

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

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

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## FOUR PLATES

At this time I am continuing the discussion of crane flies from India, taken chiefly by Dr. Fernand Schmid in Kumaon and Sikkim, with a smaller number of species received from Aloysius Camilleri, taken in the Darjeeling District of the eastern Himalayas and by P. Susai Nathan in southern India. I am very greatly indebted to the collectors for this unusually interesting series of Tipulidæ, the types of which are preserved in my personal collection.

## TIPULINÆ

**CTENACROSCELIS DORSOPLEURALIS SURYA** subsp. nov.

Plate 2, fig. 23.

Mesonotal præscutum with disk virtually covered by four dark gray stripes, the interspaces brownish black, paler behind; no yellow ground area before suture, as in *majesticus*; pleura yellow, with a narrow brown dorsal stripe; wings without a pale central stripe, as in typical *dorsopleuralis*; abdomen dark brown, lateral tergal borders brownish gray, basal sternites obscure yellow; male hypopygium with tergal lobes narrowly separated; eighth sternite with large divergent lobes, clothed with long yellow setæ; outer dististyle relatively long, inner style with a conspicuous setiferous lobe on mesal face near base.

*Male*.—Length, about 30 to 33 millimeters; wing, 35 to 40; antenna, about 4 to 4.3.

Frontal prolongation of head light brown above, dark brown on lower half; nasus elongate; palpi black. Antennæ with scape brownish yellow, pedicel yellow, flagellum light brown, outer segments darker; flagellar segments long-suboval, lower face slightly produced, verticils very small. Head light brown; vertical tubercle emarginate medially.

Pronotum light yellow, the scutum infuscated medially. Mesonotal præscutum with disk virtually covered by four dark brownish gray stripes, the interspaces brownish black, cinnamon brown posteriorly; outer lateral margins of stripes

darkened, lateral borders broadly light yellow; posterior sclerites of notum dark brownish gray, the posterior third of mediotergite and lower two-thirds of pleurotergite yellow, the dorsal part of latter weakly darkened. Pleura yellow, with a narrow but conspicuous dark brown longitudinal stripe extending from the cervical region across the dorsal pleurites to before the wing root. Halteres dark brown, base of stem fulvous. Legs with coxæ and trochanters yellow; femora yellowish brown, tips narrowly but conspicuously black, the amount subequal on all legs; remainder of legs yellowish brown, outer tarsal segments darker. Wings strongly tinged with brown, prearcular and costal fields, with the stigma, darker; no brightening of the central cells, as in typical *dorsopleuralis*; a narrow brown seam on posterior two-thirds of m-cu; a narrow obliterative area at and before the cord, larger and more conspicuous before stigma; veins reddish brown. Venation: m-cu subequal to the distal section of Cu<sub>1</sub>; cell M<sub>4</sub> broad.

Abdominal tergites dark brown, lateral borders broadly brownish gray, posterior margins narrowly pale; basal sternites obscure yellow; outer segments, including hypopygium, dark brown. Male hypopygium (Plate 2, fig. 23) generally as in *majesticus*, differing in all details. Ninth tergite, *t*, with the lobes relatively small, tips obtuse to subtruncate, separated by a very narrow notch. Basistyle with apical lobe small, with relatively sparse setæ. Outer dististyle, *d*, relatively long, proportionately much longer than in *majesticus*; inner style relatively stout, shaped as in the figure; a conspicuous setiferous lobe on mesal face near base; setæ of outer face of style opposite the tubercle sparse and weak. Eighth sternite, *s*, with the lobes large, divergent, separated by a broad notch, provided with very long yellow setæ, this area continued cephalad onto the body of the sternite to form large setal areas.

*Habitat*.—India (Bengal, Sikkim).

Holotype, male, Kurseong, West Bengal, altitude 5,455 feet, June 6, 1958 (*Camilleri*). Paratypes, ♂♂, Git Dabbling, West Bengal, altitude 5,100 feet, September 15, 1959 (*Schmid*); ♂, Lingsoka, West Bengal, altitude 4,270 feet, September 9, 1959 (*Schmid*); ♂, Ligship, Sikkim, altitude 1,700 feet, September 25, 1959 (*Schmid*); ♂, Tashigang, Sikkim, altitude 3,120 feet, September 29, 1959 (*Schmid*); ♂, Tinglin, Sikkim, altitude 2,950 feet, September 28, 1959 (*Schmid*).

Differs from typical *Ctenacroscelis dorsopleuralis* Alexander, of Pakistan and the western Himalayas, in the larger size, coloration of the wings and body and especially in the structure of the male hypopygium, including the tergite and outer dististyle.

**DOLICHOPEZA (NESOPEZA) APHOTISMA** sp. nov.      Plate 1, fig. 1; Plate 2, fig. 24.

Size large (wing of male 12 millimeters or more); general coloration dark liver brown; legs brownish black, outer tarsal segments whitened; wings strongly suffused, stigma darker, a small darkened cloud on anterior cord; medial forks relatively shallow; abdominal sternites conspicuously bicolored, yellow and dark brown; male hypopygium with the tergal shield blackened laterally, posterior border nearly truncate; ventral dististyle large; eighth sternite with posterior border shallowly bilobed.

*Male*.—Length, about 11 to 12 millimeters; wing, 12 to 13; antenna, about 4 to 4.2.

Frontal prolongation of head light brown, palpi dark brown. Antennæ with scape, pedicel and base of first flagellar segment yellow, remainder brownish black; flagellar segments slightly enlarged at base; verticils unilaterally arranged, shorter than the segments. Head with front light yellow, anterior vertex yellowish brown, posterior vertex with a large brown area on either side of midline.

Pronotum dark brown. Mesonotal præscutum with four liver brown stripes that are scarcely differentiated from the darker ground, intermediate stripes separated by a capillary line; remainder of notum liver brown, central area of scutum narrowly paler; vestiture of notum short and sparse. Pleura light liver brown, ventral sternopleurite and meron paler. Halteres with stem dirty white, knob dark brown. Legs very long; fore coxæ light brown, remaining coxæ more yellowed; trochanters light yellow, with a brown spot beneath; femora brownish black, bases narrowly more brightened; tibiæ black; basitarsi black on about the proximal three-fourths, remainder of tarsi white, faintly tinged with greenish. Wings (Plate 1, fig. 1) strongly suffused, stigma darker brown; a small darkened cloud on anterior cord; veins dark brown, obliterative areas on anterior cord small. Veins of outer two-thirds of wing with strong macrotrichia, lacking on basal section of  $Cu_1$  and 2nd A, very sparse but long at outer end of 1st A. Venation:  $Sc_2$  ending at near two-thirds Rs, the

latter longer than m-cu, nearly straight; medial forks relatively shallow, cell  $M_1$  about twice its petiole; m-cu from one-fourth to one-fifth its length before fork of M.

Abdominal tergites light brown, posterior borders narrowly more blackened, more extensive on outer segments; sternites conspicuously bicolored, bases dark brown, about the outer half yellow; hypopygium brown. Male hypopygium (Plate 2, fig. 24) with the tergite, *t*, shield-shaped, narrowed behind, outer lateral angles heavily blackened, coarsely toothed; posterior border subtruncate, weakly convex at midline, margin with a blackened streak on either side of midline, disk of tergite with scattered relatively small setæ. Dorsal dististyle, *d*, relatively short, its length about three and one-half times the breadth, tip obtuse, setæ relatively short; ventral style large, especially the glabrous dorsal crest; beak and lower beak confluent, without an acute notch separating them; outer posterior area of style rounded, without major setæ. Phallosome including narrow dusky blades. Eighth sternite, *s*, with posterior border produced into a small yellow plate that is bilobed by a small V-shaped notch; setæ small, especially near the tips of the lobes.

*Habitat*.—India (Kumaon).

Holotype, male, Trijugi, Pauri Garhwal, in *Rhododendron* association, altitude 7,000 feet, May 19, 1958 (*Schmid*). Paratopotypes, 2 males, May 26, 1958.

*Dolichopeza* (*Nesopeza*) *aphotisma* is readily told from other regional dark-colored species with suffused wings by the distinctive structure of the male hypopygium, including especially the tergite, ventral dististyle and eighth sternite. The most similar such species include *D. (N.) himalayæ* Alexander, *D. (N.) orientalis* Brunetti, and some further novelties described in the present paper.

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

Plate 2, fig. 25.

Size medium (wing of male 11 millimeters); general coloration brown; tips of basitarsi and remainder of tarsi snowy white; wings strongly darkened; male hypopygium with the tergal plate narrowed outwardly, submedian blades with a double row of long fimbriations; inner dististyle relatively slender, gently sinuous; eighth sternite with posterior margin unmodified.

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

Frontal prolongation of head brownish yellow, with long black setæ; palpi dark brown. Antennæ relatively long, as shown by the measurements; scape obscure yellow, pedicel reddish brown, flagellum dark brown; verticils coarse, the more proximal segments with a few unusually long bristles. Head with front light yellow, vertex light olive brown.

Pronotum dark brown. Mesonotal præscutum brown with four feebly differentiated more grayish stripes, the intermediate pair divided by two delicate darker brown central lines; scutum dark brown, scutellum and postnotum with a more grayish cast. Pleura dark brown, the ventral sternopleurite paler. Halteres with stem dusky, knob dark brown. Legs with coxæ brown, trochanters more testaceous; femora, tibiæ and most of basitarsi dark brown, the outer fifth or sixth of the last, with the remainder of tarsi, snowy white. Wings strongly darkened, stigma oval, dark brown; veins relatively pale brown. About six or seven scattered macrotrichia on outer half of vein 2nd A. Venation; Rs subequal to  $R_{2+3}$ ; free tip of  $Sc_2$  before  $R_2$ , medial forks relatively deep; cell  $M_1$  slightly less than twice its petiole.

Basal abdominal tergites reddish brown, apices of segments two and three and the succeeding segments darker brown; basal sternites yellow, patterned with brown, especially the posterior borders; outer segments, including hypopygium, dark brown. Male hypopygium (Plate 2, fig. 25) with the blackened tergal plate, *t*, relatively small, each lateral wing smooth, its posterior end produced caudad into a slender extension; submedian blades of tergite dusky, smooth, the upper edge and apex with a dorsal and a marginal fringe of slender fimbriations, longer and more hairlike than in other similar species. Outer dististyle, *d*, relatively slender, gently sinuous, the setæ longer than the diameter of the style; inner style relatively narrow, apex of beak feebly emarginate. Phallosome, *p*, including various flattened blades and plates; ædeagus relatively small, about as in *microphallus*. Eighth sternite with posterior margin subtruncate to very gently emarginate, without lobes or a median notch, surface with abundant long setæ.

*Habitat*.—India (Sikkim).

Holotype, male, Lathong, altitude 6,560 feet, May 15, 1959 (Schmid).

Although it is generally similar to other regional dark colored species, including *Dolichozeza* (*Nesozeza*) *himalayæ* Alexander and *D. (N.) microphallus* sp. nov., the present fly seems quite distinct in the hypopygial structure, especially the tergite.

**DOLICHOZEZA (NESOZEZA) EXTRUDENS** sp. nov. Plate 1, fig. 2; Plate 2, fig. 26.

Size medium (wing of male 11 millimeters); general coloration dark brown, median region of præscutum paler; outer tarsal segments snowy white; wings strongly infuscated, stigma darker; vein 2nd A with macrotrichia throughout most of its length; male hypopygium with the phallosome extruded; eighth sternite unmodified.

*Male*.—Length, about 12 millimeters; wing, 11; antenna, about 3.5.

Frontal prolongation of head light brown above, more yellowed on sides, vestiture black, long and conspicuous. Antennæ with scape and pedicel testaceous yellow, flagellum brownish black; flagellar segments elongate, exceeding the verticils. Head pale yellow in front, including the low vertical tubercle; posterior part of head brown.

Pronotum brown. Mesonotal præscutum brown, the broad central region more testaceous brown, representing a median stripe, the lateral stripes very reduced; scutal lobes dark brown, median area paler brown; scutellum and postnotum dark brown. Pleura almost uniformly brown, dorsopleural membrane and the ventral pleurites slightly more yellowed. Halteres dark brown. Legs with coxæ brown; trochanters obscure yellow; femora black, tibiæ and basitarsi paler, brown, the latter with outer fourth or fifth, with remainder of tarsi, snowy white, last segment a trifle darkened. Wings (Plate 1, fig. 2) strongly infuscated, stigma oval, darker brown; a narrow brown seam on anterior cord; restricted obliterative areas before and beyond stigma and across cell 1st  $M_2$ ; veins brown. Macrotrichia on veins beyond general level of origin of Rs, basad of this more sparse, with trichia on outer fifth of 1st A and about the four-fifths of 2nd A. Venation: Medial forks relatively shallow, cell  $M_1$  about one-third longer than its petiole; m-cu from near two-fifths to one-half its length before fork of M; cell 2nd A moderately broad.

