veins with small macrotrichia, abundant on M_1 , M_2 and second and third sections of M_{1+2} ; lacking on M_3 . Venation: Petiole of cell M_1 short, subequal to or shorter than m ; cell 1st M_2 small, pentagonal; $m-cu$ at or beyond fork of M_{3+4} ; cell 2nd A narrow.

Abdominal tergites dark brown, posterior borders of segments narrowly pale, sternites and hypopygium more reddish yellow. In female, subterminal segments brownish black; genital shield polished yellow; cerci long and slender, straight, tips obtuse. Male hypopygium (Plate 5, fig. 43) with the tergite, t , apically produced into a shieldlike plate, including the flattened lobes that are separated by a linear incision, apices of lobes obliquely truncated, margins fringed with short setæ, transversely with smaller blackened spinoid bristles; lower face on either side with flange provided with a compact group of about 20 black spinoid setæ. Notch of ninth sternite, $9s$, with two globular lobes that are fringed apically with very long yellow setæ, the

longest about three times the lobe. Outer dististyle *d*, with apex obliquely dilated into a conspicuous head, stem with a series of very long strong setæ, those of the head much shorter. Inner style with beak a compressed-flattened glabrous cleaver-like blade, lower beak a slender darkened lobe; outer basal lobe a powerful blade that narrows into a slender curved spine, surface with conspicuous setæ. Eighth sternite with posterior border convex, unmodified and with sparse scattered setæ only.

Habitat.—India (Assam).

Holotype, male, Umlangshor, Khasi-Jaintia, altitude 4,100 feet, April 18, 1960 (*Schmid*). Allotype, female, Nongjni, Khasi-Jaintia, altitude 3,750 feet, April 19, 1960 (*Schmid*).

The most similar regional species include *Tipula* (*Indotipula*) *divisa* Brunetti, *T. (I.) elegantula* Brunetti, and a few others recently described by the present writer, all best distinguished by hypopygial characters. In the present fly in the most distinctive features are found in the tergite and in both dististyles.

TIPULA (INDOTIPULA) BANGERTERANA sp. nov. Plate 1, fig. 17; Plate 5, fig. 44.

Mesonotal præscutum and scutum orange yellow, posterior sclerites and pleura clearer yellow; tips of femora narrowly blackened; wings tinged with light brown, cells C and Sc conspicuously dark brown, stigma paler; male hypopygium with tergal lobes acute at tips, spines of inner dististyle elongate, blackened; apical blades of eighth sternite broad, the central emargination narrow.

Male.—Length, about 15 millimeters; wing, 15.5; antenna, about 5.5.

Frontal prolongation of head above light yellowish brown, including the long nasus, clearer yellow beneath; palpi with first and last segments obscure yellow, intermediate pair more blackened. Antennæ with three proximal segments light yellow, remainder of flagellum black; flagellar segments elongate, much exceeding their verticils, basal enlargements small. Anterior vertex dull orange, posterior vertex extensively brownish gray, obscure yellow behind and on genæ; vertical tubercle low, entire.

Pronotum broadly dark brown medially, sides extensively light yellow. Mesonotal præscutum and scutum orange yellow, the extreme anterior end of præscutum slightly darker, scutellum and postnotum light yellow. Halteres with stem yellow, knob weakly darkened. Legs with coxæ and trochanters light yellow; femora obscure brownish yellow, tips narrowly black; tibiæ

light brown, tips narrowly darker, tarsi passing into black, terminal segment brownish yellow; claws toothed. Wings (Plate 1, fig. 17) tinged with light brown, cells C and Sc conspicuously dark brown, stigma paler; whitish lines in cells R and M adjoining vein M; oblitative areas before stigma and across cell 1st M_2 ; veins brown. Longitudinal veins beyond cord with macrotrichia, lacking on R_{1+2} and Rs; trichia on outer ends of M and 2nd A, very sparse on Cu_1 and 1st A. Venation: Petiole of cell M_1 nearly three times m; M-cu at fork of M_{3+4} ; cell 2nd A moderately broad.

Basal abdominal tergites brownish yellow, trivittate with brownish black, the central stripe becoming obliterated at about the fourth segment; sternites more yellowed; subterminal segments, including the broad base of eighth sternite, brownish black; hypopygium light yellow. Male hypopygium (Plate 5, fig. 44) generally as in *pierreana*, differing in all details. Tergite, *t*, with the horns nearly parallel at base, outer ends strongly divergent, tips acute; median point slender. Lobe of ninth sternite, *9s*, shorter and stouter, surface corrugated. Basistyle produced into a flattened blade and a lower low darkened lobe. Outer dististyle, *d*, small, slender, narrowed outwardly. Inner style with beak and lower beak very obtuse, blackened, much as in *pierreana*; spines of region of outer basal lobe long and conspicuous, heavily blackened. Eighth sternite, *8s*, with the apical blades much broader and more obtuse at tips, outer margins with about 10 to 12 long yellow setæ, the outer ones longer; central emargination narrower than in *pierreana*.

Habitat.—India (Assam).

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

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

The species is named for Mr. H. Bangerter, of Herrliberg, Switzerland, author of important papers on biology and taxonomy of the Swiss Tipulidæ. In its general appearance, especially the abruptly darkened costal border of the wings, the species differs evidently from *Tipula* (*Indotipula*) *pierreana* sp. nov., but is closely allied, as indicated by the hypopygial structure, all details in the two flies being quite distinct.

TIPULA (INDOTIPULA) PHALLACÆNA sp. nov. Plate 1, fig 18; Plate 5, fig. 45.

Size small (wing of male 12 millimeters); mesonotal præscutum light brown disk with two obscure yellow stripes that are strongly narrowed behind, pleura pale yellow; antennal flagellum conspicuously bicolored yellow and black; femora and tibiæ yellow, claws toothed; wings weakly suffused with brown, vaguely patterned with paler; petiole of cell M_1 long; abdomen yellowish brown, outer segments extensively dark brown; male hypopygium with tergite completely divided medially, posterior margin produced into the slightly divergent horns, basistyle slightly produced; ædeagus dilated at base, on each lateral margin with six strong spinoid setæ; eighth sternite unarmed or unmodified.

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

Frontal prolongation of head obscure orange, including the long nasus; palpi dark brown, incisures narrowly pale. Antennæ with scape and pedicel yellow, succeeding segments conspicuously bicolored, bases intensely black, apices light yellow, outer three segments more uniformly blackened; basal enlargements moderate; verticils shorter than the segments. Head obscure orange in front, more brownish gray behind; a low bilobed vertical tubercle, with a narrow brown line extending from its emargination to the occiput.

Pronotum testaceous yellow. Mesonotal præscutum light brown with two obscure yellow stripes that are strongly narrowed behind, with a capillary brown median line, sides of præscutum light brown, lateral stripes scarcely differentiated; scutum and scutellum chiefly light brown, scutal lobes vaguely patterned with slightly darker brown; mediotergite light brown. Pleura and pleurotergite almost uniformly pale yellow, sternopleurite more whitened. Halteres with stem yellow, knob dark brown. Legs with coxæ and trochanters yellow; femora and tibiæ yellow, basitarsi slightly darker, outer tarsal segments darker; claws toothed. Wings (Plate 1, fig. 18) weakly suffused with brown, prearcular and costal regions more yellowed; stigma pale brownish yellow, darker posteriorly; more whitened obliterative areas before stigma and across base of cell 1st M_2 ; margin in radial field slightly more yellowed; veins dark brown, more brownish yellow in the brightened fields. No squamal trichia; veins beyond origin of Rs with abundant macrotrichia, lacking on R_{1+2} ; basal of cord on outer two-thirds of M and

distal end of basal section of Cu_1 ; anal veins virtually glabrous. Venation: R_{1+2} present; Rs a little longer than m-cu, the latter about two-thirds the distal section of Cu_1 ; cell M_1 long-petiolate, this about two and one-half times m; m-cu just beyond fork of M_{3+4} ; cell 2nd A relatively narrow.

