

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

By CHARLES P. ALEXANDER  
*Amherst, Massachusetts*

Separate from  
THE PHILIPPINE JOURNAL OF SCIENCE  
Published by the National Institute of Science and Technology  
Manila, Philippines  
VOLUME 95, No. 1, MARCH, 1966

MANILA  
BUREAU OF PRINTING  
1967

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

By CHARLES P. ALEXANDER

*Amherst, Massachusetts*

(Received for publication, September 29, 1965.)

## FIVE PLATES

In this report I am considering again the genus *Limonia* Meigen as represented in the extensive collections made in various parts of India by Dr. Fernand Schmid. Five earlier parts in this series of papers have been devoted wholly or extensively to this same genus which is greatly developed in this part of Eurasia. These are listed<sup>1</sup> in order to facilitate the work of later students.

**LIMONIA (LIMONIA) ECTOPA** sp. nov.

Plate 1, figs. 2, 7.

Size medium (wing of male over 7 millimeters); general coloration of mesonotum yellow, restrictedly patterned with brown; femora yellow, apices narrowly brownish black; wings weakly brownish yellow, stigma brown, Sc long; abdominal tergites bicolored, bases brownish yellow, apices brown; male hypopygium with the rostral prolongation of ventral dististyle long, ventromesal lobe of basistyle and the phallosome complex.

*Male*.—Length, about 6.5 millimeters; wing, 7.3; antenna, about 1.3.

Rostrum and palpi yellow. Antennæ light brown, pedicel more yellowed; flagellar segments long-oval, more lengthened outwardly, terminal segment a trifle longer than the penultimate. Head grayish brown; anterior vertex reduced to a capillary line or virtually lacking.

Pronotum yellowish brown, sides darker. Mesonotal præscutum yellow with a slightly darker yellowish brown central area that is widened posteriorly, lateral præscutal margins darker brown; scutum pale yellow medially, lobes pale brown; scutellum brown, parascutella yellow; postnotum yellow, the disk of the mediotergite brown, the lateral and posterior borders

<sup>1</sup> Asia, XLVI. Philip. Jour. Sci. 88 (1959) 137-184, 5 pls; Asia, LI. *Ibid.* 92 (1963) 205-246, 4 pls.; Asia, LIV. *Ibid.* 93 (1964) 277-324, 5 pls.; Asia, LV. *Ibid.* 93 (1964) 427-478, 5 pls.; Asia, LVII. *Ibid.* 94 (1965) 397-434, 5 pls.

yellow; præscutum and scutum with long sparse setæ, scutellum with these few and microscopic. Pleura yellow with a conspicuous brown dorsal longitudinal stripe, broadest on propleura, narrowed posteriorly, ending on the ventral pleurotergite before the halteres. Halteres with stem yellow, knob light brown. Legs with coxæ and trochanters yellow; femora yellow, near apex narrowly brownish black, the extreme tip vaguely yellowed; tibiæ yellow, tips narrowly infuscated; tarsi brownish yellow, passing into brown outwardly; claws with a single stout basal tooth. Wings (Plate 1, fig. 2) weakly brownish yellow, prearcular and costal fields clear yellow; stigma short-oval, brown; a very small brown cloud at origin of  $R_s$ ; darkenings at cord and outer end of cell 1st  $M_2$  so narrow as to be indicated chiefly by the slightly more darkened veins; veins brown, yellowed in the brightened fields. Venation:  $Sc$  long,  $Sc_1$  ending just before fork of  $R_s$ ,  $Sc_2$  near its tip; m-cu shortly before fork of  $M$ .

Abdominal tergites bicolored, bases brownish yellow, apices brown, the latter becoming narrower on outer segments; sternites more uniformly yellow, hypopygium yellow. Male hypopygium (Plate 1, fig. 7) with the tergite,  $t$ , large, about one-half wider than long, posterior border very shallowly emarginate, cephalic border nearly straight. Basistyle,  $b$ , large, especially the complex ventromesal lobe which is nearly equal in size to the body of style; flattened, with a broad inner lobe that divides into two lobules, the inner end obtuse with dense coarse setæ, outer end terminating in a short point and a stouter lobe with several appressed spines; outer lobe longer and more slender, outerly with setæ. Dististyle,  $d$ , only about one-half as extensive as the basistyle, the body long-oval, near its base on outer margin with a nearly hyaline oval lobule with pale setoid extensions over the surface; setæ of body of lobe elongate at near midlength, the outer setæ small and delicate; rostral prolongation a very long gently curved rod. Phallosome,  $p$ , including small flattened gonapophyses,  $g$ , and a complex central ædeagus that includes a flaring flattened plate on either side near base, outer end of ædeagus complex, as shown, with an upper shield-shaped dilation and lateral arms that leave a circular opening on either side.

*Habitat.*—Assam.

Holotype, male, Pushing, Manipur, altitude 6,000 feet, July 18, 1960 (*Schmid*).

The present fly is entirely distinct from other regional species of the subgenus that have the rostral prolongation of the dististyle produced into a long curved rod or blade, such as in *Limonia* (*Limonia*) *acinacis* Alexander. It differs particularly in various details of the hypopygium, including the accessory lobule on outer face of dististyle, the complex basistyle, and especially the phallosome, including the somewhat remarkable ædeagus. It should be emphasized that the two circular areas near the outer end of the ædeagus actually are openings through the organ and not merely on the surface.

**LIMONIA (LIMONIA) HIANIS** sp. nov.

Plate 1, figs. 3, 8.

Size small (wing of male about 5 millimeters); general coloration of thorax fulvous yellow, pleura with a conspicuous brown longitudinal stripe; antennæ relatively long, flagellar segments with short apical pedicels, the bases with dense yellow setæ; wings buffy, stigma pale brown, cell  $M_2$  open by the atrophy of basal section of  $M_3$ ; male hypopygium with apex of dististyle unequally bilobed, the rostral prolongation a long curved spine.

*Male*.—Length, about 4.6 millimeters; wing, 5.2; antenna, about 1.2.

Rostrum small, yellow; palpi brown. Antennæ relatively long, brown; flagellar segments long-oval with short abrupt apical pedicels, segments with abundant long yellow setæ; verticils of the more proximal segments relatively long but shorter than the segments; terminal segment longer than the penultimate, tapering to the subacute tip. Head gray; eyes large, contiguous above.

Pronotal scutum brown, scutellum more yellowed. Mesonotal præscutum subnitidous, fulvous medially, more yellowed sublaterally, margins vaguely more darkened; posterior sclerites of notum light brownish yellow, parascutella clearer yellow; mesonotal setæ very sparse, lacking on scutellum and postnotum. Pleura light yellow below, dorsally with a conspicuous brown longitudinal stripe extending from the propleura across the dorsal sclerites to the base of abdomen, passing just beneath the halteres. Halteres with stem yellow, knob brown. Legs with coxæ light yellow, fore pair slightly darker; trochanters yellow; remainder of legs obscure yellow, the outer tarsal segments very slightly darker; claws long, with a single slender subbasal spine. Wings (Plate 1, fig. 3) faintly tinged with buffy; stigma short-oval, pale brown; veins light brown. Ve-

nation:  $Sc_1$  ending beyond midlength of  $Rs$ ,  $Sc_2$  slightly removed,  $Sc_1$  alone longer than  $r-m$ ; cell  $M_2$  open by atrophy of basal section of  $M_3$ ; cell 2nd  $M_2$  about one-half longer than its petiole;  $m-cu$  slightly exceeding the distal section of  $Cu_1$ , at the fork of  $M$ ; anal veins parallel at bases.

Abdominal tergites dark brown, sternites yellow, outer two segments, including the hypopygium, more yellowed. Male hypopygium (Plate 1, fig. 8) with the tergite, *t*, transverse, posterior border very gently emarginate to form two very low lobes, each with about eight long setæ; median area of cephalic border produced. Basistyle, *b*, with ventromesal lobe large, apex very obtuse to subtruncate. Dististyle, *d*, with apex unequally bilobed, with long setæ; rostral prolongation very long, appearing as a slender spinelike rod, curved to the acute tip, the concave lower margin with a few unusually long setæ. Gonapophysis, *g*, with mesal-apical lobe blackened, slender, at tip curved slightly laterad. Ædeagus bilobed at apex, the bases of the genital tubes widely separated.

*Habitat*.—Assam.

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

*Limonia* (*Limonia*) *bifaria* Alexander has the dististyle of the male hypopygium somewhat as in the present fly although less exaggerated, especially the rostral prolongation. It differs in all other details of hypopygial structure, including the bilobulate ventromesal lobe of the basistyle, gonapophyses and ædeagus, as well as in the closed cell 1st  $M_2$  of the wings. *L. (L.) tagax* Alexander, of Thailand, has the venation somewhat as in the present fly, differing conspicuously in the hypopygial structure.

**LIMONIA (LIMONIA) LYSSA** sp. nov.

Plate 1, figs. 5, 9.

Size medium (wing about 6 millimeters); general coloration of mesonotum brownish yellow, pronotum and pleura dark brown; antennæ black; legs light yellow; wings weakly tinged with brown, the very small stigma darker brown,  $Sc$  long; abdominal tergites and hypopygium uniformly dark brown, sternites cinnamon brown; male hypopygium with body of the dististyle unusually long, the rostral prolongation a strongly curved sclerotized rod.

*Male*.—Length, about 6 millimeters; wing, 6.1; antenna about 1.4

Rostrum and palpi black. Antennæ black; proximal flagellar segments oval, succeeding ones longer, subequal, terminal segment elongate, about one-half longer than the penultimate, gradually narrowed outwardly. Head dark brownish gray; anterior vertex reduced to a capillary strip.

Pronotum dark brown. Mesonotal præscutum almost uniformly brownish yellow, median region a little darker, surface nitidous; scutum yellowed medially, lobes light brown; scutellum and postnotum medium brown; mesonotum virtually glabrous, præscutum anteriorly and the scutum with very sparse short setæ. Pleura dark brown, sternopleura and meron yellowed, metapleura darkened. Halteres with stem obscure yellow, the large knob brownish black. Legs with fore coxæ brown, remaining coxæ and all trochanters yellow; remainder of legs light yellow; claws with slender spines at extreme base. Wings (Plate 1, fig. 5) weakly tinged with brown, the very small stigma darker brown; veins medium brown. Venation: Sc long, Sc<sub>1</sub> ending about opposite five-sixths Rs, Sc<sub>2</sub> longer, near the tip; cell 1st M<sub>2</sub> subequal to distal section of M<sub>4</sub>; m-cu about two-fifths its length beyond fork of M; anal veins nearly parallel at origin.

Abdominal tergites uniformly dark brown, sterniles more-cinnamon brown; hypopygium dark brown. Male hypopygium (Plate 1, fig. 9) with the tergite, *t*, unusually long, its length subequal to the breadth across base, narrowed gradually outwardly; apex truncate, margins thickened; a few long setæ on either side. Basistyle, *b*, with ventromesal lobe emarginate to form two lobules, each with long setæ. Dististyle, *d*, with the body unusually long, somewhat as in many species of the subgenus *Geranomyia*, provided with numerous setæ, the marginal ones long; rostral prolongation a strongly curved sclerotized rod, the outer half forming a weak blade, tip obtuse, all setæ small and sparse. Gonapophysis, *g*, broad, its mesal-apical lobe small and slender. Ædeagus, *a*, broad, apex bilobed, the genital openings protected by a low upper plate.

*Habitat*.—Assam.

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

In its general appearance and the coloration of the wings and legs the present fly is as much as in some other regional members of the subgenus and of *Atypophthalmus* Brunetti but the structure of the male hypopygium is quite distinct from all. As was indicated in the above description, the elongate dististyles are suggestive of many species in the subgenus *Geranomyia* Haliday.

**LIMONIA (LIMONIA) PERAMABILIS** sp. nov.

Plate 1, fig. 4.

Size medium (wing of female about 11 millimeters); head, including the rostrum, black; thorax yellow, præscutum with three brown stripes, each scutal lobe with a single large black central area; halteres with apices of knobs yellow; fore femora yellow, the apical seventh and a broad ring beyond midlength black, remaining femora black with a yellow subterminal ring; wings light yellow, more saturated anteriorly, with a handsome brown pattern; vein Sc long, cell 1st  $M_2$  short; Abdomen yellow, lateral margins of sternites at base with a blackened area; ovipositor with cerci very long and slender.

*Female*.—Length, about 12 millimeters; wing, 11; antenna, about 2.3.

Rostrum and palpi black. Antennæ with scape black, pedicel dark brown, proximal two flagellar segments yellowed, the succeeding segments brown, shorter than the longest verticils; terminal segment about one-half longer than the penultimate. Head dull black; anterior vertex relatively narrow, slightly less than the diameter of the scape.

Pronotum yellow. Mesonotal præscutum yellow with three brown stripes, the central one not reaching the suture behind; posterior sclerites of notum yellow, each scutal lobe with a very large central black area. Pleura yellow. Halteres relatively short and stout, stem black, the base restrictedly light yellow, apices of knobs deeper yellow. Legs with coxæ and trochanters yellow; fore femora yellow, the apical seventh and a slightly broader ring beyond midlength black, the latter area subequal to the subterminal yellow ring; middle and hind femora black with a yellow subterminal ring; tibiæ yellow, tips extensively brownish black; basitarsi brownish yellow, darkened outwardly, remainder of tarsi black. Wings (Plate 1, fig. 4) light yellow, handsomely patterned with brown, including three spots in cell R, the first just beyond the light yellow arcus; cell M with a darkened area before midlength, crossing cell

Cu and reaching the margin in cell 1st A; comparable large brown clouds in outer ends of cells Cu and 2nd A; further darkenings at cord and outer end of cell 1st  $M_2$ , with seams on outer medial veins and at wing apex darker brown but narrow; stigma brown, its extreme center yellowed; prearcular and costal fields, with the interspace along vein Cu darker butter yellow, including the proximal fourth of Rs; veins light yellow in the brightened fields, brown in the patterned areas. Venation: Sc long,  $Sc_2$  brown, ending just beyond the fork of Rs, much longer than  $Sc_1$ ;  $R_{1+2}$  about three-fifths to two-thirds  $R_{2+3}$ ; cell 1st  $M_2$  short, subequal to or less than distal section of  $M_{1+2}$ ; m-cu from about one-third to one-half its length before fork of M; anal veins divergent, vein 2nd A short and virtually straight.