Abdomen dark brown, the proximal two segments somewhat brighter. Male hypopygium (Plate 2, fig. 26) with the tergal region, *t*, pale medially, appearing as a transverse plate, lateral borders slightly sclerotized, surface with numerous relatively

short setæ; lateral lobes appearing as black virtually smooth suboval structures; from lower surface on either side of midline with a brown virtually glabrous plate that evidently represents the usual median blade of the tergite and is presumed to be a modified proctiger. Dorsal dististyle, *d*, relatively long and slender, darkened, with short setæ; lower style broadest beyond base, here provided with long setæ, outer half, including the obtuse beaks more nearly glabrous, the outer margin with a few long setæ. Phallosome, *p*, conspicuous, appearing as divergent pale winglike blades and the unusually long ædeagus that is extruded from the genital chamber. Eighth sternite with margin unmodified.

*Habitat*.—India (Kumaon).

Holotype, male, Khati, Almora, altitude 7,700 to 8,000 feet, September 10, 1958 (*Schmid*).

*Dolichopeza (Nesopeza) extrudens* is generally similar to some other regional members of the subgenus, including *D. (N.) himalayæ* Alexander and *D. (N.) orientalis* Brunetti. It may be told by the structure of the male hypopygium, including also the eighth sternite, and by the evidently more setiferous wing veins, including both anals.

**DOLICHOPEZA (NESOPEZA) MICROPHALLUS** *sp. nov.* Plate 1, fig. 3; Plate 2, fig. 27.

Size medium (wing of male 11.5 millimeters); general coloration dark brown, præscutum with four more yellowish brown stripes; legs dark brown, basitarsi paler brown, remainder of tarsi light yellow; wings relatively broad, strongly darkened, stigma darker brown; free tip of  $Sc_2$  in direct longitudinal alignment with  $R_1$ , medial forks deep; male hypopygium with the lateral tergal plates broadly rounded, ventral extensions very broad, margins with sparse fimbriæ; phallosome including the long slender ædeagus and subtending basal wings; posterior border of eighth sternite gently emarginate.

*Male*.—Length, about 10 millimeters; wing, 11.5; antenna, about 3.2.

Rostrum dark brown, palpi black. Antennæ with scape dark brown, pedicel testaceous brown, flagellum brownish black; flagellar segments subcylindrical, exceeding the verticils. Head brown.

Pronotum brown. Mesonotal præscutum with the restricted ground dark brown, most evident on the humeri and lateral parts, disk with four more yellowish brown stripes, the intermediate pair more evident; central dividing vitta darker, es-



pecially on anterior half; posterior sclerites of notum dark brown. Pleura dark brown; dorsopleural membrane dark. Halteres with stem brown, knob brownish black. Legs with coxæ dark brown, trochanters more yellowed, especially the anterior pair, with a darker spot beneath; femora and tibiæ dark brown, basitarsi paler brown, remainder of tarsi light yellow. Wings (Plate 1, fig. 3) broad, strongly darkened; stigma oval, darker brown; a narrow dusky cloud at the anterior cord in bases of cells  $R_3$  and  $R_5$ ; veins dark brown. No macrotrichia on vein 2nd A. Venation: Free tip of  $Sc_2$  in direct longitudinal alignment with  $R_1$ , tip of  $R_3$  atrophied; medial forks relatively deep, cell  $M_1$  about three times its petiole.

Abdomen dark brown, eighth sternite slightly darker. Male hypopygium (Plate 2, fig. 27) with the lateral blackened plates of tergite, *t*, appearing as broadly rounded blades, vaguely roughened to virtually smooth; central area narrowly blackened, very slightly convex, with a few long setæ; the usual ventral blades or extensions relatively short but very broad, surface microscopically lined or sculptored, margins with short scattered pale fimbriæ. Outer dististyle, *d*, broadest near base, gradually narrowed to the slender obtuse tip; inner style long and relatively narrow, beak produced. Phallosome, *p*, including the long but slender ædeagus and subtending pale wings or gonapophyses. Eighth sternite with posterior border gently emarginate.

*Habitat*.—India (Sikkim).

Holotype, male, Chachu, in *Rhododendron* association, altitude 9,500 feet, May 21, 1959 (*Schmid*).

The most similar regional species is *Dolichopeza* (*Nesopeza*) *extrudens* sp.nov., which has the venational details and hypopygial structure quite distinct. The phallosome, with the ædeagus, of the present fly are noticeably smaller and more slender than in *extrudens*, suggesting the specific name. The peculiar venation of the radial field, as described and figured, is alike on both wings of the type and appears to be quite normal.

**DOLICHOPEZA (NESOPEZA) ORCHESTES** sp. nov. Plate 1, fig. 4; Plate 2, fig. 28.

Size small (wing of male about 8.5 millimeters); general coloration of head and thorax reddish brown, pleura patterned with brown; stem of halteres with very long erect setæ; femora yellow, tips darkened, tibiæ with tips, together with

the tarsi, snowy white; wings tinged with brown, patterned with darker; medial forks shallow; abdominal tergites bicolored, yellow and dark brown; male hypopygium with the tergite broad, on either side with a blackened plate, extended caudad into a bidentate rod; dististyles distinctive in shape and vestiture.

*Male*.—Length, about 8 millimeters; wing, 8.6; antenna, about 4.3.

Frontal prolongation of head testaceous yellow, palpi dark brown. Antennæ relatively long, as shown by the measurements: scape and pedicel brownish yellow, flagellum brownish black; flagellar segments elongate, much exceeding their verticils, first segment about one-half longer than the second. Front weakly infuscated anteriorly, light yellow before the antennal bases; vertex yellowish brown.

Thorax reddish brown, præscutum with four very poorly indicated more yellowed stripes, pleurotergite slightly darker. Propleura brown, remainder of pleura brown, slightly darkened on posterior border of mesepisternum and again on the meron, forming a vague narrow girdle. Halteres with stem light brown, knob dark brown; stem with very long erect silvery setæ over the entire length, the longest nearly as long as the knob. Legs with coxæ and trochanters yellow; femora yellow, more obscure beyond base, tips narrowly infuscated; tibiæ dirty white basally, the broad tips and the tarsi snowy white. Wings (Plate 1, fig. 4) tinged with brown, the prearcular and costal fields darker; stigma dark brown, oval; cord conspicuously seamed with paler brown; outer radial field slightly darkened, including seams over the veins; obliterative areas restricted, before the stigma and across the fork of M; veins brown. Longitudinal veins beyond general level of origin of Rs with long macrotrichia, lacking on 1st A; M with very few scattered trichia, more numerous at outer end; 2nd A with a single trichium at near midlength. Venation: Rs about one-half longer than  $R_{2+3}$ ; medial forks shallow, cell  $M_1$  from one-fourth to about one-fifth longer than its petiole; m-cu about one-third its length before fork of M; cell 2nd A relatively narrow.

Abdominal tergites bicolored, yellow, sides of posterior border dark brown, on the intermediate segments the color more or less interrupted at the midline; sternites light yellow, vaguely darkened at the incisures; segments seven and eight.

black, nine more chestnut, the appendages yellow. Male hypopygium (Plate 2, fig. 28) with the tergite, *t*, broad, each side a smooth black plate, narrowed outwardly, apex unequally bidentate, posteriorly the plate broadly obtuse; central area produced caudad into a long point. Ninth sternite with abundant very long setæ. Dististyles, *d*, distinctive; outer style slender, gently curved, apex with two or three flattened black spinoid setæ, with other more normal bristles back from tip; outer margin at near midlength with a brush of long black setæ; inner style broad, the inner apical angle produced into a slender spine and with a small blackened knob; disk of style with a pendulous lobe that is tipped with a pencil of very long reddish bristles. *Æ*deagus appearing as a slender spinoid organ, narrowed into an acute point. Eighth sternite unmodified.

*Habitat*.—India (Sikkim).

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

*Dolichopeza* (*Nesopeza*) *orchestes* most resembles species such as *D. (N.) vitripennis* Alexander and *D. (N.) volupta* sp. nov., differing in the pattern and venation of wings and especially in the structure of the male hypopygium, involving all structures. The vestiture of the stem of the halteres is noteworthy.

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

Plate 3, fig. 29.

Size medium (wing of male 10.5 millimeters); general coloration brown, præscutum with a broad brownish yellow central stripe; legs dark brown, the tips broadly white, including the outer sixth of basitarsi and remaining segments; wings strongly darkened, stigma dark brown; vein 2nd A with sparse macrotrichia on outer two-thirds; male hypopygium with the tergal plate produced medially into two darkened entirely glabrous blades, narrowed outwardly; eighth sternite with posterior border entirely unmodified.

*Male*.—Length, about 10 millimeters; wing, 10.5; antenna, about 3.4.

Frontal prolongation of head brownish yellow, with long black setæ; palpi dark brown, terminal segment black. Antennæ of moderate length; scape, pedicel and base of first flagellar segment obscure yellow, remainder black; flagellar segments subcylindrical, longer than the verticils. Head with

front and anterior vertex light yellow, remainder of vertex light brown.

Pronotum brown. Mesonotal præscutum brown, the central area broadly more brownish yellow, lateral stripes darker, inconspicuous; remainder of notum brown. Pleura, including the dorsopleural membrane, brown. Halteres dark brown. Legs with coxæ medium brown; trochanters yellow, with a large black spot on lower face; remainder of legs dark brown, the outer sixth of basitarsi and remainder of tarsi snowy white. Wings strongly darkened, stigma oval, dark brown; a narrow brown seam on anterior cord; restricted whitened obliterative areas before and beyond stigma and across the fork of M; veins brown. Vein 2nd A with sparse but long trichia on outer two-thirds, on 1st A about the distal third. Venation:  $Sc_2$  ending at near three-fifths the length of Rs, the latter a little longer than  $R_{2+3}$ ; medial forks relatively shallow, cell  $M_1$  subequal to or a little longer than its petiole.

Abdomen, including hypopygium, dark brown, the basal two tergites more yellowed. Male hypopygium (Plate 3, fig. 29) with the tergite, *t*, consisting of a blackened plate on either side, surface virtually smooth, outer end bilobed into a lower more rounded polished black part; central area produced, margin blackened, beneath on either side produced into a dark brown blade, broad at base, outwardly narrowed to a point, surface with microscopic lines but entirely glabrous. *Ædeagus* relatively stout. Eighth sternite with posterior border entirely unmodified, truncate, with very sparse scattered setæ.

*Habitat*.—India (Sikkim).

Holotype, male, Yungang, altitude 5,700 feet, May 14, 1959 (*Schmid*).

In its plain coloration and darkened wings, *Dolichopeza* (*Nesopeza*) *penthema* much resembles certain other regional species, including *D. (N.) aphotisma* sp. nov., *D. (N.) aquila* sp. nov., *D. (N.) himalayæ* Alexander and *D. (N.) scotoptera* sp. nov., differing from these especially in the structure of the male hypopygium, particularly the tergite and eighth sternite.

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

Plate 3, fig. 30.

Size relatively large (wing of male 13 millimeters); general coloration dark brown; antennæ uniformly darkened; tarsi whitened, including the narrow tips of the basitarsi; wings strongly infuscated, stigma darker; Rs and  $R_{2+3}$  subequal, medial forks deep; a few macrotrichia near tip of vein 2nd

A; male hypopygium with the tergite terminating in flattened black blades, in their dorsal aspect appearing pointed; inner dististyle relatively narrow.

*Male*.—Length, about 12 millimeters; wing, 13; antenna, about 3.5.

Frontal prolongation of head dark brown, palpi black. Antennæ with scape and pedicel dark gray, flagellum black; flagellar segments nearly cylindrical, exceeding the coarse verticils. Head dark brown.

Pronotum and mesonotum almost uniformly dark brown, the central area of præscutum and narrow midline of scutum more reddish brown. Pleura dark brown. Halteres dark brown, extreme base of stem yellowed. Legs with coxæ dark brown; trochanters testaceous brown; femora and tibiæ black; basitarsi black on about the proximal five-sixths or six-sevenths, remainder of tarsi whitened. Wings strongly infuscated, especially the costal border, stigma still darker; veins dark brown. Most veins beyond level of origin of Rs with long conspicuous macrotrichia, including outer ends of M,  $Cu_1$  and 2nd A, 1st A glabrous. Venation: Rs short, subequal to  $R_{2+3}$ ; medial forks relatively deep, cell  $M_1$  about two and one-half times its petiole; m-cu about one-third its length before fork of M.