Abdomen yellowish brown, somewhat darker medially, lateral borders darker brown, extreme margins pale; sternites more yellowed; outer segments extensively dark brown, the posterior end of eighth sternite and the styli paler. Male hypopygium (Plate 5, fig. 45) with tergite, *t*, completely divided medially by pale membrane, the mesal outer margin of each half produced into a strong subtriangular horn, these slightly divergent, tips acute. Ninth sternite produced into a cylindrical lobe tufted with yellow setæ. Basistyle, *b*, small, apex slightly produced. Outer dististyle, *d*, a small lobe, much like the lobe of the ninth sternite but smaller. Inner style with beak undarkened, lower beak broad, heavily blackened; outer basal lobe produced, its margin with a triangular tooth or flange. Ædeagus, *a*, dilated at base, margins sclerotized, on either side with six strong spinoid setæ about evenly spaced. Eighth sternite unmodified, posterior border gently convex, the broad central region membranous.

Habitat.—India (Assam).

Holotype, male, Langkhe, Manipur, altitude 5,000 feet, July 20, 1960 (Schmid).

Tipula (*Indotipula*) *phallacaena* apparently is most nearly related to *T. (I.) brunnicauda* Brunetti, *T. (I.) bilobula* Alexander, and some other species, differing evidently in the hypopygial structure. The conformation of the ædeagus is noteworthy. The reference to these particular flies to *Indotipula* must be considered to be provisional.

TIPULA (INDOTIPULA) PIERREANA sp. nov. Plate 2, fig. 19; Plate 5, fig. 46.

General coloration of thorax orange, pronotum broadly dark brown medially; femora and tibiæ yellow, tips narrowly blackened; wings weakly tinged with brown, cells C and Sc, with the stigma, pale brown; abdominal tergites yellow, beyond the first trivittate with dark brown, outer segments blackened; male hypopygium with posterior border of tergite tridentate, central tooth acute; lobe of ninth sternite elongate; eighth sternite with two flattened yellow blades.

Male.—Length, about 12.5 millimeters; wing, 14.5; antenna, about 4.5.

Frontal prolongation of head, including nasus, obscure yellow; palpi with proximal segments pale brown, outer segments more testaceous. Antennæ with scape and pedicel light yellow, first flagellar segment brownish yellow, remainder black; flagellar segments with basal enlargements small, verticils shorter than the segments. Head obscure orange, darker behind; vertical tubercle low, with a central impressed line.

Pronotum medially broadly dark brown, sides yellow. Mesonotal præscutum orange, weakly darkened medially, the usual stripes scarcely distinguishable from the ground; scutum orange, scutellum and postnotum orange-yellow; præscutum and scutum virtually glabrous, posterior sclerites with yellow setæ. Pleura orange, dorsopleural membrane yellow. Halteres with stem brownish yellow, knob dark brown. Legs with coxæ and trochanters yellow; femora and tibiæ yellow, tips narrowly blackened; tarsi brown, passing into black; claws toothed. Wings (Plate 2, fig. 19) weakly tinged with brown, cells C and Sc, with the stigma, pale brown; restricted obliterative areas before stigma and on basal section of M_{1+2} and M_3 ; veins light brown. Longitudinal veins beyond cord with abundant macrotrichia; outer ends of M, basal section of Cu_1 , 2nd A and m-cu with sparse trichia; Rs glabrous. Venation: R_{1+2} entire; Rs nearly two and one-half times m-cu; petiole of cell M_1 about twice m; m-cu close to fork of M.

Abdominal tergites yellow, beyond the first trivittate with dark brown, sternites yellowed, outer segments blackened. Male hypopygium (Plate 5, fig. 46) with the tergite, *t*, completely divided medially, posterior border tridentate, outer lobes longer, narrowly obtuse at tips, median lobe narrowly acute. Ninth sternite, *9s*, adjoining the basistyle produced into a long slender rod with setæ, tipped with long bristles. Basistyle, *b*, terminating in a small blade. Outer dististyle, *d*, small; inner style broad, beak broadly obtuse, lower beak smaller, acute, both blackened; region of outer basal lobe with two small pale spinous points, the smaller one glabrous. Eighth sternite, *8s*, narrowed outwardly, terminating in two depressed-flattened yellow blades, tips obtuse, outer margins with a few conspicuous setæ. Ædeagus conspicuous, apophyses apparently lacking.

Habitat.—India (Assam).

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

I dedicate this species to Claude Pierre, student of the western Palæarctic Tipulidæ, author of the Tipulinæ in *Genera Insectorum*. The closest relatives include *Tipula* (*Indotipula*) *bangerterana* sp. nov., *T. (I.) bilobula* Alexander, and possibly *Tipula varaha* Alexander. The latter still is known only from the female and if it is found to belong here the peculiar structure of the ovipositor differs from that in typical *Indotipula* and the entire group of species may well be found to represent a new subgeneric group.

TIPULA (VESTIPLEX) BRYCEANA sp. nov.

Plate 2, fig. 20; Plate 6, fig. 47.

Size small (wing of male 13 millimeters); mesonotal præscutum light yellow with three broad more orange stripes, postnotum and pleura yellow; wings light brown, variegated with whitened areas; male hypopygium with ventral arm of tergite conspicuous, extended laterad into a hornlike extension; inner dististyle with beak very slender, black, posterior end of style produced backward into a yellow flattened blade; phallosome as single broad central yellow plate, the gonapophyses extended caudad beyond the small ædeagus.

Male.—Length, about 12.5 to 13.5 millimeters; wing, 13 to 15; antenna, about 3.5 to 4.1.

Frontal prolongation of head, including nasus, light yellow, somewhat darker beneath; palpi brown. Antennæ with scape and pedicel light yellow, flagellum brownish black; basal enlargements of segments small, terminal segment short-oval, verticils shorter than segments. Head dark orange; vertical tubercle low, entire.

Pronotum yellow, scutum narrowly darkened medially. Mesonotal præscutum with the restricted ground light yellow pollinose, disk with three broad more orange or brownish orange stripes, the central one, in cases, vaguely divided by a paler vitta; scutum yellow, each lobe with two confluent brownish orange areas; posterior sclerites golden yellow pollinose, scutellum with a capillary brown central line; præscutum with short pale yellow setæ, those of the posterior sclerites long, yellow. Pleura yellow, including the clear yellow dorsopleural region. Halteres black, apex of knob paler. Legs with coxæ and trochanters light yellow, remainder of legs brown, claws toothed. Wings (Plate 2, fig. 20) light brown, variegated with whitish areas, especially large and conspicuous before cord and subbasally in outer radial field; basad of cord the

white areas only a little less extensive than the ground; inconspicuous oblitative areas in bases of cells 1st M_2 and M_3 ; stigma oval, brown; veins pale brown. Veins beyond general level of origin of Rs with macrotrichia, including a few on Rs and outer ends of both anal veins and outer half of M, lacking on basal section of Cu_1 . Venation: Rs about two and one-half times m-cu; petiole of cell M_1 about one-half longer than m.

Abdomen variegated brown and yellow, outer segments more uniformly darkened. Male hypopygium (Plate 6, fig. 47) with the tergite, *t*, narrowly divided medially; dorsal tergal lobes produced on outer lateral angles, the mesal lobes lacking; ventral armature distinctive, as figured, including a low mesal roughened lobe and a larger outer arm that is extended laterad into a hornlike extension. Outer dististyle, *d*, yellow, slightly expanded outwardly. Inner style with beak blackened, very slender; lower beak obtuse; posterior end of style produced backward into a flattened yellow blade, its apex obtuse. Phallosome, *p*, distinctive, appearing as a single broad central yellow plate, the gonapophyses extended caudad. Eighth sternite unmodified.

Habitat.—India (Assam).

Holotype, male, Hkayam Boum, Manipur, altitude 8,500 feet, June 22, 1960 (*Schmid*). Paratopotypes, 2 males, pinned with type.

This interesting fly is named for Derek Bryce, of Blackburn, Lancaster, England, student of the biology of British Tipulidæ. *Tipula* (*Vestiplex*) *bryceana* is quite distinct from other regional members of the subgenus in the somewhat peculiar structure of the male hypopygium, particularly the tergite, inner dististyle and phallosome. The most similar species perhaps is *T. (V.) theowaldana* sp. nov., but the resemblance is not particularly close. The wing pattern of the holotype and one paratype is very pale, to appear almost teneral, but the second paratype is fully colored.

TIPULA (VESTIPLEX) CHISWELLANA sp. nov. Plate 2, fig. 21; Plate 6, fig. 48.

