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**New or insufficiently known Australasian  
crane flies (Dipt. Tipulidae)**

Charles P. Alexander

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**New or insufficiently known Australasian crane flies. I  
(Tipulidae, Diptera)**

Charles P. Alexander  
Emeritus, University of Massachusetts, Department of Entomology,  
Amherst, Massachusetts

(With 50 figures)

The species of Tipulidae discussed at this time are from various localities in the Australasian region. The majority are from New Guinea where they were collected by Dr. Lambertus Johannes Toxopeus, chiefly in the Snow Mountains (Sneeuw Gebergte) of the former Netherlands New Guinea, now West Irian in the Republik Indonesia. Toxopeus was a member of the Third Archbold Expedition to New Guinea in 1938-1939 and made entomological collections of paramount importance. The short account of his life and work here provided is adapted from the obituary notice by Diakonoff, 1951, cited in the list of Selected References later in the present paper.

Toxopeus was born September 8, 1894, in Toeban, Java. He studied and taught natural history in Holland and later in various schools in Java. In 1938 he was appointed by the Government of the Dutch East Indies to be the leader of the Dutch group of the Third Archbold Expedition to New Guinea (designated as the joint Netherlands Indian-American Expedition). The principal collecting areas were in the high Snow Mountain region, with further numbered stations extending from Hollandia, on Humboldt Bay, in June 1938, to Lake Habbema, near Mount Wilhelmina in the Snow Mountains (Stations 4 to 7, June-July, August to November 1938), returning to Hollandia by mid-April 1939 and during this period establishing ten further camps between November 1938 and July 1939. Details concerning the 17 collecting sites have been given in other papers cited hereinafter.



(Alexander, 1958; Brass, 1941, 1942; Toxopeus, 1940). The extraordinary diversity and richness of these collections has been emphasized by Diakonoff whose paper provides further information concerning this outstanding student and entomological collector. Most tragically, Toxopeus was killed when he was run down in a motor car accident in Mandung, Java, March 21, 1951, at the age of 56.

Types and other materials resulting from these collections are preserved chiefly in the Leiden Museum, with further parts being assigned to the American Museum of Natural History, New York. I am most grateful to Dr. Maurits Anne Lieftinck for the privilege of retaining the types of the unique specimens included in the Toxopeus collections, as had been indicated in several earlier reports. Dr. Lieftinck formerly was Director of the Zoological Museum and Laboratory at Bogor (Buitenzorg), Java, and later was with the Government Museum of Natural History, Leiden. In subsequent papers I hope to complete the study of the still unworked materials in this collection.

In the present account further Australasian species are included being based on collections made by Dr. Jean L. Laffoon in northern New Guinea and Bougainville, by Noel L. H. Krauss in New Hebrides, by Edwin H. Bryan, Jr., Otto H. Swezey and Elwood C. Zimmerman in Fiji, and by Swezey and Louis R. Garrigou in New Caledonia. I express my deepest thanks to all of these friends and co-workers for their generosity in providing me with many new and rare species of crane flies.

#### Selected list of references

In the accompanying list of papers that stress the Archbold III New Guinea Expedition I have included supplementary references to the five further Archbold Expeditions to New Guinea and adjacent regions. These detailed accounts and descriptions of the six expeditions by Archbold, Brass and Rand are of great interest and value to all students of the incredibly rich fauna and flora of New Guinea and its adjoining islands. The *Bibliography of New Guinea Entomology* by Gressitt and Szent-Ivany cites 6140 references to the insects of New Guinea and adjacent areas through 1967 and is of primary importance to all workers.

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## Tipulinae

1. *Nephrotoma (Scamboneura) curtistyla* sp. n.

General coloration of thorax yellow, patterned with brown, including three separate praescutal stripes, pleura and pleurotergite yellowed; antennae of male with flagellum uniformly brownish black; wings whitened, stigma small, brown; intermedial abdominal tergites with pale basal rings, posterior borders blue or plumbeous bordered by velvet black, lateral tergal borders and sternites yellowed; male hypopygium with outer dististyle short, the length less than three times the greatest breadth.

Male. — Length, about 13 mm.; wing, 11.5 mm.; antenna, about 4 mm.

Female. — Length, about 15-16 mm.; wing, 12 mm.

Frontal prolongation of head yellow, nasus long; palpi yellow, terminal segment very long. Antennae 12-segmented; scape and pedicel yellow, in male flagellum brownish black, the segments with very small basal enlargements, verticils small, terminal segment slightly longer than the penultimate; in female proximal three flagellar segments bicolored, brownish black, apices conspicuously yellowed. Head orange yellow, clearest on the entire vertical tubercle; vertex with a narrow brown median vitta; occipital band paler brown, the margins vaguely indicated.

Pronotum yellow, sides of scutum weakly darkened. Mesonotal praescutum with three polished brown stripes, intermediate areas obscure yellow to brownish yellow, humeral region and lateral border clearer yellow; scutal lobes yellowed, centers extensively brownish black, median region more yellowed; scutellum light brown, parascutella more yellowed; mediotergite light yellow, posterior third brown. Pleura and pleurotergite yellowed. In female there are slight differences in coloration but a single species seems to be indicated. Halteres with stem yellow, knob dark brown. Legs with coxae and trochanters yellow, fore coxae weakly more darkened, especially in the allotype; femora brownish yellow, tibiae and tarsi darker brown; claws small, simple. Wings (Fig. 1) whitened, the small stigma brown; veins darker brown, trichia beyond cord black, conspicuous. Venation as shown; medial forks deep, second and third sections of veins  $M_{1-2}$  subequal; *m-cu* about one-half its length beyond the fork of *m*.

Abdomen with basal tergite chiefly yellow, restrictedly patterned with brown, succeeding tergites with basal rings pale, in cases clear light yellow, the broad posterior band blue-gray plumbeous medially, proximal and apical borders more velvety



brownish black, lateral tergal borders broadly yellow in male, narrowly blackened in females; outer tergites and sternites more yellowed, genital segments chiefly yellow in both sexes. Male hypopygium (Fig. 6) with ninth tergite, *t*, transverse, posterior border with two lobes and a small median lobule; ventral surface with a sclerotized light brown plate, tergite above with sparse small blackened spinoid setae arranged in two slightly separated groups. Median lobe of ninth sternite, *s*, suboval in outline, distal end broader, surface with abundant microscopic setulae. Outer dististyle, *d*, unusually short, extending only slightly beyond apex of the inner style, the length less than three times the greatest breadth; inner style with outer third blackened, extended into an upper lobe, apex truncate, lower beak very small; dorsal crest low, yellow, with long yellow setae. Eighth sternite with posterior border nearly truncate, surface with relatively sparse scattered black setae. What are interpreted as being gonapophyses appear as flattened blades, expanded outwardly, apices truncated.

Habitat: Northern New Guinea (West Irian).

Holotype, ♂, Hollandia, altitude 1.000 feet, March 1945 (Jean Laffoon). Allotype, ♀, pinned with type. Paratopotype, ♀.

The present fly differs from *Nephrotoma* (*Scamboneura*) *nigrodorsalis* (Alexander), of northeastern New Guinea in coloration and especially in hypopygial structure. There are still further undescribed species of the subgenus in New Guinea.

The relationships between *Nephrotoma* Meigen and *Scamboneura* Osten Sacken are so close that I am considering the latter group as representing a subgenus of the older genus. The venation and male hypopygial structure are very similar in the two groups and likewise show a close relationship with *Dolichozepe* Curtis. The venation of the present fly (Fig. 1) may be compared with that of *Dolichozepe* (*Dolichozepe*) *distivena* sp. n. (Fig. 2).

## 2. *Dolichozepe* (*Dolichozepe*) *anthema* sp. n.

Size small (wing of male 10 mm.); head pale yellow on front, dark brown posteriorly; antennae of male short, about one-fifth the wing; thorax conspicuously patterned with yellow and brownish black, including an anterior transverse girdle on mesopleura with a less distinct band over the pleurotergite and adjoining sclerites; legs extensively patterned with white; wing venation of the *Scamboneura* type, including the very narrow cell *2nd A*; male hypopygium with posterior border of tergite shallowly concave, almost smooth, the usual lateral lobes undeveloped, the contiguous mesal lobe of the basistyle microscopically roughened; inner dististyle with the enlarged head strongly bifid, the larger roughened portion truncated at apex.

Male. — Length, about 9 mm.; wing, 10 mm.; antenna, about 2 mm.

Frontal prolongation of head short, very pale yellow, mouthparts and palpi brownish black. Antennae of male relatively short, about one-fifth the wing; scape and pedicel yellow, flagellum black; flagellar segments long-cylindrical, normal vestiture black, short, dense, concentrated on lower face, verticils long and powerful, at midlength of organ about as long as the segment. Anterior vertex clear orange yellow, the remainder of head behind dark brown.

Cervical region and pronotum broadly brownish black above, clear light yellow on sides. Mesonotal praescutum with three confluent brownish black stripes, on anterior half the humeral region extensively yellow, confluent with the propleural pattern; scutum behind suture dark brown, continued ventrad over the parascutella and pleurotergite to form a broad band. Pleura chiefly covered by a very broad complete transverse girdle, including the posterior half of praescutum, mesopleura and the intervening dorsopleural region, pteropleurite and meron orange, silvery pruinose. Halteres very long, stem brownish yellow, knob dark brown. Legs with fore and middle coxae obscure yellow, posterior pair light brown; trochanters brownish yellow; femora light brown, paler basally, darker before the narrowly whitened genua; tibiae pale brown, tips more extensively whitened; tarsi whitened, proximal parts of basitarsi vaguely infuscated; claws slender, simple. Wings suffused with brown, the oval stigma darker brown; veins brown. Venation of the *Scamboneura* type, with *Rs* far distad, beyond the level of all other elements of the cord, the anterior cord thus appearing very oblique; medial forks very deep, cell  $M_1$  about five times its petiole; *m-cu* less than one-half its length before fork of *M*; cell *2nd A* very narrow.

Abdominal tergites chiefly dark brown, vaguely ringed with obscure orange beyond the basal rings, outer segments more uniformly darkened, hypopygium yellow, the appendages blackened. Male hypopygium (Fig. 7) with ninth tergite, *t*, transverse, posterior margin very shallowly concave, with short lateral concavities, lacking developed lateral lobes as occur in most other species; margin blackened, virtually smooth, with irregular microscopic roughenings only. Mesal lobes of basistyle, *b*, closely approximated to the tergite, transversely oval, with abundant small tubercles. Dististyles, *d*, as shown, outer style with a basal extension, distally with more than a score of strong setae,

the longest at apex; inner style with the enlarged subcircular head strongly deflexed, bifid, the larger darkened part decurved, apex truncate, surface with abundant microscopic roughenings. Aedeagus, *a*, short and stout, penis a very long slender pale filament.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 13, Rattan Camp, altitude 1,100 meters, March 5, 1939 (Toxopeus); Archbold III Expedition; type in author's collection.

The specific name, *anthema*, is from the Greek, signifying a dancer. Other regional species of the subgenus having the so-called *Scamboneura* type of venation and very narrow cell 2nd *A* include *Dolichozeza* (*Dolichozeza*) *disseminata* Alexander, *D. (D.) distivena* sp. n., *D. (D.) mongas* sp. n., *D. (D.) percuneata* Alexander, and *D. (D.) thiasus* sp. n., all most readily distinguished among themselves by the length and structure of the antennae, venation and pattern of the wings, coloration of the legs, and the details of hypopygial structure.

### 3. *Dolichozeza* (*Dolichozeza*) *bibasis* sp. n.

Size medium (wing of male 12 mm.); antennae relatively short, black, scape and pedicel yellow; general coloration of head and thorax brown; legs brown, tips of femora and tibiae very narrowly pale, outer tarsal segments yellowish white; wings light brown, stigma darker, cord transverse, cell *M*<sub>1</sub> deep, about five times its petiole; abdomen dark brown, intermediate segments with an obscure orange band at near midlength; male hypopygium having beak of inner dististyle with two blackened denticles.

Male. — Length, about 11-12 mm.; wing, 10.5-12 mm.; antenna, about 3.1-3.5 mm.

Frontal prolongation of head very short, light brown, palpi black. Antennae with scape and pedicel yellow, flagellum black; flagellar segments cylindrical, the first subequal in length to the combined second and third, normal vestiture very short, longest verticils exceeding one-half the segments. Head light brown, the low vertical tubercle light yellow.

Pronotal scutum brown, the very reduced scutellum yellowed. Mesonotum almost uniformly dark brown, humeral and lateral regions of praescutum slightly more yellowed. Pleura brown. Halteres very long, brown. Legs brown, femoral bases yellowed, tips of femora and tibiae very narrowly pale, basitarsi light brown, outer tarsal segments paler yellowish white; claws small, simple. Wings light brown, stigma and a contiguous seam over anterior cord darker brown, cell *R*<sub>3</sub> beyond stigma with a



conspicuous whitened area, before stigma and over fork of *M* very restrictedly pale; veins brown. Venation: Cord, including *Rs*, virtually transverse; medial forks deep, *M*<sub>1</sub> about five times its petiole; *m-cu* about one-half its length before fork of *M*; cell *2nd A* relatively narrow.

Abdomen dark brown, intermediate segments with an obscure orange band at near midlength at base of outer ring, broader and more conspicuous on sternites; hypopygium slightly paler than the subterminal segments. Male hypopygium (Fig. 8) with ninth tergite, *t*, narrowly transverse, lateral lobes low, widely separated; mesal lobe of basistyle relatively small, blackened, microscopically roughened. Outer dististyle, *d*, about four times as long as broad, inner style with the broad base yellowed, outer half of beak narrowed gradually to the obtuse tip, face of beak with two blunt blackened denticles, the more distal one placed close to lower edge.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 7, Moss Forest Camp, altitude 2,800 meters, October 14, 1938 (Toxopeus); Archbold III Expedition, in Leiden Museum. Paratype, ♂, Station 9, Baliem River, altitude 1,700 meters, December 7, 1938 (Toxopeus), in Alexander Collection.

The specific name, *bibasis*, is from the Greek, signifying a kind of dance. *Dolichopeza (Dolichopeza) bibasis* is most similar to species such as *D. (D.) setistyla* sp. n., differing in the coloration of the legs and wings, short antennae, and especially in the details of hypopygial structure. In this genus the close union or approximation of the basistyle and lateral lobe of the tergite should be emphasized, in many species the two lobes being so nearly joined as to appear as a single unit.

#### 4. *Dolichopeza (Dolichopeza) distivena* sp. n.

Allied to *percuneata*; general coloration of thorax yellow, patterned with brown, including a transverse girdle on pleura; legs with tips of femora very narrowly white, of tibiae more broadly so, posterior tarsi uniformly white; wing venation of the *Scamboneura* type, *Rs* being transverse, very short, lying distad of other elements of the cord, cell *2nd A* exceedingly narrow; male hypopygium apparently with a single dististyle.

Male. — Length, about 9 mm.; wing, 9 mm.; antenna, about 2 mm.

Frontal prolongation of head obscure yellow, mouthparts dark brown; palpi elongate, very light brown, apex of terminal segment blackened. Antennae with base of scape light yellow,

outer half brown, pedicel light brown, flagellum dark brown; flagellar segments cylindrical, longest verticils of proximal segments exceeding the latter, all segments with a dense short pubescence; terminal segment abruptly smaller, less than one-fifth the size of the penultimate. Head above light yellow, including the low vertical tubercle, genae and sides of posterior vertex extensively light brown.