Abdomen yellow, lateral margins of sternites at base with a blackened area, more extensive on the proximal segments. Ovipositor with cerci very long and slender, gently upcurved to the acute tips; hypovalvæ stout, tips narrowly darkened.

*Habitat*.—Sikkim.

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

*Limonia (Limonia) peramabilis* is quite different from all other regional species in the unusual color pattern of the legs. Other such species having conspicuously patterned wings include *L. (L.) angulosa* Alexander, *L. (L.) anteterminalis* Alexander and *L. (L.) festiva* (Brunetti), having vein Sc relatively short, and *L. (L.) propior* Alexander and *L. (L.) vajra* Alexander, with  $Sc_2$  ending opposite or beyond the fork of Rs, as in the present fly. All of these differ evidently in the leg pattern and in the details of venation and wing pattern.

**LIMONIA (LIMONIA) PERPRODUCTA** sp. nov.

Plate 1, figs. 1, 10.

Size large (wing about 15 millimeters); head with rostrum produced anteriorly, the vertex narrowed and prolonged behind, lengthening the head; mesonotum brownish yellow, præscutum with conspicuous stripes, pleura brownish black; halteres with knob brownish black, the tip light yellow; femora brown, tips broadly yellow, enclosing a narrow black subterminal ring; wings yellow, extensively patterned with brown in virtually all cells excepting Sc;  $R_{1+2}$  longer than  $R_{2+3}$ , cell 1st  $M_2$  long, irregular in outline; male hypopygium with outer third of dististyle narrowed.



*Male*.—Length, about 15 millimeters; wing, 15; antenna, about 3.4.

*Female*.—Length, about 13 to 14 millimeters; wing, 14.5 to 15.5; antenna, about 3.

Head elongate in both sexes, rostrum long, the labial palpi nearly equal to it in length, appearing as pale narrow blades; posteriorly head strongly narrowed and produced backward; rostrum and palpi brown. Antennæ with scape and pedicel yellow, flagellum light brown; segments subequal in length to their verticils, the terminal segment about as long as or slightly exceeding the penultimate. Head yellowed, with a conspicuous brown area at center of posterior vertex.

Pronotal scutum brownish yellow, blackened medially behind, provided with erect black setæ; scutellum obscure yellow, pretergites blackened. Mesonotal præscutum brownish yellow with two approximated brownish black stripes, united in front and behind, the lateral stripes less evident, with a smaller brown area close to lateral border; scutal lobes brown, the central area yellowed, continued backward onto the scutellum which otherwise is brown; mediotergite broadly black on central part, sides somewhat more narrowly obscure yellow, pleurotergite concolorous. In the male, the præscutum with numerous small delicate black setæ on interspaces, including the humeri, each scutal lobe on mesal and lateral parts with much longer porrect black setæ, the midregion of the lobe glabrous; scutellum with slightly weaker porrect black setæ, postnotum glabrous; in the female the notal setæ are weaker and less conspicuous, especially those of the scutum. Pleura extensively brownish black, more brownish yellow ventrally. Halteres with stem yellow, knob extensively brownish black, apex light yellow. Legs with coxæ yellowed, fore pair brownish black, middle pair less evidently so; trochanters yellow; femora brown, tips broadly yellow, enclosing a narrow black ring that is subequal to or narrower than the yellow apex; tibiæ brown, tips very narrowly darker; basitarsi brown, outer tarsal segments black; claws of male with a comb of about six spines, the outermost longest. Wings (Plate 1, fig. 1) with the ground yellowed, extensively patterned with brown, appearing as broad areas in all cells, the dark color exceeding the yellow markings, the latter forming a longitudinally streaked pattern with a **transverse band at level of origin of Rs** and a broader area beyond cord, extending from C into cell 1st M<sub>2</sub>; stigma more obscure yellow, narrowly ringed

with brown; cell Sc clear light yellow, C mostly yellow, slightly patterned with pale brown; veins brown, Sc more yellowed. Venation: Sc long Sc<sub>1</sub> ending about opposite the fork of the long Rs, Sc<sub>2</sub> near its tip; R<sub>1+2</sub> longer than R<sub>2+3</sub>; cell 1st M<sub>2</sub> long, irregular, m being much shorter than the basal section of M<sub>3</sub>; m-cu shortly beyond the fork of M, the distance slightly variable.

Abdominal tergites light brown, sternites more yellowed, outer three segments brownish black. Ovipositor yellow, the cerci very slender. Male hypopygium (Plate 1, fig. 10) with posterior border of tergite, *t*, narrowed, the central third truncate; cephalic margin with central third strongly convex; posterior third of tergite with long black setæ. Basistyle, *b*, with ventromesal lobed appressed to body of style, provided with abundant long yellow setæ. Dististyle, *d*, narrowed on outer third. Gonapophyses, *g*, pale, slender. Ædeagus, *a*, broad at base, the outer half narrowed.

*Habitat*.—Sikkim.

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

Allotype, female, Chamiteng, altitude 9,900 feet, August 24, 1959 (*Schmid*).

Paratype, female, Tsomgo, altitude 9,900 feet, August 26, 1959 (*Schmid*).

*Limonia* (*Limonia*) *perproducta* is noteworthy particularly because of the modified head, as described, in conjunction with the conspicuously patterned wings. The various members of the subgenus that are allied to *L.* (*L.*) *hostilis* Alexander, with the heads even more modified, have the wings only weakly patterned and with the labial palpi lengthened, in the extreme case of *L.* (*L.*) *tanyrhyncha* Alexander excessively so. Other superficially similar regional species have the mouthparts normal for the subgenus.

LIMONIA (LIMONIA) SERPULA sp.

Plate 1, figs. 6, 11.

General coloration of thorax obscure yellow, pleura clearer yellow; antennæ black, relatively long, flagellar segments oval; legs light brown; wings weakly infuscated, stigma small, very pale brown, Sc<sub>1</sub> ending about opposite two-thirds Rs, Sc<sub>2</sub> near its tip; male hypopygium with dististyle enlarged at base, narrowed into a slender sinuous rod, the tip obtuse with short setæ.

*Male*.—Length, about 4.5 millimeters; wing, 5; antenna, about 1.

Rostrum light yellow; palpi black. Antennæ black, relatively long; flagellar segments longer outwardly, the terminal one about four-fifths the penultimate. Head light cinnamon brown, more pruinose behind; anterior vertex broad.

Pronotum yellowish brown. Mesonotum obscure yellow, without distinct pattern; pleura and pleurotergite clear light yellow. Halteres brownish black, base of stem restrictedly yellowed. Legs with coxæ and trochanters light yellow; remainder of legs light brown; claws long and slender, only gently curved, with a long basal spine. Wings (Plate 1, fig. 6) weakly infuscated; stigma small, oval, very pale brown; veins brown. Venation: Sc long, Sc<sub>1</sub> ending about opposite two-thirds Rs, Sc<sub>2</sub> near its tip; cell 1st M<sub>2</sub> long, subrectangular, about as long as distal section of M<sub>3</sub>; m-cu shorter than distal section of Cu<sub>1</sub>, placed shortly beyond fork of M.

Abdominal tergites medium brown, sternites and hypopygium yellowed. Male hypopygium (Plate 1, fig. 11) with the tergal lobes, *t*, obtuse, separated by a narrow emargination, lobes with numerous long setæ. Basistyle, *b*, with ventromesal lobe large, low, appressed to mesal face of style. Dististyle, *d*, much smaller than the basistyle, enlarged at base, with long conspicuous setæ, outwardly narrowed into a slender sinuous rod, its tip obtuse, with short setæ.

*Habitat*.—Assam.

Holotype, male, Mawtang, Khasi-Jaintia Hills, altitude 4,000 feet, April 12, 1960 (*Schmid*).

*Limonia* (*Limonia*) *serpula* is most similar to species such as *L. (L.) acinacis* Alexander, *L. (L.) bifaria* Alexander, *L. (L.) tagax* Alexander, and some other regional species, differing specially in the hypopygial structure, including the basistyle and dististyle, including the obtuse apex of the rostral prolongation of the latter.

**LIMONIA (LIBNOTES) INATTENTA** sp. nov.

Plate 2, fig. 12.

Size large (wing of male 19 millimeters); general coloration of thorax dark brown, posterior sclerites of notum brownish gray; rostrum, palpi and antennæ black; knobs of halteres dark brown; legs dark brown to brownish black; wings suffused with brown, cells C and Sc darker, with three still darker brown costal areas placed at origin of Rs and tips of Sc<sub>1</sub> and R<sub>1</sub>; abdominal tergites variegated brown and yellow, sternites

more uniformly brownish black, hypopygium more yellowed; male hypopygium with two long rostral spines.

*Male*.—Length, about 13 millimeters; wing, 19; antenna, about 2.6.

*Female*.—Length, about 12 millimeters; wing, 15.

Rostrum and palpi intensely black. Antennæ black; flagellar segments suboval, the outer ones more elongate; longest verticils subequal to the segments, the outer ones longer; terminal segment about one-half longer than the penultimate, its outer third narrowed. Head gray, center of posterior vertex infuscated; anterior vertex of male very narrow.

Pronotum dark brown. Mesonotal præscutum with the restricted ground blackened, disk with four brown stripes, the laterals confluent with the intermediates, narrowly gray before suture; scutal lobes dark brown, remainder of notum brownish gray, including the pleurotergite. Pleura dark brown, dorso-pleural membrane restrictedly yellowed. Halteres elongate, stem yellow, knob dark brown. Legs with fore coxæ dark brown, remaining coxæ and all trochanters more brownish yellow; remainder of legs dark brown to brownish black, tips of femora slightly darker. Wings (Plate 2, fig. 12) suffused with brown, cells C and Sc darker brown; three still darker brown areas placed at origin of Rs, and at tips of Sc<sub>1</sub> and R<sub>1</sub>, the two latter larger and reaching C; vague paler brown clouds at wing tip and along cord; veins brown, darker in the patterned areas, the subcostal interspaces yellow. Venation: Sc long, Sc<sub>1</sub> ending about opposite midlength of cell 1st M<sub>2</sub>, Sc<sub>2</sub> close to its tip; free tip of Sc<sub>2</sub> and R<sub>2</sub> in transverse alignment; outer ends of radial veins strongly decurved, especially in the male; cell 1st M<sub>2</sub> elongate, m about one-half longer than the basal section of M<sub>3</sub>; m-cu nearly twice its length beyond fork of M; anal veins converging at bases.

Abdominal tergites brown medially, apices obscure yellow, this color becoming more extensive on the outer segments; sternites more uniformly brownish black; hypopygium more yellowed. Male hypopygium generally as in other members of the subgenus; rostral spines two, very long.

*Habitat*.—Assam.

Holotype, male, Waiten, Lushai Hills, Mizo District, altitude 2,500 feet, September 8, 1960 (*Schmid*). Allotopotype, female, pinned with the type.

By Edwards' key to the species of *Libnotes* (1928) the present fly runs to *Limonia* (*Libnotes*) *sphagnicola* (Edwards), of Buru, described in 1926; the name is preoccupied and was renamed *L. (L.) muscicola* Alexander, 1942. This latter fly is an entirely different species in the coloration of the body, legs and wings. Among the Indian species of *Limonia* it is more similar to *Limonia* (*Laosa*) *dolonigra* Alexander, distinguished by the subgeneric character of having a supernumerary cross-vein in cell R<sub>3</sub> of the wings.

**LIMONIA (LIBNOTES) SIMPLICERCUS** sp. nov.

Plate 2, figs. 13, 18.

Size medium (wing of female 10 millimeters or more); mesonotal præscutum with four obscure yellow stripes, patterned with brown, darker laterally; pleura conspicuously variegated dark brown and yellow; knobs of halteres darkened; legs yellow, fore coxæ dark brown basally; wings obscure yellow, with a conspicuous pale brown pattern that is chiefly costal and subcostal in distribution, including a large area in the bases of cells R and M; vein 2nd A long and straight; ovipositor with both cerci and hypovalvæ short and simple.

*Female*.—Length, about 8.5 to 9.5 millimeters; wing, 10 to 11.

Rostrum buffy yellow; palpi brownish black. Antennæ brownish black; basal flagellar segments subglobular to short-oval, with very short abrupt apical pedicels, outer segments passing into elongate cylindrical, terminal segment very long, about one-half longer than the penultimate; each flagellar segment with a single very long verticil, the longest about one half more than the segment. Head brownish gray; anterior vertex reduced to a linear strip, at the narrowest point subequal in diameter to a single row of ommatidia.

Pronotal scutum obscure orange, conspicuously variegated with dark brown, scutellum obscure yellow, pretergites clearer yellow. Mesonotal præscutum with the disk chiefly covered by four obscure yellow stripes, the interspaces represented by a diffuse median darkening on anterior half and comparable sublateral areas on posterior third, in the paratype the dark areas more extensive and more or less interconnected; humeral and lateral præscutal borders darker brown; scutum yellow, each lobe vaguely patterned with darker; scutellum yellowed; mediotergite pale brown, posterior border yellowed, pleurotergite more uniformly yellow. Pleura yellow, conspicuously variegated with dark brown spots on propleura, anipesterium,

anterior sternopleurite, pteropleurite and metapleura. Halteres obscure yellow, knob darkened, especially outwardly. Legs with coxæ yellow, basal half of fore pair dark brown; trochanters yellow; remainder of legs yellow, outer tarsal segments darkened. Wings (Plate 2, fig. 13) obscure yellow, prearcular and costal regions brighter yellow; a conspicuous pale brown pattern, including bases of cells Sc, R and M, origin of Rs, a band at cord, extending from C to end of vein Cu, stigmal region at end of  $R_{1+2}$  and outer end of cell 1st  $M_2$ ; all subcostal darkenings more intense in cell Sc; veins beyond cord light brown, based of cord yellowed, especially in the interspaces of the costal field. Venation: Sc long,  $Sc_1$  ending nearly opposite r-m,  $Sc_2$  longer; free tip of  $Sc_2$  pale, lying just basad of level of  $R_2$ ;  $R_{1+2}$  projecting as a small spur; cell 1st  $M_2$  relatively long, gently widened outwardly, subequal in length to  $M_4$ ; m and basal section of  $M_3$  subequal and in transverse alignment; m-cu just before midlength of  $M_{3+4}$ , subequal to distal section of  $Cu_1$ ; anal veins convergent, 2nd A long and straight, not arcuate as in *longinervis*.