Size large (wing of male about 20 millimeters); mesonotal præscutum brownish yellow, with four brownish gray stripes, the lateral pair bordered by darker brown; posterior sclerites of notum with a central brownish black line extending from suture to abdomen; antennæ relatively short; femora light brown, tips conspicuously blackened, claws simple; wings light

brown, variegated by light yellow areas, especially before cord; abdominal tergites yellow, trivittate with dark brown, central stripe broad, fifth and succeeding segments black; male hypopygium with tergite very narrowly transverse, upper lobes very low and rounded, lower ledge blackened, indistinctly bilobed; no appendage on ninth sternite; basistyle with an outer obtuse blackened lobe and a mesal spine; outer dististyle relatively short, inner style with beak short and obtuse.

Male.—Length, about 17 to 18 millimeters; wing, 19.5 to 21.5; antenna, about 3.1 to 3.2.

Frontal prolongation of head chestnut brown, nasus elongate; palpi black. Antennæ with scape and pedicel yellow, first flagellar segment brownish yellow, succeeding segments weakly bicolored, the bases slightly darkened, outer segments uniformly light brown to darker brown; longest verticils exceeding the segments. Head fulvous, with a broad brown central area on vertex; vertical tubercle very low.

Cervical region and pronotum chiefly darkened, anterior margin of scutum black. Mesonotal præscutum brownish yellow with four brownish gray stripes, the lateral pair bordered by darker brown, the intermediate stripes less evidently so; each scutal lobe with two brownish gray areas that are bordered by brown, central area yellow; scutellum and mediotergite grayish yellow with a narrow continuous brownish black central line extending from suture to abdomen, more distinct in the holotype; parascutella and pleurotergite more yellowed. Pleura olive yellow, variegated by clearer yellow on sternopleurite, meron and metapleura; propleura and anterior border of anepisternum brownish black; dorsopleural membrane light brown. Halteres brown, base of stem restrictedly yellowed, knob brownish black, apex a little paler. Legs with coxæ yellowish gray; trochanters obscure yellow; femora light brown, tips conspicuously black; tibiæ and tarsi dark brown; claws small, simple. Wings (Plate 2, fig. 21) chiefly light brown, variegated by relatively restricted light yellow areas before cord and across bases of outer radial cells; obliterative areas slightly more whitened; cells C and Sc uniformly yellowed, the latter brighter; stigma small, dark brown; areas at arculus, origin of Rs and over anterior cord slightly darker than the ground; veins brown. Longitudinal veins beyond cord with relatively sparse trichia, present on outer half of R_{4+5} , M_1 , M_2 and fewer on M_3 , none on R_{1+2} , present or lacking on R_3 . Venation: Rs long, more

than twice m-cu; petiole of cell M_1 subequal to or shorter than m; m-cu beyond base of M_4 .

Basal abdominal tergites yellow, trivittate with dark brown, central stripe broad, laterals narrow, margins more yellowed; sternites yellow; fifth and succeeding segments black. Male hypopygium (Plate 6, fig. 48) with the tergite, *t*, very narrowly transverse, constricted at midwidth, the upper lobes very low and rounded, setæ lacking on lateral half of each lobe, very dense but small near midline; lower ledge blackened, margin sinuous to indistinctly bilobed, margin microscopically roughened. Ninth sternite, *9s*, without an appendage. Basistyle, *b*, with an outer obtuse blackened lobe and a mesal more acute spine; inner ventral angle of basistyle adjoining the sternite with an oval orange lobe tipped with a few very long yellow setæ. Outer dististyle, *d*, relatively short, slightly expanded outwardly, apex of outer blade oblique. Inner style with beak short and obtuse. Apex of penis guard simple, without lateral points, as occur in some generally similar species.

Habitat.—India (Assam).

Holotype, male, Sirhoi Kashong, Manipur, altitude 7,500 feet, July 12, 1960 (*Schmid*). Paratype, male, Hkayam Boum, Manipur, altitude 8,500 feet, June 23, 1960 (*Schmid*).

Tipula (*Vestiplex*) *chiswellana* is named in honor of Dr. John R. Chiswell, of the Department of Zoology, University of Bristol, England, author of an outstanding paper on the larvæ of the British Tipulinæ. In its general appearance the fly is similar to *T. (V.) exechostyla* sp. nov., with which it was associated in nature, differing conspicuously in the hypopygial structure, especially the tergite, lack of an appendage on the ninth sternite, and in both dististyles.

TIPULA (VESTIPLEX) EXECHOSTYLA sp. nov. Plate 2, fig. 22; Plate 6, fig. 49.

Size large (wing of male to 20 millimeters); mesonotal præscutum obscure yellow with four brownish gray stripes, posterior sclerites of notum with a central brown line; antennæ relatively long, flagellar segments black; femora obscure yellow, tips broadly blackened, claws nearly simple, with a small basal denticle; wings light brown, variegated by large yellow areas, especially before the cord, wings of female subatrophied; basal abdominal segments yellow, tergites narrowly trivittate with brownish black, outer segments uniformly brownish black; male hypopygium with outer dististyle unusually long, inner style

with a conspicuous hump on outer margin; appendage of ninth sternite unusually long and slender, tip acute; basistyle with a single blackened spine.

Male.—Length, about 14 to 17 millimeters; wing, 17 to 20; antenna, about 4 to 5.

Female.—Length, about 18 millimeters; wing, 4.7.

Frontal prolongation of head, including nasus, yellow; palpi brown, incisures narrowly pale. Antennæ with scape and pedicel yellow, first flagellar segment brownish yellow, remainder black; flagellar segments longer than their verticles, with small basal enlargements. Head yellow, with a dark brown central line on vertex, extending from the small but distinct tubercle to occiput, sides of posterior vertex less evidently darkened.

Pronotal scutum brownish yellow, with three vague brown areas. Mesonotal præscutum obscure yellow with four brownish gray stripes that are narrowly bordered by darker brown, least evident on outer margin of lateral stripes, lateral præscutal borders dark brown; in female, only the intermediate præscutal stripes clearly evident, their margins darker; scutum yellow medially, with a capillary brown line, lobes chiefly covered by two nearly confluent brown areas; scutellum and mediotergite yellow with a central brown line, pleurotergite brownish yellow, katapleurotergite golden yellow. Pleura greenish yellow, clearer yellow ventrally, dorsopleural membrane infuscated. Halteres brown, base of stem narrowly yellowed, knob dark brown. Legs with coxæ and trochanters yellow; femora obscure yellow, tips broadly blackened; claws of male virtually simple, with a very small basal denticle. Wings (Plate 2, fig. 22) of male light brown, variegated by large yellow areas, before cord in cells R through the anals, the largest in R, M, 1st A and 2nd A; beyond cord across bases of outer radial cells; a more whitened oblitative area across cell 1st M_2 and the adjoining cells; stigma medium brown, cells C and Sc unpatterned, the latter clearer yellow; veins brown. Outer radial veins, together with M_1 and M_2 , with macrotrichia, those lacking on veins before cord with the exception of a short series at midlength of 2nd A. Wings of female medium brown; subapterous, straplike, the venation entirely distorted.

Abdomen with proximal four segments yellow, tergites narrowly trivittate with brownish black, lateral borders narrowly yellowed; fifth segment brownish yellow, apex and all remaining segments brownish black. Male hypopygium (Plate 6, fig. 49)

with the upper plate of tergite, *t*, terminating in slender setiferous lobes that are separated by a U-shaped emargination; ventral lobes slender, heavily blackened, tips incurved, surface microscopically roughened. Ninth sternite, *9s*, with an oval blackened lobe, the appendage very long and slender, base expanded, tip narrowly blackened, acute, margin with sparse long yellow setæ scattered over the entire length; in cases the acute tip longer and more gradually blackened. Basistyle, *b*, adjoining the ninth sternite extended into a long acute black spine. Outer dististyle, *d*, very elongate, slightly widened at apex to form a weak spatula. Inner style complex, beak relatively narrow, outer margin with a conspicuous blackened lobe or hump, which has suggested the specific name; inner margin near base with a pale to more darkened pendant lobe provided with long erect to retrorse yellow setæ, ædeagus, *a*, relatively stout, the penis guard slender, before tip with two small erect points.

Habitat.—India (Assam).