Cervical region and central area of pronotal scutum brown, the sides, scutellum and pretergites light yellow. Mesonotal praescutum with humeral region yellow, disk with lateral stripes and anterior third of central region dark brown, the latter paler behind, connecting with the humeri; scutum and base of scutellum pale brown, remainder of notum more yellowish brown. Pleura light yellow with a conspicuous transverse brown girdle, more intense on the mesepisternum, paler behind. Halteres very long, stem brownish yellow, knob blackened. Legs with all coxae and trochanters light yellow, the latter restrictedly darkened beneath at tips; femora brown, apices very narrowly white, tibiae very light brown, the extreme base and broad tips whitened; basitarsi of fore legs very weakly darkened, the remainder snowy white, posterior tarsi uniformly white. Wings (Fig. 2) weakly infuscated, stigma brown; veins dark brown. Venation of the *Scamboneura* type, with  $R_s$  very short, subequal to  $R_2$ , placed distad of remainder of cord at inner end of stigma; cell  $R_3$  conspicuously narrowed on outer half; veins of medial field long,  $m-cu$  nearly its own length before  $M_4$ ; cell *2nd A* exceedingly narrow, especially outwardly.

Proximal abdominal tergites weakly bicolored, dark brown, paler basally, proximal sternites yellowed, outer abdominal segments, including hypopygium, more uniformly darkened. Male hypopygium (Fig. 9) with ninth tergite, *t*, very narrowly transverse, lateral ends long extended, median region of anterior border slightly produced and shallowly emarginate, with microscopic sculpture, the darkened lobes of ventral surface with large coarse tubercles. Basistyle, *b*, very short and stout. Dististyle, *d*, apparently a single element, the usual dorsal style very reduced in size and not well differentiated from the base of the major style, provided with unusually long setae.

Habitat: Northern New Guinea (West Irian).

Holotype, ♂, Hollandia, altitude 1,000 feet, March 1945 (Jean Laffoon).

The various Papuan species that are allied to *Dolichopeza* (*Dolichopeza*) *percuneata* Alexander are recorded earlier under *D. (D.) anthema* sp. n., all best separated among themselves by hypopygial characters. The great reduction or virtual loss of the dorsal dististyle in the present fly should be stressed.

### 5. *Dolichopeza* (*Dolichopeza*) *mongas* sp. n.

General coloration of mesonotum brownish yellow, pleura yellow, with a transverse light brown girdle; antennae of male very long, nearly three-fourths the body; legs dark brown, tibiae and tarsi variegated with white; wings strongly infuscated, anterior cord restrictedly patterned with darker, venation of outer radial field of the *Scamboneura* type; male hypopygium with outer dististyle very small, oval, the length about twice the greatest breadth, the setae totalling about fifteen.

Male. — Length, about 10.5 mm.; wing, 11 mm.; antenna, about 7.5 mm.

Frontal prolongation of head exceedingly reduced, brown, palpi and mouthparts brownish black. Antennae of male very long, nearly three-fourths the body; scape very pale yellow, pedicel whitened, flagellum brownish black; flagellar segments long-cylindrical, with abundant erect normal vestiture and one or two much longer verticils, the longest nearly one-third the segment. Front and anterior vertex light yellow, slightly darker behind the antennae, remainder of head dark cinnamon brown; anterior vertex broad, about equal to the visible diameter of the eye.

Pronotum and propleura light yellow. Mesonotal praescutum virtually covered by four broad brownish yellow stripes, the darker brown ground at cephalic end and as short lateral areas behind the humeri; posterior sclerites brownish yellow, posterior border of mediotergite vaguely darker. Pleura yellow, mesanepisternum light brown to form a transverse girdle. Halteres with stem yellowed, knob brown. Legs with coxae and trochanters yellow; femora obscure yellow, more infuscated outwardly, tip narrowly whitened; tibiae dark brown, tips whitened, narrower on fore and middle pairs, broader on posterior tibia where more than one-fifth is included; basitarsi dark brown, tips and remainder of tarsi white; claws very small, simple. Wings (Fig. 3) strongly infuscated, prearcular and costal fields narrowly more darkened, stigma not further differentiated; a brown cloud over anterior cord; veins brown. Venation of radial field approaching the *Scamboneura* type, the very short transverse *Rs* slightly distad of the level of other elements of cord; medial



forks deep, cell  $M_1$  more than three times its petiole; *m-cu* about one-third its length before fork of *M*; cell *2nd A* very narrow.

Abdomen dark brown, intermediate tergites with a light gray ring at near midlength of segment, just beyond the impressed areas of the basal rings. Male hypopygium (Fig. 10) with ninth tergite, *t*, transverse, posterior border gently emarginate, entirely undarkened, lateral angles smooth, obtuse, brown, contiguous with the spiculose lobe on mesal face of basistyle, *b*. Outer dististyle, *d*, very small, oval, the length about twice the greatest breadth, provided with about 13 to 15 strong setae; inner style with outer end darkened, slightly wrinkled, outer margin with sparse long setae. Aedeagus with the penis long, pale, very slender.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 7, Moss Forest Camp, altitude 2,800 meters, October 23, 1938 (Toxopeus); Archbold III Expedition; type in author's collection.

The specific name, *mongas*, is from the Greek, for a certain type of dance. The species is most like *Dolichopoeza (Dolichopeza) thiapus* sp. n. in the venation and pattern of the legs and wings, differing in the very long male antennae and in hypopygial structure, including both dististyles. *D. (D.) distivena* sp. n. differs more evidently in all of the above characters.

## 6. *Dolichopeza (Dolichopeza) setistyla* sp. n.

Size large (wing of male 12 mm. or more); antennae long, the flagellar verticils longer and stouter than the erect normal vestiture; legs dark brown, claws of male very small, simple; wings pale brown, with more whitened areas before and beyond the stigma and in bases of outer medial cells; abdomen long, tergites light brown, sides of outer ring of intermediate segments with conspicuous silvery areas, sternites more bicolored, light brown with a yellow band at near midlength, outer segments dark brown; male hypopygium with tergal lobes small, erect, widely separated; inner dististyle cleaver-shaped, apex obtuse, near outer end with a darkened area comprised of large setigerous punctures bearing short prostrate setae, outer and marginal setae long and conspicuous.

Male. — Length, about 10-11 mm.; wing, 11-13 mm.; antenna, about 6-6.5 mm.; haltere, 2.8-3 mm.

Rostrum and palpi brownish black, terminal segments of latter long and slender, nearly equal in length to the combined second and third segments. Antennae of male brownish black, long; flagellar segments cylindrical, with dense short erect setulae throughout their length, these about equal in length to diameter

of segment, the sparse verticils longer, from about 1.5 to twice the diameter. Head dark brown.

Pronotum reduced, brown. Mesonotal praescutum and scutum almost uniformly dark brown, humeral region very restrictedly yellow, posterior sclerites of notum paler brown. Pleura pale brown, propleura, anepisternum and ventral sternopleurite darker brown. Halteres elongate, stem brownish white, base narrowly yellow, knob dark brown. Legs with coxae and trochanters brown, remainder of legs dark brown; claws very small, simple. Wings (Fig. 4) pale brown, costal region and outer radial field darker, stigma still darker brown, with a whitened area at either end; more extensive pale marks near bases of cells *1st M*<sub>2</sub> and *M*<sub>4</sub>; veins darker brown. Venation: Outer medial cells relatively deep, *M*<sub>1</sub> nearly three times its petiole; *m-cu* about one-half its length before fork of *M*; cell *2nd A* relatively broad.

Abdomen long, tergites light brown, lateral borders narrowly darker, on sides of outer ring of tergites two to five with a conspicuous silvery gray pruinose area; sternites more bicolored, light brown with a yellowed band at near midlength; hypopygium small, dark brown. Second segment of abdomen very long, the transverse impression beyond midlength. Male hypopygium (Fig. 11) with the widely separated lobes of the ninth tergite, *t*, erect. Basistyle, *b*, with mesal lobe provided with abundant microscopic tubercles, the apical ones larger. Outer dististyle, *d*, short, about one-half the inner, apex obtuse; inner style cleaver-shaped, on disk near outer end with a darkened area with large setigerous punctures that bear short prostrate setae, the normal marginal and outer setae long and conspicuous.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 6, Scree Valley Camp, altitude 3,800 meters, September 14, 1938 (Toxopeus); Archbold III Expedition, in Leiden Museum. Paratopotypes, 2 ♂♂, September 11-27, 1938; 4 ♂♂, East of Wilhelmina Top, altitude 3,600 meters, September 5-9, 1938 (Toxopeus).

*Dolichopeza (Dolichopeza) setistyla* is readily distinguished from other regional species by its size, wing pattern and venation, and especially by hypopygial structure. In the short series of specimens available there is some variation in the relative lengths of the antennal verticils and the normal vestiture. In the holotype the condition is as described but some other specimens have the verticils much shorter, subequal to or but slightly longer than the normal setulae. The other features, including the hypopygium, are generally similar to the type and I consider all as belonging to a single species.

### 7. *Dolichozepeza* (*Dolichozepeza*) *thiasus* sp. n.

Mesonotum almost uniformly medium brown, pleura concolorous, with a darker brown transverse girdle; antennae of male relatively short, less than one-half the body; legs dark brown, tibiae and tarsi extensively white; wings strongly infuscated, slightly patterned with darker, venation of the outer radial field of the *Scamboneura* type; male hypopygium with dististyles distinctive, outer style longer than the inner, its length about five times the breadth across base, narrowed at outer end; penis a long sinuous blackened rod.

**Male.** — Length, about 12 mm.; wing, 10.5 mm.; antenna, about 4.5 mm.

**Female.** — Length, about 13 mm.; wing, 10.5 mm.; antenna, about 3 mm.

Frontal prolongation of head flattened and reduced; mouthparts and palpi brownish black. Antennae of male relatively short; scape brownish yellow, pedicel clearer yellow, flagellum brownish black; flagellar segments cylindrical, normal vestiture very short, verticils long, those of intermediate segments about two-thirds the segment; first flagellar segment approximately as long as the second and third combined, the terminal very small. Head brown, anterior vertex slightly more brightened.

Pronotum brown. Mesonotum almost uniformly medium brown, praescutum without evident pattern. Pleura medium brown, the mesepisternum and sternum much darker to produce a broad transverse girdle. Halteres dark brown, base of stem narrowly yellowed. Legs with coxae brown; trochanters yellowed; femora dark brown, tips narrowly whitened; tibiae dark brown, extreme bases and broader tips whitened; tarsi white, proximal half of basitarsi slightly more infuscated; claws, male, slender, simple. Wings weakly infuscated, stigma and a narrow seam over anterior cord darker brown; veins brown. Venation: Radial field of the *Scamboneura* type, with *Rs* placed farther distad than *r-m*, in alignment with the basal section of  $R_{4-5}$ ; medial cells deep,  $M_1$  about four times its petiole; *m-cu* about one-third its length before fork of *M*; cell *2nd A* very narrow.

Abdominal tergites dark brown, each paler at near midlength; hypopygium darkened. Ovipositor (Fig. 12) with hypovalvae heavily blackened. Male hypopygium (Fig. 11) with ninth tergite, *t*, a narrow band, the concave posterior border narrowly blackened, the small lateral knobs smooth, blackened. Basistyle, *b*, with mesal lobe contiguous with lateral tergal knobs. Dististyles, *d*, distinctive, outer style longer than the inner, about five times



the greatest breadth across the basal half, outer end narrowed and gently curved; inner style with the stout beak appearing doubled. Penis, *pen*, a long sinuous thickened black rod that terminates in a long slender point.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 14, Sigi Camp, altitude 1,500 meters, February 18, 1939 (Toxopeus); Archbold III Expedition. Allotopotype, ♀, pinned in copula with type.

The specific name, *thiasus*, is Greek for a troop of dancers. The most similar species is *Dolichopeza* (*Dolichopeza*) *mongas* sp. n., readily told by the long male antennae and the structure of the male hypopygium, especially both dististyles and the long slender pale penis.

### 8. *Dolichopeza* (*Nesopeza*) *kraussiana* sp. n.

Mesonotal praescutum light brown with four darker brown stripes, pleura yellow, conspicuously patterned with brown; antennae of male elongate, proximal flagellar segments bicolored, yellow, the apices darkened; femora light yellow with a narrow brown subterminal ring, tibiae and tarsi white, the tips of former very narrowly dark brown; wings whitened, with a conspicuous brown pattern, *Rs* long, with an erect basal spur, medial forks very shallow; male hypopygium with eighth sternite very large, the outer lateral angles produced caudad into fingerlike lobes.

Male. — Length, about 10 mm.; wing, 9.5 mm.; antenna, about 4.5 mm.

Female. — Length, about 10 mm.; wing, 10 mm.

Frontal prolongation of head dark brown, with very long setae; palpi dark brown, outer end of terminal segment paler. Antennae of male elongate; scape and pedicel yellow, flagellum yellow, outer ends of segments darkened, narrowest on the first, progressively more extensive outwardly, on the intermediate segments subequal to the ground, on outer segments involving about two-thirds; terminal segment very small. In female, antennae short, flagellar pattern about as in male. Head grayish brown, occipital region slightly darker brown.

Cervical region brownish black. Pronotal scutum dark brown, posterior border narrowly paler, scutellum and pretergites light yellow. Mesonotal praescutum light brown, with four darker brown stripes, lateral pair very broad, reaching the margin; scutal lobes brown, sides and median area light yellow; scutellum brown, parascutella yellowed; mediotergite brown, sides vaguely more yellowed, pleurotergite light brown above, katapleurotergite yellow. Pleura yellow, conspicuously patterned with dark brown, including the propleura and anepisternum. Halteres with stem

light yellow, knob dark brown. Legs with fore coxae dark brown, remaining coxae and all trochanters yellow; femora light yellow with a narrow dark brown subterminal ring, the actual tip paler; tibiae white, extreme tip dark brown; tarsi very long, white. Wings (Fig. 5) whitened, with a very conspicuous brown pattern, chiefly costal, including virtually all of cells *C* and *Sc*, with posterior extensions that reach vein *M* behind, the centers of the darkened areas paler than the margins; beyond arculus with subbasal areas from vein *M* to axillary border, very narrowly interrupted behind vein *1st A*; further extensive darkenings at wing tip, reaching the margin on veins *R*<sub>3</sub>, *R*<sub>4-5</sub> and *M*; semicircular areas at end of vein *1st A* and at margin of cell before *2nd A*; much smaller darkenings include marginal spots on veins *M*<sub>2</sub>, *M*<sub>3</sub>, *M*<sub>4</sub> and *2nd A* and as seams at fork of *M*, *m-cu* and outer end of *Cu*<sub>1</sub>; a very pale brown wash beyond midlength of cell *M*; veins pale brown, darker in the patterned areas. Venation: *Rs* long, with an erect spur near base; medial forks very shallow, cell *M*<sub>1</sub> across margin of wing about three-fourths its length; *m-cu* approximately its own length before fork of *M*; vein *2nd A* short, the cell broad.