Abdominal tergites obscure brownish yellow, sternites clearer yellow. Ovipositor (Plate 2, fig. 18) with valves simple, not toothed as in *longinervis* (Plate 2, fig. 18), both the cerci and hypovalvæ short, the latter longer, with a blackened spot at base.

*Habitat*.—Assam.

Holotype, female, Kongai, Manipur, altitude 3,900 feet, July 7, 1960 (*Schmid*). Paratopotype, female, with the type.

The most similar species is *Limonia (Libnotes) longinervis* (Brunetti), which has the wing pattern and venation somewhat similar, differing as described. The more simple structure of the valves of the ovipositor in the present fly is noteworthy.

**LIMONIA (LIBNOTES) UNIVIBRISSA** sp. nov.

Plate 2, figs. 14, 19.

Size medium (wing of male about 10 millimeters); mesonotum almost uniformly cinnamon brown, scutellum yellow; legs brown to brownish black; wings medium brown, stigma darker brown; Sc relatively short,  $Sc_1$  ending about opposite two-thirds Rs,  $Sc_2$  near its tip, m-cu close to fork of M; abdominal tergites brown, posterior borders of segments yellowed, sternites and outer segments more uniformly yellowed; ventral dististyle of male hypopygium with two rostral spines, the accessory lobe tipped with a single strong bristle.

*Male*.—Length, about 8 to 9 millimeters; wing, 9 to 10; antenna, about 2 to 2.2.

Rostrum brownish black, palpi black. Antennæ black; basal flagellar segments oval, succeeding segments more elongate, outer ones very long and slender, with exceedingly long verticils. Head brownish gray; eyes very large in male, broadly contiguous dorsally, eliminating the antertior vertex.

Thoracic notum almost uniformly cinnamon brown, without distinct pattern, scutellum and median region of scutum yellow. Pleura brown above, ventral sclerites yellowed. Halteres with stem dusky, base narrowly yellowed, knob blackened. Legs with coxæ cinnamon brown, fore pair more darkened basally; trochanters yellow; femora brown to brownish black, bases yellowed, tips broadly still more darkened; tibiæ and tarsi brown. Wings (Plate 2, fig. 14) almost uniformly suffused with medium brown, costal border slightly more yellowed; stigma oval, darker brown; very narrow to scarcely indicated pale brown seams at origin of Rs and along the cord; veins brown. Venation: Sc relatively short, Sc<sub>1</sub> ending about opposite two-thirds Rs, Sc<sub>2</sub> near its tip; cell 1st M<sub>2</sub> long, slightly exceeding the distal section of M<sub>1+2</sub>; m-cu slightly longer than distal section of Cu<sub>1</sub>, placed close to fork of M.

Abdominal tergites brown, the posterior borders broadly more yellowed in the holotype, more uniformly darkened in the paratype with the borders only narrowly obscure yellow; sternites and outer tergites, including the hypopygium, more yellowed. Male hypopygium (Plate 2, fig. 19) with the tergite, *t*, large, semicircular in outline, cephalic margin nearly truncate; posterior border with abundant long setæ. Basistyle, *b*, relatively small, its area slightly more than that of the ventral dististyle; ventromesal lobe elongate. Dorsal dististyle, *d*, a smooth gently curved rod, narrowed very gradually to the acute tip; ventral style with the rostral prolongation very long and slender, its tip gently decurved; two long pale rostral spines with obtuse tips from a small basal tubercle; a long setuliferous tubercle near base of prolongation, at its apex with a single very long seta that exceeds the tubercle in length. Gonapophyses pale, elongate-triangular, tip slender, at apex bent slightly laterad. Ædeagus, *a*, broad, the apical lobes widely separated; subtending membranous sheath very pale.

*Habitat*.—Assam.

Holotype, male, Tairenpokpi, Manipur, altitude 4,000 feet, May 31, 1960 (*Schmid*). Paratopotype, male pinned with the type.

*Limonia* (*Libnotes*) *univibrissa* is one of several puzzling species of the genus that have the venation almost as in typical *Limonia* but with the male hypopygium having the characteristics of *Libnotes*, including the ventral dististyle and its armature. On the basis of this latter character I am referring the present fly to *Libnotes* where the reduction of setæ at apex of the accessory tubercle of the ventral style to a single bristle is noteworthy. The most similar species is *L. (L.) garoensis* Alexander (*longipennis* Brunetti, 1918, preoccupied) which has the venation much the same except for slight details, differing in the coloration of the body, legs and wings, and with the hypopygial details distinct, the accessory tubercle having three long bristles. Edwards (1924) considers the latter species to be very close to *L. (L.) infixa* (Walker) of New Guinea and on the basis of venation retains it in the subgenus *Limonia* (as *Limmobia*).

LIMONIA (LIBNOTES) ISHANA sp. nov.

Plate 2, fig. 15.

Thorax light yellow, the notum patterned with brown, contrasting abruptly with the ground; halteres blackened; legs obscure yellow; wings weakly tinged with brownish yellow, restrictedly patterned with brown, Sc short, Sc<sub>1</sub> ending about opposite two-fifths the length of Rs, Sc<sub>2</sub> opposite origin of the latter.

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

Rostrum and palpi black. Antennæ black throughout; basal flagellar segments subglobular, the outer ones progressively more lengthened. Head dark grayish brown; eyes large, virtually contiguous above, the anterior vertex less than the diameter of a single row of ommatidia.

Pronotum black, sides restrictedly yellow. Mesonotal præscutum with the median region brown, on anterior half restrictedly divided by a slightly darker capillary vitta, posteriorly bordered by darker brown in the region of the usual interspaces; sides of præscutum broadly and abruptly light yellow; scutal lobes brown, narrowly ringed with darker brown, median region narrowly yellow; scutellum obscure yellow basally, the margin on either side of the narrow midline conspicuously dark brown; mediotergite and extreme posterior border of



pleurotergite brown, the remainder of thorax, including the dorsopleural membrane, entirely light yellow, contrasting with the darkened dorsum as described; præscutum and scutum with long sparse black setæ, erect to slightly porrect. Halteres short, blackened. Legs with fore and middle coxæ yellow, posterior coxæ and trochanters dark brown, remaining trochanters obscure yellow; remainder of legs obscure yellow, the terminal tarsal segments weakly more darkened. Wings (Plate 2, fig. 15) weakly tinged with brownish yellow, costal border narrowly clearer yellow; a restricted brown pattern that includes the small circular stigma and narrow seams at origin of Rs, cord and outer end of cell 1st  $M_2$ ; veins light brown. Veins beyond cord with abundant macrotrichia, lacking on 1st A, present at tip of 2nd A. Venation: Sc short,  $Sc_1$  ending at near one-third Rs,  $Sc_2$  opposite origin of the latter; cell 1st  $M_2$  strongly widened outwardly, basal section of  $M_3$  slightly angulated; m-cu from about one-third to two-fifths its length before fork of M; vein 2nd A strongly sinuous, the anal veins parallel at bases.

Basal abdominal tergites dark brown, the outer ones paler basally, their apices dark brown; sternites slightly paler brown, genitalia obscure orange. Ovipositor with cerci small, slender, hypovalvæ long and powerful, extending slightly beyond the cerci.

*Habitat*.—Assam.

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

In the general coloration of the wings, the present fly superficially resembles *Limonia* (*Libnotes*) *garçensis* Alexander and some others, differing evidently in the coloration of the body and in the venation. I am referring it to *Libnotes* with a question that can be answered with the discovery of the male sex.

**LIMONIA (LAOSA) IMPENSA** sp. nov.

Plate 2, figs. 16, 20.

Allied to *fuscinervis*; mesonotal præscutum yellow with four brown stripes; knobs of halteres dark brown; legs brownish black, femoral bases yellowed; wings yellow, restrictedly patterned with brown seams over the veins; supernumerary cross-vein in cell  $R_3$  more than its own length before  $R_2$ ; abdomen yellow, tergites with a poorly indicated brown central stripe, lateral borders of sternites and a subterminal ring blackened.

*Male*.—Length, about 13 to 16 millimeters; wing, 16.5 to 21; antenna, about 2.5 to 3.

*Female*.—Length, about 14 millimeters; wing, 18.

Rostrum brown, palpi blackened. Antennæ with scape and pedicel yellowish brown to light brown, flagellum brownish black with greenish tinges; lower faces of flagellar segments produced to appear triangular in profile, the condition more accentuated in the holotype. Head yellow pollinose, posterior vertex patterned with cinnamon areas; anterior vertex narrow.

Pronotum yellow, sides of scutum vaguely darkened. Mesonotal præscutum yellow with four brown stripes additional to the paler brown margins; scutum yellow medially, with a delicate brown central line, lobes patterned with brown; scutellum gray basally, apex yellowed; postnotum yellowed, darker posteriorly. Pleura yellow, restrictedly patterned with dark brown, including the restricted propleura and narrow dorsal edge of the anipe sternum, metapleural area less evidently darkened. Halteres with stem pale yellow, knob dark brown. Legs with fore coxæ yellowed, remaining coxæ weakly darkened; trochanters yellow; femora light to darker brown, the tips more infuscated, bases restrictedly yellowed; tibiæ and tarsi dark brown to brownish black, tips of the former almost black. Wings (Plate 2, fig. 16) yellow, the prearcular and costal regions clearer yellow, cell Sc dark brown; restricted paler brown seams over the veins, more widened at  $R_{1+2}$  origin of Rs and as a seam along vein Cu in cell M; wing tip in cell  $R_1$  narrowly darkened; veins brown in the patterned areas, more yellowed elsewhere, arculus yellowed. Venation;  $Sc_1$  ending about opposite midlength of cell 1st  $M_2$ ; free tip of  $Sc_2$  pale, at tip of  $R_{1+2}$ ,  $R_2$  more basal in position; outer radial veins strongly decurved distally, cell  $R_2$  extensive at margin; supernumerary crossvein in cell  $R_3$  more than its own length before  $R_2$ ; cell 1st  $M_2$  long, m arcuated, about one and one-half to two and one-half times the basal section of  $M_3$ ; m-cu at near one-fourth to one-fifth the length of cell 1st  $M_2$ ; cell 2nd A long.

Abdominal tergites yellow with a poorly indicated darker central stripe that is more evident at base; sternites clearer yellow, lateral borders black; segments six and seven blackened to form a subterminal ring; hypopygium yellowed. Ovipositor with cerci short, slender, strongly upcurved. Male hypopygium (Plate 2, fig. 20) with the tergite, *t*, large, posterior

border convexly rounded, cephalic margin produced to form a low angle. Basistyle, *b*, with ventromesal lobe slightly smaller than the body of style. Dorsal dististyle, *d*, slender, narrowed very gradually to the acute tip; ventral style subequal in area to the basistyle, rostral prolongation slender, the outer end decurved, near its base with a compact group of four long rostral spines from a common tubercle, the spines pale and expanded slightly outwardly; a longer outer tubercle bearing a pencil of very long yellow setæ. Gonapophyses, *g*, elongate-triangular, narrowed to a slender point. Ædeagus broad, the genital tubes lying close together, with broad subtending margins.

*Habitat*.—Assam.

Holotype, male, Chingsao, Manipur, altitude 3,800 feet, June 13, 1960 (*Schmid*). Allotype, female, Loni, Manipur, altitude 4,500 feet, June 16, 1960 (*Schmid*). Paratype, male, with the allotype.

The most similar species is *Limonia* (*Laosa*) *fuscinervis* (Brunetti) which differs evidently in the coloration of the body, legs and wings. This fly has the brown seams to the wing veins broader and more broken into smaller areas and the legs are yellow, the femora with a narrow subterminal brown ring. As indicated in other papers I am retaining in *Laosa* Edwards the various species formerly assigned to *Libnotes* Westwood that have a supernumerary crossvein in any of the outer radial cells.

**LIMONIA (LAOSA) NOCTIPES** sp. nov.

Plate 2, fig. 17.

Generally similar to *dolonigra* in the blackened legs, differing in the conspicuous light yellow wings with an extensive pale brown pattern, the veins yellow; cell 1st  $M_2$  very long, subequal to the distal section of vein  $M_{1+2}$ .

*Female*.—Length, about 10 millimeters; wing, 13; antenna, about 2.2.

Rostrum dark brown, shorter than remainder of head; palpi brown. Antennæ with scape and pedicel brown, flagellum black; basal flagellar segments subglobular, with exceedingly short apical pedicels, outer segments becoming short-oval to oval, terminal segment longer than the penultimate, narrowed on outer half, verticils much shorter than the segments. Head light brown; anterior vertex narrow.

Pronotum yellowish brown, cervical sclerites darker. Mesonotal præscutum with the restricted ground yellow pollinose, disk with four brown stripes that are nearly confluent, anterior third of intermediate stripes more orange, humeral and lateral borders darker brown; scutum yellow medially, lobes with a single extensive brown area; scutellum and mediotergite brown, heavily golden yellow pollinose, pleurotergite brown. Pleura dark brown, pollinose; dorsopleural region yellow. Halteres yellow. Legs with coxæ and trochanters yellow; femora and tibiæ black, the bases of the former narrowly yellowed, on fore legs including about the proximal fifth, on posterior pair about the proximal eighth; tarsi brown, outer segments blackened. Wings (Plate 2, fig. 17) light yellow, prearcular and costal fields more saturated yellow; a heavy pale brown pattern, appearing as broad seams to all veins, beyond the cord the color subequal in extent to the ground, basad of cord including a postarcular area, a complete seam along vein Cu in cell M, a continuous seam over basal third of 1st A and tip of 2nd A, and the apical border in cell 2nd A and proximal half of 1st A; veins clear yellow, beyond the cord including those in the patterned areas, basad of cord with Cu and tip of 2nd A darker; arculus and h conspicuously whitened. Venation: Sc long, Rs more than twice the basal section of  $R_{4+5}$ ;  $Sc_2 + R_{1+2}$  extending beyond  $R_2$  for a distance about equal to the latter, the free tip of  $Sc_2$  placed at its whitened tip; supernumerary crossvein in cell  $R_3$  about its own length before  $R_2$ ; cell 1st  $M_2$  very long, subequal to the distal section of  $M_{1+2}$  widened outwardly, m angularly bent and spurred, about two and one-half times the basal section of  $M_3$ ; m-cu at near two-fifths  $M_{3+4}$ .