Holotype, male, Sirhoi Kashong, Manipur, altitude 7,500 feet, July 13, 1960 (*Schmid*). Allotype, female, Hkayam Boum, Manipur, altitude 7,500 feet, June 20, 1960. Paratopotypes, 7 males, with the type, altitude 6,000 feet, June 6–8, 1960; 6 males, altitude 7,500 feet, July 11–13, 1960; paratypes, 5 males, with the allotype, altitude 8,500 feet, June 21–23, 1960 (*Schmid*).

Tipula (*Vestiplex*) *exechostyla* is quite distinct from other somewhat similar large-sized species of the subgenus by the hypopygial structure, especially both dististyles and the appendage of the ninth sternite. Among the regional species it is most similar to *T. (V.) chiswellana* sp. nov. This is the only Indian species of the subgenus having reduced wings in the female sex that occurs south of the Himalayan system and to date it has been found only on the two highest mountains in Manipur.

TIPULA (VESTIPLEX) THEOWALDANA sp. nov.

Plate 2, fig. 23; Plate 6, fig. 59.

Size small (wing of male 12 millimeters); mesonotal præscutum yellow with four darker stripes; scutellum and mediotergite with a darkened central line; antennal scape and pedicel light yellow, flagellum black; femora brownish yellow with a narrow brown subterminal ring; wings light brown, inconspicuously patterned with darker brown and whitened areas; basal abdominal tergites yellow, trivittate with dark brown, outer

segments more uniformly blackened; male hypopygium with upper tergal lobes large, tips obtuse; a single dististyle, its beak slender, blackened, posterior end of style produced backward into a large triangular extension.

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

Frontal prolongation of head yellow, including the long nasus; palpi light brown, third segment more yellowed, fourth short, black. Antennæ with scape and pedicel light yellow, flagellum black; flagellar segments with small basal enlargements, segments longer than their verticils; terminal segment elongate-conical, about one-third the penultimate. Head orange, with a delicate pale brown central vitta extending from the summit of the low entire vertical tubercle to the occiput.

Pronotum pale yellow, with three large brown spots. Mesonotal præscutum yellow pollinose, with four stripes, the intermediate pair more grayish on anterior third, dark brown behind, narrowly separated by a gray line; lateral stripes entire; scutum yellow pollinose, each lobe with two triangular brown areas, the posterior one more than twice the size of the anterior; scutellum and mediotergite brown, yellow pollinose, with a dark brown central line, parascutella brownish yellow, pleurotergite obscure yellow, the katapleurotergite anteriorly golden yellow; præscutal setæ small, those of posterior sclerites much longer, all pale. Pleura yellow, variegated with brown on propleura and anepisternum; dorsopleural membrane yellow. Halteres with stem obscure yellow, knob dark brown, apex vaguely paler. Legs with coxæ and trochanters yellow; femora brownish yellow with a narrow brown subterminal ring, subequal to or broader than the obscure yellow apex; tibiæ and tarsi dark brown; claws toothed. Wings (Plate 2, fig. 23) light brown, inconspicuously patterned with darker brown and whitened areas; prearcular and costal fields more yellowed, unpatterned; stigma brown; paler brown clouds at origin of Rs, cord and along vein Cu in cell M; pale areas chiefly before and beyond origin of Rs, bases of outer radial cells, near base and apex of cell M, near base of cell Cu and two marginal brightenings in cell 1st A; an obliterative area across midlength of cell 1st M₂, the extreme base of the cell darkened; veins brown, more yellowed in the brightened fields. Most longitudinal veins beyond cord with macrotrichia, these lacking on basal two-thirds of Cu₁ and 1st A; a few trichia on m and m-cu. Venation: Rs about

twice m-cu; cell M_1 elongate, its petiole subequal to m; m-cu close to midlength of M_{3+4} ; cell 2nd A narrow.

Basal abdominal tergites yellow, trivittate with dark brown, extreme lateral borders pale, succeeding tergites more obscure yellow, the median dark stripe becoming paler and more diffuse, sublateral stripes narrow and darker, interrupted at posterior borders of segments, lateral margins pale; sternites more reddish yellow; outer four segments black, dististyles yellowed. Male hypopygium (Plate 6, fig. 50) with the tergite, *t*, large, having the usual dorsal and ventral lobes characteristic of the subgenus; dorsal lobes larger, elongate, tips obtuse, surface with relatively small scattered setæ, on outer margin near base with a group of about a dozen very long setæ, these exceeding the lobe in length; ventral tergal lobes shorter and narrower, their tips incurved, blackened, obtuse. Apex of basistyle, *b*, produced. Dististyles, *d*, single; beak slender, heavily blackened, dorsal crest produced backward as a narrow lobe; posterior end of style produced into a much larger triangular extension; along lower margin of style a glabrous structure that may represent the usual dorsal style which otherwise is not evident. Eighth sternite transverse, posterior border emarginate, pale, with a concentration of long black setæ on either side of the median area.

Habitat.—India (Assam).

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

Dedicated to Br. Theowald (Theodorus Henri Ignatius Van Leeuwen), distinguished student of the biology and taxonomy of the western Palaearctic Tipulidæ. The fly is distinct from other small members of the subgenus, being most similar to *Tipula* (*Vestiplex*) *bryceana* sp. nov., but with the hypopygial structure, especially the dististyle, quite unique. The general resemblance to species of the subgenus *Schummelia* is noteworthy but the fly unquestionably seems to belong to *Vestiplex*.

TIPULA (OREOMYZA) BRINDLEANA sp. nov.

Plate 2, fig. 24; Plate 6, fig. 51.

Size small (wing of male 9.5 millimeters); mesonotal præscutum gray with three dark brown stripes, anterior end of central stripe divided; posterior sclerites of notum gray with a continuous dark brown central line; legs black, claws simple; wings subhyaline, restrictedly patterned with dark brown, including C, Sc and outer radial field; vein R chiefly atrophied, cell 1st M_2 small; abdominal sternites blackened; male hypo-

pyguim with posterior tergal border broadly emarginate; ædeagus terminating in paired parallel spines, with a nearly terminal horn on either side.

Male.—Length, about 9 millimeters; wing, 9.5; antenna, about 3.3.

Frontal prolongation of head above light gray, including the elongate nasus, sides dark brown; palpi black. Antennæ 12-segmented, relatively long; scape yellowish brown, pedicel clear yellow, flagellum black; flagellar segments subcylindrical without defined basal enlargements, longer than their verticils. Head clear light gray, silvery on front, sides of posterior vertex and genæ more infuscated; vertical tubercle low.

Pronotal scutum yellowish gray with three brown areas, scutellum light yellow. Mesonotal præscutum gray with three dark brown stripes, the median one narrowly divided on anterior third, lateral stripes narrow, especially behind; interspaces, including the central pale area, with conspicuous darkened setigerous punctures; posterior sclerites of notum gray, with a continuous dark brown central line extending from suture to abdomen; scutal lobes extensively dark brown, parascutella and anapleurotergite darker, katapleurotergite more yellowish gray. Pleura grayish yellow, the ventral sclerites clearer gray; dorso-pleural membrane light yellow. Halteres with stem yellow, knob brownish black. Legs with coxæ yellow, fore pair slightly pruinose; trochanters yellow; remainder of legs intensely black, bases of fore pair narrowly yellowed; claws simple. Wings (Plate 2, fig. 24) subhyaline, restrictedly patterned with dark brown, including cells C and Sc, stigma, and outer margin of radial field; narrower brown seams at origin of Rs and along cord to margin; still narrower markings over M and 2nd A; veins dark brown. Macrotrichia on longitudinal veins beyond general level of origin of Rs and also on 2nd A. Venation: Rs about one-half longer than m-cu; R_{1+2} virtually lacking, represented by a weak spur; cell M_1 about one and one-half to twice its petiole; cell 1st M_2 small; m-cu at fork of M_{3+4} .

First abdominal tergite brownish gray, segment two brownish yellow, darkened apically, succeeding segments brownish black, lateral margins broadly yellow; outer segments and sternites more blackened; hypopygium yellowed. Male hypopygium (Plate 6, fig. 51) with tergite, *t*, transverse, posterior border with a U-shaped emargination, leaving broadly obtuse lobes that have the same general conformation as the emargination, each with relatively few short setæ. Outer dististyle, *d*,

broadened outwardly; inner style with beak relatively slender, lower beak irregular in outline; outer basal lobe small, covered with abundant delicate setulæ. Phallosome, *p.*, with gonapophyses, *g.*, elongate, the two taken together appearing lyriform; ædeagus broad, terminating in two acute parallel spines, the intervening notch membranous, on sides near apex with divergent horns. Eighth sternite with posterior margin convex, the pale membranous apex with abundant setæ.