Abdominal tergites bicolored, beyond the first with basal ring narrowly yellowed, apices brown; sternites chiefly light yellow, apices very narrowly brown; outer segments including hypopygium dark brown to brownish black. Male hypopygium (Fig. 14) with eighth sternite, *8s*, very large, exceeding in length the combined eighth and ninth tergites, outer lateral angles produced caudad into darkened fingerlike lobes provided with abundant coarse erect black setae, mesal part of each lobe much less extended, with shorter vestiture. The united 9th sternite and basistyle, with the tergite, unusually small. Ninth tergite, *t*, with posterior border trilobed, median lobe low and broad, smooth, lateral arms extended cephalad as long blackened rods. Dististyle, *d*, as figured, outer style small, some of the apical setae very long.

Habitat: New Hebrides.

Holotype, ♂, Erromango, 11 km west of Ipotu, March 1970 (Krauss). Allotopotype, ♀, pinned with type. Paratopotype, a badly damaged male, wings mounted on slide, 8 km west of Ipotu, altitude 150-250 meters, March 1970 (Krauss).

This very attractive and distinct species is named for the collector, my long-time friend, Noel L. H. Krauss, to whom I am indebted for many crane flies from all faunal areas. The relatively few regional members of the subgenus include *Dolichopeza (Nesopeza) praesultator* Alexander, of northern New Guinea, and *D. (N.) jobiensis* Alexander, from Japen Island, in Geelvink Bay, northwestern New Guinea, very different from the present fly in wing pattern and other characters.

### Genus **Tipula** Linnaeus

*Tipula* Linnaeus; Systema Naturae, Edit. 10: 585; 1758.

#### 9. **Tipula (Indotipula) laffooniana** sp. n.

Allied to *villis*; mesonotal praescutum orange yellow, with three very slightly darker stripes; wings brownish yellow, prearcular and costal fields more orange yellow, stigma yellowish brown; outer abdominal segments, including the large hypopygium, black; male hypopygium with outer dististyle widened at apex, not emarginate or bilobed.

Male. — Length, about 15-16 mm.; wing, 17-17.5 mm.; antenna, about 3.5-3.7 mm.

Female. — Length, about 20-23 mm.; wing, 19-21 mm.

Frontal prolongation of head relatively short, orange yellow, with a narrow brown longitudinal dorsal stripe, sides slightly pruinose; nasus long and slender; palpi yellow, terminal segment very long. Antennae with scape and pedicel yellow, first flagellar segment brown, yellowed basally, succeeding segments black; flagellar segments conspicuously binodose, the outer enlargement larger and more angular than the basal one, verticils very long. Head with the broad anterior vertex brownish gray with a narrow darker brown central vitta, posterior vertex orange, genae light gray.

Pronotum and praescutum chiefly orange yellow, the latter with three very slightly darker reddish brown stripes, scutal lobes similarly darkened; posterior sclerites of notum clear light yellow. Pleura reddish yellow. Halteres with stem yellow, the small knob dark brown. Legs with coxae brownish yellow, trochanters clearer yellow; femora yellow basally, passing into brown, tips darker; tibiae brown, outer ends and tarsi dark brown; legs very long, claws of male with a small tooth. Wings brownish yellow, prearcular and costal fields more orange yellow, stigma yellowish brown; veins brown, more yellowed in the brightened fields. Venation:  $Sc_1$  preserved, shorter than  $Sc_2$ ;  $R_s$  shorter than  $R_{2-3}$ ; petiole of cell  $M_1$  longer than  $m$ ;  $m-cu$  at or shortly before fork of  $M_{3-4}$ ; cell *2nd A* moderately broad.

Abdomen yellow basally, outer segments more patterned with darker, outer four segments chiefly black, including the large conspicuous hypopygium, outer dististyles yellowed. Male hypopygium (Fig. 27) with tergal lobes, *t*, conspicuous, the terminal point strongly deflected. Outer dististyle, *d*, widened outwardly, not emarginate or bilobed as in *querella*; inner style with the spinoid setae of the subdorsal row about seven in number, small and weak. Eighth sternite with posterior border convexly rounded, without conspicuous setae.

Habitat: Northern Solomon Islands.

Holotype, ♂, Bougainville Is., altitude 1,000 feet, September-November 1944 (Jean Laffoon). Allotopotype, ♀ pinned with type. Paratopotypes, 2 ♂♂, 2 ♀♀, with the types.

I dedicate this fly to Dr. L. Laffoon, of the Department of Zoology and Entomology of the Iowa State University, to whom I am indebted for many interesting crane flies from Bougainville and northern New Guinea. The most similar species is *Tipula (Indotipula) querella* Alexander, described from Kokoda, Papua, which differs in the smaller size and in details of hypopygial structure, including the dististyles. Both of these species have the spinoid setae of the inner style small and weak as compared with the usual condition found in species of *Indotipula*.

#### Subgenus **Papuatipula** Alexander

*Tipula (Papuatipula)* Alexander; Proc. Linn. Soc. New South Wales, 60: 52 — 53; (type- *novae-britanniae* Alexander, Toma, New Britain).

*Tipula (Papuatipula)* Alexander; Philippine Jour. Sci., 57: 114 — 115; 1935.

As indicated in the accounts provided under the above references, the subgenus *Papuatipula* is most nearly related to *Acutipula* Alexander and *Indotipula* Edwards, differing most evidently in the fundamental structure of the male hypopygium. In the many species now known from New Guinea and neighboring islands the venation of the radial field of the wing shows a progressive reduction in the length of *Rs* and in the crowding cephalad of its anterior branch with the final complete atrophy of vein *R*<sub>1-2</sub>, as shown in figures 15 through 26 of the present paper. There remain several further undescribed species of *Papuatipula* that will be defined in subsequent papers.



**10. *Tipula (Papatipula) consiliosa* sp. n.**

Size large (wing of male over 20 mm.); mesonotal praescutum with four narrow gray stripes that are bordered by brown, posterior sclerites of notum and the pleura yellow or orange, light gray pruinose; halteres elongate, dark brown; wings brownish yellow, weakly patterned with pale brown, *Rs* slightly longer than  $R_{2-3}$ ,  $R_{1-2}$  distinctly preserved, about two-thirds  $R_{2-3}$ ; male hypopygium with beak of the inner dististyle long and relatively slender, lower beak a massive blackened lobe.

Male. — Length, about 24-25 mm.; wing, 21-24 mm.; antenna, about 4-4.1 mm.

Frontal prolongation of head orange, dorsally light gray pruinose; nasus distinct, elevated; prolongation subequal in length to remainder of head; palpi with first segment yellowish brown, remainder blackened. Antennae with scape and pedicel yellow, proximal flagellar segments bicolored, beyond the first darkened basally with about the outer half paler, on succeeding segments becoming more uniformly darkened, longest verticils about one-half longer than the segments. Head orange, posterior vertex dusted with light gray; vertical tubercle low.

Pronotum orange, dusted with light gray, sides slightly darker, scutellum clearer yellow. Mesonotal praescutum with the restricted ground yellowed, disk with four narrow gray stripes bordered by cinnamon brown, the intermediate pair confluent on posterior fifth, interspaces light gray; scutum light gray, each lobe with two brownish gray areas that are margined by light brown; scutellum light gray, parascutella more yellowed; postnotum obscure yellow, conspicuously light gray pruinose. Pleura orange, heavily light gray pruinose, dorsopleural region extensively orange. Halteres elongate, dark brown, base of the stem abruptly orange. Legs with coxae and trochanters light orange, very sparsely pruinose; femora orange, outer ends slightly darker; tibiae and basitarsi obscure orange, outer segments dark brown. Wings brownish yellow, weakly patterned with pale brown, including the posterior prearcular region, stigma, and a confluent area in bases of outer radial cells, *m-cu* and adjoining parts of vein *Cu*, and the usual darkening before midlength of cell *Cu*; oblitative area at cord relatively inconspicuous, scarcely reaching cell  $M_3$ ; bases of outer medial cells not brightened; all outer medial veins back from margin narrowly bordered by light yellow; veins light brown. Venation (Fig. 17): *Rs* slightly longer than  $R_{2-3}$ ; vein  $R_{1-2}$  distinctly preserved, about two-thirds

$R_{2-3}$ ; petiole of cell  $M_1$  subequal to  $m$ ;  $m-cu$  at or beyond midlength of  $M_{3-4}$ .

Abdomen with proximal four tergites orange, outer half of second and succeeding two light brown medially, narrowly brownish black sublaterally, the margins beyond the base broadly silvery white; fifth and sixth tergites darker chestnut brown, lateral borders more broadly whitened; seventh tergite white a conspicuous sublateral orange spot on either side, its outer border darker; eighth tergite uniformly pale, ninth tergite very pale yellow, heavily white pruinose, posterior lobes darker; proximal sternites brownish yellow, the outer ones darker brown, terminal two segments slightly more pruinose. Abdomen with basal tergite very narrow, sternite more extensive; second tergite very long, exceeding the combined third and fourth tergites; second sternite a little shorter, subequal to the combined third and fourth sternites. Male hypopygium (Fig. 28) with the ninth tergite,  $t$ , separated from the fused sternite and small basistyle; eighth sternite narrow, posterior border scarcely modified. Ninth tergite with posterior border produced into two low rounded lobes that are separated by a short narrow notch, the lobes with abundant short blackened peglike spinoid setae. Basistyle,  $b$ , at apex with a fingerlike lobe that is directed mesad. Outer dististyle,  $d$ , broad at base, narrowed to a point outwardly, with a blackened flange extended basad, outer half of style with numerous strong setae; inner style with beak long and relatively slender, lower beak a massive blackened lobe; region of posterior crest with about 12 strong setae; outer basal lobe shaped generally like the outer half of outer style, terminating in a blackened point. Aedeagus,  $a$ , powerful, blackened, apex with two flattened blades.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Lake Habbema, altitude 3,225 meters, August 5, 1938 (Toxopeus); Archbold III Expedition, in Leiden Museum. Paratypes, 2 ♂♂, Station 7, Moss Forest Camp, altitude 2,700 meters, October 14 and 20, 1938.

The species is most readily separated from other members of the subgenus that have  $R_s$  elongate and vein  $R_{2-3}$  preserved by the pale wing pattern and especially by hypopygial structure, including the tergite and both dististyles.

11. **Tipula (Papatipula) gressittiana** sp. n.

General coloration of mesonotum gray, patterned with brown; antennae relatively short, flagellar segments nearly cylindrical, verticils short; legs yellow, femora with a vaguely indicated pale brown ring; wings with the restricted ground clear yellow, attractively patterned with white, pale brown and darker brown; *Rs* long, all radial veins preserved, *m-cu* at fork of  $M_{3-4}$ ; male hypopygium with posterior border of ninth tergite shallowly concave, margin with abundant darkened spinoid setae, outer dististyle a simple yellow blade, inner style complex, beak slender, outer basal lobe a slender spine, eighth sternite unmodified.

Male. — Length, about 17 mm.; wing, 19 mm.; antenna, about 3.5 mm.

Frontal prolongation of head slightly shorter than the remainder, light brown, nasus distinct; palpi obscure yellow, terminal segment darker outwardly. Antennae relatively short; scape brownish yellow, succeeding segments weakly bicolored, yellow, bases darkened; flagellar segments nearly cylindrical, basal enlargements scarcely developed, terminal segment subequal to the penultimate, verticils shorter than the segments. Head light brown; vertical tubercle represented by a small elevation behind each antennal fossa.

Prothorax small, yellowish brown. Mesonotal praescutum with the broad interspaces gray pruinose, disk with three chestnut stripes, the lateral pair with their mesal margin brownish gray, almost concolorous with the interspace; scutal lobes pale brown, margins and median area more grayish; posterior sclerites of notum light brown, parascutella pale gray, smooth; mediotergite with abundant long appressed silvery setae, pleurotergite light gray above, the katapleurotergite light brown with a darkened spot on dorsal edge. Pleura chiefly yellowish gray without clearly defined pattern. Halteres light brown. Legs with coxae pale brown, silvery pruinose; trochanters brownish yellow; femora yellow with a vaguely indicated pale brown subterminal ring; remainder of legs yellow, outer tarsal segments slightly darker; claws with a conspicuous tooth at near midlength, with a smaller basal point. Wings slightly narrowed at apex, attractively patterned, ground clear light yellow, cell *M* slightly paler; a conspicuous pale brown pattern, areas of proximal half darker with whitened pattern as described; darker brown marks at and near arculus, at near midlength of cell *Cu*, posterior cord, stigma, and outer end of cell *1st M*<sub>2</sub>, with adjacent veins; whitened areas at cord, including proximal third of cell *1st M*<sub>2</sub> and an oblique band in bases of cells *M*<sub>1</sub> to *M*<sub>4</sub>, inclusive, with a further

extension in outer end of cell  $R_5$ ; additional whitened pattern in prearcular field, basal fourth of cell  $Cu$ , and a distinct small spot in center of the darkened mark in cell  $Cu$ ; coloration of veins very variable in different parts of wing, being yellow in the light areas, darker in the brown markings; distal ends of all outer medial veins light yellow, including narrow margins in the otherwise brown cells. Venation: (Figs. 15, 16):  $R_s$  about one-half longer than  $R_{2-3}$ ; all outer radial veins preserved;  $m$  about twice the petiole of cell  $M_1$ ;  $m-cu$  far distad, at or close to fork of  $M_{3-4}$ .

Abdominal tergites variegated brownish yellow and darker brown, the elongate second segment with basal ring obscure yellow, outer ring brown; succeeding segments obscure yellow, sparsely pruinose, darker sublaterally, borders narrowly gray; sternites yellow. Male hypopygium (Fig. 29) with ninth tergite,  $t$ , relatively long, posterior border shallowly concave, the margin with abundant darkened spinoid setae. Outer dististyle,  $d$ , a simple yellow blade; inner style complex, beak long and slender, lower beak short and stout, terminating in a microscopic point; region of posterior crest slightly elevated, outer basal lobe a slender spine. Aedeagus,  $a$ , short and stout, the subtending apophyses very small, oval; penis slender, relatively short, apex terminating in three filaments, the central one much smaller. Eighth sternite with posterior margin very gently convex to subtruncate, with sparse scattered pale setae, none large or modified.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 10, Mist Camp, altitude 1,800 meters, January 9, 1939 (Toxopeus); Archbold III Expedition; type in author's collection.

This attractive fly is named for Dr. Judson Linsley Gressitt, distinguished entomologist at the Bishop Museum, Honolulu, student of the Coleoptera and authority on the zoogeography of Antarctica and the Pacific Islands. I assign this species to the subgenus *Papuatipula* despite certain differences in venation and in hypopygial structure. There is no close relative so far made known.

## 12. *Tipula* (*Papuatipula*) *lieftincki* sp. n.

Size large (wing of male about 25 mm.); female subapterous (wing about 5 mm.); antennae of male short, proximal flagellar segments bicolored, dark brown with yellowed tips; mesonotum yellowish gray, praescutal borders narrowly brownish black; halteres very long; legs dark brown; wings of male light brown, attractively patterned with



darked brown and cream-colored areas, the latter including a band at anterior cord and in bases of outer medial cells; a conspicuous brown spot before midlength of cell *Cu*; proximal abdominal segments orange, lateral margins blackened, outer five segments more uniformly gray; male hypopygium with tergite terminating in two broad subquadrate lobes; inner dististyle mitten-shaped, the palm narrow.

**Male.** — Length, about 23 mm.; wing, 25-26 mm.; antenna, about 3 mm.; haltere about 4.5 mm. Some males smaller, length, about 17 mm.; wing, 18 mm.