Abdomen yellow, tergite seven and sternites five to seven blackened, the genital segment obscure yellow. Ovipositor with cerci small and slender; hypovalvæ large and powerful, tips narrowed into points.

*Habitat*.—Sikkim.

Holotype, female, karponang, altitude 8,100 feet, August 22, 1959 (*Schmid*).

The only other regional species of *Laosa* that have the legs almost uniformly blackened are *Limonia (Laosa) dolonigra* Alexander and *L. (L.) impensa* sp. nov., both of which differ evidently in the coloration of the thorax and wings. The fe-

male of *dolonigra* has cell 1st  $M_2$  much shorter than in the present fly.

**LIMONIA (DICRANOMYIA) ABIGOR** sp. nov.

Plate 3, figs. 21, 25.

Size medium (wing of male 6 millimeters); general coloration of thorax brown; antennæ of male long, about one-third the wing; legs brownish black, outer tarsal segments slightly paler; wings strongly blackened, stigma darker brown; abdominal tergites brownish black, basal sternites bicolored, black, with about the outer third of each light yellowish gray; male hypopygium with the ventral dististyle large and fleshy, its area about three times that of the basistyle, rostral prolongation small, with two long curved pale spines.

*Male*.—Length, about 5.5 millimeters; wing, 6; antenna, about 2.1.

Rostrum brown, palpi black. Antennæ of male long, about one-third the wing, brownish black throughout; flagellar segments long, with short apical pedicels; verticils only about one-third the segment, longer than the abundant dark colored setæ; terminal segment a little longer than the penultimate. Head dark brown.

Pronotum dark brown. Mesonotum medium brown throughout, the scutum with a few conspicuous erect black setæ. Pleura darker brown. Halteres black, base of stem restrictedly paler. Legs with coxæ and trochanters obscure yellow, the fore pair darker; remainder of legs brownish black, outer tarsal segments slightly paler. Wings (Plate 2, fig. 21) strongly blackened, the oval stigma darker brown; veins dark brown. Macrotrichia on veins beyond cord on  $R_s$ , outer third of  $M$  and the extreme distal end of the basal section of  $Cu_1$ . Venation:  $Sc$  long,  $Sc_1$  ending about opposite midlength of  $R_s$ ,  $Sc_2$  longer, near its tip; free tip of  $Sc_2$  and  $R_2$  pale, in transverse alignment,  $R_{1+2}$  extended beyond for almost an equal distance, the spur with macrotrichia to the end;  $R_s$  long,  $m-cu$  just before fork of  $M$ .

Abdominal tergites brownish black; basal sternites bicolored, black, with about the outer third light yellowish gray; outer segments and hypopygium brownish black. Male hypopygium (Plate 3, fig. 25) with tergite,  $t$ , relatively small, narrowed outwardly, apex with a very small U-shaped emargination, the small lobes each with four long setæ, on either side of tergite near base with two further long setæ. Basistyle,  $b$ , small, the ventromesal lobe only a little less than body of style. Dorsal

dististyle, *d*, a slender curved sickle, narrowed to a long spine; ventral style large and fleshy, its area about three times that of the basistyle; rostral prolongation small, tip obtuse, with two long curved pale spines at near midlength of outer face, these exceeding the prolongation, arising from small slightly unequal basal tubercles. Gonapophyses, *g*, narrowed gradually into the long slender mesal-apical lobe, obtuse at tip. *Æ*deagus slender, the apex a single pale lobe.

*Habitat*.—Sikkim.

Holotype, male, Ramtang, altitude 5,780 feet, October 13, 1959 (*Schmid*).

*Limonia* (*Dicranomyia*) *abigor* superficially resembles *Limonia* (*Limonia*) *indefessa* Alexander in the coloration and venation of the wings and in the long antennæ. It differs conspicuously in hypopygial structure, including the very large ventral dististyle and the simple ventromesal lobe of the basistyle.

LIMONIA (DICRANOMYIA) CLARISSIMA sp. nov.

Plate 3, figs. 22, 26.

General coloration of body pale yellow; rostrum, halteres and legs yellow, outer tarsal segments brownish black; antennæ brown, terminal segment elongate; wings whitened, without stigma or other pattern except for a faint cloud in the axillary region, the veins tinged with green; *Sc*<sub>1</sub> ending about opposite one-fifth *Rs*, *Sc*<sub>2</sub> not far from its tip, cell 1st *M*<sub>2</sub> elongate, its inner end strongly pointed; male hypopygium with outer end of dorsal dististyle acutely pointed, ventral style with rostral prolongation blackened, spines elongate, placed close together on face of style near base.

*Male*.—Length, about 5.5 millimeters; wing 6.5; antenna, about 0.8.

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

Rostrum and palpi yellowed. Antennæ brown, with greenish tints; flagellar segments oval, the outer ones becoming elongate, terminal segment about one-fourth longer than the penultimate; verticils of the more proximal segments nearly to the articles, of the outer segments shorter. Head yellow, the anterior vertex weakly infuscated.

Thorax uniformly pale yellow. Halteres and legs light yellow, trochanters and the outer segments strongly tinged with green, outer two or three tarsal segments brownish black; claws slender, with a relatively short outer spine and still more

reduced basal points. Wings (Plate 3, fig. 22) whitened, entirely unpatterned except for a dusky cloud in the axilla; no vestige of a stigma; veins of anterior border, including C, Sc and R very pale, remaining veins light brown, with vague greenish tints, especially along costal border. Macrotrichia on longitudinal veins beyond cord, with fewer scattered trichia on Rs and outer end of M, none on either anal vein. Venation: Sc<sub>1</sub> ending about opposite one-fourth to one-fifth Rs, Sc<sub>2</sub> not far from its tip; cell 1st M<sub>2</sub> elongate, its inner end strongly pointed; basal section of M<sub>1+2</sub> subequal to or in cases longer than m-cu, the latter at or close to the fork of M.

Abdomen light yellow, including the hypopygium with the exception of the dististyles. Ovipositor with cerci slender, up-curved to the acute tips, hypoalvæ darkened. Male hypopygium (Plate 3, fig. 26, diagrammatic) badly damaged by fungi, only the dististyles, *d*, clearly preserved, mounted on microscope slide. Dorsal style gently curved to a long blackened apical spine, ventral style relatively small, oval, the beak blackened, especially outwardly; apex microscopically notched, with three of four setæ; rostral spines two, elongate, exceeding the rostrum beyond their insertion, placed close together on face of rostrum near its base.

*Habitat*.—Sikkim.

Holotype, a fragmentary male, Tsomgo, altitude 12,500 feet, in *Rhododendron* association, August 26, 1959 (*Schmid*). Allotopotype, female. Paratopotype, a fragment, pinned with type.

*Limonia* (*Dicranomyia*) *clarissima* is readily told from other regional species by the virtually unpatterned wings, including the loss of the stigmal darkening and the pointed base of cell 1st M<sub>2</sub>. It resembles species such as the Nearctic *L. (D.) pudica* (Osten Sacken) but is quite distinct. The strong green tints on the antennæ, legs and wing veins indicate a more greenish yellow color of the body in living specimens.

LIMONIA (DICRANOMYIA) EURYRHYNCHA sp. nov.

Plate 3, figs. 23, 27.

General coloration yellow, central area of præscutum and the scutal lobes brown; halteres brownish black; femora brown, tips narrowly yellowed; wings whitened, slightly patterned with brown, m-cu before the fork of M; male hypopygium with the rostral prolongation of ventral dististyle very broad, the margin with about nine strong black setæ, rostral spines on face of prolongation.

*Male*.—Length, about 7 millimeters; wing, 7.8; antenna, about 1.

Rostrum slightly elongated, dark brown; maxillary palpi black, labial palpi green. Antennæ brown, the segments tinted with green; flagellar segments longer than their verticils; terminal segment shorter than the penultimate. Head brown.

Pronotum brown above, yellowed laterally. Mesonotal præscutum with middorsal region brown, representing the usual stripes, narrowed and more intensely darkened in front, broadly expanded behind, on sides crossing the suture to cover the scutal lobes, the median area at suture narrowly pale; posterior sclerites of notum yellow, the mediotergite weakly more darkened; præscutal interspaces with long erect to slightly porrect dark setæ. Pleura yellowed. Halteres brownish black, base of stem yellow. Legs with coxæ and trochanters yellow; femora brown, bases narrowly yellowed, tinged with green, tips more narrowly obscure yellow; tibiæ brown, outer tarsal segments brownish black, with green tints. Wings (Plate 3, fig. 23) whitened, stigma pale brown; very narrow to scarcely evident pale brown clouds from the stigma basad to fork of Rs, with another darkening at origin of the latter; wing base whitened, including the veins, remaining veins brown, in the radial field with greenish tints. Venation:  $Sc_1$  ending opposite origin of Rs (in holotype) or slightly beyond,  $Sc_2$  not apparent in available material; cell 1st  $M_2$  long, widened outwardly, longer than the veins beyond, basal section of  $M_3$  in paratype longer than in the type; m-cu from about one-half to three-fourths its length before fork of M.

Abdominal tergites pale brown medially, sternites and hypopygium yellowed. Male hypopygium (Plate 3, fig. 27) with the ninth tergite, *t*, long, the posterior border with a deep and narrow U-shaped emargination, the lobes broadly rounded, with several long black setæ; anterior border of tergal plate nearly truncate, thickened. Basistyle, *b*, with ventromesal lobe conical, tip obtuse, with relatively few setæ. Dorsal dististyle, *d*, a strongly curved sickle, tip recurved shortly into a point; ventral style slightly exceeding the basistyle in area, rostral prolongation very broad, the margin with 8 or 9 long black setæ; rostral spines two, placed close together on face of style, directed basad. Gonapophyses, *g*, with mesal-apical lobe slender, separated from body of apophysis by a narrow U-shaped emargination.



*Habitat.*—Sikkim.

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

*Limonia (Dicranomyia) euryrhyncha* is told readily from other regional species of the subgenus by the hypopygial characters, particularly the distinctive rostral prolongation of the ventral dististyle. Certain other somewhat similar species with slightly patterned wings and with the tip of the dorsal dististyle slightly recurved have the ventral style entirely different from the present fly.

**LIMONIA (DICRANOMYIA) FLAVOCINCTA** (Brunetti).

Plate 3, fig. 28.

*Limnobia flavocincta* BRUNETTI, Rec. Indian Mus. 15 (1918) 289–290.

*Limnobia flavocincta* EDWARDS, Rec. Indian Mus. 26 (1924) 298.

The species was described from two females, taken at Mahabaleshwar, Satara District, West India. Edwards [(1924) reference] has provided additional notes on the types. The male hypopygium has not been illustrated and is shown at this time (Plate 3, fig. 28). I am retaining the species in the subgenus *Dicranomyia* Stephens on the basis of hypopygial structure.

Additional records: Cinchona, Anaimalai Hills, South India, altitude 4,000 to 5,000 feet, September 18, 1946 (*P. Susai Nathan*).

Kodaikanal, Palni Hills, altitude 7,000 feet, September 15, 1921 (*Fletcher*); received through an exchange of specimens with Edwards.

**LIMONIA (DICRANOMYIA) NEOFASCIPENNIS** nom. nov.

*Dicranomyia fascipennis* BRUNETTI, Fauna British India, Diptera Ne-matocera (1912) 379–380, pl. 7, fig. 9; preoccupied by *Limnobia fascipennis* SAY, Jour. Acad. Nat. Sci. Philadelphia 3 (1823) 19; *Limnobia fascipennis* THOMPSON, Eugenes Resa, Diptera (1869) 447.

It had been suggested by Edwards (1924) that this species was identical with *Limonia (Dicranomyia) fullowayi* (Alexander) and perhaps also with *L. (D.) punctulata* (de Meijere). However, all three species are well defined and the present fly requires a new name.

**LIMONIA (DICRANOMYIA) PARJANYA** sp. nov.

Plate 3, fig. 24; Plate 4, fig. 33.

Allied to *dactylophora*; general coloration of thorax obscure yellow, the pronotum and præscutum with a continuous brown central stripe, pleura and pleurotergite yellowed; femora yellow, tips narrowly brown; wings faintly tinged with yellow,

stigma brown,  $Sc_1$  ending about opposite  $Rs$ ,  $Sc_2$  far retracted; male hypopygium with the rostral spines very long, ædeagus slender.

*Male*.—Length, about 5.8 to 6 millimeters; wing, 6.5 to 7.2; antennæ, about 1.

*Female*.—Length, about 7 millimeters; wing, 8.

Rostrum yellow, palpi black. Antennæ black; flagellar segments oval, subequal to the verticils. Head gray, light silvery on front; anterior vertex broad, exceeding three times the diameter of the scape.

Prothorax and mesonotal præscutum obscure yellow with a continuous brown central stripe, paler behind, ending at the suture, lateral præscutal stripes obsolete or virtually so; posterior sclerites of notum yellowed, scutal lobes, and sides of scutellum weakly infuscated, mediotergite grayish. Pleura and pleurotergite yellowed, sternopleurite more pruinose. Halteres elongate, stem pale brown, yellowed at base, knob brown. Legs with coxæ and trochanters yellow; femora yellow, tips narrowly brown; tibiæ and tarsi brownish yellow, outer tarsal segments brown; claws with a single very long basal spine. Wings (Plate 3, fig. 24) faintly tinged with yellow, base and costal region clearer yellow, stigma brown; veins light brown. Venation:  $Sc_1$  ending opposite to some distance before origin of  $Rs$ ,  $Sc_2$  far retracted,  $Sc_1$  alone subequal to  $Rs$ ; m-cu at or shortly before fork of  $M$ .