Abdomen, including the hypopygium, dark reddish brown. Male hypopygium (Plate 3, fig. 30) with the tergite, *t*, produced into two blackened plates, outer end from above appearing pointed, from the side more rounded, only slightly roughened; from ventral part beneath each plate submedially with a long darkened blade, at tip expanded into an oval obtuse head; surface virtually glabrous, margin with few and very small fimbriæ. Outer dististyle, *d*, about five times as long as broad, tip very obtuse; inner style relatively narrow, beak slender, lower beak very low; style with a few long setæ near base, including two long pale ones at near midlength of outer margin. Phallosome, *p*, a pale mass that terminates in a decurved arm, tip obtuse; ædeagus slender, relatively weak. Eighth sternite, *8s*, with posterior border subtruncate, with a U-shaped emargination, the adjoining lobes pale and flattened.

*Habitat*.—India (Kumaon).

Holotype, male, Trijugi, Pauri Garhwal, in *Rhododendron* association, altitude 7,000 feet, May 26, 1958 (Schmid).

*Dolichopeza* (*Nesopeza*) *scoptera* is most like *D. (N.) aphotisma* sp. nov., differing evidently in the structure of the male hypopygium.

**DOLICHOPEZA (NESOPEZA) THIASOPHILA** sp. nov. Plate 1, fig. 5; Plate 3, fig. 31.

Allied to *volupta*; general coloration of thorax brownish orange, mesepisternum darker; tips of tibiæ broadly whitened, tarsi snowy white; wings whitish subhyaline, stigma conspicuous; abdominal tergites conspicuously bicolored, hypopygium orange; male hypopygium with tergal lobes simple, rounded; apex of basistyle produced into a stout blackened blade; lobes of ninth sternite with elongate setæ, dorsal lobule slender.

*Male*.—Length, about 8 to 8.2 millimeters; wing, 9 to 9.2; antenna, about 4 to 4.2,

*Female*.—Length, about 10 millimeters; wing, 10; antenna, about 3.

Frontal prolongation of head yellowish brown, clearer yellow on sides; palpi dark brown. Antennæ of male relatively long, as shown by the measurements; scape and pedicel yellow, flagellum black; segments elongate—cylindrical, much longer than the verticils. Head cinnamon brown, orbits very narrowly pale.

Pronotal scutum cinnamon brown, scutellum yellow. Mesonotal præscutum chiefly orange or brownish orange, the interspaces slightly darker, especially the anterior half of the median vitta; scutal lobes with obscure orange centers that are ringed with light brown; posterior sclerites of notum light brown. Pleura light yellow on propleura and pteropleurite, the mesepisternum dark brown, forming a conspicuous transverse girdle; ventral meron darkened. Halteres with stem yellow, becoming more obscure outwardly, knobs brownish black. Legs with all coxæ and trochanters light yellow; femora dark brown; tibiæ more yellowish brown, the tips passing into white, on the posterior legs involving about the distal fifth of segment, narrower on the other legs; remainder of tarsi snowy white. Wings (Plate 1, fig. 5) whitish subhyaline, cells beyond cord vaguely darker; stigma oval, dark brown; veins brownish black, conspicuous. Abundant macrotrichia on veins of about the outer two-thirds of wing, including all but the base of 1st A, lacking or reduced to one or two on 2nd A. Venation: Sc<sub>2</sub> ending shortly before fork of Rs;

medial forks moderately deep, cell  $M_1$  from about one-half longer than its petiole to twice this length.

Abdominal segments conspicuously bicolored, tergites orange yellow basally, clearer yellow on sides, with approximately the outer half brownish black, the subterminal segments more uniformly blackened; sternites more extensively orange, posterior borders narrowly infuscated; hypopygium orange. Male hypopygium (Plate 3, fig. 31) with the tergal plate, *t*, relatively small, narrow medially, expanded on sides, the lateral blades obtuse, smooth. Basistyle, *b*, above at apex produced into a broad blackened blade or point, its outer end oblique; lower apical angle rounded, with very long yellow setæ. Outer dististyle, *d*, relatively small and weak; inner style large, flattened; dorsal crest with pale fimbriations, outer end with a group of about ten long setæ; beak blackened, upturned, apex dilated, obtuse, lower beak smaller, a decurved point. Ninth sternite *9s*, large, on either side produced caudad into a large lobe, both ends of which are conspicuously setiferous, the lower group roughened, somewhat as in *volupta*, upper setæ long; dorsal end of sternal lobe produced into a slender lobule provided with long setæ, those at apex shorter, much longer than in *volupta* (this lobule drawn separately in figure; in *volupta* lobule subcircular or disklike). Eighth sternite unmodified.

*Habitat*.—India (Sikkim).

Holotype, male, Teng, altitude 4,600 feet, May 12, 1959 (*Schmid*). Allotype, female, Tikjak, altitude 4,900 feet, April 7, 1959 (*Schmid*). Paratypes, males, Singbeng, altitude 4,920 feet, April 26, 1959 (*Schmid*); males, Pemayangtse, 5,600 feet, April 27, 1959 (*Schmid*).

Although it is closely allied to *Dolichopeza* (*Nesopeza*) *volupta* sp. nov., the present fly differs evidently in the structure of the male hypopygium, particularly the ninth tergite and sternite, apex of basistyle, and the inner dististyle.

**DOLICHOPEZA (NESOPEZA) VOLUPTA** sp. nov.      Plate 1, fig. 6; Plate 3, fig. 32.

Allied to *vitripennis*; general coloration brownish yellow, intermediate abdominal segments conspicuously bicolored, subterminal segments black, hypopygium brownish yellow; tarsi and tips of tibiae snowy white; wings whitish hyaline, apex broadly more darkened, veins dark brown; male hypopygium with the ninth sternite above produced into a circular head

that is densely provided with curved setæ, ventral cephalic end of sternite with abundant coarse setæ that are roughened by microscopic tubercles.

*Male*.—Length, about 8.5 to 9 millimeters; wing, 8 to 9.5; antenna, about 4 to 4.5.

*Female*.—Length, about 9.5 millimeters; wing, 9; antenna, about 2.

Frontal prolongation of head brownish yellow, palpi dirty yellow. Antennæ of male long; scape, pedicel and base of first flagellar segment yellow, remainder of organ black; flagellar segments long-cylindrical, with a short dense erect pubescence; verticils unilaterally distributed, shorter than the segments; terminal segment small, narrowed outwardly, its length about four times the greatest diameter. Head light chestnut brown, paler on occiput; vertical tubercle small; setæ restricted to an orbital series on posterior vertex and some longer ones on sides of the same area.

Pronotum testaceous yellow. Mesonotum almost uniformly brownish yellow, with indications of a darkened central stripe on anterior half of præscutum; vestiture very sparse, pale yellow. Propleura yellow, remainder of pleura brownish yellow, the anepisternum a little darker. Halteres with stem obscure yellow, knob blackened. Legs with fore coxæ and trochanters whitened, remaining coxæ more yellowed; femora pale yellow, tips narrowly darkened; tibiæ very pale brown, the narrow tips and remainder of legs snowy white. Wings (Plate 1, fig. 6) whitish hyaline, cells beyond cord almost insensibly darkened; stigma dark brown, oval, conspicuous; veins dark brown. Veins of about the outer three-fourths of wing with conspicuous macrotrichia, lacking on bases of Sc, M, Cu<sub>1</sub> and 1st A, none on 2nd A. Venation: Sc long, Sc<sub>2</sub> ending shortly before fork of Rs, the latter more than one-half longer than R<sub>2+3</sub>; medial forks relatively shallow, M<sub>1</sub> longer than its petiole, m-cu about two-thirds its length before fork of M.

Abdomen with basal segment and proximal end of second brownish yellow, remainder of second and three to six, inclusive, conspicuously bicolored, yellow, the posterior borders black, on the intermediate tergites including about one-half the segment, sternites with much narrower darkened margins; segments seven and eight black, forming a ring; hypopygium brownish yellow. Male hypopygium (Plate 3, fig. 32) with



the tergite, *t*, and sternite fused basally, region of sternite, *s*, on dorsal edge produced into a slender arm that is dilated into a circular head, densely provided with yellow setæ; ventral part of sternite produced and dilated, fringed with strong setæ that are covered with small tubercles to produce a knobby appearance, the setæ at anterior angle larger and stronger, more posterior setæ retrorse, bent very strongly cephalad. Tergite, *t*, narrow, broadly transverse, lateral wings expanded into a smooth blackened blade. Basistyle, *b*, terminating in a short pale triangular point, not blackened as in *thiasophila*. Outer dististyle, *d*, slender, with relatively short black setæ; inner style a broad pale blade, its narrow beak blackened, slender, separated from body of style by a linear notch; apex of blade produced into hyaline fimbriations and setæ. Eighth sternite unmodified, median region with very long erect yellow setæ.

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

Holotype, male, Khumyara, Pauri Garhwal, Kumaon, altitude 4,300 to 5,000 feet, May 28, 1958 (*Schmid*). Allotype, female, Lingsoka, West Bengal, altitude 4,500 feet, September 10, 1959 (*Schmid*). Paratypes, 1 male, pinned with allotype; male, Dethang, Sikkim, altitude 4,000 feet, April 1, 1959 (*Schmid*); males, Singbeng, Sikkim, altitude 4,920 feet, April 26, 1959 (*Schmid*).

*Dolichopeza (Nesopeza) volupta* differs from *D. (N.) vitripennis* Alexander in the coloration of the body and wings, including the slightly darkened tips of the latter. The antenna of the present fly is slightly shorter than in *vitripennis*. This species and *D. (N.) thiasophila* sp. nov., where the male sex is known, have complex and distinctive male hypopygia that have been further compared under the account of the latter species.

#### LIMONIINÆ

#### LIMONIINI

#### Genus LIMONIA Meigen

#### Subgenus SIVALIMNOBIA novum.

Characters of venation and structure of the male hypopygium about intermediate between those of typical *Limonia* and *Dicranomyia* Stephens. Antennæ with proximal flagellar segments oval, the outer ones elongate, with very long verticils. Anterior vertex broad. Venation (Plate 1, figs. 7, 8) with Sc

ending beyond origin of Rs, commonly at or before midlength of the vein. Ovipositor with cerci very small, hypovalvæ correspondingly enlarged. Male hypopygium (Plate 3, figs. 33, 36) with the ventral dististyle bearing a slender rostral arm that is triangularly expanded at outer end, terminating in a stout spine, with a second separate spinous arm near base of style; gonapophysis with mesal-apical lobe long and slender.

Type of subgenus: *Limonia* (*Sivalimnobia*) *fortis* (Brunetti) (Oriental Region).

Other included species: *L. (S.) alticola* (Edwards) (includes *curvispina* Alexander), of Formosa; *L. (S.) approximata* (Brunetti), of India; *L. (S.) bicolor* (Brunetti) (includes *L. (S.) bipunctata* Brunetti), of India; *L. (S.) euphileta* Alexander (includes *biceps* Alexander), of Japan; *L. (S.) kali* sp. nov., of India; *L. (S.) marginella* Alexander (*marginata* Brunetti, preoccupied), of India; *L. (S.) nongkodjadjarensis* (de Meijere), of Java, and *L. (S.) rahula* sp. nov., of India.

The species of the present group hitherto have been placed either in *Limonia* or *Dicranomyia*, chiefly on the basis of relative length of vein Sc of the wings. It has long been recognized that the various species form a peculiar and isolated group within the genus but no attempt had been made to provide a name for it. The various species may be distinguished in both sexes by the genitalic structures discussed under the subgeneric diagnosis. The known species range from Japan and Java westward into India, which seems to be the center for the group. All forms are of medium size, generally of a yellow or fulvous color and commonly with unpatterned wings, the more aberrant species including especially *bicolor*, *kali*, and *marginella*.

LIMONIA (SIVALIMNOBIA) KALI sp. nov.

Plate 1, fig. 7; Plate 3, fig. 33.

General coloration of thorax polished black; wings strongly infuscated, stigma oval, darker brown; abdomen black, basal segments patterned with yellow; cerci of ovipositor very small; male hypopygium with tergite large, posterior border with a broad V-shaped notch.