**Female.** — Length, about 25 mm.; wing, 5 mm.

**Male.** Frontal prolongation of head long, subequal to the remainder, dark brown; nasus distinct, with long black setae; palpi brownish black, incisures narrowly paler. Antennae of male short; scape and pedicel dark brown, flagellar segments beyond the first vaguely bicolored, dark brown with obscure yellow tips, the small terminal segment uniformly black; flagellar segments with very small basal enlargements, longest verticils subequal to or very slightly exceeding the segments. Head dark chestnut brown, light gray pruinose; vertical tubercle longitudinally furrowed.

Pronotal scutum brown, heavily light gray medially. Mesonotal praescutum yellowish gray with four slightly darker brownish gray stripes, border narrowly brownish black; posterior sclerites of notum chiefly light gray, each scutal lobe with two separate very pale brown areas; scutellum and mediotergite vaguely patterned. Pleura yellowish gray below, chiefly dark chestnut brown above, ventral sclerites patterned with much paler brown. Halteres very long, as shown by the measurements, dark brown, base of stem narrowly orange yellow. Legs with coxae pale, gray pruinose; trochanters pale brown; remainder of legs dark brown, tarsi passing into black; legs very long, claws of male small, with two basal spines, the outer one small. Wings light brown, attractively patterned with darker brown and cream-colored areas; darker brown marks include the stigma and adjoining bases of radial cells, posterior cord and confluent outer end of vein *Cu*, with a conspicuous brown area before midlength of cell *Cu*, this preceded and followed by whitened pattern; similar conspicuous whitenings include a very distinct band at and before cord, extending from *C* across cell *1st M*<sub>2</sub> into the base of cell *M*<sub>3</sub>, the bases of the other outer medial cells similarly whitened; less evident pale areas beyond stigma and in outer ends of cells *R*<sub>3</sub>, *R*<sub>5</sub> and *M*<sub>4</sub>; veins brown, whitened in the pale band

over the anterior cord. Venation: (Fig. 24) vein  $R_{1-2}$  atrophied,  $R_3$  very long, exceeding  $R_{2-3}$ ; inner end of cell  $1st M_2$  pointed,  $m-cu$  at near two-thirds  $M_{3-4}$ .

Proximal abdominal tergites orange, more or less light gray pruinose, especially basally; lateral margins blackened on basal part, conspicuously light gray on outer ring, including more than the outer half of segment, basal sternites orange, darker laterally; outer four segments darkened, tergites black with light gray borders, outer five sternites uniformly gray. Second abdominal segment very long, outer four segments short and crowded. Male hypopygium (Fig. 30) with ninth tergite,  $t$ , transverse, posterior border with two broad subquadrate lobes separated by a narrow split, apex of each lobe nearly truncate, with very short dark setulae. Basistyle,  $b$ , on mesal face near apex with a large oval yellow lobe with very sparse setae. Outer dististyle,  $d$ , a narrow blade that terminates in a needlelike spine, with an additional low blackened flange with irregular teeth; inner style mitten-shaped, the «palm» less than three times the «thumb» portion, the latter comprising the lower beak. Aedeagus,  $a$ , very stout, its diameter greater than that of the outer dististyle; penis elongate, terminating in two long sinuous threads. Eighth sternite with posterior border gently convex, on central part with about a score of short inconspicuous setae.

*F e m a l e*. Generally as in male excepting for the sexual characters. Wings greatly reduced, as shown by the measurements; general coloration brown, more yellowed on proximal half, with a conspicuous whitened band at cord, venation entirely distorted. Veins very flabrous, costal setae sparse and scattered, those of outer half shorter, lacking along posterior border of wing; veins glabrous. Halteres long, the large knobs paler than the stems. Legs shorter and stouter than in male. Ovipositor with cerci relatively short, straight and slender, tips obtuse; hypovalvae shorter, broad basally, narrowed into subacute daggerlike points.

*Habitat*: Netherlands New Guinea (West Irian).

*Holotype*, ♂, Station 6, Scree Valley Camp, altitude 3,800 meters, September 22, 1938 (Toxopeus); Archbold III Expedition, in Leiden Museum. *Allotype*, ♀, Lake Habbema, east of Wilhelmina Top, altitude 3,600 meters, August 16, 1938 (Toxopeus). *Paratypes*, ♂♂, with the types, Lake Habbema, July 29 — August 4, 1938; east of Wilhelmina Top, 3,600 meters, September 7, 14, 1938.

I take pleasure in naming this conspicuous fly for Dr. Maurits A. Lieftinck, distinguished student of the Odonata and Apoidea of the Australasian region, to whom I am indebted for many appreciated favors. From other large members of the subgenus the present fly is readily told by the details of wing pattern and especially by the structure of the male hypopygium. *Tipula (Papatipula) cyclopica* Alexander appears to be the nearest relative. This latter originally was assigned to the subgenus *Acutipula* Alexander but evidently is correctly assigned to the present group. It should be noted that among the paratypes there are smaller individuals (the smallest measurements given earlier) that agree so closely in hypopygial characters that they are assigned to the present species despite this difference.

### 13. *Tipula (Papatipula) pensilis* sp. n.

Size relatively small (wing of male 14-15 mm.); mesonotum darkened, praescutum with four brownish gray stripes that are narrowly margined with dark brown, posterior sclerites darker brown; antennae with flagellar segments light yellow, narrowly blackened basally; femora light brown, tips darkened; wings weakly darkened, patterned with darker brown and whitened areas; male hypopygium with tergal lobes approximated, dististyles complex.

**Male.** — Length, about 14-15 mm.; wing, 14-14.5 mm.; antenna, about 4 mm.

**Female.** — Length, about 19 mm.; wing, 17 mm.

Frontal prolongation of head long, subequal to the remainder, brownish black above, including the slender nasus, beneath at base paler brown; palpi dark brown, incisures light yellow, terminal segment elongate, black. Antennae with scape brownish black, pedicel light yellow, flagellar segments yellow, the very small basal enlargements narrowly blackened; longest verticils slightly exceeding the segments. Head gray above, darker adjoining the eyes, the narrow anterior vertex more blackened, slightly elevated.

Pronotal scutum dark brown, gray pruinose sublaterally, scutellum yellow. Mesonotal praescutum gray with four slightly more brownish gray stripes that are narrowly margined by dark brown, humeral region and anterior border more blackened; scutum brownish black, the posterior border gray; scutellum light gray with paired brown spots at base; postnotum dark brown, restrictedly paler laterally, pleurotergite gray pruinose. Pleura gray below, with darker areas on anepisternum and dorsal pteropleurite, dorsopleural membrane brownish yellow. Halteres brown, base of stem dull orange, apex of knob vaguely paler. Legs with coxae and trochanters dark brown, sparsely pruinose; femora light brown, apices dark brown; tibiae light brown, tips



more narrowly darkened; tarsi dark brown, basitarsi with proximal ends paler; claws of male long, with a conspicuous tooth at near midlength and a smaller basal spine. Wings weakly darkened, cells *C* and *Sc* slightly more suffused; a restricted darker brown and whitened pattern; darker markings include the stigma, a seam in bases of outer radial cells adjoining the anterior cord, *m-cu* and adjoining parts of vein *Cu*, and more narrowly on outer medial veins, including bases of veins  $M_1$  and  $M_2$ ; a conspicuous brown area before midlength of cell *Cu*; paler brown clouds at margins of all outer cells, interrupted by whitened spots at ends of longitudinal veins  $R_{4-5}$  to  $M_4$ , inclusive; the more whitened areas include the obliterative band at cord, before and beyond the stigma, and on either side of the darkened mark in cell *Cu*; veins light brown, dark brown in the patterned areas, whitened in the obliterative band. Venation: (Fig. 20) *Rs* shorter than  $R_{2-3}$ ; base of vein  $R_{1-2}$  preserved, the outer end pale to obliterated; *m* subequal to petiole of cell  $M_1$ ; *m-cu* at near midlength of  $M_{3-4}$ ; inner end of cell 1st  $M_2$  pointed.

Abdomen with basal tergite brownish gray; second tergite with basal ring slightly longer than the outer, brownish gray, narrowly bordered by brownish black, outer ring and tergites three to six dark brown, their basal ring very narrow, more plumbeous, outer ring dark chestnut brown, lateral borders conspicuously yellow, margined internally by brownish black; tergites seven to nine more uniformly brownish gray or plumbeous; sternites gray plumbeous to brownish black, proximal segments more reddened. Male hypopygium (Fig. 31) with ninth tergite, *t*, narrowed at outer end, terminating in two lobes provided with blackened spinoid setae. Basistyle, *b*, bearing a conspicuous lobe directed ventrad, terminating in long setae. Dististyle, *d*, with margin of outer style slightly dilated beyond base, apex with two major separated black teeth, with an intervening smaller projection; inner style complex, lower beak very large, blackened, the region of the outer basal lobe with a second smaller blackened lobule. Phallosome, *p*, massive, blackened, lower margin with microscopic denticle, aedeagus stout.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂ Station 13, Rattan Camp, altitude 1,150 meters, February 11, 1939 (Toxopeus); Archbold III Expedition, in Leiden Museum. Allotopotype, ♀, pinned with type. Paratopotypes, ♂, altitude 1,200 meters, February 4, 1939; paratypes, ♀, Station



10, Mist Camp, altitude 1,800 meters, January 9, 1939; ♂, Station 12, Lower Mist Camp, altitude 1,550 meters, January 31, 1939.

The present fly is readily distinguished by hypopygial characters, including especially the basistyle and inner dististyle.

#### 14. *Tipula* (*Papuatipula*) *satirica* sp. n.

Size large (wing of male 20 mm.); mesonotal praescutum light brown, anterior and lateral margins narrowly brownish black; pleura brownish gray, restrictedly patterned with darker; antennae with pedicel light yellow, flagellar segments bicolored; legs with femora yellow, tips dark brown, slightly more extensive on fore and middle pairs; wings light brown, outer radial field darker, with an additional sparse darker brown pattern, pale markings restricted, outer end of vein  $R_{1-2}$  obliterated; abdominal segments with outer rings brownish black, the sides narrowly obscure yellow; male hypopygium with posterior border of tergite with two approximated spiniferous lobes, dististyles very complex.

Male. — Length, about 20 mm.; wing, 20 mm.; antenna, about 4 mm.

Frontal prolongation of head nearly equal in length to remainder, dark brown above, including the conspicuous nasus; proximal segments of palpi brown, incisures more yellowed, terminal segment black. Antennae with scape dark brown, pedicel light yellow, flagellum bicolored, the bases dark brown, remainder yellow; terminal segment very small, blackened; longest verticils slightly exceeding the segments. Head brownish gray, vertex narrowly bordered by darker brown, including the low vertical tubercle, the very restricted front before the antennae light yellow.

Pronotal scutum medium brown, darker laterally, scutellum paler brown, vaguely patterned with darker brown on sides. Mesonotal praescutum light brown, the four stripes virtually concolorous, indicated chiefly by the slightly differentiated borders; anterior and lateral margins of praescutum narrowly brownish black, the transverse suture more narrowly black; scutum light brown with more than the posterior half of each lobe slightly darker, their mesal borders dark brown, restricting or eliminating the midline; scutellum dark brown, vaguely paler at midline, parascutella pale brown; mediotergite with anterior two-thirds brownish black, narrowly pruinose medially and on sides, posterior third with two oval brownish gray areas, pleurotergite more uniformly brown. Pleura brownish gray, slightly patterned with darker on ventral sternopleurite; dorsopleural membrane cinnamon brown. Halteres dark brown, base of stem narrowly obscure

yellow. Legs with fore and middle coxae cinnamon brown, posterior pair darker brown; trochanters obscure yellow; femora yellow, tips dark brown, slightly more extensive on fore and middle pairs; tibiae brown, bases more yellowed, tarsi black; claws with a large spine at near midlength and a smaller basal point. Wings light brown, darker beyond cord, especially in radial field, prearcular region more yellowed; a restricted brown pattern includes the stigma, distal side of anterior cord, *m-cu*, outer end of cell *1st M*<sub>2</sub> and fork of *M*<sub>1-2</sub>; darkened area before midlength of cell *Cu* large and conspicuous, preceded and followed by clearer yellow marks; veins *R*<sub>3</sub> to *Cu* inclusive with a small yellow marginal spot, the remainder of apices of these cells slightly darker; obliterative areas before anterior cord and near outer end of cell *M* adjoining vein *Cu* conspicuous; veins brown, darker in the patterned areas; veins at origin and tip of *Rs*, beyond the stigma and across cell *1st M*<sub>2</sub> in the obliterative field whitened. Venation: (Fig. 21) *Rs* subequal to *R*<sub>2-3</sub>; vein *R*<sub>1-2</sub> virtually obliterated, the basal third barely evident in the whitened area beyond the stigma; petiole of cell *M*<sub>1</sub> and *m* subequal; *m-cu* shortly beyond midlength of *M*<sub>3-4</sub>.

Abdomen with first tergite and basal ring of second light brown, sides of the latter blackened; succeeding tergites with outer rings brownish black, narrowly obscure yellow on sides, basal rings more nacreous, narrower on outer segments, concealed beyond the fifth, outer segments gray pruinose; sternites light brown, posterior borders of outer segments narrowly darker; outer segments more uniformly darkened. Male hypopygium (Fig. 32) with ninth tergite, *t*, transverse, posterior border nearly straight, with two small intermediate lobes separated by a very narrow U-shaped emargination, provided with abundant black spinoid pegs. Dististyles, *d*, very complex, as shown, both the outer and inner styles deeply bifid, beak of inner style slender.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 7, Moss Forest Camp, altitude 2,800 meters, October 13, 1938 (Toxopeus); Archbold III Expedition; type in author's collection.

The most similar species having the wing pattern generally as in the present fly and with vein *R*<sub>1-2</sub> chiefly atrophied is the larger *Tipula* (*Papuatipula*) *lieftincki* sp. n., which differs in the wing pattern and especially in the entirely distinct male hypopygium.

15. *Tipula* (*Papuatipula*) *staryi* sp. n.

General coloration of thorax light gray, praescutum with a complicated striped pattern; antennae relatively short, flagellar segments brown; fore femora dark brown, remaining femora brownish yellow with narrowly dark brown tips, tibiae and tarsi dark brown; wings light brown, variegated by darker brown and white, the latter especially conspicuous before cord and across bases of outer medial cells, attaining the apex in cell  $R_5$ ; a broad continuous darker brown seam along vein  $Cu$ , including the narrow cell  $Cu_1$ , and adjoining posterior border of cell  $M$ ,  $m-cu$  at near two-thirds  $M_{3-4}$ ; basal abdominal segments orange yellow, succeeding segments light gray, broadly dark brown sublaterally, borders of tergites two to six narrowly whitened; male hypopygium with posterior border of ninth tergite with a broad V-shaped emargination, the triangular lobes with abundant blackened spinoid pegs, apex of outer dististyle a blackened flange.

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

Frontal prolongation of head nearly as long as remainder, gray above, narrowly lined with dark brown, sides chestnut brown, nasus elongate; palpi brownish black, incisures of third segment restrictedly pale. Antennae relatively short; scape dark brown, pruinose, pedicel paler brown, flagellar segments brown, their bases very slightly darker; segments virtually cylindrical with little or no basal enlargement, verticils delicate, shorter than the segments. Head above gray, center of posterior vertex and genae vaguely darker; vertical tubercle longitudinally furrowed, leaving irregular lateral ridges.