Abdominal tergites and outer sternites dark brown, basal sternites obscure yellow. Male hypopygium (Plate 4, fig. 33) with the tergite, *t*, very broad, narrowed toward the cephalic end; posterior border shallowly emarginate, leaving very broad low lobes that bear numerous long pale setæ. Basistyle, *b*, with ventromesal lobe very large, the main body flattened, with an axillary lobe at base, its outer third yellowed and bearing a brush of long yellow setæ. Dorsal dististyle, *d*, bent at base, the apex narrowed into a long spine; ventral style relatively small, its area less than the total of the basistyle; rostral prolongation large, more sclerotized, narrowed to the pointed apex; two very long straight rostral spines that arise close together, the spines longer than the prolongation beyond their base; on outer margin of prolongation near base with an elongate tubercle tipped with a brush of long yellow setæ. Gonapophysis, *g*, with mesal-apical lobe relatively short, the tip slightly pointed. Ædeagus, *a*, long and slender.

*Habitat*.—Sikkim.

Holotype, male, Lachung, altitude 8,610 feet, July 10, 1959 (*Schmid*). Allotopotype, female, pinned with type. Paratopotypes, males and females, on three pins, with the types.

*Limonia* (*Dicranomyia*) *parjanya* is most closely related to *L. (D.) dactylophora* Alexander, of Kashmir which differs in several structures of the male hypopygium, particularly the basistyle, ventral dististyle and ædeagus.

LIMONIA (DICRANOMYIA) PARVATI sp. nov.

Plate 4, figs. 29, 34.

Allied to *mesosternata*; general coloration brownish black, the præscutum and scutum polished; wings brownish yellow, conspicuously patterned with darker brown, Sc<sub>1</sub> ending opposite origin of Rs or shortly beyond; male hypopygium with rostral prolongation of the ventral dististyle narrow, with two widely separated spines.

*Male*.—Length, about 7.5 millimeters; wing, 8; antenna, about 1.5.

*Female*.—Length, about 8 millimeters; wing, 8.5.

Rostrum and palpi brownish black. Antennæ brownish black; flagellar segments oval, passing into long-oval, subequal to or exceeding their verticils; terminal segment longer than the penultimate, its apex narrowed. Head blackish gray; eyes large, the vertex narrow, subequal to the diameter of the scape.

Pronotal scutum brownish black, scutellum and pretergites pale. Mesonotal præscutum and scutum polished brownish black, paler laterally, scutal lobes yellowed behind; scutellum and postnotum more grayish black; vestiture of scutum and the præscutal interspaces erect and conspicuous, black. Pleura blackish gray, in cases the anepisternum more intensely blackened, pteropleurite paler. Halteres short, brownish black, base of stem obscure yellow. Legs with fore coxæ brownish black, midcoxæ light brown, posterior pair and all trochanters yellowed; femora light brown, more yellowed basally, darker outwardly; tibiæ and tarsi dark brown; claws with a single developed spine. Wings (Plate 4, fig. 29) brownish yellow, conspicuously patterned with darker brown, including the broad apex and a band crossing the wing at cord, with further major spots at origin of Rs and fork Sc, ends of both anal veins, an arcular darkening and a cloud at near midlength of vein Sc; veins brown, interspaces of veins of costal field more yellowed. Venation: Sc<sub>1</sub> ending about opposite (in holotype) or

shortly beyond origin of Rs, Sc<sub>2</sub> not apparent, evidently retracted to the darkened cloud on vein Sc; m-cu at or shortly before the fork of M.

Abdomen dark brown to brownish black, basal sternites paler. Ovipositor with cerci long and slender, nearly straight. Male hypopygium (Plate 4, fig. 34) with tergite, *t*, narrowly transverse, the posterior border shallowly emarginate, the lobes low and broad, with numerous long black setæ. Basistyle, *b*, with the ventromesal lobe large, with coarse setæ. Dorsal dististyle, *d*, a long slender sickle, tip truncate; ventral style slightly smaller than the total area of the basistyle; rostral prolongation narrow, with two widely separated spines. Gonapophyses, *g*, with mesal-apical lobe slender. Ædeagus, *a*, terminating in a narrow median lobe.

*Habitat*.—West Bengal, Sikkim.

Holotype, male, Labha, West Bengal, altitude 5,000 feet, September 11, 1959 (*Schmid*). Allotype, female, Singhik, Sikkim, altitude 3,700 feet, August 6, 1959 (*Schmid*). Paratopotype, male, with the holotype.

The most similar species are the Japanese *Limonia* (*Dicranomyia*) *mesosternata* (Alexander) and *L. (D.) mesosternatoides* (Alexander), which differ especially in hypopygial structure. All three species have the dorsal dististyle of the hypopygium a slender sickle with the apex truncate.

**LIMONIA (DICRANOMYIA) PISCATAQUIS** Alexander.

*Limonia (Dicranomyia) piscataquis* ALEXANDER, *Canad. Ent.* 73 (1941) 86–87. (Type—United States, Piscataquis County, Maine.)

*Limonia (Dicranomyia) vabei* NIELSEN, *Ent. Medd.* 26 (1951) 185–186, 2 figs. (Type—Greenland.)

*Limonia (Dicranomyia) kamtschatica* (Lackschewitz), as *Dicranomyia*, *Entomol. Obozrenie*, No. 3 43 (1964) 711–712, 4 figs. (Venation, ♂ hyp.); New synonymy. (Type—Kamchatka.)

**LIMONIA (DICRANOMYIA) YOGANIDRA** sp. nov.

Plate 4, figs. 30, 35.

Belongs to the *tristis* (*liberta*) group; general coloration gray, thorax patterned with brown; femora brown; wings long and narrow, pale yellow, veins pale; male hypopygium with posterior border of tergite convex; basistyle with ventromesal lobe terminating in a tuft of black setæ; rostral prolongation of ventral dististyle obtuse, the spines short.

*Male*.—Length, about 8 millimeters; wing, 8.3 to 8.5.

Rostrum and palpi black. Antennæ black throughout; flagellar segments oval. Head gray; anterior vertex narrow, about one-half the diameter of the scape.

Pronotal scutum brownish gray, scutellum yellowed. Mesonotum gray, the præscutum with darkened stripes, humeral region yellowed; posterior sclerites brownish gray, variegated with yellow on parascutella and at the postnotal sutures. Pleura light brown, gray pruinose, propleura darker. Halteres long, stem whitened, knob dark brown. Legs with coxæ and trochanters yellow, fore coxæ slightly darker; remainder of legs long and slender, femora brown, tibiæ paler brown, tarsi brown, the outer segments darker. Wings (Plate 4, fig. 30) relatively long and narrow, as illustrated; pale yellow, clearer yellow in the prearcular and costal regions, stigma not indicated; veins pale brown, more yellowed in the brightened fields. Venation:  $Sc_1$  ending opposite origin of  $Rs$ ,  $Sc_2$  shortly removed;  $Rs$  about one-half longer than basal section of  $R_{4+5}$ ;  $m-cu$  at fork of  $M$ , subequal to or longer than distal section of  $Cu_1$ .

Abdomen relatively long, dark brown, the large hypopygium orange. Male hypopygium (Plate 4, fig. 35) with the tergite,  $t$ , semicircular in outline, posterior border convex, cephalic margin nearly truncate; outer border heavily margined; setæ reduced, including a larger intermediate pair near posterior border. Basistyle,  $b$ , with a slender lobe at outer mesal end, tufted with long black setæ; ventromesal lobe about one-half the size of body of style, slightly widened outwardly, the apex with a concentration of black setæ. Dorsal dististyle,  $d$ , a long slender gently curved sickle, its tip acute; ventral style large, its area exceeding that of the basistyle; apex of rostral prolongation obtuse, the two spines short, placed close together. Gonapophyses,  $g$ , with mesal-apical lobe slender, its outer end shortly curved, tip acute. Ædeagus,  $a$ , with a single apical lobe, as in the group.

*Habitat*.—Assam.

Holotype, male, Hanggou, Manipur, altitude 3,300 feet, July 31, 1960 (*Schmid*.) Paratopotype, male, pinned with type.

The most similar regional species include *Limonia* (*Dicranomyia*) *sordida* (Brunetti) and *L. (D.) tyrranica* Alexander, both differing especially in the broader wings and in the structure of the male hypopygium.

Subgenus **NEALEXANDRIARIA** novum

Characters generally as in *Dicranomyia* Stephens, differing especially in the venation, where cell  $M_2$  is open by the atrophy of veins  $m$  and both sections of  $M_3$ , about as in *Alexandriaria* which differs in the hypopygial structure. Wings (Plate 4, fig. 31) with  $Sc$  generally short, longest in *injucunda* where it ends virtually opposite the origin of  $Rs$ , in others the distance between tip of  $Sc_1$  and origin of  $Rs$  exceeding twice the length of the latter;  $Rs$  shorter than basal section of  $R_{4+5}$ , in cases much shorter, in others, as *nigroephippiata* the two elements more nearly equal;  $Sc_2$  far from tip of  $Sc_1$ , the latter commonly two or more times as long as  $Rs$ ; cell  $M_2$  open as described, there being only two branches of  $M$ , the branches lying generally parallel to one another. In *brevissima*  $Rs$  is transverse, perpendicular to  $R$ , placed at proximal end of the stigma.

Male hypopygium much as in *Dicranomyia*; posterior border of tergite very shallowly emarginate (*tecta*) to very deeply notched (*argyrata*, *nathalinæ*). Rostral spines commonly two in number, as in *Dicranomyia*; in *tecta* with a single spine that apparently is formed by the fusion of two normal spines. In *Alexandriaria* the dorsal dististyle is a long curved sickle, the ventral style distinctive, with the body unusually small, its prolongation very reduced, with two setoid spines near its base and with two long fleshy lobes that together form a V-shaped structure.

Type of subgenus: *Limonia* (*Nealexandriaria*) *tecta* Alexander (Mindanao).

The various species included herewith had been referred to *Alexandriaria* Garrett but with considerable question because of marked differences in structure of the male hypopygium. Other species include *L. (N.) argyrata* (Alexander), of Formosa and Luzon; *L. (N.) atayal* Alexander, Formosa; *L. (N.) atromaculata* (Edwards), Samoa; *L. (N.) brevissima* (Alexander), Luzon; *L. (N.) carneotincta* (Alexander), Malaysia; *L. (N.) conveniens* (Walker), New Zealand; *L. (N.) diengana* Alexander, Java; *L. (N.) injucunda* sp.nov., Assam; *L. (N.) nathalinæ* Alexander, Mindanao; *L. (N.) nigroephippiata* Alexander, South India; *L. (N.) ochricapella* Alexander, Fiji; *L. (N.) prominens* (Brunetti), Goa, South India; *L. (N.) semirufa* (Edwards), New Hebrides; *L. (N.) simplissima* (Alexander), Java; *L. (N.) sollicita* Alexander, Luzon; *L. (N.) tenella* (de Meijere), Java; *L. (N.) unibrunnea* Alexander, South China,

Kwangtung. *L. (N.) cinereicapella* Alexander, of the Palau Islands, doubtfully belongs here, and may prove to be an aberrant member of *Idioglochina* Alexander.

The subgenus *Alexandriaria* was proposed by Garrett in 1922 (Proc. Ent. Soc. Washington 24:60) for three supposedly new forms that appear to represent a single species, the type being *Limonia (Alexandriaria) suffusca* (Garrett). These types were purchased by me from Garrett and are preserved in the Alexander Collection. Other species falling in this subgenus include the first described *L. (A.) whartoni* [Needham (1908)] and the nearly apterous *L. (A.) phalangioides* Alexander, 1943. All species presently known are Nearctic in distribution.

**LIMONIA (NEALEXANDRIARIA) INJUCUNDA** sp. nov.

Plate 4, fig. 31.

General coloration of mesonotum light brown, pleura yellowed; wings strongly infuscated, stigma only vaguely indicated, Sc long, Sc<sub>1</sub> ending just before origin of Rs, Sc<sub>2</sub> far retracted.

*Female*.—Length, about 4.3 millimeters; wing, 4.9

Rostrum brownish yellow; palpi pale brown, outer segments brownish black. Antennæ brownish black; proximal flagellar segments almost globular, about equal to their verticils, outer segments longer, the terminal one longest. Anterior vertex broad, light silvery, posterior vertex darker.

Pronotum light brown. Mesonotal præscutum almost uniformly light brown, the humeral and lateral portions a trifle more yellowed, posterior sclerites light brown; parascutella, pleurotergite and pleura more yellowed. Halteres short, stem yellowish brown, knob dark brown. Legs with coxæ and trochanters yellow; remainder of legs broken. Wings (Plate 4, fig. 31) strongly infuscated, the stigma only vaguely indicated; veins light brown, those in the prearcular field more brownish yellow. Macrotrichia on longitudinal veins beyond cord with the exception of Cu<sub>1</sub>, lacking on basal veins behind Sc. Venation: Sc unusually long, Sc<sub>1</sub> ending just before origin of Rs, Sc<sub>2</sub> far retracted, Sc<sub>1</sub> elongate, about one-third longer than Rs, the latter shorter than the basal section of R<sub>4+5</sub>; m-cu about one third longer than distal section of Cu<sub>1</sub>.

Abdominal tergites dark brown, sternites yellowed. Ovipositor with cerci virtually straight, very slender; hypovalvæ stout, obscure yellow, bases narrowly dark brown.

*Habitat*.—Assam.

Holotype, female, Marou, Manipur, altitude 4,000 feet, August 14, 1960 (*Schmid*).

*Limonia* (*Nealexandriaria*) *injucunda* is quite different from the other Indian members of the subgenus, especially in coloration and the unusually long Sc. In its venation it is most like the Formosan *L. (N.) atayal* Alexander, in the female sex differing in details of venation, especially the relative proportions of veins Sc<sub>1</sub>, Rs and the basal section of R<sub>4+5</sub>.

LIMONIA (SIVALIMNOBIA) UMA sp. nov.

Plate 4, figs. 32, 36.

Size large (wing of male 9 millimeters); mesonotum yellow, the præscutum with a broad polished black central stripe, mesal ends of scutal lobes similarly patterned, posterior sclerites of notum black; femora obscure yellow, tips narrowly brownish black; wings strongly tinged with brown, stigma oval, dark brown, Sc unusually long, Sc<sub>1</sub> ending opposite three-fifths Rs; abdomen conspicuously patterned with black and yellow, male hypopygium blackened.