*Male*.—Length, about 6 millimeters; wing, 7; antenna, about 1.6.

*Female*.—Length, about 7.5 millimeters; wing, 7.5.

Rostrum and palpi black. Antennæ black throughout; basal flagellar segments oval, outer ones becoming elongate, with

very long verticils, outer three segments subequal in length. Head black.

Thorax polished brownish black to black, dorsopleural region paler; vestiture of notum very reduced in size and number. Halteres moderately long, blackened, base of stem narrowly yellow. Legs with fore and middle coxæ dark brown, posterior pair more yellowed; trochanters yellow; remainder of legs dark brown, femoral bases obscure yellow; claws of male with a single very long spine, of female with about three smaller spines, the outermost largest. Wings (Plate 1, fig. 7) strongly infuscated, stigma oval, darker brown; prearcular and costal fields more yellowish brown; veins dark brown. Rs and veins beyond cord with numerous long trichia. Venation:  $Sc_1$  ending shortly before midlength of Rs,  $Sc_2$  near its tip;  $R_2$  and free tip of  $Sc_2$  in transverse alignment; m-cu at work of M.

Abdomen black, the basal segments patterned with yellow, most extensive on second and third segments, the bright colors greatly reduced beyond this; genitalia of both segments black. Ovipositor with cerci greatly reduced, as in the subgenus; hypovalvæ very large, their bases enlarged. Male hypopygium (Plate 3, fig. 33) with the tergite, *t*, large, posterior border with a broad V-shaped notch, the lateral lobes with long setæ. Basistyle, *b*, with ventromesal lobe moderately large, with relatively few setæ. Dorsal dististyle, *d*, smooth, sinuous, tip acute; ventral style relatively small, subglobular, rostral prolongation slender at base, triangularly dilated outwardly, the upper angle with a single powerful spine; face of style near base with a long yellow rod that terminates in a blackened spine. Gonapophysis, *g*, with mesal apical lobe long and slender. Ædeagus, *a*, glabrous, terminating in two narrow lobes.

*Habitat*.—India (West Bengal).

Holotype, male, Kurseong, altitude 5,455 feet, September 9, 1958 (*Camilleri*). Allotopotype, female, September 6, 1958.

This very distinct fly is readily told from all other members of the subgenus having unpatterned wings by the polished black color of the body. Superficially the species resembles *Limonia* (*Dicranomyia*) *nigrithorax* (Brunetti), a member of the *morio* group of the subgenus, in all regards a very different fly.

LIMONIA (SIVALIMNOBIA) RAHULA sp. nov.

Plate 1, fig. 8; Plate 3, fig. 36.

Size large (wing of male 8.5 millimeters); general coloration of thorax fulvous yellow, pleura paler yellow; a small black spot on pleura beneath wing root; femora yellow, tips very narrowly brown; wings tinged with brownish yellow, stigma slightly darker;  $Sc_1$  ending about opposite one-third the length of Rs; abdominal tergites darkened medially, yellow on sides, sternites yellow, outer segments blackened; male hypopygium with posterior border of tergite deeply notched, the obtuse lobes with very long setæ; spine of blade of ventral dististyle relatively short, gently curved; gonapophyses darkened, tips of mesal apical lobes acute; apical lobes of ædeagus stout, divergent.

*Male*.—Length, about 7.5 millimeters; wing, 8.5; antenna, about 1.6.

*Female*.—Length, about 7.5 millimeters; wing, 9.

Rostrum brownish black; palpi black. Antennæ with scape and pedicel light brown, flagellum black; basal flagellar segments oval, the outer ones becoming very long, with still longer verticils. Head dark brown; anterior vertex broad.

Cervical region darkened. Pronotum yellowish brown, yellowed on sides. Mesonotum fulvous yellow, the præscutum with vague indications of a darker central stripe; central region of scutum, posterior borders of scutal lobes and the scutellum paler yellow. Pleura pale yellow, with a small black spot at the posterior dorsal point of the anepisternum, beneath the wing root. Halteres elongate, stem very slender, dusky, more brightened at base, knob infuscated. Legs with all coxæ and trochanters yellow; femora yellow, tips very narrowly brown; tibiæ and tarsi yellow, terminal tarsal segment brownish black; claws with an outer spine and one or two smaller more basal ones. Wings (Plate 1, fig. 8) tinged with brownish yellow; stigma oval, only slightly darker; veins pale brown. Veins beyond cord with long macrotrichia, with others on outer half of Rs, and on outer ends of Sc, M, and 2nd A, lacking on main stem of  $Cu_1$  and 1st A. Venation:  $Sc_1$  ending about opposite one-third the length of Rs,  $Sc_2$  removed, more so in the type;  $M_{3+4}$  shorter than  $M_4$ ; m-cu just before the fork of M.

Abdomen with tergites darkened medially, yellow on sides, sternites yellow; outer segments blackened in both sexes. Ovipositor with cerci very small, as in the subgenus. Male

hypopygium (Plate 3, fig. 36) of the general type of *fortis*. Ninth tergite, *t*, with posterior border deeply notched, lobes obtusely rounded, with very long setæ, longer than in *fortis* or *kali*, some nearly as long as the tergite. Dorsal dististyle, *d*, slender, blackened throughout; ventral style with the spine of the dilated blade relatively short, gently curved. Gonapophysis, *g*, darkened, mesal apical lobes acute at tips. Apical lobes of ædeagus stout, divergent.

*Habitat*.—India (Kumaon).

Holotype, male, Tapoban, Pauri Garhwal, altitude 7,300 feet, August 2, 1958 (*Schmid*). Allotype, female, Kanol, Pauri Garhwal, altitude 8,530 feet, August 19, 1958 (*Schmid*).

The most similar regional species is the much smaller *Limonia (Sivalimnobia) fortis* (Brunetti), which differs in details of coloration, venation and structure of the male hypopygium, especially the tergite, ventral dististyle and gonapophysis. It should be noted that the relative position of the spines of the ventral dististyle, as shown in the present fly and in *L. (S.) kali* sp. nov. (Plate 3, fig. 33) appears to depend on the position assumed on the microscope slide in mounting.

LIMONIA (LIBNOTES) LÆTINOTA sp. nov.

Plate 1, fig. 9.

Size medium (wing of male 13 millimeters); thorax black, gray pruinose, the præscutum and scutum abruptly orange, not or scarcely patterned; antennæ black; legs brown; wings long and narrow, weakly tinted, costal border and stigma darker brown; outer veins strongly decurved; cell 1st  $M_2$  long, shorter than the veins beyond it, m-cu at near one-third the length of cell 1st  $M_2$ ; basal and subterminal abdominal tergites dark brown, intermediate ones yellowed; hypopygium orange.

*Male*.—Length, about 11 millimeters; wing, 13; antenna, about 2.2.

Rostrum and palpi black. Antennæ black throughout; basal flagellar segments oval, constricted at the incisures, outer segments longer, exceeding the verticils; terminal segment strongly narrowed on outer third, exceeding the penultimate in length. Head dark gray; anterior vertex reduced to a capillary strip.

Prothorax, mesonotal scutellum and postnotum and the pleura black, gray pruinose; mesonotal præscutum and scutum abruptly orange, the former vaguely darkened at cephalic end. Halteres dark brown, base of stem restrictedly pale. Legs with fore

coxæ blackened, pruinose, yellowed at apex beneath, remaining coxæ and all trochanters yellow; femora and tibiæ brown, tarsi outwardly still darker; claws long and nearly straight, with two teeth, the outermost longer. Wings (Plate 1, fig. 9) long and narrow, weakly tinged with brown; costal border and stigma darker brown, interrupted by a yellow spot in cell C before the free tip of  $Sc_2$ ; wing tip narrowly darkened; veins brown. Venation: Sc ending about opposite midlength of level of cell 1st  $M_2$ ; free tip of  $Sc_2$  far before  $R_2$ ; outer ends of veins  $R_3$ ,  $R_{4+5}$  and the medial veins decurved, the former more strongly so; cell 1st  $M_2$  long, about one-half vein  $M_3$  beyond it; m-cu at from one-third to one-fourth the length of  $M_{3+4}$ ; anal veins strongly convergent near bases.

Basal abdominal tergites dark brown, second to fifth more yellowed, subterminal segments brownish black; basal sternites clearer yellow; hypopygium orange, relatively small.

*Habitat*.—South India.

Holotype, male, Cinchona, Anamalai Hills, altitude 3,500 feet, April, 1956 (*Susai Nathan*).

*Limonia* (*Libnotes*) *lætinota* is entirely distinct from other described regional species. In some respects it suggests members of the *nervosa* group but is not closely related.

**LIMONIA (DICRANOMYIA) NEABJUNCTA** sp. nov. Plate 1, fig. 10; Plate 3, fig. 34.

Allied to *abjuncta*; size medium (wing over 7 millimeters); general coloration of thorax dark brown; antennæ black, outer flagellar segments very long, with conspicuous verticils; wings strongly tinged with brown, patterned with darker brown; Sc ending beyond origin of Rs; abdomen dark brown, basal sternites extensively yellowed; male hypopygium with the rostral spines widely separated, the intervening space glabrous; mesal apical lobe of gonapophysis very long and slender.

*Male*.—Length, about 6 to 7 millimeters; wing, 7 to 8.5.

*Female*.—Length, about 7 millimeters; wing, 7.5.

Rostrum light brown, palpi black. Antennæ black; flagellar segments short, the outer ones becoming very long; verticils of outer segments greatly lengthened, exceeding the segments. Head dark brown, more yellowed posteriorly.

Prothorax dark brown, variegated by obscure yellow. Mesonotal præscutum with the ground brownish yellow pollinose, restricted to the sublateral and humeral regions, disk with

three dark brown stripes, the interspaces darkened, lateral margins again darkened; scutum and scutellum dark brown, central region of scutum narrowly obscure yellow; postnotum paler brown, pruinose. Pleura chiefly dark brown. Halteres with stem dusky, base yellowed, apex of knob dark brown. Legs with fore coxæ brown, the others more yellowed; trochanters yellow; femora narrowly obscure yellow at base, remainder darkened, including outer segments. Wings (Plate 1, fig. 10) strongly tinged with brown, restrictedly patterned with darker brown, including the stigma and seams at origin of Rs, cord and outer end of cell 1st M<sub>2</sub>; veins brown. Macrotrichia on longitudinal veins beyond general level of origin of Rs, including outer ends of M, Cu<sub>1</sub> and 2nd A, 1st A glabrous. Venation: Sc<sub>1</sub> ending a short distance beyond origin of Rs, in cases to nearly one-third the length, Sc<sub>2</sub> likewise beyond origin of Rs; m-cu close to fork of M.

Abdominal tergites and hypopygium dark brown; basal sternites bicolored, dark brown with broad yellow posterior borders, basal segment entirely yellow, outer sternites darkened; ninth tergite and basistyle chiefly obscure yellow, ventral dististyle brownish black. Male hypopygium (Plate 3, fig. 34) with the tergite, *t*, transverse, posterior border with two broadly obtuse lobes separated by a V-shaped notch; setæ chiefly restricted to the thickened outer ends of the lobes. Basistyle, *b*, with ventromesal lobe large, with long delicate setæ, most conspicuous on ventral face. Dorsal dististyle, *d*, a long slender curved sickle; ventral style a little more extensive than the basistyle, with a large accessory lobule; rostral prolongation large, with two widely separated spines from strong basal tubercles, the intervening surface glabrous, contrasting with the condition in *abjuncta* where this area is densely setiferous. Gonapophysis, *g*, with mesal apical lobe unusually long and slender. Ædeagus broad, conspicuously bilobed.

*Habitat*.—India (Kumaon).

Holotype, male, Khati, Almora, altitude 7,700 to 8,000 feet, September 11, 1958 (*Schmid*). Allotype, female, Tungnath, Pauri Garhwal, altitude 9,000 feet, June 1, 1958 (*Schmid*). Paratypes, 2 males, with the allotype; males, Dhur, Almora, altitude 7,400 feet, September 8, 1958 (*Schmid*); 1 male, Dogalbeta, Pauri Garhwal, altitude 7,000 to 8,300 feet, May 30, 1958 (*Schmid*).

The most similar species is *Limonia (Dicranomyia) abjuncta* Alexander, of the eastern Himalayas, which differs chiefly in the structure of the male hypopygium, particularly the dististyles and gonapophyses. The male hypopygium of *abjuncta* has been figured by the writer [Rec. Indian Mus. 29 (1927)] 193, fig. 8.