Pronotal scutum gray, scutellum very compressed flattened, yellow. Mesonotal praescutum with ground light gray, with four poorly indicated bluish gray stripes, the intermediate pair separated by a capillary pale gray vitta, mesal margins of intermediate stripes narrowly blackened on anterior third, becoming expanded and confluent at anterior end; scutum gray, each lobe with two separate darker gray areas; posterior sclerites of notum gray, parascutella yellowed. Pleura gray, katapleurotergite, pteropleurite and meron yellowed, very sparsely pruinose, dorsopleural membrane yellow. Halteres with stem light brown, base narrowly yellow, knob darker brown. Legs with coxae obscure orange, very sparsely pruinose, trochanters light brown; fore femora dark brown, base narrowly yellowed, middle and hind femora brownish yellow, tips narrowly dark brown; tibiae and tarsi dark brown. Wings with the ground light brown, variegated by darker brown and white; a conspicuous white band before cord reaching base of cell  $M_3$ , thence to the wing tip as broad bases to outer medial



cells and extreme outer ends of cells  $R_3$  and  $R_5$ ; extensive but less evident whitenings in cells  $M$  and posterior third of cell  $M_4$  and in centers of cells  $M$ ,  $Cu$  and anterior border of cell *1st A*; the darker brown pattern most evident as a broad continuous seam along vein  $Cu$ , including all of the narrow cell  $Cu_1$  and a confluent seam in cell  $M$ ; the brown cloud common in the subgenus at midlength of cell  $Cu$  much paler than the adjoining seams; veins brown, darker in the heavily patterned parts, paler in the whitened areas, especially along the cord. Macrotrichia on outer section of vein  $R_{4-5}$  and outer medial branches. Venation: (Fig. 23) Outer two-thirds of vein  $R_{1-2}$  atrophied; vein  $R_3$  long and nearly straight, about one-half longer than  $R_{2-3}$ ,  $Rs$  shorter, about two-thirds  $R_{2-3}$ ; petiole of cell  $M_1$  about one-half longer than  $m$ , cell *1st M*<sub>2</sub> strongly pointed at inner end,  $m-cu$  at near two-thirds  $M_{3-4}$ .

First abdominal segment and basal half of second orange yellow, succeeding tergites light gray with broad sublateral dark brown or brownish black stripes, the narrow borders of outer rings of tergites two to six narrowly whitened; sternites beyond midlength of second brownish gray; hypopygium more yellowed, sparsely pruinose. Male hypopygium (Fig. 33) with posterior border of ninth tergite,  $t$ , with a broad V-shaped emargination, the lobes triangular, margins with abundant blackened spinoid pegs and fewer long setae. Outer dististyle,  $d$ , slightly widened at base, nearly parallel-sided, apex with a blackened flange; inner style with dorsal crest rounded, with long yellow setae some of which are angularly bent before tips; beak slender, pale, lower beak black, concave, outer basal lobe black, flattened. Aedeagus short and stout.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, East of Wilhelmina Top, altitude 3,600 meters, September 7, 1938 (Toxopeus); Archbold III Expedition; type in author's collection.

The species is named for Dr. Jaroslav Stary, of Olomouc, Czechoslovakia, capable student of the Tipulidae. It is readily told from other species by the wing pattern, including the broad continuous brown seam along vein  $Cu$ , and in hypopygial characters, including the ninth tergite.



16. *Tipula* (*Papuatipula*) *strictistyla* sp. n.

General coloration of mesonotal praescutum light gray with four poorly differentiated light brown stripes that are slightly variegated by darker, pleura light gray variegated by darker gray, dorsopleural membrane obscure yellow; legs yellowed, tarsi passing into brown; wings whitened with a chiefly costal brown pattern, including areas at ends of all outer radial cells, interrupted at the veins; *Rs* short, nearly twice the basal section of  $R_{4-5}$ ,  $R_{1-2}$  chiefly atrophied, pale; male hypopygium with outer dististyle long and slender, narrowed very gradually to a single terminal blackened point; inner style with beak broadly flattened, lower beak much narrower, margin of style extended into a blackened spine.

Male. — Length, about 18 mm.; wing, 19 mm.; antenna, about 2 mm.

Frontal prolongation of head light brown, slightly gray pruinose above, the long slender nasus slightly decurved; labial palpi dark brown, maxillary palpi light brown (outer segments broken). Antennae with scape and pedicel brownish yellow, flagellum light yellow, bases of third and succeeding segments narrowly brown (broken beyond seventh segment); verticils unusually short, subequal to or shorter than the segments. Head gray in front, including the rugose anterior vertex, posterior vertex pale brown.

Pronotum chiefly brown, restrictedly variegated by light gray areas. Mesonotal praescutum light gray with four poorly differentiated stripes, chiefly light brown, the intermediate pair darker and confluent behind, outer borders of lateral stripes slightly darker; posterior sclerites of notum brownish gray, each scutal lobe with two poorly indicated darker gray areas, the posterior one larger; mediotergite clearer gray, especially the posterior third, sides of basal part slightly darkened; pale yellow setae on praescutal interspaces, scutellum and interspaces. Pleura light gray, ventral sternopleurite and meron darker gray, anepisternum vaguely more darkened; dorsopleural membrane obscure yellow. Halteres with stem brownish yellow, knob brown. Legs with coxae yellowish gray, trochanters yellow; femora and tibiae yellowed, tarsi passing into brown. Wings whitened, with a restricted brown pattern that is chiefly costal; cells *C* and *Sc* brown, the long narrow stigma darker brown; similar brown clouds at ends of all outer radial cells, interrupted at the veins; restricted postarcular darkenings and a very small brown area before midlength of cell *Cu*; narrow darker brown seams along cord in bases of the outer radial cells, *m-cu* and adjoining

parts of *Cu* narrowly dark brown; veins brown, paler in costal field, darker in patterned areas along cord. Venation: (Fig. 22) *Rs* yellowed, nearly twice the basal section of *R*<sub>4-5</sub>; *R*<sub>1-2</sub> chiefly atrophied, vaguely preserved in the whitened poststigmatal area; vein *R*<sub>3</sub> very long, slightly concave; petiole of cell *M*<sub>1</sub> and *m* subequal; *m-cu* beyond two-thirds *M*<sub>3-4</sub>.

Abdomen light cinnamon brown, posterior borders of tergites very narrowly yellow, lateral margins more broadly so, broader and more conspicuous on outer segments; sternites obscure orange yellow, posterior margins similarly narrowly yellowed; outer segments more uniformly brown, hypopygium yellowed. Male hypopygium (Fig. 34) with ninth tergite, *t*, small, transversely oval, posterior margin produced into two short lobes separated by a narrow notch, lobes with abundant small blackened spiculate setae. Basistyle, *b*, with an oval lobe adjoining the dististyles, *d*; outer style long and slender, narrowed very gradually to a single terminal blackened point; inner style with beak broadly flattened, lower beak much narrower; lower margin of style extended into a blackened blade of spine, its tip lying across the base of the lower beak.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 14, Sigi Camp, altitude 1,500 meters, February 17, 1939 (Toxopeus); Archbold III Expedition; type in author's collection.

In the general pattern of the wings the present fly is most similar to *Tipula* (*Papuatipula*) *leucosticta* Alexander, from eastern New Guinea (Stephansort, Astrolabe Bay, collected by Lajos Biro), later collected in New Ireland by Frank H. Taylor. The male hypopygium of the two species are entirely distinct.

### 17. *Tipula* (*Papuatipula*) *toxopeina* sp. n.

Size large (wing over 20 mm.); mesonotum light gray, praescutum with three pale brown stripes; legs light brown, tarsi black, claws of male bidentate; wings pale cream yellow, extensively patterned with light brown; abdomen of male orange, narrowly blackened sublaterally, the extreme borders light gray, tergites five and six black, sternites and hypopygium obscure orange to yellow; male hypopygium with outer dististyle conspicuously dilated on basal half, terminating in two divergent black spines; apex of penis with two elongate yellow lobes.

Male. — Length, about 21-22 mm.; wing, 22-23 mm.; antenna, about 3.8-4 mm.

Female. — Length, about 25 mm.; wing, 25 mm.

Frontal prolongation of head longer than remainder, orange yellow, nasus distinct; proximal three segments of palpus yellow, terminal segment dark brown. Antennae relatively short, scape and pedicel orange, flagellar segments bicolored, the small basal enlargements black, remainder yellow, the amount of the latter decreasing on outer segments; flagellar verticils very long. Head dull orange, genae weakly dusted with gray.

Pronotum light yellow. Mesonotal praescutum light gray with three poorly indicated narrow pale brown stripes, interspaces more yellowed; scutum light gray, each lobe with two pale brown areas; posterior sclerites of notum yellow, light gray pruinose; vestiture of notum short and pale. Pleura brownish yellow, light gray pruinose, dorsopleural membrane light orange. Halteres elongate, brown, base of stem obscure orange. Legs with coxae yellow, very light pruinose; trochanters yellow; femora and tibiae light to medium brown, tarsi darker brown, outwardly passing into black; claws of male long, bidentate, basal spine more slender. Wings pale cream yellow with an extensive pale brown pattern to produce an attractive pattern; the darkest and most extensive areas at and just beyond arculus, leaving a clear yellow spot before arculus that includes the base of cell *2nd A*, outer radial and medial fields darkened, exceeding the ground pattern; extensive brown areas over *m-cu* and adjoining vein *Cu*; further darkenings at origin of *Rs*, before midlength of cell *Cu* and as an isolated spot on margin of cell *1st A*; much paler brown marks before cord, most extensive in cells *R*, *M*, outer third of *Cu* and much of *1st A*; veins medium brown, pale and partly obliterated on anterior cord and across cell *1st M*<sub>2</sub>. Venation (Fig. 18) *Rs* longer than *R*<sub>2-3</sub> long, entire; petiole of cell *M*<sub>1</sub> and *m* subequal; *m-cu* at near two-thirds to three-fourths *M*<sub>3-4</sub>, cell *2nd A* broad.

Male with proximal abdominal tergites orange, sublaterally narrowly blackened, the extreme borders light gray; tergites five and six black, sternites and hypopygium yellow to obscure brownish orange; second segment, especially the tergite, very long. In female the conspicuous outer blackened area on tergites lacking; ovipositor with cerci long and very slender, hypovalvae broad, tips obtuse. Male hypopygium (Fig. 35) with posterior border of ninth tergite, *t*, produced, apex with two blackened spiculate lobes. Outer dististyle, *d*, with proximal half conspicuously dilated, outer part narrowed, with two divergent black spines; inner style complex, as shown, the longest part bilobed or concave, with

a smaller blackened lobe at its base, this bent strongly inward into a obtuse knob. Apex of penis with two elongate yellow lobes, their apices obtuse.

Habitat: Netherlands New Guinea (West Irian).

Holotype, ♂, Station 7, Moss Forest Camp, altitude 2,800 meters, October 10, 1938 (Toxopeus); Archbold III Expedition, in Leiden Museum. Allotopotype, ♀, altitude 2,850 meters, August 23, 1938. Paratopotype, ♂, with the allotype.

This attractive fly is dedicated to the collector, Lambertus Johannes Toxopeus, whose life and accomplishments were considered briefly in the introduction to the present paper. It is most readily distinguished from other large sized regional species having patterned wings by the hypopygial structure, including the outer dististyle.

### Limoniinae Limoniini

#### 18. *Limonia* (*Libnotes*) *colossus* sp. n.

Size very large (wing of male 28 mm.); general coloration of head and thorax brownish yellow to cinnamon brown, thoracic dorsum with darker pattern, pleura almost uniformly reddened, with a gray sheen; antennae with scape and pedicel light brown, flagellum yellow; halteres with base of knob dark brown; legs yellow, tips of fore femora broadly brown, remaining femora with narrower paler brown subterminal rings; wings long and relatively narrow, conspicuously patterned with darker, including series of spots along the veins, stigma darker brown; male with costal vestiture spinoid, free tip of  $Sc_2$  in transverse alignment with  $R_2$ ; cell  $1st M_2$  elongate,  $m$  longitudinal in position, its anterior end at near three-fourths the length of cell; abdominal tergites yellowish brown with a longitudinal darker brown pattern; male hypopygium with rostral spines long, at summit of a stout tubercle.

Male. — Length, about 20 mm.; wing,  $28 \times 4.8$  mm.; antenna about 3.8 mm.

Rostrum very light brown, palpi dark brown. Antennae with scape and pedicel light brown, flagellum yellow; flagellar segments oval, the major seta a trifle longer than the segment. Head cinnamon brown; anterior vertex narrow, about one-third the diameter of the antennal scape.

Pronotal scutum yellowed, longitudinally patterned with pale brown stripes, posterior margin on either side with a group of about 18 small black setae; scutellum light yellow. Mesonotal praescutum with the restricted ground light yellow, lateral borders and disk with a total of six light cinnamon brown stripes, the intermediate pair with posterior half darker, anteriorly ending abruptly some distance before margin, with a short capillary



central darkening; vestiture of praescutal interspaces abundant but reduced to scarcely evident microscopic black setae; scutum obscure yellow, each lobe with two nearly confluent pale brown areas, median area less evidently patterned, extended caudad as a very narrow stripe into the scutellum, not reaching the posterior border, remainder of scutellum light yellow; mediotergite pale grayish yellow with a similar narrow brown central line. Pleurotergite and pleura almost uniformly reddish, with a gray sheen, very vaguely patterned with darker on propleura. Halteres with stem light yellow, knob pale brown, base narrowly darker brown. Legs with coxae yellowed, outer face of fore pair patterned with brown, less evident on mid coxae, posterior pair unpatterned; fore femora yellow, tips broadly brown, including about one-sixth of the segment; remaining femora with a narrower subterminal ring, more distinct on middle legs, narrower on posterior pair where they are only slightly more extensive than the yellowed apex; all femora with abundant exceedingly small dark colored setae, remainder of legs yellowed, bases and tips of tibiae narrowly and inconspicuously darkened, outer three tarsal segments brown; claws black, with a curved spine at near midlength and a more basal concentration of about nine smaller teeth, the outermost slightly larger. Wings long and relatively narrow, as shown by the measurements, nearly six times as long as broad; ground color very pale yellow, the centers of virtually all cells with a pale brown streak that does not reach the veins, the latter with numerous darker brown spots, virtually all single and not confluent; stigma and a smaller area at tip of vein *R* dark brown, conspicuous; veins yellow, brown in the patterned parts. Costal vestiture including abundant short spinoid setae, remaining veins with setae slightly longer, very delicate and inconspicuous. Venation:  $Sc_1$  ending opposite outer end of cell *1st M*<sub>2</sub> at tip, its free outer section in transverse alignment with *R*<sub>2</sub>; all outer veins decurved, the more anterior ones especially so, the radial branches reaching the wing apex; *Rs* straight, cell *1st M*<sub>2</sub> elongate, *m* longitudinal in position, its anterior end at near three-fourths the cell, basal section of *M*<sub>3</sub> transverse, nearly one-half *m*; *m-cu* at near one-third *M*<sub>3-4</sub>.