Habitat.—India (Assam).

Holotype, male, Pushing, Manipur, altitude 6,000 feet, July 18, 1960 (*Schmid*). Paratype, male, Singkap, Manipur, altitude 3,800 feet, August 16, 1960 (*Schmid*).

The species is named for Allan Brindle, of the Manchester Museum, England, who has done outstanding work on the immature stages of the British Tipulidæ. *Tipula* (*Oreomyza*) *brindleana* is readily told from the most similar species, *T. (O.) camillerii* Alexander, by the very different wing pattern and structure of the male hypopygium.

TIPULA (OREOMYZA) VAYU sp. nov.

Plate. 2, fig. 25; Plate 6, fig. 52.

Belongs to the *variipennis* group; size medium (wing of male 12 millimeters); mesonotal præscutum light yellowish gray, patterned with brown, including four stripes, mediotergite with a darkened central line; basal flagellar segments bicolored; femora brownish black, tips more intensely darkened; wings whitened, with a restricted brown pattern, including cells C and Sc; Rs about three times m-cu, R_{1+2} atrophied; abdominal tergites yellow, with three longitudinal brownish black stripes, lateral borders extensively clear light gray, outer segments, including hypopygium, blackened; male hypopygium with tergal lobes obtuse; inner dististyle with dorsal crest low, posterior end obtuse; eighth sternite narrowed outwardly, apex membranous, with three brushes of setæ, the median group dense but shorter.

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

Frontal prolongation of head dark brown, dorsum light gray pruinose; nasus light brown, tufted with long yellow setæ; palpi dark brown, terminal segment black. Antennæ relatively long, as shown by the measurements; proximal three segments yellow, succeeding four or five bicolored, the small basal enlargements black, remainder brownish yellow, passing into brown, outer segments more uniformly darkened; segment longer

than the verticils, with an additional delicate white pubescence. Front and sides of vertical tubercle whitened; head behind gray, with a capillary brown central stripe extending from vertical tubercle to occiput, narrowed behind.

Pronotum light gray, scutum with three brown areas. Mesonotal præscutum light yellowish gray, conspicuously patterned with brown, including a pair of intermediate stripes that are broadly separated in front, confluent behind, the posterior half of the central interspace with an additional delicate brown line; sublateral stripes narrow, dark brown, the lateral borders broadly paler brown; præscutal interspaces with conspicuous brown setigerous punctures; scutum gray, each lobe with two slightly separated brown areas; scutellum gray, darkened medially, especially behind; mediotergite gray with a darkened central line, pleurotergite chiefly dark brown, the katapleurotergite bordered anteriorly by gray. Pleura yellowish gray, dorsopleural region more yellowed; vague indications of pale brown areas on anepisternum, ventral sternopleurite and meron. Halteres with stem yellow, knob dark brown. Legs with coxæ light yellowish gray; trochanters brownish yellow; femora brownish black, tips more intensely blackened, bases restrictedly yellowed; claws of male toothed. Wings (Plate 2, fig. 25) with the ground color whitened, with a restricted but conspicuous brown pattern, including cells C and Sc and the elongate stigma; further darkened areas at arculus, origin of Rs, anterior cord and outer end of vein R_3 ; pale brown washes at midlength and at outer end of cell M and in cubital and anal cells; veins dark brown, C more yellowed. Basal petiola of wing elongate; longitudinal veins beyond cord with abundant long black trichia, basad of cord these on all but base of M, extensively on Cu_1 and both anals; Rs with a few trichia at near midlength. Venation: Rs very long, exceeding three times m-cu, in direct longitudinal alignment with R_{4+5} ; cell M_1 nearly three times its petiole; m-cu at fork of M_{3+4} .

Basal abdominal tergite brownish gray, succeeding segments yellow, with three longitudinal brownish black stripes, lateral borders extensively clear light gray; basal sternites brownish black medially, yellowed on sides; outer segments brownish black, hypopygium chiefly blackened. Male hypopygium (Plate 6, fig. 52) with tergite, *t*, transverse, central region of posterior border produced into two obtuse lobes that are separated by a U-shaped emargination, the midarea further divided by a median

split and dorsal furrow; vestiture of lobes small and inconspicuous. Outer dististyle, *d*, flattened, moderately broad. Inner style with both beak and lower beak blackened, obtuse at tips; dorsal crest indicated by a low pale flange, its posterior end obtuse; region of outer basal lobe produced into a conspicuous blade, its apex obtuse. Ædeagus, *a*, stout, near apex with a small erect triangular tooth. Eighth sternite, 8s, extensive, narrowed outwardly, posterior border membranous, with abundant setæ, mostly short, laterally forming brushes of very long setæ, the median region with a very compact group of shorter fulvous bristles.

Habitat.—India (Assam).

Holotype, male Dawki, Manipur, altitude 200 feet, April 8, 1960 (*Schmid*).

Other regional species of the group that have vein R_{1+2} atrophied include *Tipula* (*Oreomyza*) *camillerii* Alexander, *T. (O.) gnoma* Alexander, *T. (O.) lætabunda* Alexander, *T. (O.) striatipennis* Brunetti, and others. All such species differ among themselves chiefly in the nature of the body color and wing pattern, and in the structure of the male hypopygium, particularly the inner dististyle and eighth sternite. I have provided additional notes on the type specimen of *striatipennis* [Rec. Indian Mus. 44 (1942) 48].

ILLUSTRATION

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

PLATE 1

- FIG. 1. *Nephrotoma glossophora* sp. nov.; venation.
2. *Nephrotoma sternemarginata* sp. nov.; venation.
3. *Nephrotoma umbonis* sp. nov.; venation.
4. *Tipula* (*Brithura*) *nielseniana* sp. nov.; venation.
5. *Tipula* (*Bellardina*) *séguyana* sp. nov.; venation.
6. *Tipula* (*Bellardina*) *vaillantiana* sp. nov.; venation.
7. *Tipula* (*Nippotipula*) *edwardsomyia* sp. nov.; venation.
8. *Tipula* (*Nippotipula*) *kertésziana* sp. nov.; venation.
9. *Tipula* (*Schummelia*) *costolutea* sp. nov.; venation.
10. *Tipula* (*Schummelia*) *durga* sp. nov.; venation.
11. *Tipula* (*Schummelia*) *ishidana* sp. nov.; venation.
12. *Tipula* (*Schummelia*) *lindneriana* sp. nov.; venation.
13. *Tipula* (*Sivatipula*) *bhishma* sp. nov.; venation.
14. *Tipula* (*Angaratipula*) *tokunagana* sp. nov.; venation.
15. *Tipula* (*Acutipula*) *takahashiana* sp. nov.; venation.
16. *Tipula* (*Indotipula*) *apicidilata* sp. nov.; venation.
17. *Tipula* (*Indotipula*) *bangerterana* sp. nov.; venation.
18. *Tipula* (*Indotipula*) *phallacæna* sp. nov.; venation.

PLATE 2

- FIG. 19. *Tipula* (*Indotipula*) *pierreana* sp. nov.; venation.
20. *Tipula* (*Vestiplex*) *bryceana* sp. nov.; venation.
21. *Tipula* (*Vestiplex*) *chiswellana* sp. nov.; venation.
22. *Tipula* (*Vestiplex*) *execestyla* sp. nov.; venation.
23. *Tipula* (*Vestiplex*) *theowaldana* sp. nov.; venation.
24. *Tipula* (*Oreomyza*) *brindleana* sp. nov.; venation.
25. *Tipula* (*Oreomyza*) *vayu* sp. nov.; venation.
26. *Nephrotoma glossophora* sp. nov.; male hypopygium.
27. *Nephrotoma sternemarginata* sp. nov.; male hypopygium.
28. *Nephrotoma umbonis* sp. nov.; male hypopygium.

PLATE 3

- FIG. 29. *Tipula* (*Brithura*) *nielseniana* sp. nov.; male hypopygium.
30, 31. *Tipula* (*Bellardina*) *séguyana* sp. nov.; male hypopygium.
32. *Tipula* (*Bellardina*) *vaillantiana* sp. nov.; male hypopygium.
33. *Tipula* (*Nippotipula*) *edwardsomyia* sp. nov.; male hypopygium.
34. *Tipula* (*Nippotipula*) *anastomosa* Edwards; male hypopygium.