*Male*.—Length, about 8.5 millimeters; wing, 9; antenna, about 2.

Rostrum polished black, palpi dull black. Antennæ with scape and pedicel brown, flagellum black; basal flagellar segments oval, the outer ones more elongate; verticils of outer segments very long, the longest about twice the segments. Head brownish black.

Pronotal scutum blackened, scutellum brownish yellow. Mesonotal præscutum brownish yellow on sides, medially with a broad polished black stripe; scutum brownish yellow, the mesal third of each lobe blackened, separated by a narrow obscure yellow central line; scutellum and mediotergite blackened; vestiture of mesonotum very sparse and reduced. Pleura and pleurotergite polished brownish yellow; a small darkened spot on anepisternum beneath the wing root. Halteres with stem yellowish brown, knob blackened. Legs with coxæ and trochanters yellow; femora obscure yellow, tips narrowly brownish black; tibiæ and tarsi light brown, outer tarsal segments dark brown. Wings (Plate 4, fig. 32) strongly tinged with brown, stigma oval, darker brown; paler central streaks in cells R to Cu, inclusive; veins dark brown. Venation: Sc unusually long, Sc<sub>1</sub> ending about opposite three-fifths Rs, Sc<sub>2</sub>



near it tip; cell 1st  $M_2$  about equal to distal section of  $M_{1+2}$ ; m-cu subequal to distal section of  $Cu_1$ , placed at fork of  $M$ .

Abdominal tergites black, with a conspicuous yellow spot on either side, the base and apex blackened; sternites yellow, the apices narrowly blackened, the bases less evidently so; seventh segment almost uniformly darkened, eighth mostly yellow, restrictedly infuscated on sides; hypopygium black. Male hypopygium (Plate 4, fig. 36) with the tergite, *t*, transverse but long, posterior border with a shallow V-shaped emargination, the thickened apices with numerous long black setæ. Basistyle, *b*, with ventromesal lobe simple, the long apical setæ yellowed. Dorsal dististyle, *d*, a nearly straight rod, its apex bent at an angle; ventral style smaller than the basistyle; rostral prolongation slender, the spine long, nearly two times the apex of the prolongation; basal spine long and slender, shorter than its base. Gonapophysis, *g*, with mesal-apical lobe long and narrow. Ædeagus terminating in two small oval lobes.

*Habitat*.—Assam.

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

The most similar regional species is the smaller *Limonia* (*Sivalimnobia*) *kali* Alexander which is distinguished by the almost polished uniformly black thorax, different abdominal pattern, and the shorter vein Sc. The various species of the subgenus have the male hypopygium unusually uniform in structure despite very distinct body and wing coloration. One of the most isolated of all known crane flies as regards wing pattern is *L. (S.) pleiades* Alexander, of Mindanao, and this has the male hypopygium much as in other members of the subgenus.

LIMONIA (MELANOLIMONIA) RHADINOSTYLA sp. nov.

Plate 5, figs. 37, 42.

General coloration of thorax polished brownish black; wings narrow, strongly blackened; male hypopygium with tergal lobes low; basistyle with ventromesal lobe small, with long setæ; dorsal dististyle a strongly curved rod, the long tip acute, ventral style unusually slender, without a rostral spine; gonapophysis with mesal-apical lobe slender, blackened; ædeagus setiferous, before apex on either side with a small projection.

*Male*.—Length, about 4.5 millimeters; wing, 4.8; antenna, about 1.1.

Rostrum dark brown; palpi black. Antennæ black; proximal flagellar segments subglobular, the outer ones more oval, terminal segment about one-half longer than the penultimate, its outer third strongly narrowed. Head with anterior vertex darkened, apparently not silvery as in related species, posterior part of head black.

Thorax polished brownish black, parascutella and posterior sclerites of pleura yellowed. Halteres black, base of stem extensively yellowed. Legs with fore coxæ brownish yellow, remaining coxæ and all trochanters yellow; remainder of legs broken. Wings (Plate 5, fig. 37) narrow, strongly blackened, stigma concolorous; veins brown. Longitudinal veins beyond cord with macrotrichia, lacking on Cu. Venation:  $Sc_1$  ending opposite origin of Rs,  $Sc_2$  far retracted,  $Sc_1$  alone only a little shorter than Rs; m-cu close to fork of M.

Abdominal tergites brownish black, sternites brownish yellow, eighth segment yellowed, hypopygium brownish black. Male hypopygium (Plate 5, fig. 42) with the tergite, *t*, transverse, slightly narrowed outwardly, posterior border very shallowly emarginate; lateral lobes low with long conspicuous setæ. Basistyle, *b*, with ventromesal lobe small, basal in position, setæ long and conspicuous. Dorsal dististyle, *d*, a strongly curved rod, narrowed at midlength, thence slightly more dilated, narrowed gradually to a long acute spine; ventral style small, unusually slender, the length exceeding two times the greatest width, narrowed gradually to the oval apex; no rostral spine. Gonapophysis, *g*, with mesal-apical lobe slender, blackened. Ædeagus, *a*, setiferous, apex simple, on either side before tip with a small projection.

*Habitat*.—Assam.

Holotype, male, Serrarim, Khasi-Jaintia, altitude 5,800 feet, October 3, 1960 (*Schmid*).

*Limonia (Melanolimonia) rhadinostyla* is quite distinct from all other regional members of the subgenus, especially in the hypopygial structure, as the unusually slender and simple ventral dististyle that lacks the usual rostral spine. Only a few species of *Melanolimonia* lack this spine, as was discussed in an earlier paper in this series [*Philip. Jour. Sci.* **93** (1964) 468–469].

LIMONIA (GERANOMYIA) ABLUSA sp. nov.

Plate 5, figs. 38, 43.

Mesonotal præscutum brownish yellow, the disk with three narrow dark brown stripes; dorsal half of thoracic pleura dark brown, the ventral part light yellow; legs yellow, femur with a very vague pale brown subterminal ring; wings weakly darkened, with a very heavy brown pattern that is chiefly costal in distribution, with no darkened dots in the cells; Sc long, m-cu before fork of M; male hypopygium with the two rostral spines very unequal, the outer one stouter, arising from a large basal tubercle.

*Male*.—Length, excluding rostrum, about 4 to 4.5 millimeters; wing, 4.7 to 5; rostrum, about 1.7 to 1.8.

Rostrum black, nearly one-third as long as the wing. Antennæ black. Head blackened, with a continuous capillary gray central line, narrower on the anterior vertex.

Pronotum light brown, darker laterally, more yellowed behind. Mesonotal præscutum brownish yellow, the disk with three narrow dark brown stripes, the central vitta narrowed behind, becoming obsolete before the suture, the stripes narrower than the interspaces; scutal lobes brown, more intense along the mesal edge, this being a posterior extension of the lateral præscutal darkening, the central area yellowed; median region of scutum and a dash on scutellum brownish black; posterior sclerites of notum brown. Pleura with a broad dark brown dorsal stripe, the ventral pleurites light yellow. Halteres dark brown. Legs with all coxæ and trochanters light yellow, with vague greenish reflections; remainder of legs brownish yellow, the femur with a very vague pale brown subterminal darkening. Wings (Plate 5, fig. 38) with the ground weakly darkened, clearer on anterior half; a heavy brown pattern appearing chiefly as six to seven costal darkenings, the most basal in cell R at arculus, not including cell C; other areas at near one-third the length of cell R, origin of Rs and tip of Sc, the latter two in cases interconnected; stigmal area and tips of outer radial veins, these more or less confluent; smaller interrupted darkened seams over cord and outer end of cell 1st M<sub>2</sub>; a small darkening at end of vein 2nd A; veins light brown. Venation: Sc long, Sc<sub>1</sub> ending about opposite three-fourths Rs, Sc<sub>2</sub> near its tip; m-cu about two-fifths to one-half its length before fork of M.

Abdominal tergites dark brown, sternites more yellowed, vaguely darkened at the incisures. Male hypopygium (Plate

5, fig. 43) with the tergite, *t*, transverse, posterior border with a broad U-shaped emargination, the lobes slightly broader, obtuse. Basistyle, *b*, small, its area about two-fifths that of the ventral dististyle; ventromesal lobe oval. Dorsal dististyle, *d*, a powerful curved rod, beyond midlength bent at a right angle, thence narrowed to an acute point; ventral style large, the setæ relatively small and sparse; rostral prolongation short, tip obtuse; outer spine stout, on a conspicuous basal tubercle, second spine only about two-thirds as long and very slender, basal tubercle lacking, placed on face of prolongation at near midlength. Gonapophysis, *g*, with mesal-apical lobe long and slender, gently curved to the acute tip. Ædeagus bilobed at apex; genital openings subterminal, lateral in position, at base of apical lobes.

*Habitat*.—Assam.

Holotype, male, Waiten, Lushai Hills, Mizo District, altitude 2,500 feet, September 8, 1960 (*Schmid*). Paratypes, 2 males on 1 pin, Thingsat, Lushai Hills, altitude 3,500 feet, September 10, 1960 (*Schmid*).

*Limonia* (*Geranomyia*) *ablusa* is most similar to species such as *L. (G.) cernua* Alexander, *L. (G.) fortibasis* Alexander, *L. (G.) poliophara* (Alexander), *L. (G.) semifaciata* (Brunetti), and *L. (G.) semistriata* (Brunetti), differing evidently in the wing pattern and in the structure of the hypopygium, particularly the ventral dististyle.

LIMONIA (RHIPIDIA) PERATRIPES sp. nov.

Plate 5, figs. 39, 44.

Belongs to the *pulchra* group; legs with femora light yellow, the tips broadly black, tibiæ and tarsi uniformly black; wings yellow with abundant brown dots in the cells; male hypopygium with rostral spines very long, subequal to or longer than the prolongation; apex of mesal-apical lobe of gonapophysis subacute, blackened.

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

*Female*.—Length, about 7 millimeters; wing, 7.2.

Rostrum and palpi black. Antennæ with scape and pedicel black; in male, flagellar segments alternating yellow and brownish black, the odd segments one through eleven, and also twelve darkened, the even numbered segments pale, all segments simple, terminal segment about two-thirds longer than the penultimate; in the female, all flagellar segments infuscated except the sixth, the darkening more pronounced on the pro-

duced face. Head brownish black; anterior vertex reduced to a capillary strip.

Pronotum yellow above, the sides blackened. Mesonotal præscutum and scutum cinnamon brown above, the anterior and lateral borders broadly light yellow, including also the dorsopleural region; scutellum and mediotergite more blackened, parascutella and pleurotergite yellow. Pleura yellow with two longitudinal brownish black stripes, the dorsal one longer and broader, beginning on the cervical region, ending at the abdomen, narrowed behind, lower stripe very narrow, including the coxæ and lower sternopleurite. Halteres yellow, knob greenish brown. Legs with coxæ lined with brown, as described; trochanters yellow; femora light yellow, tips broadly black, including about the outer fourth on fore and middle femora, the outer fifth or sixth on posterior legs; tibiæ and tarsi uniformly black. Wings (Plate 5, fig. 39) yellow, with a sparse darker brown spotted pattern and abundant pale brown dots in all cells; the larger dark areas are at fork of Rs and near outer end of vein 2nd A; smaller spots at origin of Rs, fork of Sc, R<sub>2</sub> and free tip of Sc<sub>2</sub>, tip of vein R<sub>3</sub> and restrictedly on m and m-cu; veins yellow, basal section of Cu<sub>1</sub> with alternating brown and yellow areas. Venation: Sc long, Sc<sub>1</sub> ending opposite midlength of Rs; m-cu shortly before fork of M.

Abdominal tergites light brown, posterior borders narrowly darker; sternites more yellowed; pleural membrane blackened. Male hypopygium (Plate 5, fig. 44) with the tergite, *t*, broadly transverse, posterior border convex, cephalic margin more nearly truncate, the margin of posterior border thicker. Basis-tyle, *b*, smaller than the ventral dististyle; ventromesal lobe relatively small, with very long setæ. Dorsal dististyle, *d*, gently curved, thickened beyond two-thirds the length, thence narrowed into a long acute spine; ventral spine with rostral prolongation long, its apex pointed; five very long gently curved spines that are subequal to the prolongation. Gonapophysis, *g*, with mesal-apical lobe long, the subacute apex blackened.

*Habitat*.—Assam.

Holotype, male, Waiten, Lushai Hills, Mizo District, altitude 2,500 feet, September 8, 1960 (*Schmid*). Allotype, female, Yongphu, Manipur, altitude 4,500 feet, August 12, 1960 (*Schmid*).

*Limonia* (*Rhipidia*) *peratripes* is readily distinguished from *L. (R.) marmoripennis* (Brunetti) by the uniformly blackened tibiæ and tarsi of all legs. Edwards (1924) considered *marmoripennis* to be a synonym of *L. (R.) pulchra* (de Meijere) but I believe the two to be distinct.

LIMONIA (EURHIPIDIA) ARGEMA sp. nov.

Plate 5, fig. 40.

General coloration of thoracic dorsum dull brownish black; fore femora obscure yellow, tip narrowly black, remaining femora black, the bases yellowed; more than outer half of basitarsi and the remaining tarsal segments snowy white; wings dirty white, clearer white before and beyond the oval dark brown stigma; wing tip and cord darkened, no markings at origin of Rs or in the basal cells; Rs short, strongly arcuated at origin, distal section of vein  $M_3$  lying free in the membrane; abdomen dark brown, posterior borders of sternites three to six broadly yellowish silvery.

*Female*.—Length, about 5 millimeters; wing, 5.

Rostrum black, a little shorter than remainder of head; palpi black. Antennæ black, flagellar segments of female suboval, with conspicuous apical pedicels; terminal segment stout, about one-half longer than the penultimate. Head brown.