Intermediate abdominal tergites yellowish brown, each with three brown longitudinal stripes, the median one less distinct, sternites and hypopygium clearer yellow. Male hypopygium generally as in the subgenus; ninth tergite with posterior border truncate, anterior margin strongly convex medially; outer fourth

of posterior border with numerous setae. Dorsal dististyle elongate, narrowed gradually outwardly, at near two-thirds the length strongly bent, thence narrowed to an acute point; ventral style with rostrum slender, the two very long spines approximated at apex of a stout tubercle, accessory lobe of style much larger, with about five very long dark setae; total area of ventral style less than that of the basistyle. Gonapophysis with mesal apical lobe long and slender; aedeagus terminating in two sclerotized decurved knobs; enclosed filaments of penis approximated to virtually united into a single element.

Habitat: Fiji.

Holotype, ♂, Matuka Island, July 3, 1924 (Edwin H. Bryan, Jr.).

The present fly is one of the largest known species in the great genus *Limonia*. In size it is exceeded only by the Japanese *Limonia (Laosa) kariyana* Alexander where the wing of the male may reach a length of 30 mm., the wing expanse nearly 70 mm. In the Oriental-Australasian fauna there are several smaller species of *Libnotes* that are similar to the present fly in general appearance, especially in the patterns of the legs and wings. By means of Edwards' key to the species of *Libnotes* (Jour. Fed. Malay States Mus., 14, Part 1: 74-80; 1928) these generally similar species fall between couplets 7 and 32 and include species such as *pleuralis* (Edwards), *punctatinervis* (Edwards), *punctipennis* (de Meijere), *stantoni* (Edwards), *strigivena* (Walker), and some others, all much smaller than the present fly. Characters in the male sex of species in this subgenus that have not been properly stressed include the spinoid setae of the costa of the wings and the femora of the legs, and the venation of the outer radial field of the wing where it is evident there is considerable variation in the different species.

#### 19. *Limonia (Libnotes) elachista* sp. n.

Size relatively small (wing about 13 mm.); legs yellow, femora with a narrow subterminal ring; wing cells abundantly spotted with brown, cell *1st M*<sub>2</sub> unusually small, about two-thirds as long as vein *M*<sub>4</sub>, veins *m* and basal section of *M*<sub>3</sub> subequal; male hypopygium with three elongate rostral spines from a common tubercle.

Male. — Length, about 10-11 mm.; wing, 12-13 mm.; antenna, about 2.4-2.5 mm.

Rostrum brown, palpi black. Antennae with scape and pedicel black, flagellar segments weakly bicolored, brown, apices yellowed; flagellar segments oval, longest verticils subequal to the segments. Head light brown; anterior vertex very reduced.

Pronotum light yellow to brownish yellow. Mesonotal praescutum brownish yellow, patterned with dark brown, including

four distinct stripes on more than the posterior third, nearly obsolete anteriorly; scutum light yellow medially, lobes extensively dark brown, restrictedly clear yellow at the suture; scutellum light yellow, posterior border narrowly brown, parascutella yellow; mediotergite brownish gray, anterior and posterior borders dark brown, the latter being the posterior end of a conspicuous dorsal pleural stripe. Pleura light yellow, patterned as above, with a narrow much broken stripe on sternopleurite and meron. Halteres with stem blackened, yellow basally, knob obscure yellow. Legs with coxae yellowed, fore and middle pairs restrictedly darkened, trochanters yellow; femora brownish yellow with a narrow darker brown subterminal ring, subequal to the yellow apex, remainder of legs grownish yellow (outer tarsal segments broken); vestiture of posterior femora consisting of abundant delicate setae. Wings (Fig. 36) yellow, prearcular and costal fields more saturated yellow; a narrow dark brown seam over cord, all remaining cells with an abundant pale brown spotted pattern that does not include the veins, the amount of dark color subequal to or exceeding the yellow ground; veins chiefly yellow, the cord, outer end of cell *1st M*<sub>2</sub> and outer ends of most longitudinal veins brown, vein *R*<sub>4-5</sub> uniformly yellow. Venation as shown; *R*<sub>1-2</sub> and free tip of *Sc*<sub>2</sub> longer than the oblique *R*<sub>2</sub>; *Rs* straight, in alignment with basal section of *R*<sub>4-5</sub>; cell *1st M*<sub>2</sub> unusually small, about two-thirds vein *M*<sub>4</sub>; veins *m* and basal section of *M*<sub>3</sub> subequal; *m-cu* shortly beyond one-third the length of *M*<sub>3-4</sub>.

Abdominal tergites dark reddish brown, more blackened laterally, sternites yellowed, at base and apex with small brown lateral spots; hypopygium yellow. Male hypopygium (Fig. 41) as in the subgenus; ninth tergite, *t* very large, posterior border strongly convex, lateral angles strongly extended. Dorsal dististyle, *d*, long, moderately curved; ventral style with rostral prolongation long and slender, on outer face at base with a small tubercle bearing a close group of three long spinoid setae; apex of style with a broad lobe with about six long powerful setae that form a recurved tuft or crest. Apex of aedeagus conspicuously bilobed

Habitat: Northern Solomon Islands: northern New Guinea

Holotype, ♂, Bougainville Is., altitude 1,000 feet, September-November 1944 (Jean Laffoon). Paratype, ♂, Hollandia, New Guinea, altitude, 1,000 feet, March 1945 (Jean Laffoon).

*Limonia (Libnotes) elachista* is most readily told from other generally similar regional species having abundantly spotted wings by the unusually small rectangular cell *1st M*<sub>2</sub>. By Edwards' key to the species of

*Libnotes*, cited under the preceding species, the present fly by venational characters runs to couplet 28 and beyond, disagreeing with all included species in the wing pattern and details of venation. It should be noted that in the present species and in several others that the length of the flagellar verticils as given in the key is at variance with the venational characters. By using the character of relative length of the flagellar verticils this fly runs with some difficulty to species such as *stantoni* (Edwards) and others, but is quite distinct in the venational feature stressed above which has suggested the specific name for this insect. In Edwards' key to the subgenus the various species beyond couplet 53 now are placed in the subgenus *Goniodineura* van der Wulp (type, *nigriceps* van der Wulp).

## 20. *Limonia* (*Limonia*) *bougainvilleana* sp. n.

Size small (wing slightly over 5 mm.); general coloration of thorax yellow, mesonotum patterned with brown; proximal flagellar segments with short apical pedicels, terminal segment elongate; legs light brown; wings weakly infuscated, stigma slightly darker; male hypopygium with ventromesal lobe of basistyle small; dististyle single, subglobular, rostrum a slender blade that narrows to the acute apex; gonapophysis with mesal-apical lobe long and straight.

**Male.** — Length, about 5 mm.; wing, 5.2-5.3 mm.; antenna, about 1.2 m.

Rostrum and palpi black. Antennae black; proximal flagellar segments oval, with short apical pedicels, succeeding segments long-oval, terminal one elongate, about one-half longer than the penultimate, outer half narrowed. Head brownish black, pruinose; eyes large, anterior vertex narrow.

Pronotal scutum light brown, scutellum yellowed. Mesonotal praescutum light brown with three darker stripes, the median one behind paling to reddish brown before suture, lateral stripes produced caudad to include lateral parts of scutal lobes; posterior sclerites of notum reddish brown. Pleura brownish yellow dorsally, paler yellow beneath, including a clear yellow ventral stripe on sternopleurite and meron. Halteres with stem brownish yellow, base clearer yellow, knob brown. Legs with coxae and trochanters yellow; remainder of legs light brown throughout; claws long and slender, gently curved, with a single long basal spine. Wings (Fig. 37) weakly infuscated, stigma subcircular, slightly darker brown; veins brown. Longitudinal veins beyond general level of origin of *Rs* with black trichia, including also a few on outer fourth of *2nd A*. Venation: *Sc*<sub>1</sub> ending shortly beyond fork of *Rs*, *Sc*<sub>2</sub> close to its tip; free tip of *Sc*<sub>2</sub> whitened, shorter than the veins beyond it; *m-cu* beyond midlength of *M*<sub>3-4</sub>.



Abdomen with tergites dark brown, sternites light yellow. Male hypopygium (Fig. 42) with ninth tergite, *t*, semicircular in outline, posterior border rounded, without emargination. Basistyle, *b*, with ventromesal lobe low and rounded, with long setae, near its base with a concentration of strong setae. Dististyle, *d*, single, subglobular, inner face above the elongate rostrum slightly produced, terminating in three strong setae, below the rostrum produced into a low stouter lobe; rostrum a narrow blade, gently decurved to the acute tip. Gonapophysis, *g*, with mesal-apical lobe long and straight, tip very narrowly obtuse.

Habitat: Northern Solomon Islands.

Holotype, ♂, Bougainville Is., altitude 1,000 feet, September-November 1944 (Jean Laffoon). Paratopotype, a broken male, pinned with type.

The most similar species include *Limonia (Limonia) bidentata* (Skuse), *L. (L.) bidentoides* Alexander, and some others, all most readily distinguished among themselves by hypopygial structure.

### 21. *Limonia (Limonia) perextensa* sp. n.

Belongs to the *semiermis* group; size relatively small (wing of male about 6 mm.); general coloration of thorax yellow, patterned with brown, praescutum with five stripes, mesopleura conspicuously darkened; wings subhyaline, stigma oval, pale brown, *Sc* long, *m-cu* at near one-fourth  $M_{3-4}$ ; male hypopygium with dististyle subrectangular, terminating in a small obtuse rostrum, at base of latter with an acute yellow blade.

Male. — Length, about 6 mm.; wing, 6.2 mm.; antenna, about 1.8 mm.

Rostrum and palpi brown. Antennae brown throughout; flagellar segments oval with short apical pedicels, narrower and more evident on outer segments; outer fourth of terminal segment strongly narrowed. Head dark brown.

Pronotum dark brown medially, sides yellowed, dorsopleural region with a black spot beneath the humeri. Mesonotum yellowed, praescutum with five brown stripes, the outer most marginal, the intermediate pair crossing the suture to include the scutal lobes, central stripe virtually reaching the suture, scutellum weakly infuscated. Pleura yellow, propleura narrowly darkened, mesopleura with extensive brown areas on both anepisternum and mesopleurite, pteropleurite and meral region clear light yellow. Halteres with stem yellow, knob infuscated. Legs with fore coxae extensively darkened, middle coxae less so on anterior face, remaining coxae and all trochanters yellow; femora brownish

yellow, narrowly clearer yellow basally, with a darker brown nearly terminal ring, the actual apex whitened; tibiae and tarsi light brown, outer segments darker; claws long and slender, with a single long basal spine. Wings (Fig. 38) subhyaline, prearcular and costal fields very slightly more yellowed; stigma oval, pale brown; veins darker brown. Veins beyond general level of origin of *Rs* with abundant trichia, including also the outer ends of both Anal veins. Venation: *Sc* long, *Sc*<sub>1</sub> ending shortly before fork of *Rs*, *Sc*<sub>2</sub> subequal; free tip of *Sc*<sub>2</sub> pale, shortly basad of *R*<sub>2</sub>; cell 1st *M*<sub>2</sub> long, subequal to vein *M*<sub>4</sub>; *m-cu* at near one-fourth *M*<sub>3-4</sub>.

Abdomen dark brown, central parts of hypopygium more yellowed. Male hypopygium (Fig. 43) with ninth tergite, *t*, semicircular in outline, posterior border almost evenly rounded, thickened, with a very small central emargination, setae long, marginal, more concentrated near the middle. No conspicuous development of the proctiger. Basistyle, *b*, with the ventromesal lobe very long and narrow, as in the *semiermis* group, slightly longer than the style itself, narrowed on outer third, apex with closely parallel corrugations, as in the group. Dististyle, *d*, subrectangular in outline, terminating in a small obtuse rostrum, outer margin at base of the latter with a strong acute blade that narrows to an acute point, base of style with unusually long setae. Gonapophysis, *g*, with mesal-apical lobe long, erect, apex slender, outer margin at its base with a small triangular point.

Habitat: Fiji.

Holotype, ♂, Ovalau, Levuka, altitude 0-200 meters, December 1969 (N. L. H. Krauss).

The *semiermis* group of the subgenus include the larger *Limonia* (*Limonia*) *semiermis* (Alexander), of Queensland, with races in New Caledonia, and the small *L.* (*L.*) *persetos* Alexander, of Fiji, all species differing among themselves chiefly in hypopygial structure, particularly the dististyles. In the group the hypopygium chiefly is remarkable in the elongate ventromesal lobe of the basistyle and in the conformation of the gonapophyses.

## 22. *Limonia* (*Limonia*) *prolixisetosa* sp. n.

Size large (wing of male over 10 mm.); general coloration of mesonotum reddish brown, patterned with dark brown and black; legs light brown, with very long setae; wings yellowed, stigma pale brown, costal border with very long setae on proximal two-thirds with

correspondingly long vestiture on anal border; male hypopygium with tergite large, posterior border with two low lobes that are provided with dense stout black setae; dististyle small, single, outer half blackened.

Male. — Length, about 10 mm.; wing, 10.5 mm.

Type badly broken and discolored. Rostrum and palpi black. Antennae black throughout; proximal five or six flagellar segments enlarged, subglobular, with short abrupt apical pedicels, outer segments slender. Head brownish black.

Prothorax blackened. Mesonotal praescutum dull reddish brown with more blackened stripes, on either side anteriorly with sparse long black setae; posterior sclerites of notum more uniformly reddish brown; scutal lobes with long black bristles laterally and much smaller setae near the middle; scutellum very broad. Pleura glabrous, chiefly dark brown, ventral sternopleurite obscure yellow. Halteres elongate, stem brown, near base with several long black setae, knob darker brown. Legs with fore coxae dark brown, remaining coxae and all trochanters brownish yellow; remainder of legs light brown; femora and tibiae with very long setae that exceed the diameter of the segment; claws slender, enlarged at base, with a small concentration of spines, the outermost stouter, at near two-thirds the length of claw with a small black spine. Wings (Fig. 39) broken and discolored in the unique type, ground yellow, stigma oval, pale brown; veins brown. Costal border with about the proximal two-thirds bearing very long setae, the longest about equal to the combined width of cells *C* and *Sc* opposite their insertion, opposite and beyond the stigma these setae much shorter, becoming almost microscopic before wing tip; anal border in prearcular field and over most of cell *2nd A* with similar very long but more delicate setae, becoming much shorter in cells *Cu* and *1st A*. Venation: *Sc* long, *Sc*<sub>1</sub> and *Sc*<sub>2</sub> equal, ending nearly opposite midlength of *Rs*; *m* arcuated, basal section of *M*<sub>3</sub> straight; *m-cu* just beyond the fork of *M*.

Abdomen dark reddish brown, sternites, especially the outer ones, more yellowed, hypopygium obscure yellow; first abdominal tergite and basal sternites with abundant long erect whitened setae. Male hypopygium (Fig. 44) with ninth tergite, *t*, large, posterior border with two low lobes separated by a low V-shaped emargination, vestiture restricted to very dense stout black setae on the lobes. Proctiger very broad, apex nearly truncate, surface with abundant setulae. Basistyle, *b*, with ventromesal lobe

relatively small. Dististyle, *d*, with outer half blackened, including an acute spine that presumably represents the outer end of a dorsal style, base yellowed, with numerous strong yellow setae; dististyle unusually small, its area only about one-fifth that of the basistyle. Gonapophysis, *g*, with mesal-apical lobe long, narrowed gradually into a gently curved black spine.