PLATE 4

- FIG. 35. 36. *Tipula* (*Nippotipula*) *kertésziana* sp. nov.; male hypopygium.
37. *Tipula* (*Schummelia*) *costolutea* sp. nov.; male hypopygium.
38. *Tipula* (*Schummelia*) *durga* sp. nov.; male hypopygium.

- 39. *Tipula* (*Schummelia*) *lindneriana* sp. nov.; male hypopygium.
- 40. *Tipula* (*Sivatipula*) *bhishma* sp. nov.; male hypopygium.
- 41. *Tipula* (*Angaratipula*) *tokunagana* sp. nov.; male hypopygium.

PLATE 5

- FIG. 42. *Tipula* (*Acutipula*) *takahashiana* sp. nov.; male hypopygium.
- 43. *Tipula* (*Indotipula*) *apicidilata* sp. nov.; male hypopygium.
- 44. *Tipula* (*Indotipula*) *bangerterana* sp. nov.; male hypopygium.
- 45. *Tipula* (*Indotipula*) *phallacaena* sp. nov.; male hypopygium.
- 46. *Tipula* (*Indotipula*) *pierreana* sp. nov.; male hypopygium.

PLATE 6

- FIG. 47. *Tipula* (*Vestiplex*) *bryccana* sp. nov.; male hypopygium.
- 48. *Tipula* (*Vestiplex*) *chiswellana* sp. nov.; male hypopygium.
- 49. *Tipula* (*Vestiplex*) *exechostyla* sp. nov.; male hypopygium.
- 50. *Tipula* (*Vestiplex*) *theowaldana* sp. nov.; male hypopygium.
- 51. *Tipula* (*Oreomyza*) *brindleana* sp. nov.; male hypopygium.
- 52. *Tipula* (*Oreomyza*) *vayu* sp. nov.; male hypopygium.

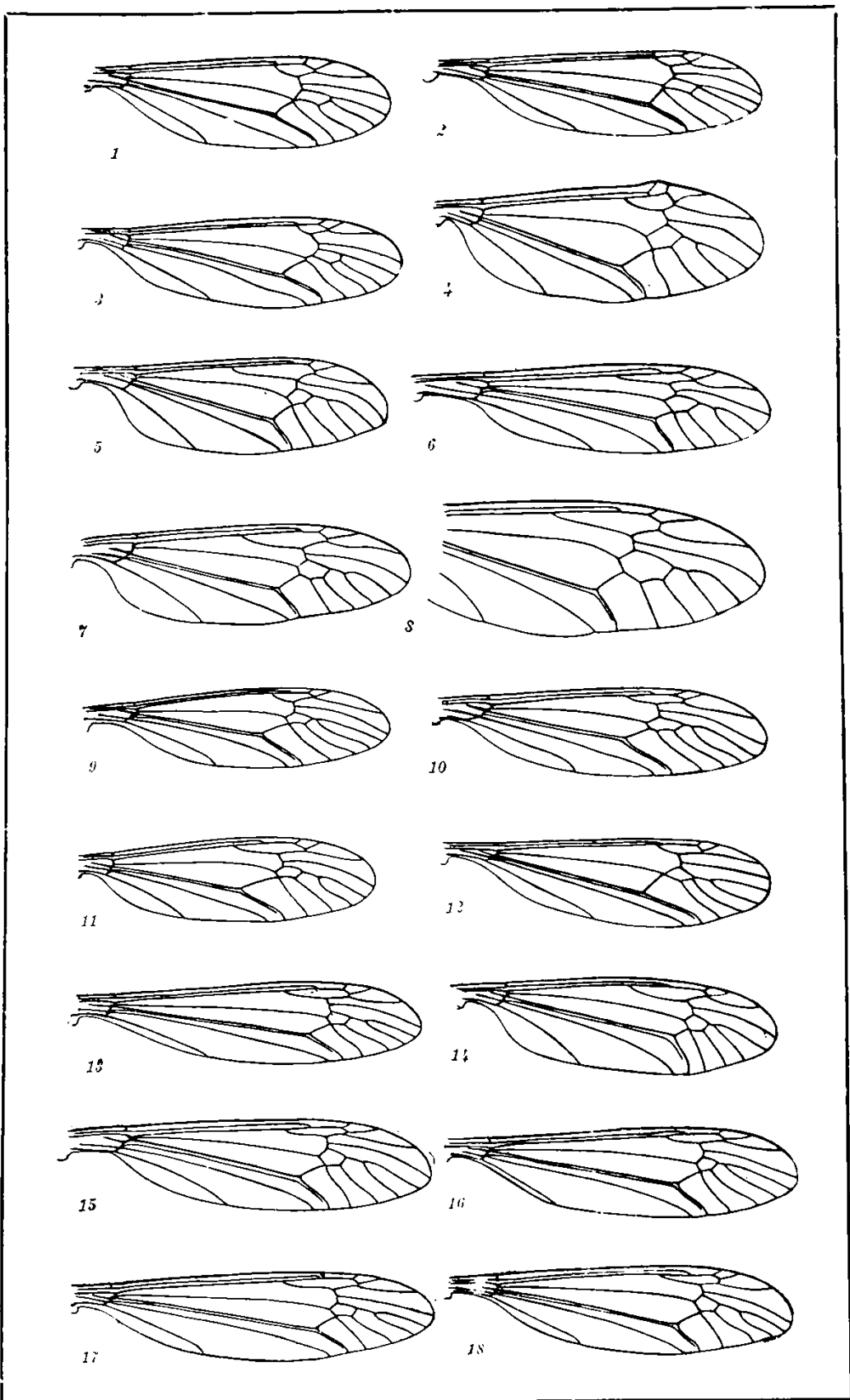


PLATE 1.

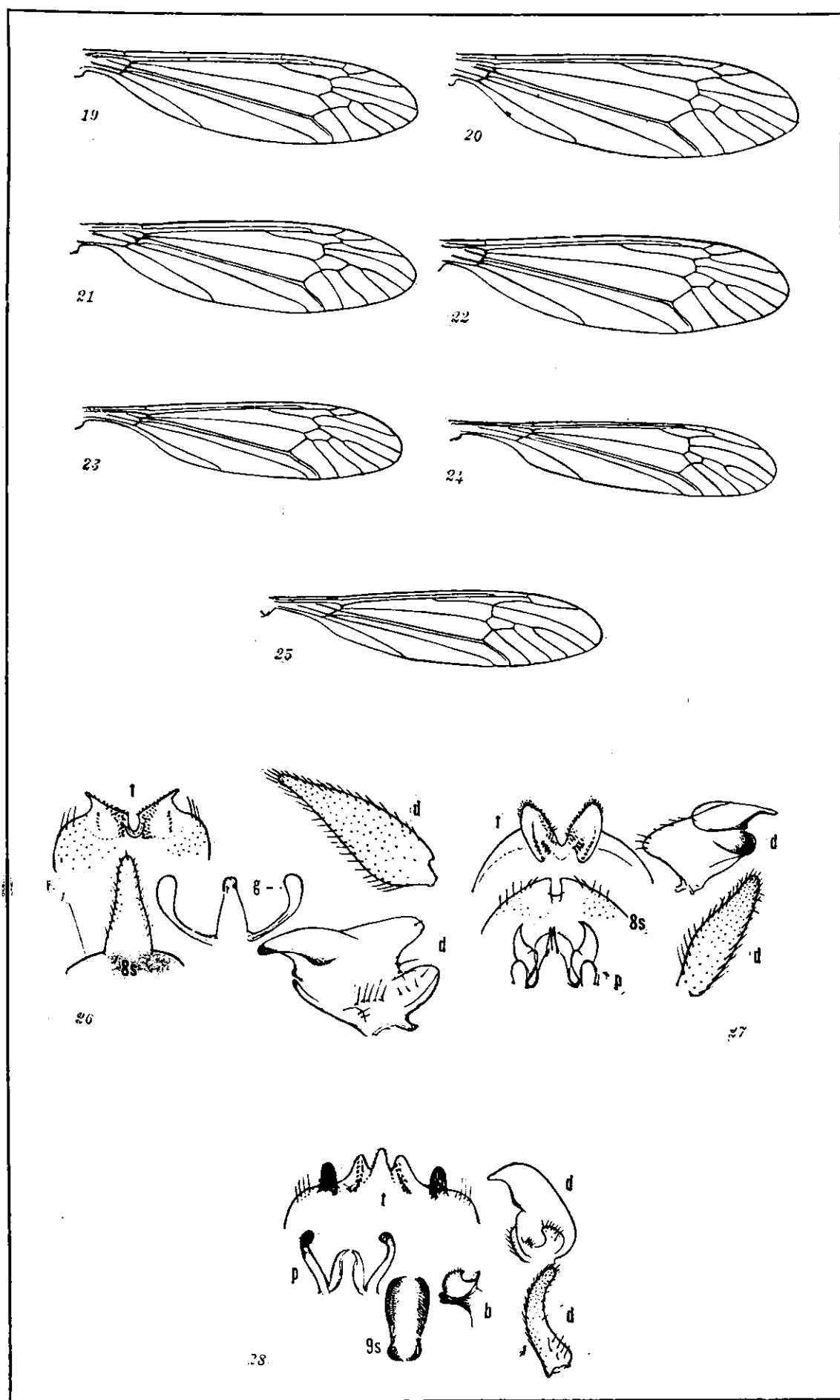


PLATE 2.