Pronotum gray. Mesonotum dull brownish black, including the disk of præscutum, humeral region and narrow lateral borders yellowed, sparsely pruinose. Pleura brownish black, the dorsal sternopleurite appearing brownish gray in an oblique light; meron and adjoining pleurites restrictedly yellowed; dorsopleural membrane light brown. Halteres with stem yellow, knob dark brown. Legs with fore coxæ and trochanters black, the remaining ones yellow; fore femora obscure yellow with about the apical tenth black, tibiæ brownish yellow, tarsi snowy white with about the proximal two-fifths of basitarsi brownish black; middle and hind femora black, the basal sixth or seventh more yellowed tibiæ and proximal two-fifths of basitarsi black, remainder snowy white. Wings (Plate 5, fig. 40) dirty white, clearer white before and beyond the conspicuous oval dark brown stigma and in cells C and Sc; wing tip broadly infuscated, more intensely so in outer ends of radial cells, region of cord more narrowly and less evidently darkened, no darkening at origin of Rs; veins brown, slightly darker in the patterned areas. Venation: Sc short,  $Sc_1$  ending just beyond origin of Rs,  $Sc_2$  far removed, as in the subgenus; Rs short, strongly arcuated at origin; distal section of vein  $M_3$

lying free in the membrane, the basal connection atrophied; m-cu at fork of M. The basal fourth of wing of type is damaged and the venation here as shown may be slightly inaccurate.

Abdominal tergites dark brown, sternites similar, the posterior borders of segments three to six broadly yellowish silvery. Ovipositor with valves yellowed, specially the slender cerci.

*Habitat*.—Assam.

Holotype, female, Huiahu, Manipur, altitude 3,800 feet, July 2, 1960 (*Schmid*).

*Limonia (Eurhipidia) argema* is entirely distinct from other regional members of the subgenus. Of these *L. (E.) coheriana* Alexander and *L. (E.) simplicis* Alexander have unpatterned wings, *L. (E.) hariola* Alexander and *L. (E.) perscitula* Alexander have the wings conspicuously patterned with brown but the markings arranged quite differently from the present fly, including a major area at origin of the longer Rs. The free outer section of vein  $M_3$  in the membrane likewise is found in the otherwise quite distinct *L. (E.) aoneura* Alexander of La Réunion and Mauritius.

LIMONIA (THRYPTICOMYIA) ACLISTIA sp. nov.

Plate 5, figs. 41, 45.

General coloration of thorax pale brown, pleura yellowed; tarsi snowy white, the proximal ends of the basitarsi black, least extensive on hind legs; wings uniformly pale brown with only the prearcular field more whitened, stigma scarcely evident; cell  $M_2$  open by atrophy of basal section of vein  $M_3$ ; tergal lobes of male hypopygium with numerous long setæ; ventromesal lobe of basistyle moderately large, without a modified apical seta.

*Male*.—Length, about 5 millimeters; wing, 5.8; antenna, about 0.8.

Rostrum yellowed, palpi light brown. Antennæ black; each segment of flagellum with an apical pedicel and a single long dorsal verticil; terminal segment longest, the outer half narrowed. Head brownish gray.

Pronotum yellowed. Mesonotal præscutum pale brown with scarcely differentiated darker stripes; posterior sclerites light brown, scutal lobes slightly darker. Pleura and pleurotergite light yellow. Halteres brown, extreme base of stem yellowed, knob black. Legs with coxæ and trochanters light yellow; femora brown, base narrowly yellowed; tibiæ dark brown; tarsi snowy white, the proximal end of basitarsus dark brown,

including about one-half of fore leg, two-fifths of mid-leg and approximately one-sixth of hind leg. Wings (Plate 5, fig. 41) long-petiolate, pale brown, the long prearcular field whitened; stigma oval, only slightly darker than the ground; veins brown. Rs and veins beyond cord with conspicuous trichia, lacking on basal veins behind R except at outer end of basal section of  $Cu_1$ . Venation: Sc variable on the two wings of type, on one  $Sc_1$  ending shortly before origin of Rs,  $Sc_2$  retracted, on the other at extreme tip of  $Sc_1$  opposite origin of Rs, the latter nearly as long as its anterior branch; cell  $M_2$  open by atrophy of basal section of  $M_3$ , cell 2nd  $M_2$  subequal to its petiole; m-cu about three-fourths its length beyond fork of M, one-third to one-half longer than distal section of  $Cu_1$ ; cell 2nd A narrow.

Abdomen, including hypopygium, dark brown. Male hypopygium (Plate 5, fig. 45) with the tergite, *t*, transverse, the posterior border shallowly emarginate, the lobes low, obtuse, each with about ten long setæ; tergite narrowly margined, the central bar stouter. What appears to represent the proctiger appears as a large semioval plate over the ædeagus, with very tiny setulæ to appear virtually glabrous. Basistyle, *b*, in area slightly larger than the ventral dististyle; ventromesal lobe large but not lengthened as in *unisetosa*, the setæ long but unmodified. Dorsal dististyle, *d*, a compressed yellow blade, narrowed to a long acute point; ventral style with rostral prolongation unusually stout, the spines placed near base. Apex of ædeagus of the unique type distorted.

*Habitat*.—Assam.

Holotype, male, Sihai Khulen, Manipur, altitude 4,700 feet, June 25, 1960 (*Schmid*).

Other regional members of the subgenus *Thrypticomyia* Skuse include *Limonia* (*Thrypticomyia*) *apicalis* (Wiedemann) and *L. (T.) unisetosa nigribasis* Alexander, differing evidently in the coloration and venation of the wings, including the closed cell 1st  $M_2$  in these species.



# ILLUSTRATIONS

[Legend: *a*, aedeagus; *b*, basistyle; *c*, cercus; *d*, dististyle; *g*, gonapophysis; *h*, hypovalvæ; *t*, tergite; *vd*, ventral dististyle.]

## PLATE 1

- FIG. 1. *Limonia (Limonia) perproducta* sp.nov.; venation.  
2. *Limonia (Limonia) ectopa* sp.nov.; venation.  
3. *Limonia (Limonia) hians* sp.nov.; venation.  
4. *Limonia (Limonia) peramabilis* sp.nov.; venation.  
5. *Limonia (Limonia) lyssa* sp.nov.; venation.  
6. *Limonia (Limonia) serpula* sp.nov.; venation.  
7. *Limonia (Limonia) ectopa* sp.nov.; male hypopygium.  
8. *Limonia (Limonia) hians* sp.nov.; male hypopygium.  
9. *Limonia (Limonia) lyssa* sp.nov.; male hypopygium.  
10. *Limonia (Limonia) perproducta* sp.nov.; male hypopygium.  
11. *Limonia (Limonia) serpula* sp.nov.; male hypopygium.

## PLATE 2

- FIG. 12. *Limonia (Libnotes) inattenta* sp.nov.; venation.  
13. *Limonia (Libnotes) simplicicercus* sp.nov.; venation.  
14. *Limonia (Libnotes) univibrissa* sp.nov.; venation.  
15. *Limonia (? Libnotes) ishana* sp.nov.; venation.  
16. *Limonia (Laosa) impensa* sp.nov. venation.  
17. *Limonia (Laosa) noctipes* sp.nov.; venation.  
18. *Limonia (Libnotes) simplicicercus* sp.nov.;  
18b. *Limonia (Libnotes) longinervis* (Brunetti); ovipositor.  
19. *Limonia (Libnotes) univibrissa* sp.nov.; male hypopygium.  
20. *Limonia (Laosa) impensa* sp.nov.; male hypopygium.

## PLATE 3

- FIG. 21. *Limonia (Dicranomyia) abigor* sp.nov.; venation.  
22. *Limonia (Dicranomyia) clarissima* sp.nov.; venation.  
23. *Limonia (Dicranomyia) euryrhyncha* sp.nov.; venation.  
24. *Limonia (Dicranomyia) parjanya* sp.nov.; venation.  
25. *Limonia (Dicranomyia) abigor* sp.nov.; male hypopygium.  
26. *Limonia (Dicranomyia) clarissima* sp.nov.; male hypopygium.  
27. *Limonia (Dicranomyia) euryrhyncha* sp.nov.; male hypopygium.  
28. *Limonia (Dicranomyia) flavocincta* (Brunetti); male hypopygium.

## PLATE 4

- FIG. 29. *Limonia (Dicranomyia) parvati* sp.nov.; venation.  
30. *Limonia (Dicranomyia) yoganidra* sp.nov.; venation.  
31. *Limonia (Nealexandriaria) injucunda* sp.nov.; venation.  
32. *Limonia (Sivalimnobia) uma* sp.nov.; venation.  
33. *Limonia (Dicranomyia) parjanya* sp.nov.; male hypopygium.  
34. *Limonia (Dicranomyia) parvati* sp.nov.; male hypopygium.  
35. *Limonia (Dicranomyia) yoganidra* sp.nov.; male hypopygium.  
36. *Limonia (Sivalimnobia) uma* sp.nov.; male hypopygium.

## PLATE 5

- FIG. 37. *Limonia* (*Melanolimonia*) *rhadinostyla* sp.nov.; venation.  
38. *Limonia* (*Geranomyia*) *ablusa* sp.nov.; venation.  
39. *Limonia* (*Rhipidia*) *peratripes* sp.nov.; venation.  
40. *Limonia* (*Eurhipidia*) *argema* sp.nov.; venation.  
41. *Limonia* (*Thrypticomyia*) *aclistia* sp.nov.; venation.  
42. *Limonia* (*Melanolimonia*) *rhadinostyla* sp.nov.; male hypopygium  
43. *Limonia* (*Geranomyia*) *ablusa* sp.nov.; male hypopygium.  
44. *Limonia* (*Rhipidia*) *peratripes* sp.nov.; male hypopygium.  
45. *Limonia* (*Thrypticomyia*) *aclistia* sp.nov.; male hypopygium.

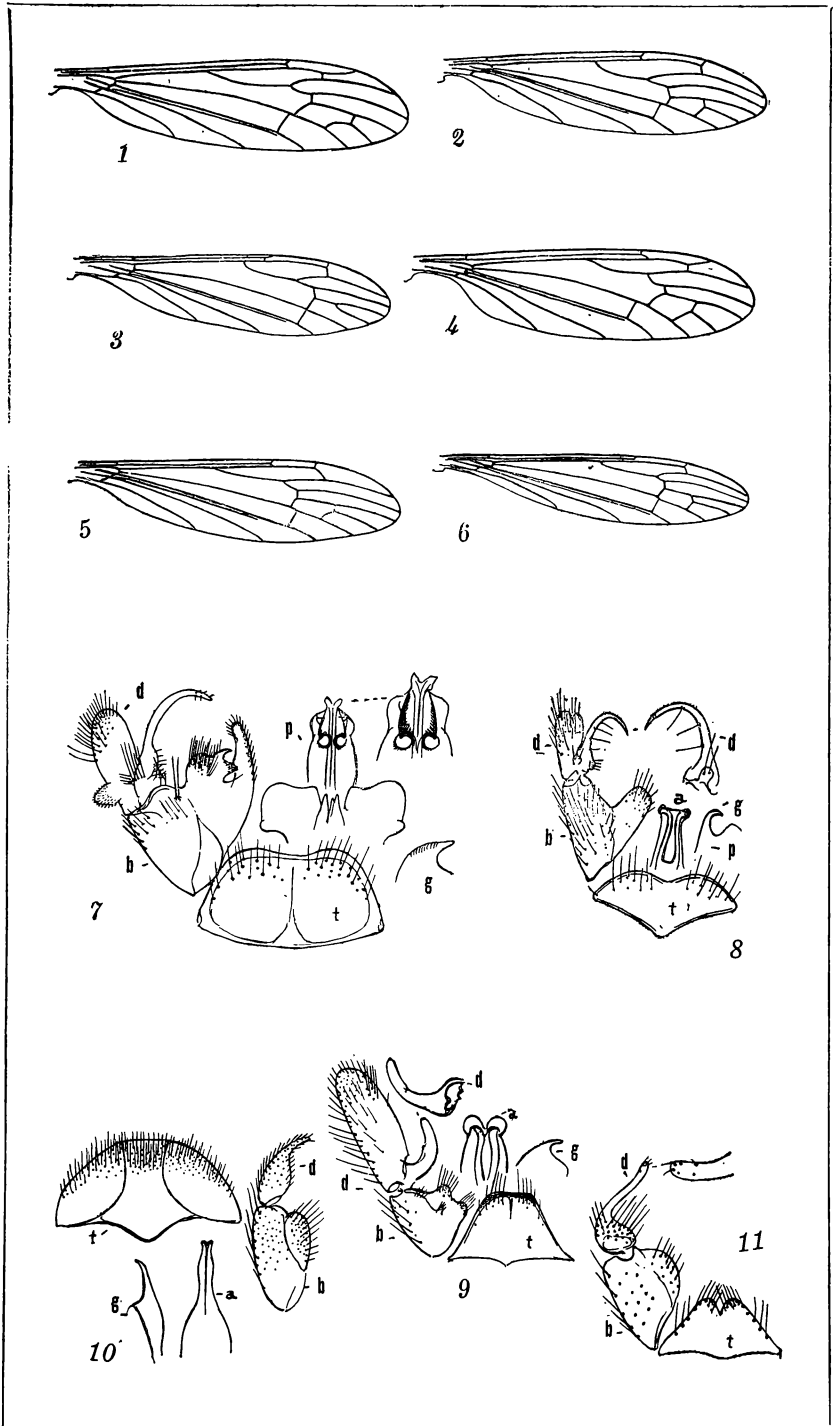


PLATE 1.