Habitat: Fiji.

Holotype, ♂, Navai Hill, Viti Levu, near Nandarivatu, altitude 2,500 feet, September 17, 1938 (E. C. Zimmerman).

The present fly is most nearly allied to *Limonia (Limonia) bryaniana* Alexander, of Samoa (Encycl. Ent., Diptera, 5: 86-88, fig. 3, wing, fig. 6, ♂ hypopygium; 1929) which has the hypopygial structure much the same, differing in the details, especially of the dististyle and proctiger. The posterior tarsi of *bryaniana* are conspicuously whitened.

### 23. *Limonia (Nealexandriaria) scolopia* sp. n.

General coloration of entire body yellow, tinged with green; legs greenish yellow; wings yellowed, unpatterned, veins more greenish yellow; male hypopygium with rostral prolongation of ventral dististyle a slender curved spine, narrowed gradually to the acute tip.

Male. — Length, about 4 mm.; wing, 4 mm.

Female. — Length, about, 5 mm.; wing, 4.8 mm.

Head and appendages pale yellow with strong greenish tinge; eyes large, intensely black.

Thorax uniformly yellow, tinged with green, more persistent on the metapleural region. Halteres with stem pale green, knob more darkened. Legs with coxae and trochanters strongly green, remainder of legs greenish yellow. Wings (Fig. 40) yellowed, unpatterned; veins greenish yellow. Longitudinal veins beyond general level of origin of *Rs* with abundant black trichia, including a few at outer end of vein *2nd A*. Venation: *Sc*<sub>1</sub> ending far before origin of *Rs*, the latter shorter than basal section of *R*<sub>4-5</sub>; *m-cu* subequal in length to distal section of *Cu*<sub>1</sub>, variable in position, from shortly before fork of *M* to more than one-third its length.

Abdomen greenish yellow. Male hypopygium (Fig. 45) with the ninth tergite, *t*, transverse, posterior border very shallowly emarginate, lateral lobes low, setae relatively long but pale and inconspicuous. Basistyle, *b*, about one-half the area of the ventral dististyle, ventromesal lobe relatively small, with long setae. Dorsal dististyle, *d*, slender, strongly curved at near two-thirds its length, narrowed to an acute point; ventral style with rostral prolongation



unique, appearing as a long gently curved spine that is narrower than the dorsal dististyle, on outer half with two punctures that bear delicate appressed setae. Gonapophysis, *g*, with mesal-apical lobe slightly expanded before the small obtuse tip.

Habitat: Tonga.

Holotype, ♂, Vavau-Neiafu, altitude 0-100 meters, November 1969 (N. L. H. Krauss). Allotopotype, ♀ pinned with type. Paratopotype, one ♀, pinned with types.

Other somewhat similar small-sized regional members of the subgenus include *Limonia* (*Nealexandriaria*) *cinereicapella* Alexander and *L. (N.) ochricapella* Alexander, which differ conspicuously in hypopygial structure, especially the rostral prolongation of the ventral dististyle.

### Hexatomini

#### 24. *Austrolimnophila* (*Austrolimnophila*) *caledoniana* sp. n.

Mesonotum chiefly light brownish yellow, patterned with darker brown, pleura and bases of coxae almost uniformly brown; legs yellow, femora with a broad nearly apical brown ring; wings yellow, with an abundant pale brown dotted and spotted pattern, with restricted darker areas at origin of *Rs* and elsewhere; abdominal tergites brownish yellow, sternites clear light yellow, sides narrowly dark brown.

**F e m a l e.** — Length, about 9.5-10 mm.; wing, 8.5-8.7 mm.; antenna, about 1.7-1.8 mm.

Rostrum light brown; palpi brown, terminal segment darker. Antennae with the elongate scape dark brown, pedicel yellowed, flagellum light brown; flagellar segments slender, cylindrical, progressively longer outwardly, the proximal ones with verticils that exceed the segments. Head dark brown; anterior vertex broad.

Pronotal scutum light yellow above, cephalic end bilobed, brownish black. Mesonotum chiefly light brownish yellow, including four confluent praescutal stripes, with a faint darkened central line at anterior end, scutellum and mediotergite with a comparable capillary darkening. Pleura almost uniformly brown, including also the narrowly darker bases of all coxae. Halteres with stem brownish yellow, knob brown. Legs with coxae clear light yellow except as described above; trochanters yellow; femora yellow, broadly brown subapically, tips brownish yellow; tibiae yellow, apices slightly darkened; tarsi yellow, outer segments pale brown. **Wings** (Fig. 46) yellow, with an abundant pale brown dotted and spotted pattern in all cells, with larger and slightly darker areas at origin of *Rs*, stigma, ends of outer veins, and the cord,

in the holotype the darkened pattern more abundant and extensive, subequal in extent to the ground; in the paratype, the markings abundant but smaller, the total less than the ground; veins yellow, slightly darker in the larger brown areas. Venation: Outer radial veins very long,  $R_4$  and  $R_5$  parallel to one another, cell  $R_4$  at margin about one-third as extensive as cell  $R_3$ ; petiole of cell  $M_1$  slightly longer than  $m$ ;  $m-cu$  at from about one-thirds to one-fourth  $M_{3-4}$ ; vein *2nd A* long, the cell narrow.

Abdominal tergites brownish yellow; sternites clear light yellow, sides narrowly but conspicuously dark brown.

Habitat: New Caledonia.

Holotype, ♀, Mont Mou, altitude 900 feet, January 1948 (L. R. Garrigou). Paratopotype, ♀, February 1949 (Garrigou).

Although the male sex of this fly presently is unavailable there appears to be no question as to the generic reference. Other Australasian members of the genus having a somewhat similar wing pattern include *Austrolimnophila* (*Austrolimnophila*) *antiqua* (Skuse), of Australia, *A. (A.) excelsior* Alexander, of New Guinea, *A. (A.) leucomelas* (Edwards), of New Zealand, and some others. Superficially the fly resembles *Paralimnophila remingtoni* (Alexander), likewise from New Caledonia, but is quite distinct.

### Eriopterini

#### Genus *Gonomyia* Meigen

*Gonomyia* Meigen; Syst. Besch. Eur. Zweifl. Ins., 1: 146; 1818.

#### Subgenus *Megalipophleps* subg. n.

Characters generally as in *Lipophleps* Bergroth and other allied subgenera. Size very large (wings to 6-7 mm.). Wings (*nigripennis*, Edwards, Fig. 47) with  $Sc$  moderately long,  $Sc_1$  ending shortly beyond origin of  $R_s$ , the latter unusually short, less than the length of cell *1st M*<sub>2</sub>. Male hypopygium (Fig. 49) with posterior border of ninth tergite,  $t$ , produced into a median lobe. Basistyle,  $b$ , with body small, outer end produced caudad into a powerful arm that is nearly twice the base, mesal face of outer end with abundant microscopic blackened points. A single very long and slender dististyle,  $d$ . Phallosome,  $p$ , with gonapophyses,  $g$ , broadly united basally, narrowed distally, only the outer ends separate, each produced into an acute point. Aedeagus a very long slender rod, exceeding the basistyle in length, bent at a right angle before apex.

Type of subgenus: *Gonomyia* (*Lipophleps*) *dicranura* Edwards (Samoa). Other included species are *labidura* Edwards and *nigripennis* Edwards, both from Samoa. Other species of large size, including *flavidapex* Edwards, of the Society Islands, and especially *metallica* Edwards, of Marquesas, evidently are not members of this subgenus despite their somewhat similar general appearance.

### ***Gonomyia* (*Megalipophleps*) *nigripennis* Edwards**

*Gonomyia* (*Lipophleps*) *nigripennis* Edwards; Insects of Samoa and other Samoa Terrestrial Arthropoda, Part 6, fac. 2, Diptera Nematocera, pp. 23-102, figs. 1-20; June 1928; reference pp. 93-94, fig. 19 (wing).

Types from Malololelei, Upolu, June 20 and 25, 1924 (Buxton-Hopkins). Additional records: Afiamalu, Upolu, altitude 2,100 feet, June 13, 1940, by sweeping (O. H. Swezey); altitude 2,200 feet, June 30, 1940 (E. C. Zimmerman).

The chief characters available for separating these very large members of the genus into a distinct subgenus are in the male hypopygium, including the single dististyle, fused gonapophyses, and the distinctive aedeagus.

### **25. *Cheilotrichia* (*Empeda*) *zimmermani* sp. n.**

General coloration of thorax yellow, notum conspicuously more darkened; halteres yellow; legs yellow, tips of femora narrowly brownish black, no scales on legs; wings brownish yellow, unpatterned; male hypopygium with both dististyles pale.

Male. — Length, about 3-3.2 mm.; wing, 3-3.5 mm.

Female. — Length, about 3 mm.; wing, 3.8-4 mm.

Rostrum brownish yellow, palpi brownish black. Antennae brownish black; proximal flagellar segments subglobular, outwardly passing through short-oval to oval, verticils of outer segments very long. Head dark brown.

Pronotum and pretergites light yellow. Mesonotal praescutum polished brownish black, sides more yellowed, scutum darker, almost black; posterior sclerites of notum brown, sparsely pruinose, parascutella and pleurotergite yellowed. Pleura chiefly yellow, mesopleura slightly darkened. Halteres light yellow. Legs yellow, tips of femora narrowly brownish black, including about the outer tenth, tips of tibiae more narrowly dark brown, outer tarsal segments darkened; legs with elongate scales additional to normal setae. Wings (Fig. 48) faintly brownish yellow, without pattern;

veins yellowish brown. Macrotrichia on virtually all longitudinal veins basad nearly to the arculus, lacking on about the basal fourth of *M*. Venation: *Sc* relatively short, *Sc*<sub>1</sub> ending just beyond origin of *Rs*; *R*<sub>3</sub> oblique, varying from about one-half to about two-thirds *R*<sub>3-4</sub>; *m-cu* at or close to fork of *M*.

Abdominal tergites brown to dark brown, sternites and hypopygium yellow. Male hypopygium (Fig. 50) with both dististyles, *d*, pale, outer style with the shorter inner arm slightly widened at the very obtuse outer end; inner style long and narrow, parallel-sided. Phallosome, *p*, without modified projections.

Habitat: Fiji.

Holotype, ♂, Nandarivatu, Viti Levu, altitude 2,900 feet, September 6, 1938, at light (E. C. Zimmerman). Allotopotype, ♀. Paratopotypes, several ♂ ♀, August 31, September 6-8, 1938.

I take great pleasure in naming this crane fly for the collector, Dr. Edwood C. Zimmerman, distinguished worker on the taxonomy in many orders of insects.

The most similar regional species is *Cheilotrichia (Empeda) crassicus* (Edwards), of Samoa, which differs conspicuously in the lack of appressed scales on the legs and in hypopygial structure, including the blackened outer dististyle. The presence or absence of scales on the legs of these two species is of interest since it is not a sexual character, the condition being the same in both sexes.



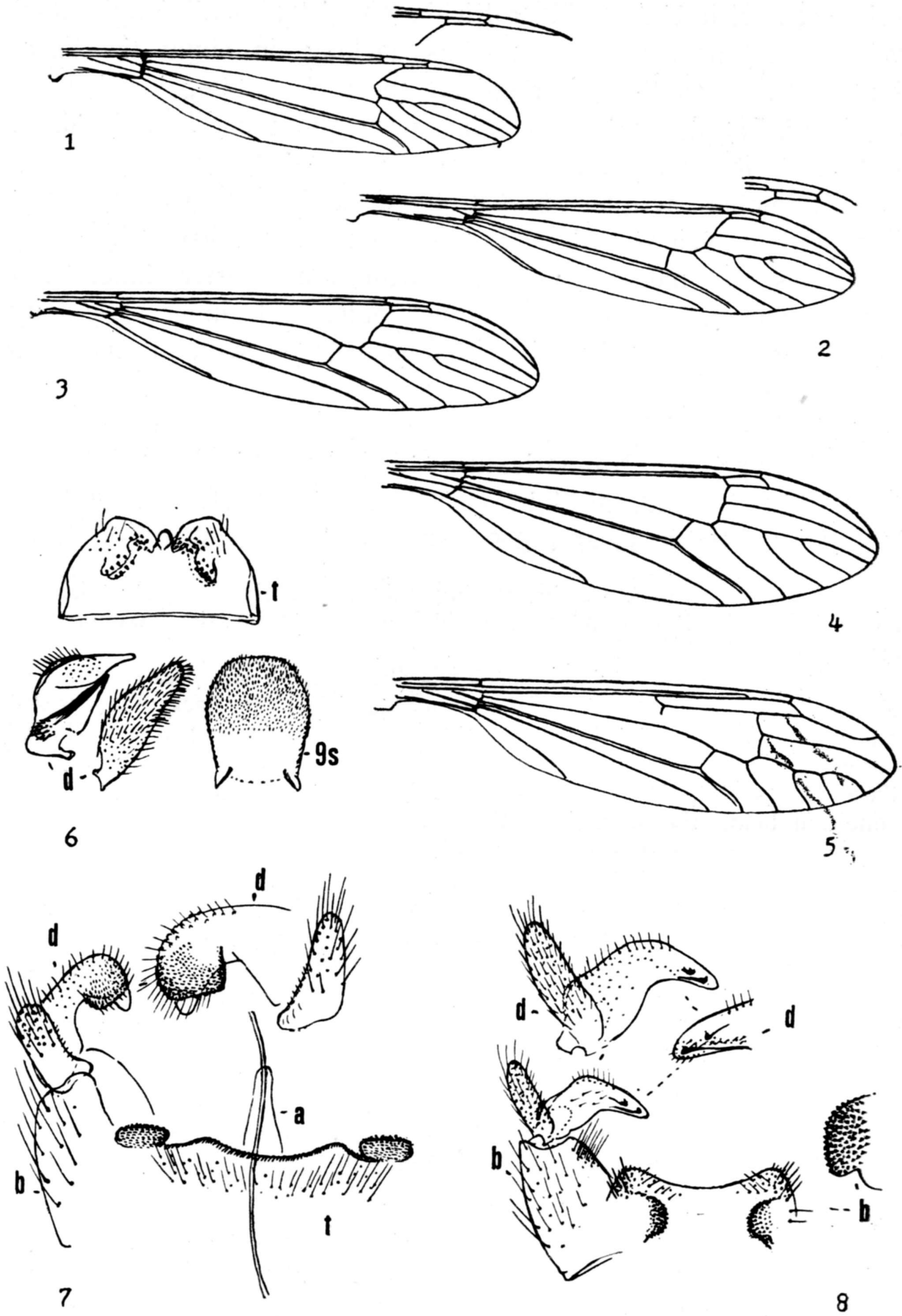


Fig. 1. *Nephrotoma (Scamboneura) curtistyla* sp. n.; venation. — Fig. 2. *Dolichozepeza (Dolichozepeza) distivena* sp. n.; venation. — Fig. 3. *Dolichozepeza (Dolichozepeza) mongas* sp. n.; venation. — Fig. 4. *Dolichozepeza (Dolichozepeza) setistyla* sp. n.; venation. — Fig. 5. *Dolichozepeza (Nesopeza) kraussiana* sp. n.; venation. — Fig. 6. *Nephrotoma (Scamboneura) curtistyla* sp. n.; male hypopygium. — Fig. 7. *Dolichozepeza (Dolichozepeza) anthema* sp. n.; male hypopygium. — Fig. 8. *Dolichozepeza (Dolichozepeza) bibasis* sp. n.; male hypopygium. — Symbols: Venation, C, Costa; R, Radius. Male hypopygium. — a, aedeagus; b, basistyle; d, dististyle; s, sternite; t, tergite.