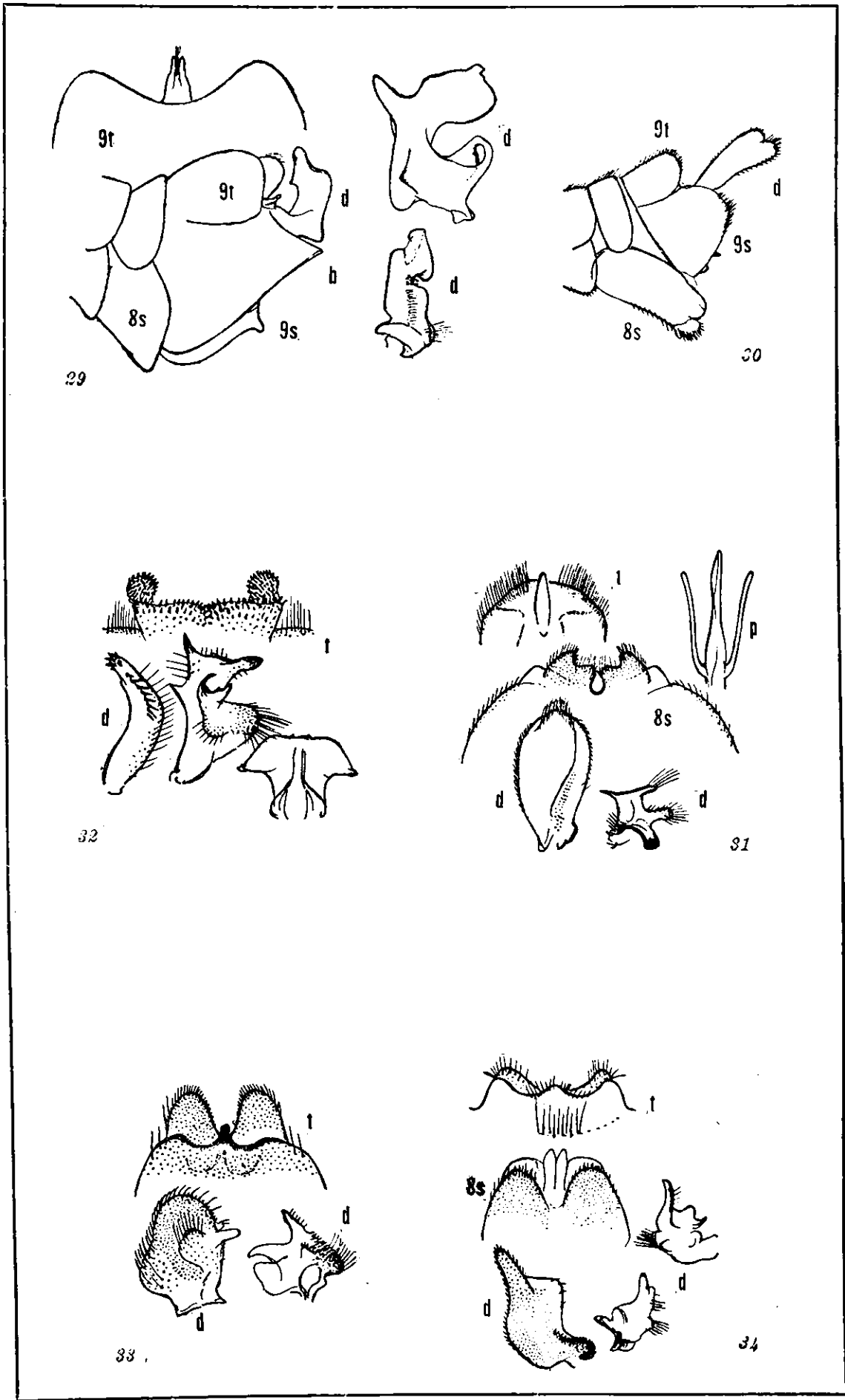
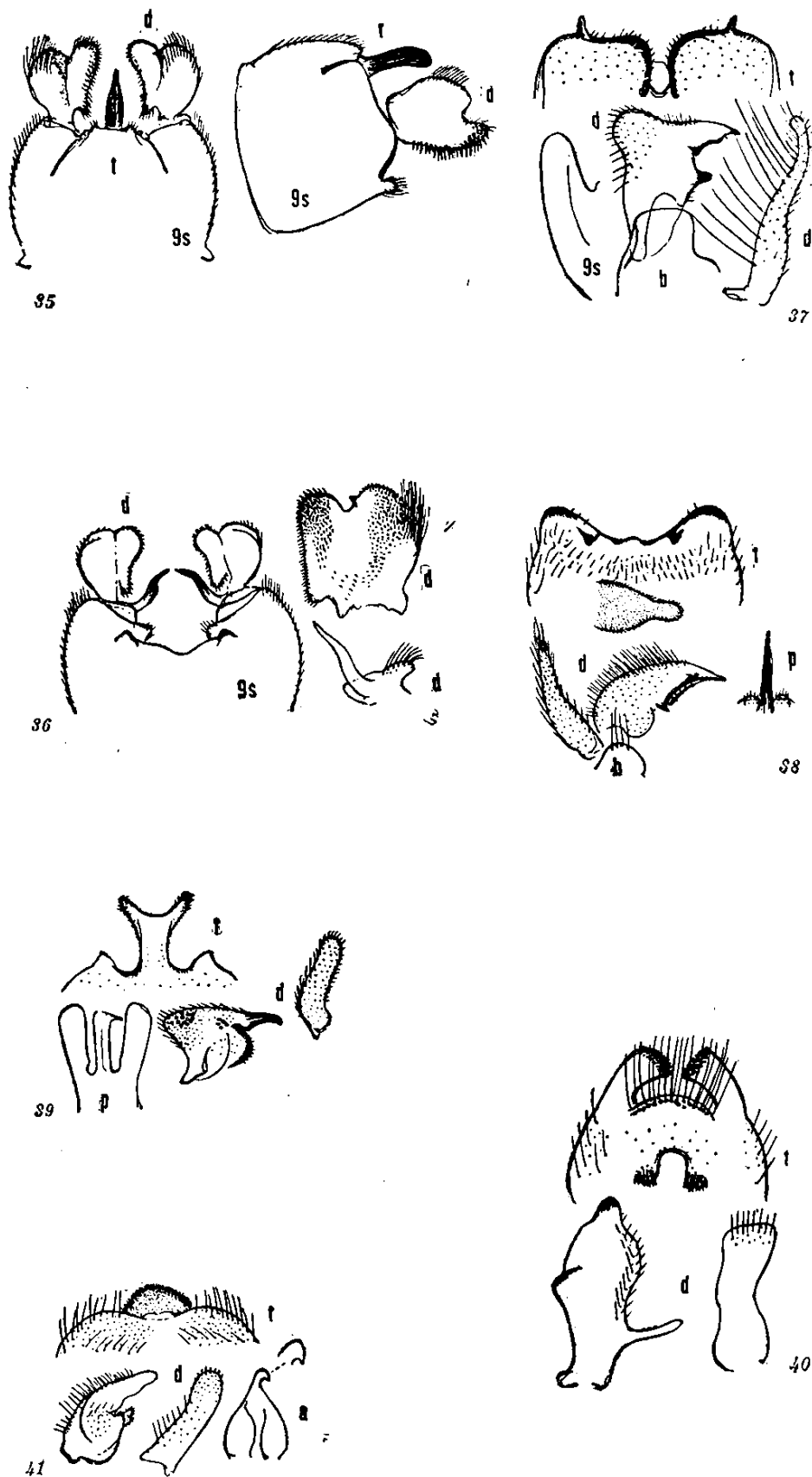


PLATE 3.