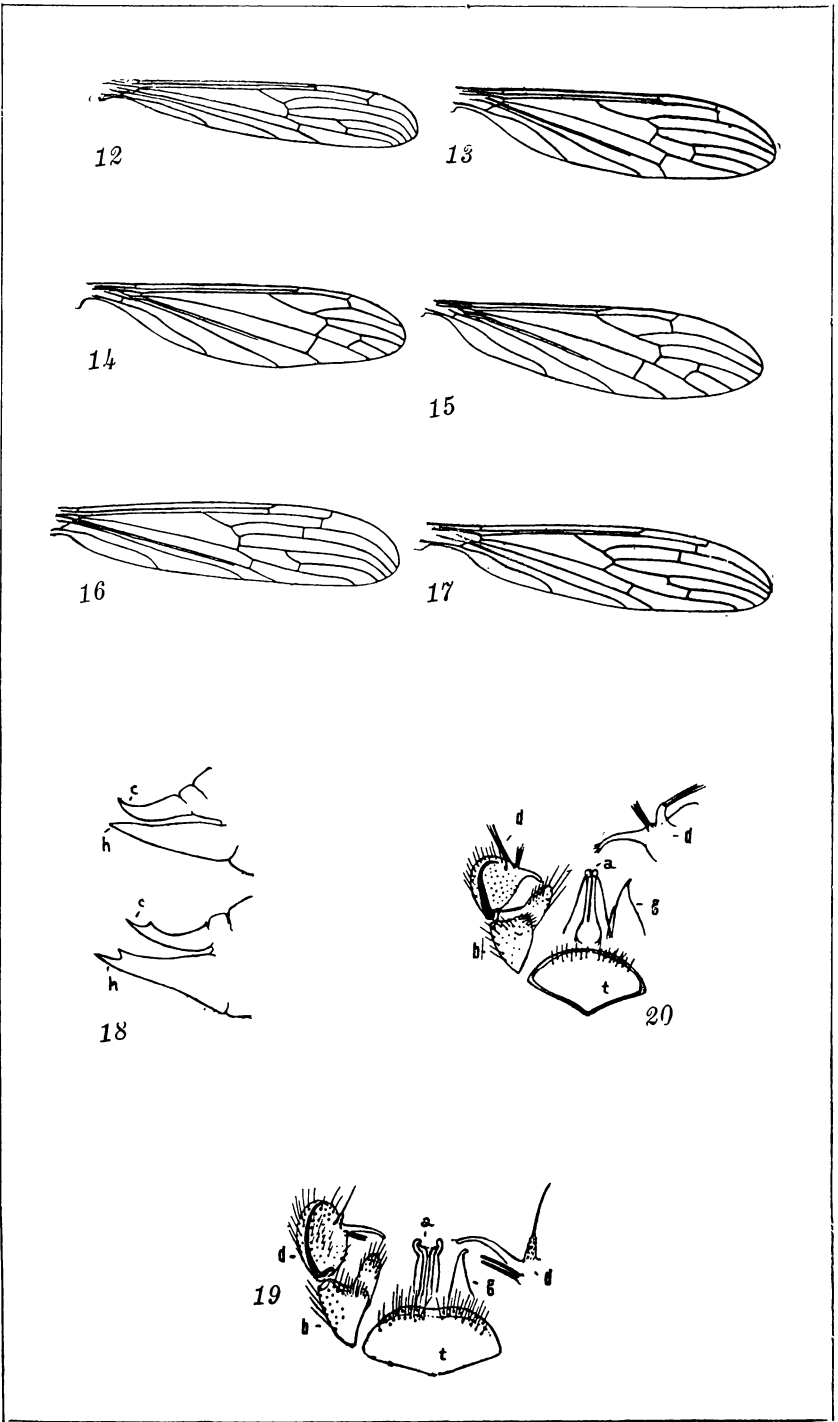


PLATE 2.

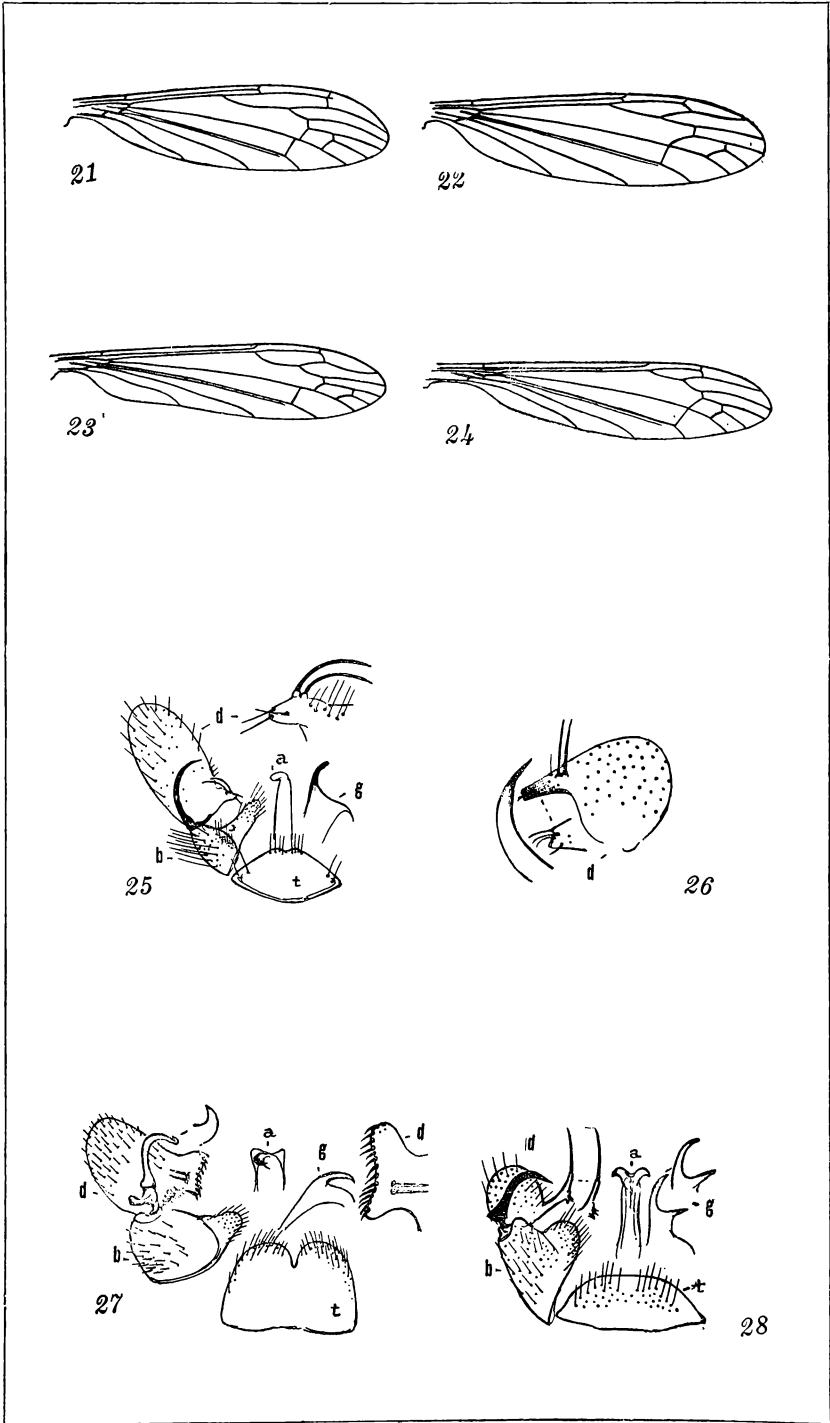


PLATE 3.

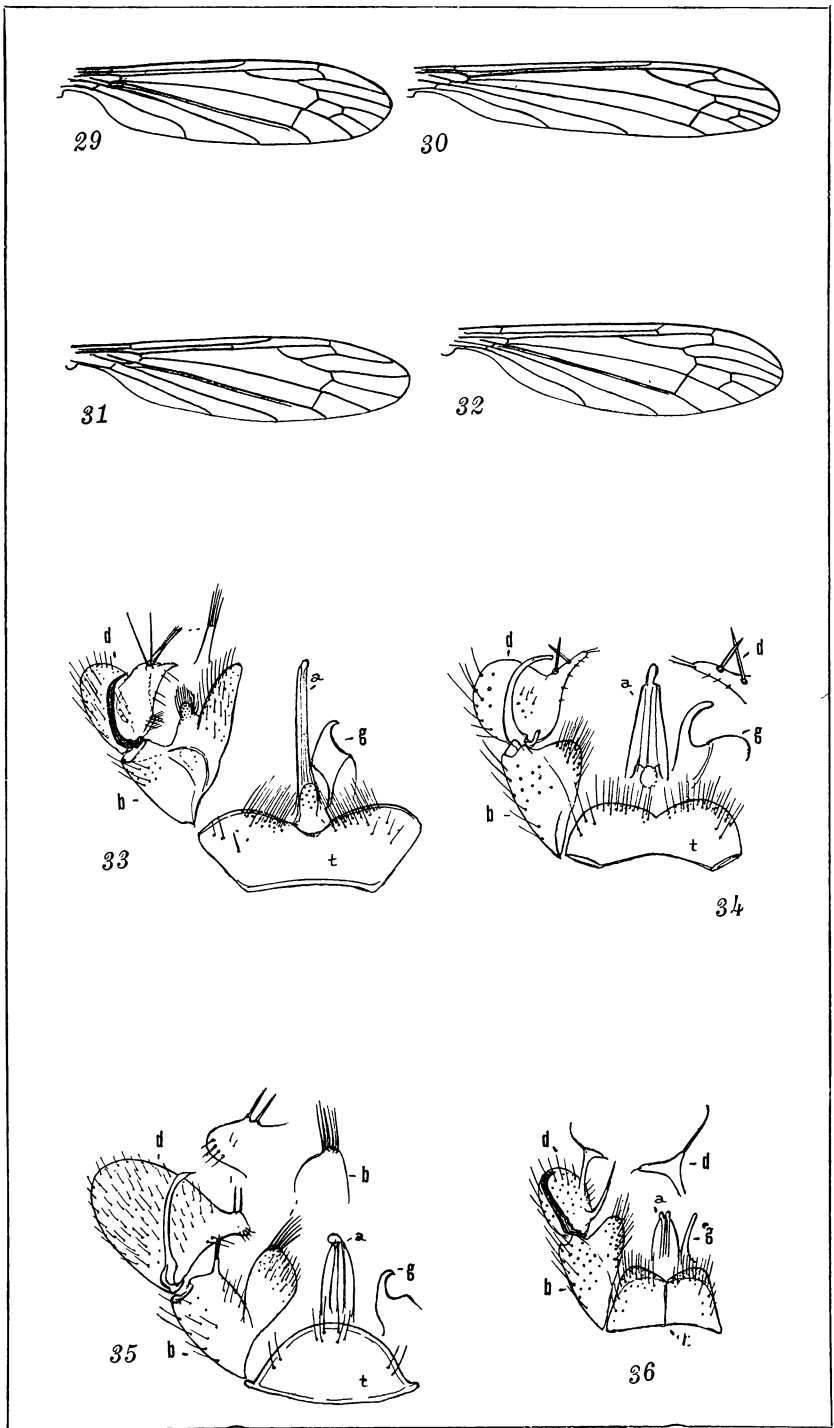


PLATE 4.

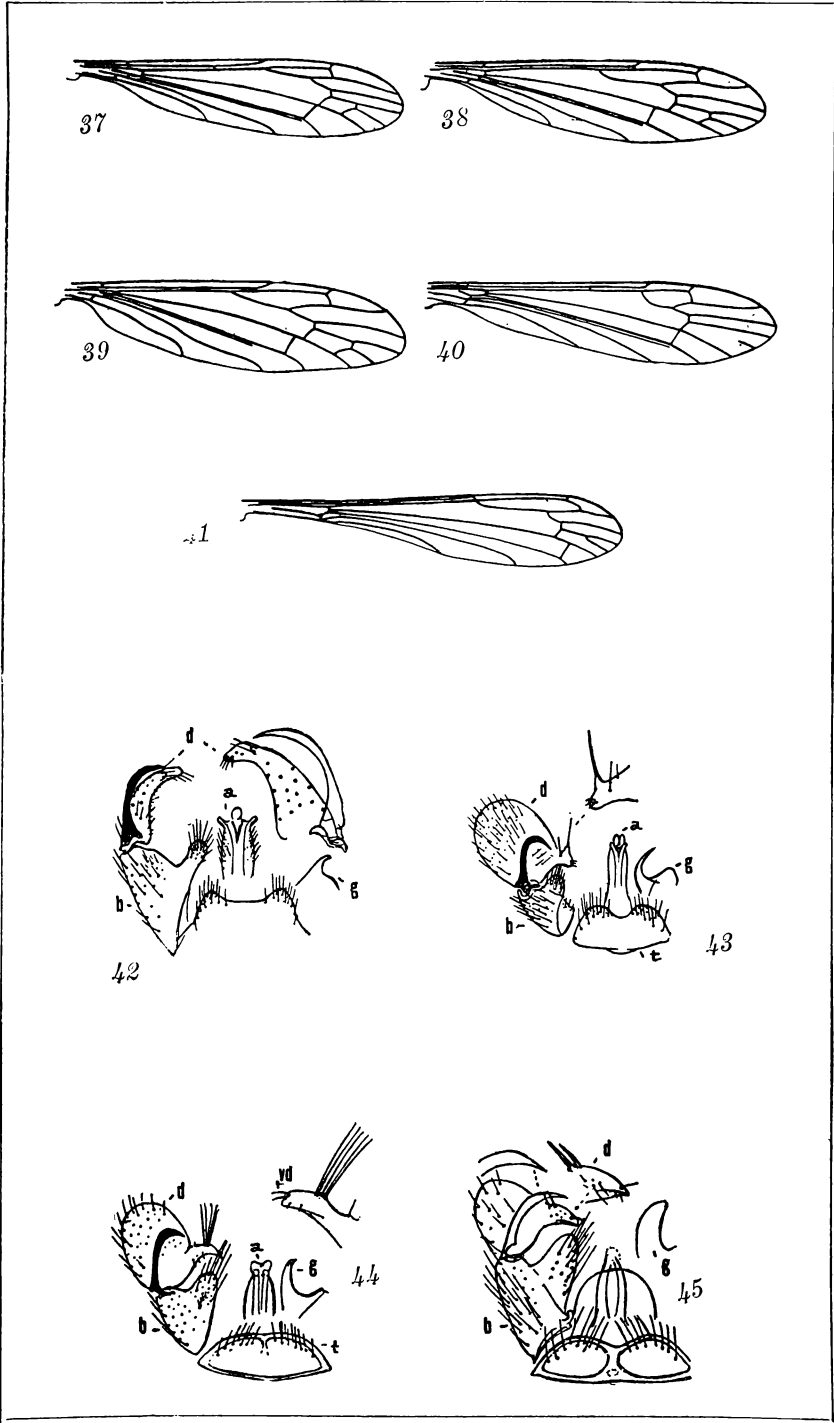


PLATE 5.