**LIMONIA (GERANOMYIA) SYAMANTAKA** sp. nov. Plate 1, fig. 11; Plate 3, fig. 35.

Size medium (wing 7 millimeters); general coloration of præscutum brown, with four paler brownish gray stripes; ventral thoracic pleura light yellow; femora yellow, with a subterminal brownish black ring; wings pale yellow, darker on the posterior half, a conspicuous brown costal pattern, the areas margined by darker brown to form ocelli; Sc long; male hypopygium with two long rostral spines from a common basal tubercle.

*Male*.—Length, excluding rostrum, about 6 millimeters; wing, 7; rostrum, about 2.2.

*Female*.—Length, excluding rostrum, about 6.5 millimeters; wing, 7; rostrum, about 2.3.

Rostrum black throughout. Antennæ brownish black; flagellar segments oval, becoming longer outwardly; verticils short, segments with a further short white pubescence. Head behind dark brown, the narrow anterior vertex and a comparable line on the posterior vertex light gray.

Pronotal scutum darkened medially and on sides, scutellum pale yellow. Mesonotal præscutum with three or four pale brownish gray stripes, separated by much darker interspaces, the median one darker than the laterals, not apparent in the female; scutum with lobes gray laterally, light brown internally, this being a posterior prolongation of the lateral interspace; inner edge of scutal lobe more yellowed, the central line darkened; scutellum testaceous yellow, narrowly darkened medially; postnotum darkened, more or less pruinose. Pleura weakly infuscated above, broadly clear light yellow below. Halteres with stem yellow, knob dark brown. Legs with coxæ and trochanters light yellow; femora yellow, with a conspicuous brownish black subterminal ring that is about twice as extensive as the yellow tip; tibiæ and tarsi brownish yellow, outer tarsal segments blackened. Wings (Plate 1, fig. 11) with the ground color of anterior half, including cell 1st  $M_2$ , pale yellow, more saturated in the costal and prearcular fields; posterior half of wings darker, including cells behind vein M and outer



medial cells; a conspicuous brown chiefly costal pattern, including six areas, the third at origin of Rs, fifth largest, surrounding the small brown stigma, the areas pale brown, margined with darker to form ocelli; darkened costal areas subequal in extent to the interspaces in type, much broader in the allotype; cord and outer end of cell 1st  $M_2$  narrowly seamed with brown; small dark brown spots at tips of veins  $R_{4+5}$ , Cu, 1st A and 2nd A; a few scattered brown dots in cells basad of cord, more numerous in the allotype; veins brown, yellow in the costal interspaces. Venation: Sc long,  $Sc_1$  ending at near two-thirds Rs,  $Sc_2$  near its tip; cell 1st  $M_2$  longer than any of the veins beyond it; m-cu just before the fork of M.

Abdominal tergites dark brown, sternites obscure brownish yellow. Ovipositor with cerci slender, straight. Male hypopygium (Plate 3, fig. 35) with the tergite, *t*, transverse, lateral lobes low, with long setæ. Basistyle with ventromesal lobe oval, yellow. Dorsal dististyle, *d*, a strongly curved sickle, its tip acute; ventral style very large, its area fully four times that of the basistyle; rostral prolongation small, bearing two very long slightly curved spines, closely approximated at apex of a strong basal tubercle. Gonapophysis, *g*, with mesal apical lobe large, curved gently to the acute tip, the concave margin with a low flange. Ædeagus broad, apex bilobed, lateral surface with very abundant pale setulæ.

*Habitat*.—India (West Bengal).

Holotype, male, Kurseong, altitude 5,455 feet, September 5, 1958 (*Camilleri*). Allotopotype, female.

The specific name, *syamantaka*, is that of one of the jewels of Vishnu in Hindu mythology. The species is quite distinct from other regional members of the subgenus, the wing pattern being most as in *Limonia* (*Geranomyia*) *fumimarginata* Alexander and *L. (G.) offirmata* Alexander, yet quite distinct.

**LIMONIA IMMERENS** sp. nov.

Plate 1, fig. 12; Plate 4, fig. 37.

Belongs to the *trigonia* group; size large (wing of male over 10 millimeters); general coloration dark brown, præscutum with three broad brownish yellow stripes; halteres brownish black, base of stem narrowly yellowed; legs brown; wings yellowish brown, conspicuously patterned with darker brown; Sc long, free tip of  $Sc_2$  beyond level of  $R_2$ ; male hypopygium with rostral prolongation of ventral dististyle long and slender, with a single spine at its base; gonapophysis bidentate.

*Male*.—Length, about 9.5 millimeters; wing, 10.7.

Rostrum and antennæ broken; palpi small, darkened. Head brownish black; anterior vertex relatively broad, about twice the diameter of scape.

Pronotum dark brown. Mesonotal præscutum polished brown, with three broad brownish yellow stripes, the posterior interspaces very narrow; posterior sclerites of notum dark brown, central region of scutum yellowed, scutal lobes brownish yellow; præscutal setæ on the interspaces, black. Pleura dark brown, more yellowed beneath the wing root. Halteres brownish black, base of stem narrowly yellow. Legs with coxæ dark brown; trochanters yellowish brown; remainder of legs brown; claws long, with a single long and slender basal spine. Wings (Plate 1, fig. 12) with the ground yellowish brown, conspicuously patterned with dark brown, including broad seams at origin of Rs, fork of Sc, cord, stigma, and outer end of cells 1st  $M_2$ ; less evident darkenings on outer veins, including the wing tip, Cu and 2nd A, veins brown. Veins beyond level of origin of Rs with long trichia, lacking on much of Sc and M and all but the outer end of the anals. Venation: Sc long,  $Sc_1$  ending about opposite fork of Rs,  $Sc_2$  near its tip; Rs long, nearly square and weakly spurred near origin; free tip of  $Sc_2$  beyond level of  $R_2$ , leaving a spur of  $Sc_2 + R_{1+2}$ ; all three elements subequal; cell 1st  $M_2$  about as long as the distal section of  $M_{1+2}$ ; m-cu close to fork of M.

Abdomen, including hypopygium, very dark brown. Male hypopygium (Plate 4, fig. 37) with the tergite, *t*, transverse, slightly narrowed outwardly, posterior border nearly truncate, with scarcely developed lobes; setæ long, concentrated on posterior fifth of the plate. Basistyle, *b*, with ventro-mesal lobe large, conspicuously setiferous, terminating in a small tubercle that bears shorter setæ. Dorsal dististyle, *d*, gently curved, its outer face scabrous, as in the group; ventral style oval, its area less than one-half that of the basistyle; rostral prolongation a long yellow rod, curved beyond midlength, along lower margin with about six equally spaced tubercles, each tipped with a long pale seta; a single rostral spine, a little shorter than its basal tubercle, the latter enlarged on proximal half. Gonapophysis, *g*, narrowed into the mesal apical lobe which is unequally bidentate, the terminal tooth larger. Ædeagus simple at tip, the genital openings being subterminal.

*Habitat*.—India (Kumaon).

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

*Limonia immerens* is quite distinct from other described regional members of the genus, being the first member of the *trigonia* group to be discovered in the Himalayan area.

ANTOCHA (ANTOCHA) AMBLYSTYLA *sp nov.*

Plate 1, fig. 13; Plate 4, fig. 38.

Size medium (wing of male 5.5 to 6 millimeters); general coloration of thorax gray, the præscutum and scutal lobes extensively dark brown; antennæ short; legs black, claws simple; wings weakly infuscated, veins unusually glabrous; male hypopygium with tergite narrowly transverse; outer dististyle a gently curved blackened rod, the slightly enlarged apex broadly obtuse; inner gonapophyses very slender, narrowed into hairlike points.

*Male*.—Length, about 4.8 to 5.3 millimeters; wing, 5.5 to 6.2; antenna, about 1.1 to 1.3.

*Female*.—Length, about 5.3 millimeters; wing, 6.2.

Rostrum brownish gray, palpi black. Antennæ short, black; flagellar segments short-oval, outer ones passing into oval, verticils short. Head dark brown, orbits and anterior vertex light gray.

Pronotum brownish gray. Mesonotal præscutum with the disk dark brown, including three darker stripes and slightly paler interspaces, lateral borders light gray; scutal lobes dark brown; posterior sclerites of notum clear blue gray. Pleura clear blue gray throughout. Halteres with stem dusky, yellowed at base, knob dark brown. Legs with coxæ light gray; trochanters brown; remainder of legs black, the bases of the femora, especially the fore pair, restrictedly paler; claws of male very long, untoothed. Wings (Plate 1, fig. 13) weakly infuscated stigma not or scarcely darker; veins brown. Veins unusually glabrous; a restricted series of trichia on outer ends of vein  $R_{4+5}$  and  $M_{1+2}$ . Venation:  $R_2$  longer than  $R_{1+2}$ ;  $R_s$  very long; m-cu before fork of  $M$ , in cases up to one-third its length.

Abdominal tergites dark brown, sternites light gray; male hypopygium brownish gray. Ovipositor with dorsal genital segment darkened, the sternite yellowed. Male hypopygium (Plate 4, fig. 38) with the tergite, *t*, narrowly transverse, the posterior border and central thickening very broad; pos-

terior border gently emarginate, the low lobes with numerous setæ. Basistyle, *b*, short and compact, outer surface with long pale setæ, those of mesal face much shorter. Dististyles, *d*, terminal, outer style a gently curved blackened rod, its apex broadly obtuse; inner style a little longer but narrower, with numerous setæ. Phallosome, *p*, about as figured, the lateral apophysis appearing as a nearly straight slender club, the longer inner apophysis very slender, narrowed gradually into a slightly curved hairlike point.

*Habitat*.—India (West Bengal).

Holotype, male, Kurseong, altitude 5,455 feet, September 5, 1958 (*Camilleri*). Allotopotype, female. Paratopotypes, 3 males, two pinned with the allotype.

*Antocha (Antocha) amblystyla* is quite different from the other very numerous species of the subgenus in the Himalayan area, differing from other gray species by the blackened legs, simple claws, unusually glabrous wing veins and, especially, by the structure of the male hypopygium, as the outer dististyle and phallosome. Among such similar species it most suggests *A. (A.) plumbea* Alexander but is quite distinct.

#### HEXATOMINI

##### PSEUDOLIMNOPHILA (PSEUDOLIMNOPHILA) MONOMELANIA sp. nov. Plate 1, fig. 14.

Size small (wing of male less than 6 millimeters); mesonotal præcutum yellowish brown with four slightly darker brown stripes; pleura more yellowed, anepisternum with a major oval black spot; legs light brown; wings weakly suffused, stigma slightly darker; macrotrichia on longitudinal veins beyond the level of origin of  $R_s$ ;  $R_2$  before the radial fork, cell  $M_1$  shorter than its petiole.

*Male*.—Length, about 5.5 millimeters; wing, 5.8; antenna, about 1.4.

*Female*.—Length, about 6 to 7 millimeters; wing, 6.5 to 7.

Rostrum brown, palpi brownish black. Antennæ dark brown; outer flagellar segments elongate, with very long verticils, the longest about one-half longer than the segments. Head brown.

Pronotum dark brown. Mesonotal præcutum yellowish brown, with four slightly darker brown stripes; posterior sclerites of notum brownish yellow, scutal lobes patterned with light brown. Pleura brownish yellow above, clearer yellow ventrally; a major oval black spot occupying most of

the anepisternum. Halteres with stem whitened, knob brown. Legs with coxæ and trochanters yellow; remainder of legs light brown, the outer tarsal segments somewhat darker. Wings (Plate 1, fig. 14) weakly suffused, prearcular and costal fields a little more yellowed, stigma slightly darker; veins brown. Longitudinal veins beyond level of origin of Rs with macrotrichia, more numerous beyond cord. Venation: Sc relatively short, Sc<sub>1</sub> ending slightly before fork of Rs, Sc<sub>2</sub> near its tip; R<sub>2</sub> before the radial fork, subequal to or a little longer than R<sub>3+4</sub>; cell M<sub>1</sub> about two-thirds its petiole; m-cu from about one-fifth to one-sixth its length beyond the fork of M.

Abdomen, including hypopygium, dark brown.

*Habitat*.—India (Kumaon).

Holotype, male, Rishikesh, Dehra Dūn, altitude 1,200 feet, March 31, 1958 (*Schmid*). Allotopotype, female, with type. Paratopotype, 1 female, March 26, 1958 (*Schmid*).

*Pseudolimnophila* (*Pseudolimnophila*) *monomelania* is quite distinct from the other regional members of the genus in the coloration of the body, especially the thoracic pleura.