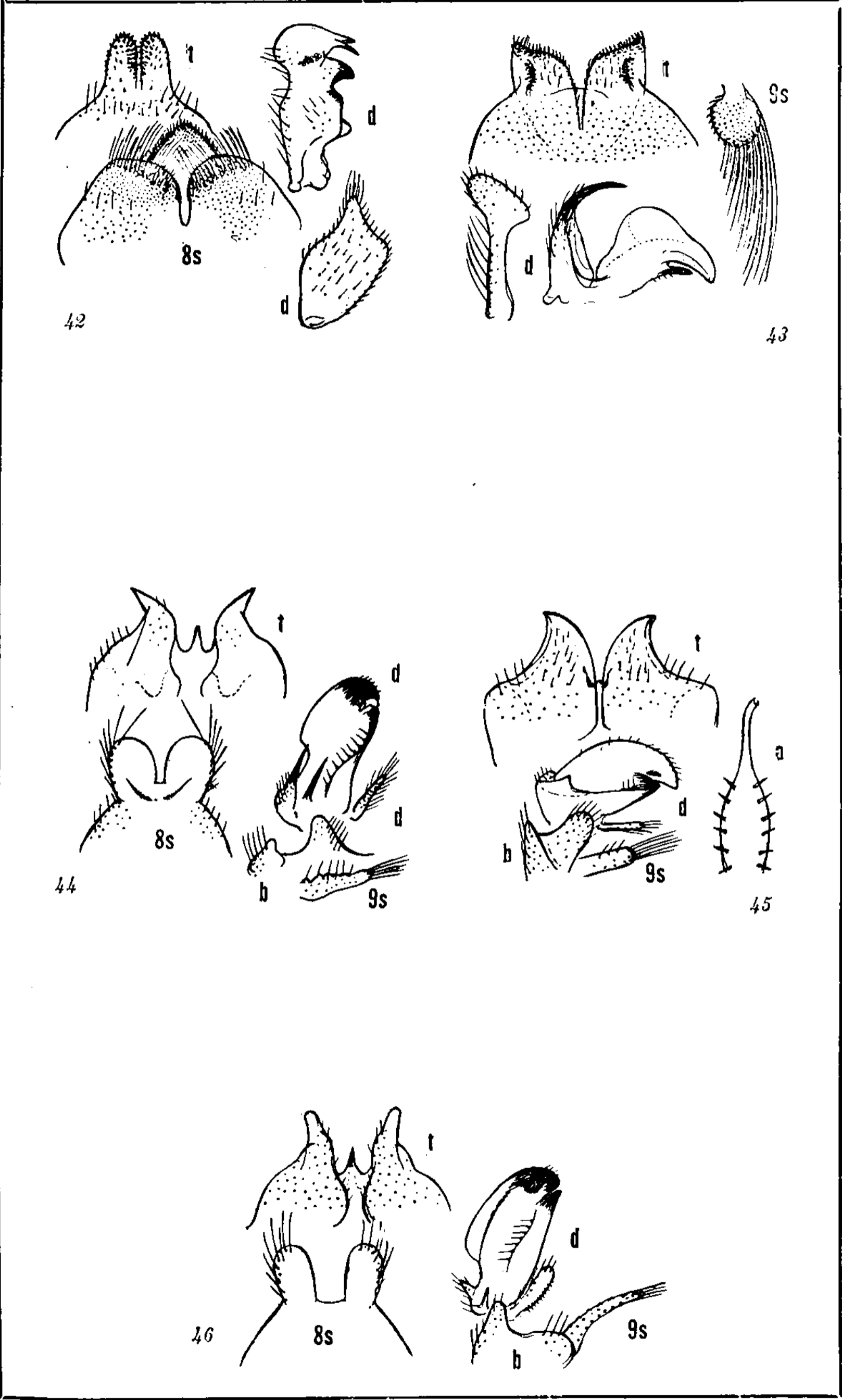


PLATE 5.

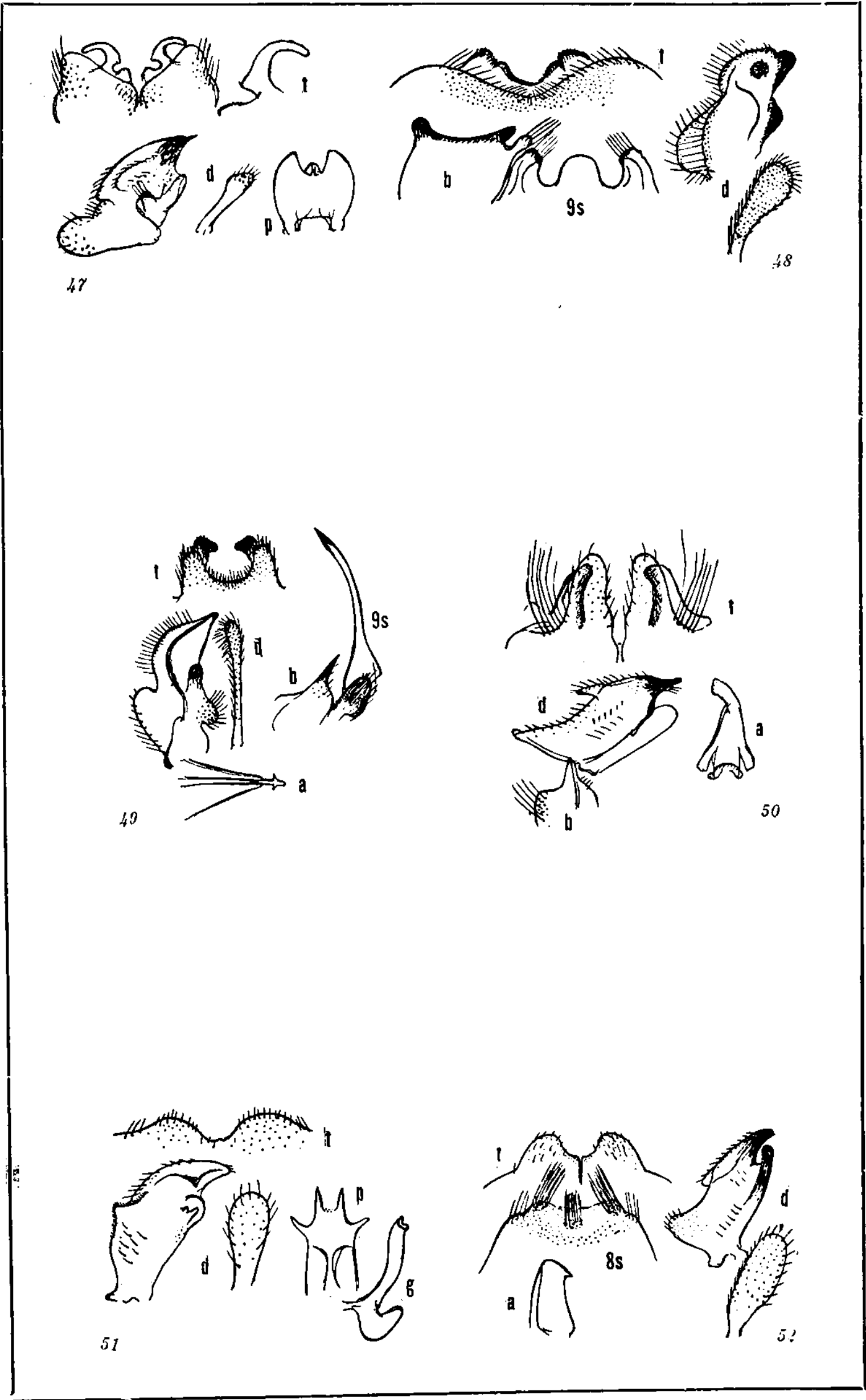


PLATE 6.