**PILARIA COORGENSIS** sp. nov.

Plate 1, fig. 15.

Size medium (wing of male less than 6 millimeters); general coloration of thorax polished orange or fulvous, pleura more yellowed; antennæ of male elongate, flagellar segments with dense erect white pubescence; wings tinged with brown, stigma vaguely darker, cell M<sub>1</sub> lacking, vein 2nd A long; abdominal tergites weakly bicolored, light brown, the posterior borders slightly darker brown.

*Male*.—Length, about 5.3 millimeters; wing, 5.8; antenna, about 2.

Rostrum yellow, base of palpi yellow, remainder black. Antennæ with scape short, light yellow, remainder black; elongate, as shown by the measurements; flagellar segments elongate-oval, with a dense vestiture of erect white setæ, additional to a long solitary verticil on the outer segments, in cases these about one-half longer than the segment. Head brownish yellow.

Pronotum and mesonotum polished orange or fulvous, the posterior sclerites and pleura clearer yellow. Halteres long, brownish black. Legs with coxæ and trochanters yellow; femora yellowish brown, clearer yellow at base, tips gradually

darker; tibiæ and tarsi dark brown to brownish black. Wings (Plate 1, fig. 15) tinged with brown, the small stigma vaguely darker, base slightly more yellowed; veins brownish black. Veins of outer two-thirds of wing with conspicuous macrotrichia, including complete series on Rs and all longitudinal veins beyond cord; basad of cord with trichia on M except at base, extreme outer end of main section of  $Cu_1$ , and virtually all of 1st A; 2nd A without trichia. Venation:  $R_{2+3}$  short, erect, less than  $R_2$ ; inner ends of cells  $R_4$ ,  $R_5$  and 1st  $M_2$  in transverse alignment; cell  $M_1$  lacking; m-cu at near midlength of  $M_{3+4}$ ; vein 2nd A elongate, the cell narrow.

Abdominal tergites weakly bicolored, light brown, their posterior borders broadly darker brown; sternites more uniformly yellowed; hypopygium brownish yellow.

*Habitat.*—South India (South Coorg).

Holotype, male, Ammatti, altitude 3,100 feet, October, 1952 (*Susai Nathan*).

*Pilaria coorgensis* is closest to *P. amica* (Alexander), of Java, differing especially in the body coloration and the long antennæ of the male sex. This is the first authentic record of the genus from India.

ATARBA (ATARBODES) TRIMELANIA sp. nov. Plate 1, fig. 16; Plate 4, fig. 39.

General coloration of thorax fulvous with three conspicuous black spots, placed on the præscutum, anepisternum and pleurotergite; legs yellow; wings grayish yellow, unpatterned; prearcular and costal fields more saturated yellow;  $Sc$  relatively long,  $Sc_1$  ending at near one-third the length of Rs; abdomen yellow, with a narrow dark brown subterminal ring; male hypopygium with the outer dististyle relatively slender.

*Male.*—Length, about 4 to 4.2 millimeters; wing, 4.5 to 4.7.

*Female.*—Length, about 5.8 millimeters; wing, 5.2.

Rostrum light yellow, palpi dark brown. Antennæ short; scape and pedicel yellow, flagellum dark brown; basal flagellar segments oval, the outer ones elongate, verticilis long and conspicuous. Head obscure yellow.

Thorax fulvous above, pleura more yellowed; on either side with three conspicuous black spots, one on lateral margin of præscutum before the suture, another on dorsal anepisternum, the third largest, occupying the dorsal pleurotergite; posterior pleural sclerites silvery pruinose. Halteres with stem yellow, knob weakly darkened. Legs with coxæ fulvous; trochanters

yellow; remainder of legs yellow, the outer tarsal segments infuscated; no tibial spurs. Wings (Plate 1, fig. 16) grayish yellow, prearcular and costal fields more saturated yellow, stigma lacking; veins yellow, deeper colored in the brightened costal field. Longitudinal veins beyond level of origin of Rs with macrotrichia, lacking on M; a few on outer half of 2nd A. Venation: Sc relatively long, Sc<sub>1</sub> ending about opposite one-third Rs, branches of the latter divergent, cell R<sub>4</sub> at margin nearly three times as extensive as cell R<sub>2</sub>; m-cu beyond fork of M.

Abdomen yellow, subterminal segments dark brown to form a narrow ring; hypopygium fulvous yellow. Male hypopygium (Plate 4, fig. 39) with the outer dististyle, *d*, relatively slender, slightly enlarged on outer third, apex and outer margin of the expanded part with appressed blackened spinules; inner style longer, gradually narrowed to the obtuse tip. Gonapophysis expanded outwardly, surface of blade with small pale points. Ædeagus, *a*, long, widest at near midlength, apex truncate.

*Habitat*.—South India.

Holotype, male, Cinchona, Anamalai Hills, altitude 3,500 feet, May, 1959 (*Susai Nathan*). Allotopotype, female, pinned with type. Paratopotype, male.

*Atarba* (*Atarbodes*) *trimelania* is readily told from *A. (A.) flava* Brunetti by the somewhat striking coloration of the thorax.

## ERIOPTERINI

GNOPHOMYIA (GNOPHOMYIA) EUPETES sp. nov. Plate 1, fig. 17; Plate 4, fig. 40.

General coloration black, including the head and thorax; antennæ of male elongate, black; femora and tibiæ yellowish brown, tips darkened, tarsi dark brown; wings slightly tinged with dusky, Sc<sub>1</sub> ending shortly beyond fork of R<sub>2+3+4</sub>, R<sub>5</sub> in longitudinal alignment with Rs; male hypopygium with the outer dististyle glabrous, inner style with outer end slender, terminating in a circular disk surrounded by strong setæ; gonapophysis unequally forked.

*Male*.—Length, about 5 millimeters; wing, 5.8; antenna, about 2.6.

Rostrum brownish black, palpi black. Antennæ of male elongate, about one-half the body, black; flagellar segments subcylindrical, with a dense white pubescence; longest verticils unilaterally arranged on lower surface of flagellum, a little

shorter than the segment. Head dull black, heavily gray pruinose; anterior vertex broad, tumid.

Pronotum dull black, sides of scutellum restrictedly yellow. Mesonotum black, surface vaguely pruinose, to produce a dull appearance; posterior two-thirds of præscutum and the scutal lobes with transverse wrinkles or lines, possibly an abnormal condition; scutellum blackish gray, with a large depressed more yellowed area on either side at base. Pleura black, dorsopleural membrane light yellowish brown. Halteres with stem dusky, more yellowed at base, knob blackened. Legs with fore and middle coxæ blackened except at tips, posterior coxæ and all trochanters yellowed; femora and tibiæ yellowish brown, tips more blackened; tarsi dark brown. Wings (Plate 1, fig. 17) slightly tinged with dusky, base restrictedly yellowed; stigma scarcely evident as a pale cloud beyond  $R_2$ ; veins dark brown. Abundant macrotrichia on longitudinal veins beyond cord, as well as the outer ends of  $R_s$ ,  $M$ ,  $Cu_1$  and the anals. Venation:  $Sc$  long,  $Sc_1$  ending just beyond fork of  $R_{2+3+4}$ ,  $Sc_2$  removed;  $R_{2+3}$  nearly one-half  $R_{1+2}$ ;  $r-m$  close to fork of  $R_s$ , the latter in direct longitudinal alignment with  $R_5$ ; cell 1st  $M_2$  long, exceeding  $M_4$ , with  $m-cu$  just beyond one-third the length.

Abdomen brownish black, hypopygium black. Male hypopygium (Plate 4, fig. 40) with the basistyle, *b*, short and stout, unmodified, some of the outer setæ very long, subequal to the outer dististyle. Outer dististyle, *d*, glabrous, expanded on basal half, thence narrowed into a spinelike blade, the tip acute; inner style enlarged at base, the apex bent at a right angle into a slender arm that ends in a rounded disk, before apex with a circlet of strong setæ. Phallosomic plate, *p*, broad, posterior border gently emarginate. Gonapophysis, *g*, bifurcate, the axial spine about three times the more slender branch.

*Habitat*.—India (Sikkim).

Holotype, male, Rapham, altitude 5,250 feet, April 2, 1959 (*Schmid*).

*Gnophomyia* (*Gnophomyia*) *eupetes* differs from *G. (G.) strenua* Brunetti in important colorational features, including the body, antennæ and legs. The male sex of *strenua* remains unknown. Likewise, *G. (G.) nigrescens* Edwards, of Thailand, is known only from the female sex and may prove to be identical with the present fly. Its distribution is such as to



make this highly improbable. It is certain that numerous species of *Gnophomyia* occur in southeastern Asia.

**GONOMYIA (PROTOGNOMYIA) ALOMATA** sp. nov. Plate 1, fig. 18; Plate 4, fig. 41.

Size above medium (wing of male 8 millimeters); general coloration black, subnitidous; antennæ and legs black; halteres black, apex of knob obscure yellow; wings suffused with blackish,  $Sc_1$  ending some distance before fork of Rs; male hypopygium with outer lobe of basistyle simple, without a flange; outer dististyle slightly enlarged at tip, intermediate style forked at apex, the arms appressed, the outer one a slender spine, lower arm a flattened blade; inner style large, apex broadly obtuse, with relatively few setæ, these not including the apex.

*Male*.—Length, about 7 millimeters; wing, 8; antenna, about 2.

Rostrum and palpi black. Antennæ black throughout; flagellar segments elongate, the outer ones exceeding the verticils. Head black, very slightly pruinose.

General coloration of thorax black, dusted with gray, surface subnitidous; sides of pronotal scutellum and the anterior pretergites yellowed. Halteres blackened, apex of knob obscure yellow. Legs with coxæ black, sparsely pruinose; remainder of legs black. Wings (Plate 1, fig. 18) suffused with blackish, stigma still darker, very narrow; veins dark brown. Veins beyond general level of origin of Rs with long macrotrichia, more extensive on 2nd A where they involve about the outer two-thirds of the vein. Venation: Sc moderately long,  $Sc_1$  ending some distance before fork of Rs,  $Sc_2$  far retracted; m-cu at fork of M.

Abdomen, including hypopygium, black. Male hypopygium (Plate 4, fig. 41) with the outer lobe of basistyle, *b*, simple, without an apical flange, as in *megalomata* and some other species, apex obtuse with relatively sparse setæ of moderate length. Outer dististyle, *d*, a simple slender rod from a much dilated base, the tip slightly enlarged, obtuse; intermediate style with stem conspicuously setiferous, forking at apex into two appressed arms of nearly equal length, the outer a slender acutely pointed spine, lower arm a flattened blade, its tip obtuse; inner style longest, gradually expanded outwardly, tip obliquely obtuse; setæ relatively sparse, small and weak, lacking on apex and base of style. Ædeagus, *a*, with apex strongly recurved.

*Habitat*,—India (Sikkim).

Holotype, male, Singbeng, altitude 4,920 feet, April 29, 1959 (Schmid).

*Gonomyia (Protogonomyia) alomata* is told from the other numerous regional members of the subgenus by the structure of the male hypopygium, particularly the dististyles and outer lobe of the basistyle. Other species have a variously modified flange at apex of the lobe of the basistyle.

GONOMYIA (GONOMYIA) BRACHYURA sp. nov. Plate 1, fig. 19; Plate 4, fig. 42.

Size medium (wing of male nearly 5 millimeters); mesonotal præscutum and scutal lobes almost uniformly brown; scutellum infuscated, its posterior border inconspicuously obscure yellow; pleura light brown with two medium brown longitudinal stripes; legs light brown; wings weakly tinged with brown, prearcular and costal regions clear light yellow,  $Sc_1$  ending about opposite one-fourth the length of  $R_s$ , m-cu at fork of  $M$ ; male hypopygium with two dististyles, the outer a flattened blade, inner style bearing a blackened subcultrate blade and a straight spine; phallosome entirely yellowish horn color, including two spinoid apophyses and a blunt subcircular outer part.

*Male*.—Length, about 4.3 millimeters; wing, 4.8.

Rostrum light brown, yellowed at apex; palpi black. Antennæ with scape and pedicel black, flagellum dark brown; proximal flagellar segments oval, with relatively short verticils and an abundant dense erect pubescence; outer flagellar segments becoming long and slender. Head gray; anterior vertex broad.

Pronotum and pretergites clear light yellow. Mesonotal præscutum and scutal lobes almost uniformly brown, the central area of scutum obscure yellow; scutellum infuscated, posterior border inconspicuously more yellowed; mediotergite brownish gray, more yellowed laterally, pleurotergite yellow, darkened posteriorly. Pleura light yellow with two medium brown longitudinal stripes, the more dorsal one extending from the cervical region to the end of the anepisternum; ventral stripe chiefly occupying the lower sternopleurite. Halteres long, stem whitened, knob weakly infuscated. Legs with the coxæ and trochanters yellow, remainder of legs light brown, outer tarsal segments dark brown. Wings (Plate 1, fig. 19) weakly tinged with brown, prearcular and costal

regions clear light yellow; stigma oval, pale brown; veins brown, yellow in the brightened fields. Veins of outer two-thirds of wing with conspicuous trichia, including all of  $R_s$ , outer three-fourth of  $M$ , outer half of basal section of  $Cu_1$  and extensively on tips of both anal veins;  $Sc$  with trichia at outer end, with one or two nearer base. Venation:  $Sc$  relatively long,  $Sc_1$  ending about opposite one-fourth the length of  $R_s$ ,  $Sc_2$  faint; basal section of  $R_5$  short;  $m-cu$  at fork of  $M$ .

Abdominal tergites dark brown, incisures paler; sternites more yellowed; hypopygium brownish yellow. Male hypopygium (Plate 4, fig. 42) distinctive; basistyle, *b*, with apical lobe relatively large and fleshy, tip obtuse. Two dististyles, *d*, the outer a straight flattened blade, inner margin of apical fifth smooth and blackened, remaining surface with long appressed setæ; inner style with beak elongate, fasciculate bristles conspicuous, the lower one longer and stouter; at base on outer face with a large flattened lobe that terminates in a blackened subcultrate blade, its base with a further strong black spine; surface of style near base of spine with a single powerful seta. Phallosome, *p*, of characteristic shape, entirely yellow horn color, even the two strong apophyses not blackened, both acutely pointed, one broader than the other; apex of phallosome, representing the ædeagus, a large subcircular disk, its apex very obtuse.

*Habitat*.—India (Kumaon).

Holotype, male, Tapoban, Pauri Garhwal, altitude 7,300 feet, July 28, 1958 (*Schmid*).

*Gonomyia* (*Gonomyia*) *brachyura* superficially resembles various other species, including members of the *decacantha* group but is entirely distinct in the structure of the male hypopygium, especially of the phallosome.

GONOMYIA (GONOMYIA) HIRSUTISTYLA sp. nov. Plate 1, fig. 20; Plate 4, fig. 43.

General coloration of mesonotal præscutum and scutal lobes opaque brownish black; rostrum orange yellow; pleura yellow, conspicuously patterned with brownish black; wings weakly darkened,  $Sc$  long,  $m-cu$  beyond the fork of  $M$ ; male hypopygium with the outer lobe of basistyle and the outer dististyle with very long setæ; phallosome with a single well-developed basal apophysis, with a shorter curved spine farther distad; ædeagus terminating in two divergent flaps.

*Male*.—Length, about 4.5 millimeters; wing, 5.4.

Rostrum orange yellow, mouthparts light brown; palpi black. Antennæ black throughout, relatively long; basal flagellar segments oval, the outer ones becoming elongate, exceeding the verticils. Head with anterior vertex yellowed, posterior vertex dark gray.

Pronotum light yellow, dark brown on sides, pretergites light yellow. Mesonotal præscutum opaque brownish black, humeri and lateral borders broadly yellow, pseudosutural foveæ black; scutal lobes brownish black, opaque, the central area broadly obscure yellow, darkened behind; scutellum obscure yellow, parascutella darker; mediotergite brownish black, anterolateral parts obscure yellow, pleurotergite yellow, narrowly darkened ventrally. Pleura light brown, conspicuously brownish black on propleura, anepisternum, ventral sternopleurite and meron; dorsopleural membrane light sulphur yellow. Halteres elongate, yellow, knobs broken. Legs with coxæ yellow; trochanters light brown; femora brown, tibiæ paler brown, tips narrowly more darkened; tarsi dark brown. Wings (Plate 1, fig. 20) weakly suffused, prearcular and costal fields slightly more yellowed, stigma barely indicated; veins brown, more yellowed in the brightened areas, especially Sc. Macrotrichia on longitudinal veins beyond general level of origin of Rs, lacking on Sc except at tip; none on basal section  $Cu_1$ ; a few on outer ends of M and the anals. Venation: Sc moderately long,  $Sc_1$  ending about opposite one-third Rs,  $Sc_2$  not clearly evident; basal section of  $R_5$  short; m-cu beyond fork of M, in cases to about one-third its length.

Abdominal tergites dark brown, sternites and hypopygium yellowed. Male hypopygium (Plate 4, fig. 43) with the outer lobe of basistyle, *b*, long-produced, its inner margin at near midlength dilated, margins and apex with abundant long setæ from stouter bases. Outer dististyle, *d*, a relatively narrow darkened blade, widest at near midlength, narrowed to the acute tip, surface of less than outer half with very long setæ, likewise from strong bases, producing a scabrous appearance; inner face of style with a long low blackened flange; inner style unusually large, its lower margin pale, membranous; fasciculate setæ two, relatively weak; outer margin of style near base with a straight darkened rod, a little broader at outer end, apex obtuse, before tip with a single strong seta. Phallosome, *p*, distinctive, including a long sinuous basal apo-

physis, at apex produced into a long spine, with a small weak apophysis opposite its base; farther distad with a short blade that curves into a straight spine; apex of ædeagus split into two divergent lobes, the lower of which includes the penis, terminating in hyaline membrane.

*Habitat*.—India (Sikkim).

Holotype, male, Lachung, altitude 8,610 feet, July 10, 1959 (*Schmid*).

*Gonomyia* (*Gonomyia*) *hirsutistyla* is told from allied regional species, as *G. (G.) multiacuta* sp.nov. and *G. (G.) tanaocantha* Alexander, by the distinctive male hypopygium.

**GONOMYIA (GONOMYIA) MULTIACUTA** sp. nov.      Plate 2, fig. 21; Plate 4, fig. 44.

Size medium (wing of male 5.5 millimeters); rostrum yellow; antennæ black throughout; mesonotal præscutum with three brown stripes, lateral borders broadly yellow, scutellum yellow; wings with Sc unusually long, cell  $R_3$  large, cell 1st  $M_2$  shorter than any of the veins beyond it; male hypopygium with two dististyles, the outer one pale, extended at apex into a narrow point or blade, surface abundantly setuliferous; inner style with an outer blackened appendage, larger than the style itself; phallosome with a pair of pale outer recurved spines and larger symmetrical black gonapophyses.

*Male*.—Length, about 5 millimeters; wing 5.5.

*Female*.—Length, about 5.5 millimeters; wing, 5.8

Rostrum yellow, palpi black. Antennæ black throughout; flagellar segments long-oval, outwardly passing into elongate, verticils long. Head of type material discolored.

Pronotum yellow. Mesonotal præscutum virtually covered by three brown stripes, the interspaces reddish brown, humeral and lateral parts broadly yellow; scutal lobes dark brown, central area yellow; scutellum broadly yellow, darkened on either side at base, parascutella darker; mediotergite chiefly dark brown, gray pruinose, anterolateral angles yellowed, pleurotergite chiefly yellow. Pleura yellow, the propleura and mesepisternum weakly infuscated. Halteres infuscated. Legs with coxæ and trochanters brownish yellow; remainder of legs darkened. Wings (Plate 2, fig. 21) weakly tinted, prearcular and costal regions yellowed, stigma barely indicated, pale brown; veins brown, more yellowed in the prearcular and costal fields. Veins of outer three-fourths of wing with long macrotrichia. Venation: Sc unusually long,  $Sc_1$

ending beyond midlength of  $R_s$ ,  $Sc_2$  a short distance from its tip; cell  $R_3$  unusually large, veins  $R_3$  only a little shorter than  $R_{2+3+1}$ ; cell 1st  $M_2$  relatively small shorter than any of the veins beyond it, m-cu at near one-third its length.

Abdominal tergites dark brown, sternites yellowed; hypopygium brownish yellow. Male hypopygium (Plate 4, fig. 44) with the apical lobe of basistyle, *b*, relatively small. Two apical dististyles, *d*, the outer one pale, flattened beyond midlength, narrowed into a long pale narrow blade, surface with very abundant setulæ; inner style with the body relatively small, terminating in two very powerful fasciculate bristles that exceed the lobe in length; on outer face of style with a larger black appendage, narrowed outwardly, before tip with a single powerful erect bristle, with another slightly shorter one near base, additional to three or four more normal setæ. Phallosome, *p*, distinctive, including an outer yellow structure that bears two recurved spinous points, and symmetrical black gonapophyses directed posteriorly, appearing about as shown in the figure.

*Habitat*.—India (West Bengal, Kumaon).

Holotype, male, Kurseong, Darjeeling, West Bengal, altitude 5,455 feet, September 6, 1958 (*Camilleri*). Allotype, female, Rambagh, Naini Tal, Kumaon, altitude 1,778 feet, October 13, 1958 (*Schmid*). Paratypes, 1 male, with the allotype; male, Loharket, Almora, Kumaon, altitude 5,770 feet, September 19, 1958; male, Tapoban, Pauri Garhwal, Kumaon, altitude 7,300 feet, July 5, 1958 (*Schmid*).

In the long  $Sc$  and unusually large cell  $R_3$  of the wings, *Gonomyia* (*Gonomya*) *multiacuta* is most like *G. (G.) resoluta* Alexander and *G. (G.) turitella* Alexander, differing especially in the distinctive male hypopygium, as described.

**GONOMYIA (GONOMYIA) PERIPLOCA** *sp. nov.*

Plate 2, fig. 22; Plate 4, fig. 45.

Size medium (wing of male 5.5 millimeters or less); rostrum light yellow; thorax black, heavily gray pruinose, variegated by yellow; pleura yellow, heavily patterned with brown; halteres light yellow; wings brownish yellow, prearcular and costal fields clearer yellow;  $Sc$  moderately long,  $Sc_1$  ending shortly beyond origin of  $R_s$ , basal section of  $R_5$  short to lacking, m-cu some distance beyond the fork of  $M$ ; male hypopygium with outer lobe of basistyle very large,

with numerous setæ; two dististyles, the inner one very broad, at its base with long darkened arm; phallosome with apex a narrow oval blade and with a single developed blackened spine or apophysis.

*Male*.—Length, about 4 to 4.5 millimeters; wing, 5 to 5.5.

Rostrum clear light yellow, palpi black. Antennæ black throughout, relatively long; basal flagellar segments suboval, with long verticils, outer segments long and slender, much exceeding the verticils. Head with front and anterior vertex light yellow, posterior vertex gray.

Pronotum and pretergites light yellow. Mesonotal præscutum almost uniformly black, heavily brownish gray pruinose, humeral and lateral parts broadly obscure yellow, pseudosutural foveæ black; scutal lobes black, brownish gray pruinose, central area bright yellow; scutellum broadly light yellow, base and parascutella brownish black; mediotergite brownish black, anterolateral parts yellow, pleurotergite yellow, ventral portion narrowly darkened. Pleura light yellow, heavily patterned with dark brown, including the propleura, ventral anepisternum and ventral sternopleurite. Halteres long, clear light yellow. Legs with coxæ yellow, trochanters more brownish yellow; femora light brown, tips darker; tibiæ brown, tips and outer tarsal segments still darker. Wings (Plate 2, fig. 22) strongly tinged with brownish yellow, prearcular and costal fields clearer yellow; stigma very pale brown, scarcely darker than the ground; veins light brown, more yellowed in the brightened fields. Macrotrichia on Rs, most longitudinal veins beyond cord, and tips of anal veins, lacking on M and basal section of Cu<sub>1</sub>. Venation: Sc moderately long, Sc<sub>1</sub> ending about opposite one-fourth to one-fifth the length of Rs, Sc<sub>2</sub> faintly indicated, just beyond origin of Rs; basal section of R<sub>5</sub> short to lacking; cell 1st M<sub>2</sub> long, subequal to vein M<sub>4</sub>; m-cu variable in position, from about two-thirds to nearly its own length beyond fork of M. In the type, one wing has the tip of vein R<sub>3</sub> and m atrophied.

Abdominal tergites brown, incisures paler; sternites and hypopygium yellow. Male hypopygium (Plate 4, fig. 45) with the apical lobe of basistyle, *b*, unusually large, expanded outwardly, apex broadly obtuse, with very numerous long yellow setæ and with a long longitudinal row of still more

powerful bristles near base of style. Two dististyles, *d*, the outer one a nearly straight dusky blade, tip acute, with a low flange at and beyond midlength, outer half with numerous long setæ and abundant microscopic setulæ; inner style with the main body very stout, the posterior part more sclerotized, cephalic margin membranous; two fasciculate setæ at apex, with other progressively smaller bristles back from the tip; at base of style with a long slender darkened arm, apex subcultrate, at near midlength with a strong bristle, surface beyond this point scabrous. Phallosome, *p*, distinctive, especially the outer half, as shown, terminating in a narrow oval apical blade; a single well-developed powerful blackened spine or apophysis, narrowed to the acute tip; the second usual spinoid apophysis very small and weak.

*Habitat*.—India (Kumaon)

Holotype, male, Kanol, Pauri Garhwal, altitude 8,530 feet, August 19, 1958 (*Schmid*). Paratopotypes, both sexes; paratypes, 1 male, Salkhola, Pauri Garhwal, altitude 2,240 feet, August 22, 1958; 1 male, Dakwani, Pauri Garhwal, altitude 9,300 to 11,000 feet, August 5, 1958 (*Schmid*).

Among the regional forms, *Gonomyia* (*Gonomyia*) *periploca* is most similar to species such as *G. (G.) chalaza* Alexander and *G. (G.) rhicnantha* Alexander, differing evidently in the structure of the male hypopygium, especially the basistyle, both dististyles and the phallosome.



# ILLUSTRATIONS

[Legend: *a*, aedeagus; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosomes; *s*, sternites; *t*, tergites.]

## PLATE 1

- FIG. 1. *Dolichopeza* (*Nesopeza*) *aphotisma* sp.nov.; venation.  
2. *Dolichopeza* (*Nesopeza*) *extrudens* sp.nov.; venation.  
3. *Dolichopeza* (*Nesopeza*) *microphallus* sp.nov.; venation.  
4. *Dolichopeza* (*Nesopeza*) *orchestes* sp.nov.; venation.  
5. *Dolichopeza* (*Nesopeza*) *thiasophila* sp.nov.; venation.  
6. *Dolichopeza* (*Nesopeza*) *volupta* sp.nov.; venation.  
7. *Limonia* (*Sivalimnobia*) *kali* sp.nov.; venation.  
8. *Limonia* (*Sivalimnobia*) *rahula* sp.nov.; venation.  
9. *Limonia* (*Libnotes*) *lætinota* sp.nov.; venation.  
10. *Limonia* (*Dicranomyia*) *neabjuncta* sp.nov.; venation.  
11. *Limonia* (*Geranomyia*) *syamantaka* sp.nov.; venation.  
12. *Limonia* *immerens* sp.nov.; venation.  
13. *Antocha* (*Antocha*) *amblystyla* sp.nov.; venation.  
14. *Pseudolimnophila* (*Pseudolimnophila*) *monomelania* sp.nov.; venation.  
15. *Pilaria* *coorgensis* sp.nov.; venation.  
16. *Atarba* (*Atarbodes*) *trimelania* sp.nov.; venation.  
17. *Gnophomyia* (*Gnophomyia*) *eupetes* sp.nov.; venation.  
18. *Gonomyia* (*Protogonomyia*) *alomata* sp.nov.; venation.  
19. *Gonomyia* (*Gonomyia*) *brachyura* sp.nov.; venation.  
20. *Gonomyia* (*Gonomyia*) *hirsutistyla* sp.nov.; venation.

## PLATE 2

- FIG. 21. *Gonomyia* (*Gonomyia*) *multiacuta* sp.nov.; venation.  
22. *Gonomyia* (*Gonomyia*) *periploca* sp.nov.; venation.  
23. *Ctenacroscelis dorsopleuralis survyia* subsp.nov.; male hypopygium.  
24. *Dolichopeza* (*Nesopeza*) *aphotisma* sp.nov.; male hypopygium.  
25. *Dolichopeza* (*Nesopeza*) *aquila* sp.nov.; male hypopygium.  
26. *Dolichopeza* (*Nesopeza*) *extrudens* sp.nov.; male hypopygium.  
27. *Dolichopeza* (*Nesopeza*) *microphallus* sp.nov.; male hypopygium.  
28. *Dolichopeza* (*Nesopeza*) *orchestes* sp.nov.; male hypopygium.

## PLATE 3

- FIG. 29. *Dolichopeza* (*Nesopeza*) *penthema* sp.nov.; male hypopygium.  
30. *Dolichopeza* (*Nesopeza*) *scotoptera* sp.nov.; male hypopygium.  
31. *Dolichopeza* (*Nesopeza*) *thiasophila* sp.nov.; male hypopygium.  
32. *Dolichopeza* (*Nesopeza*) *volupta* sp.nov.; male hypopygium.  
33. *Limonia* (*Sivalimnobia*) *kali* sp.nov.; male hypopygium.  
34. *Limonia* (*Dicranomyia*) *neabjuncta* sp.nov.; male hypopygium.  
35. *Limonia* (*Geranomyia*) *syamantaka* sp.nov.; male hypopygium.  
36. *Limonia* (*Sivalimnobia*) *rahula* sp.nov.; male hypopygium.

## PLATE 4

- FIG. 37. *Limonia immerens* sp.nov.; male hypopygium.  
38. *Antocha (Antocha) amblystyla* sp.nov.; male hypopygium.  
39. *Atarba (Atarbodes) trimelania* sp.nov.; male hypopygium.  
40. *Gnophomyia (Gnophomyia) eupetes* sp.nov.; male hypopygium.  
41. *Gonomyia (Protogonomyia) alomata* sp.nov.; male hypopygium.  
42. *Gonomyia (Gonomyia) brachyura* sp.nov.; male hypopygium.  
43. *Gonomyia (Gonomyia) hirsutistyla* sy.nov.; male hypopygium.  
44. *Gonomyia (Gonomyia) multiacuta* sp.nov.; male hypopygium.  
45. *Gonomyia (Gonomyia) periploca* sp.nov.; male hypopygium.

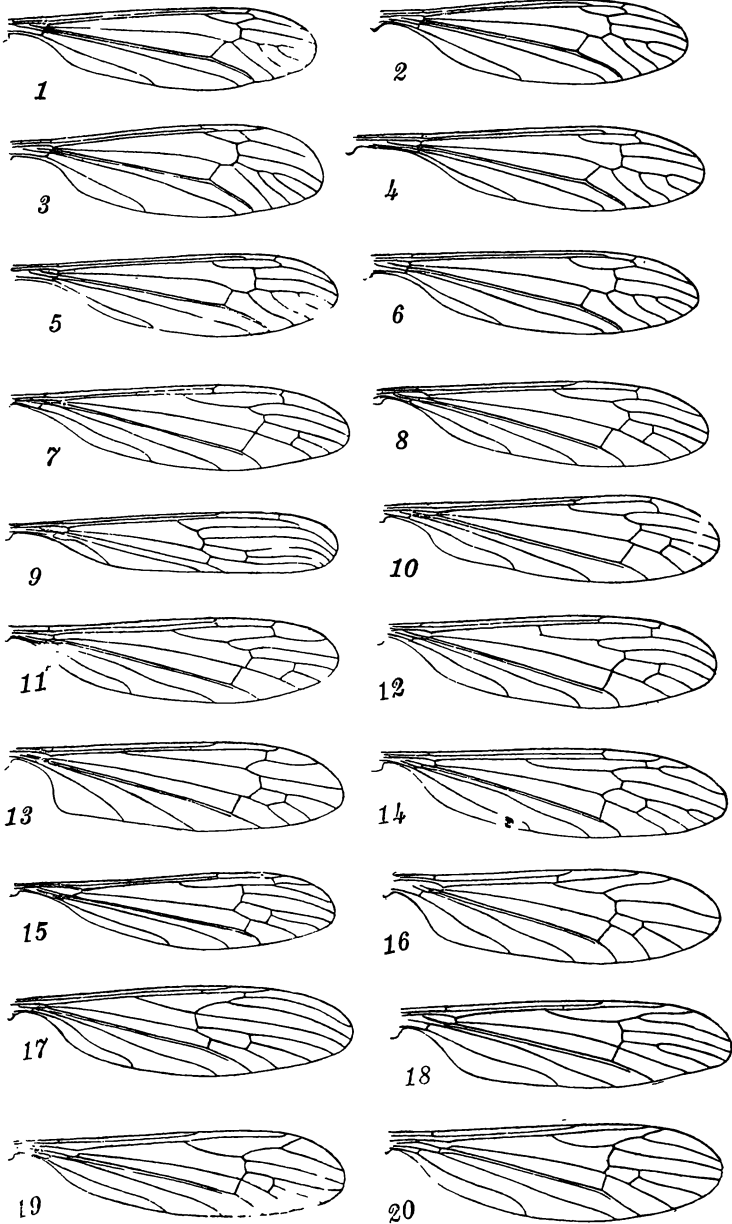
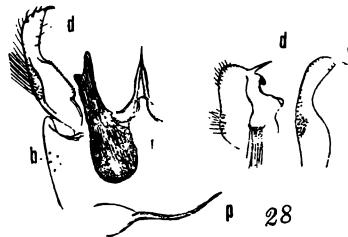
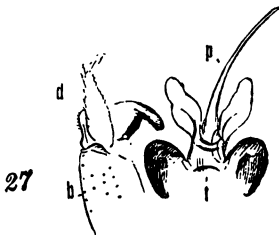
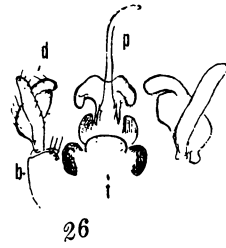
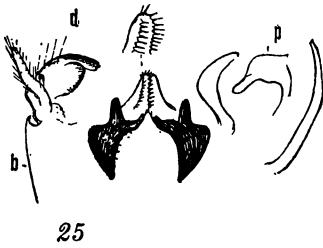
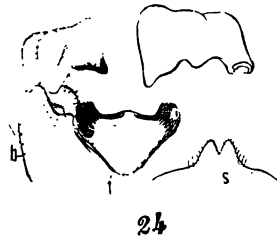
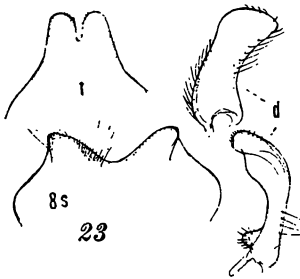
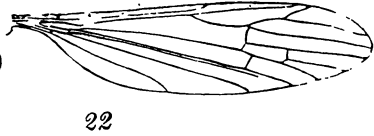
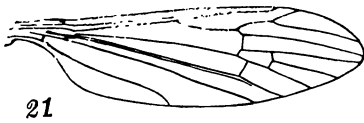
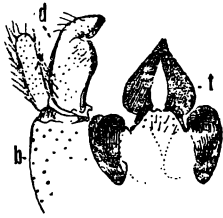
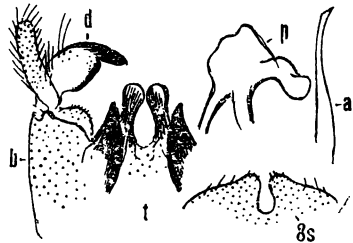


PLATE 1.

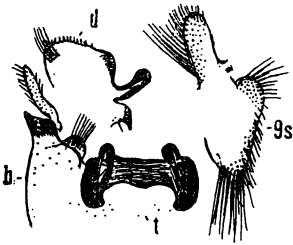




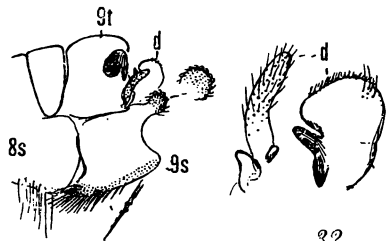
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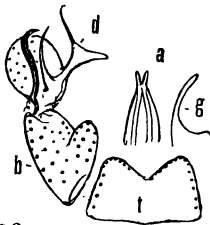
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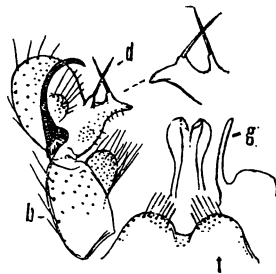
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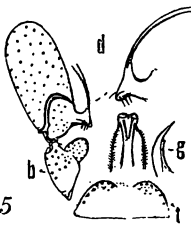
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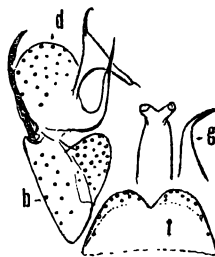
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