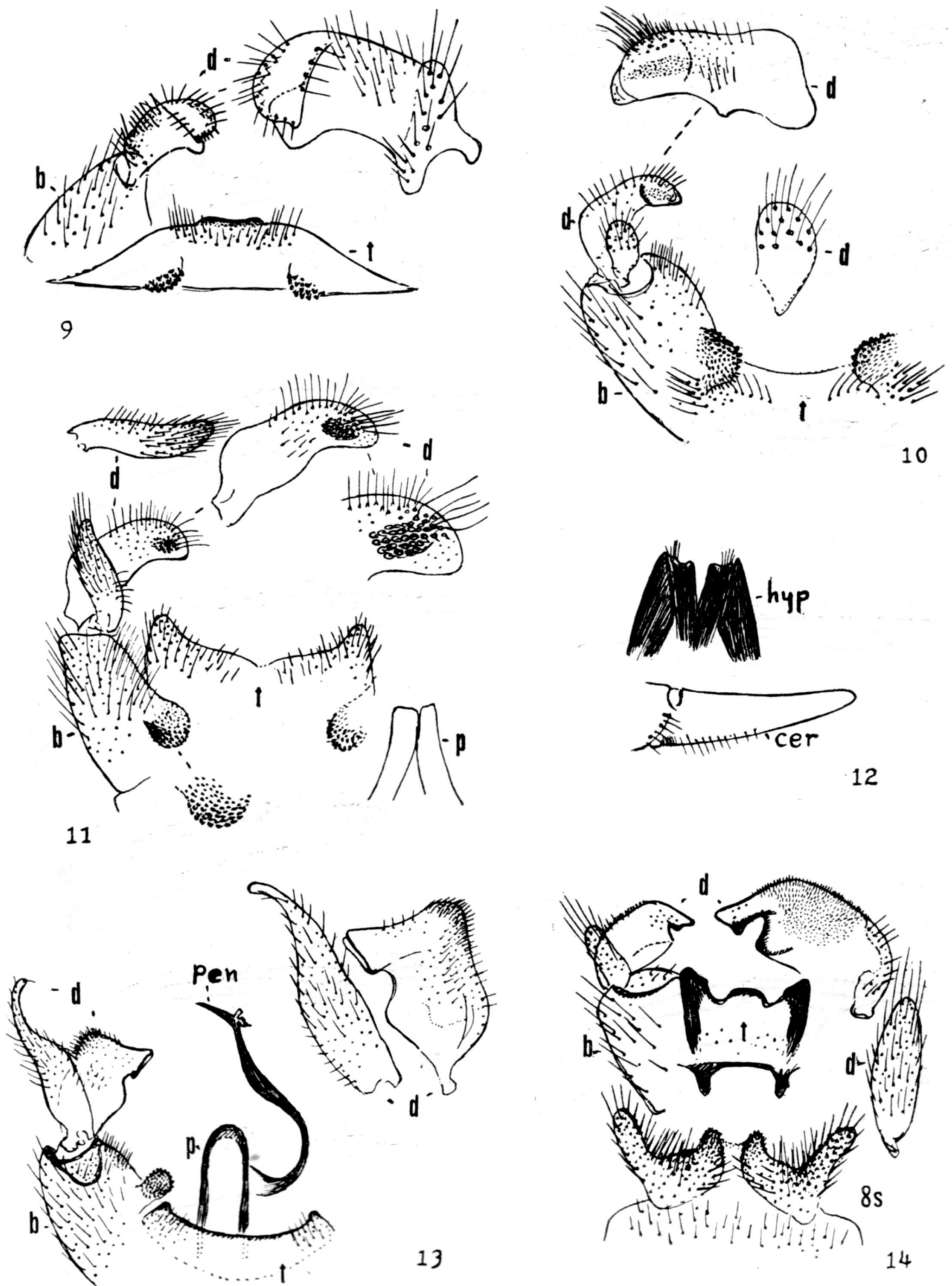
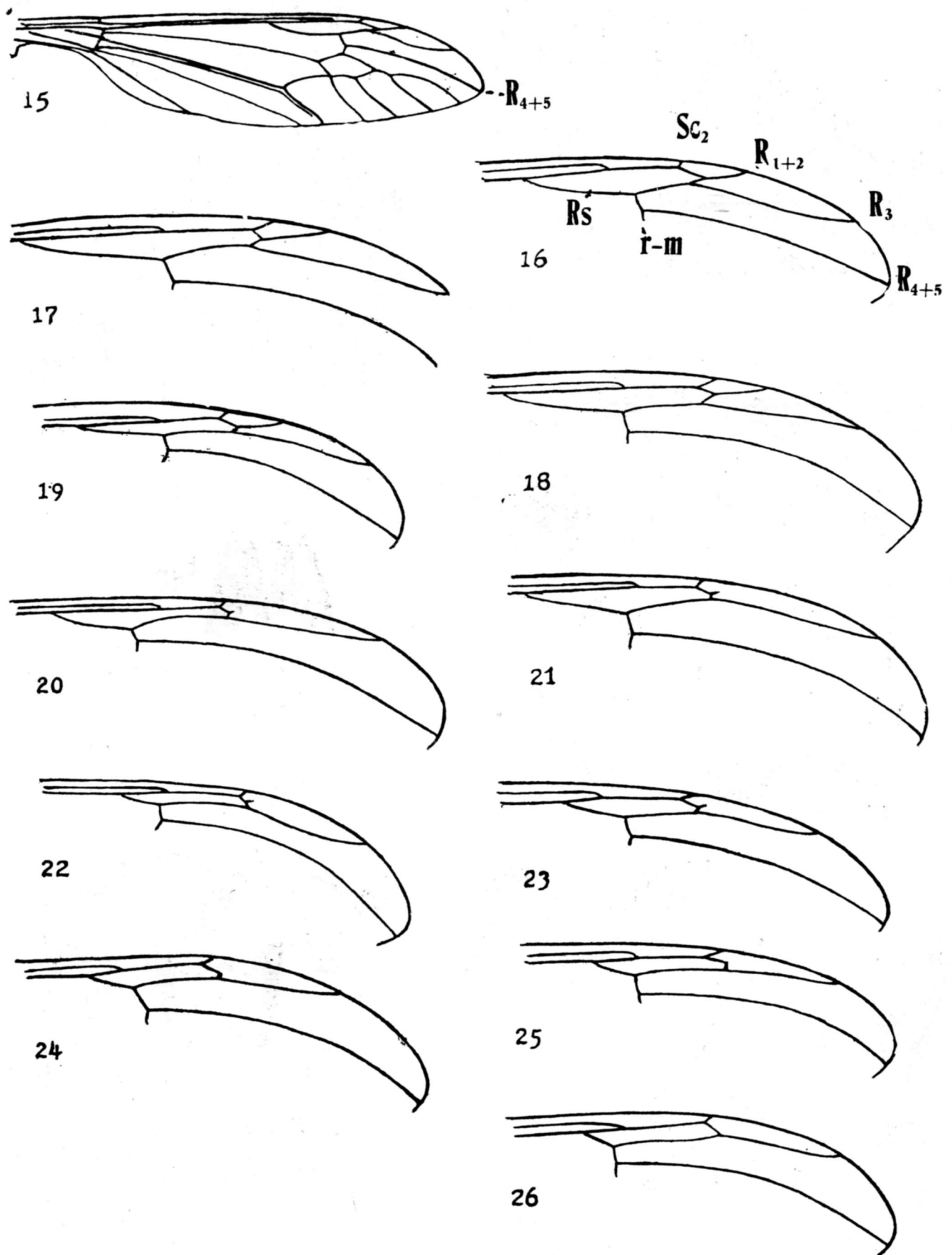


Fig. 9 *Dolichozepeza (Dolichozepeza) distivena* sp. n.; hypopygium. — Fig. 10. *Dolichozepeza (Dolichozepeza) mongas* sp. n.; male hypopygium. — Fig. 11. *Dolichozepeza (Dolichozepeza) setistyla* sp. n.; male hypopygium. — Fig. 12. *Dolichozepeza (Dolichozepeza) thiasus* sp. n.; ovipositor. — Fig. 13. *Dolichozepeza (Dolichozepeza) thiasus* sp. n.; male hypopygium. — Fig. 14. *Dolichozepeza (Nesopeza) kraussiana* sp. n.; male hypopygium. — Symbols: *b*, basistyle; *cer*, cercus; *d*, dististyle; *hyp*, hypovalva; *p*, phallosome; *pen*, penis; *s*, sternite; *t*, tergite.



Figs. 15-26. Venation of *Tipula* (*Papuatipula*) spp. — Figs. 15-16. *Tipula* (*Papuatipula*) *gressittiana* sp. n. — Fig. 17. *Tipula* (*Papuatipula*) *consiliosa* sp. n. — Fig. 18. *Tipula* (*Papuatipula*) *toxopeina* sp. n. — Fig. 19. *Tipula* (*Papuatipula*) *artifex* Alexander. — Fig. 20. *Tipula* (*Papuatipula*) *pensilis* sp. n. — Fig. 21. *Tipula* (*Papuatipula*) *satirica* sp. n. — Fig. 22. *Tipula* (*Papuatipula*) *strictistyla* sp. n. — Fig. 23. *Tipula* (*Papuatipula*) *staryi* sp. n. — Fig. 24. *Tipula* (*Papuatipula*) *lieftincki* sp. n. — Fig. 25. *Tipula* (*Papuatipula*) *omissinervis* (de Meijere): — Fig. 26. *Tipula* (*Papuatipula*) *leucosticta* Alexander. — Venational symbols: c, Costa; R, Radius; r-m, radial-medial crossvein; Sc, Subcosta.

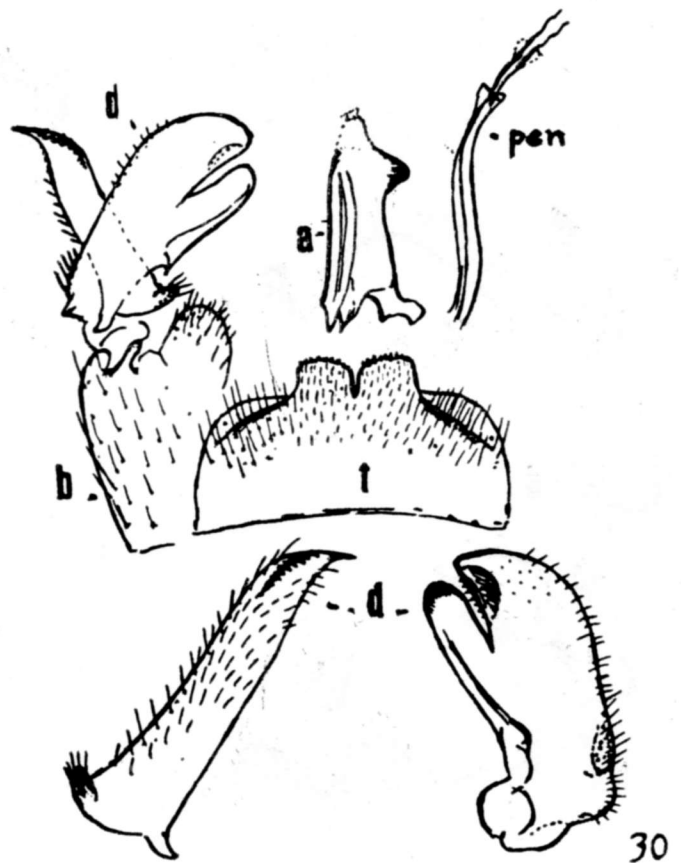
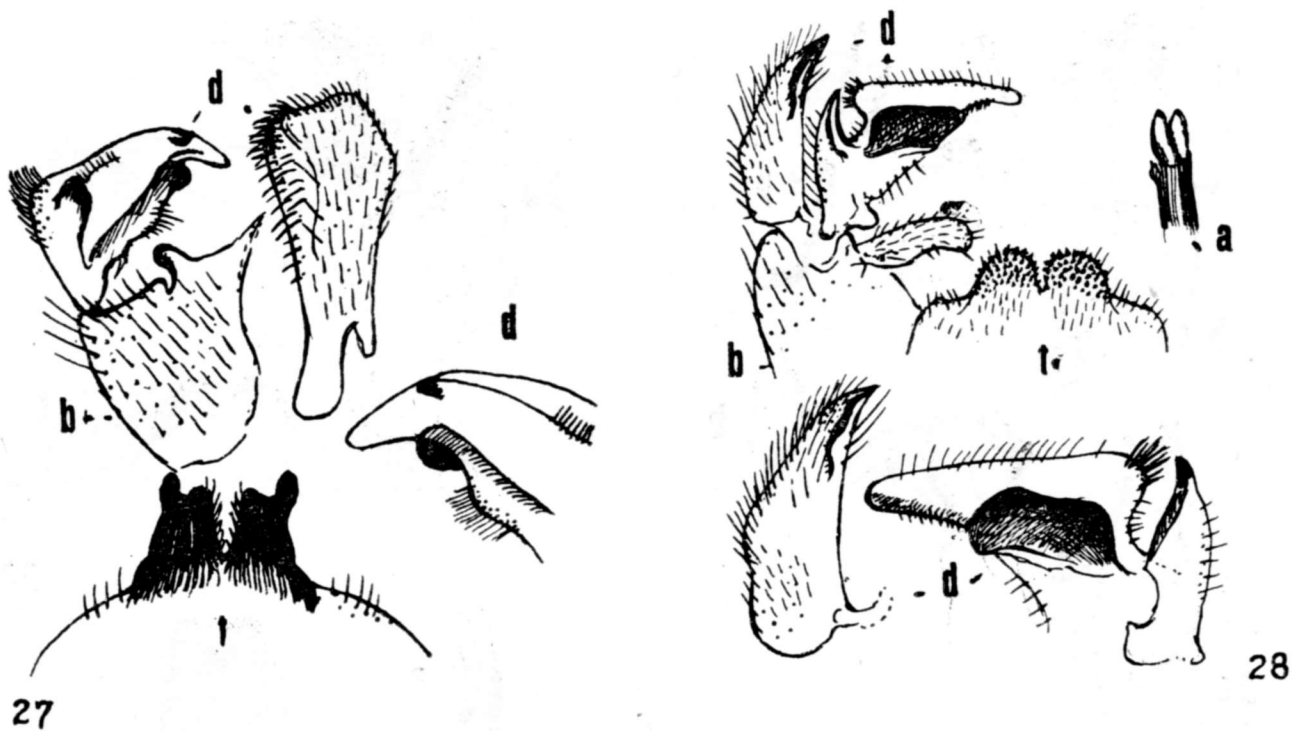


Fig. 27. *Tipula (Indotipula) laffooniana* sp. n.; male hypopygium. — Fig. 28. *Tipula (Papatipula) consiliosa* sp. n.; male hypopygium. — Fig. 29. *Tipula (Papatipula) gressittiana* sp. n.; male hypopygium. — Fig. 30. *Tipula (Papatipula) lieftincki* sp. n.; male hypopygium. — Symbols: a, aedeagus; b, basistyle; d, dististyle; pen, penis; t, tergite.



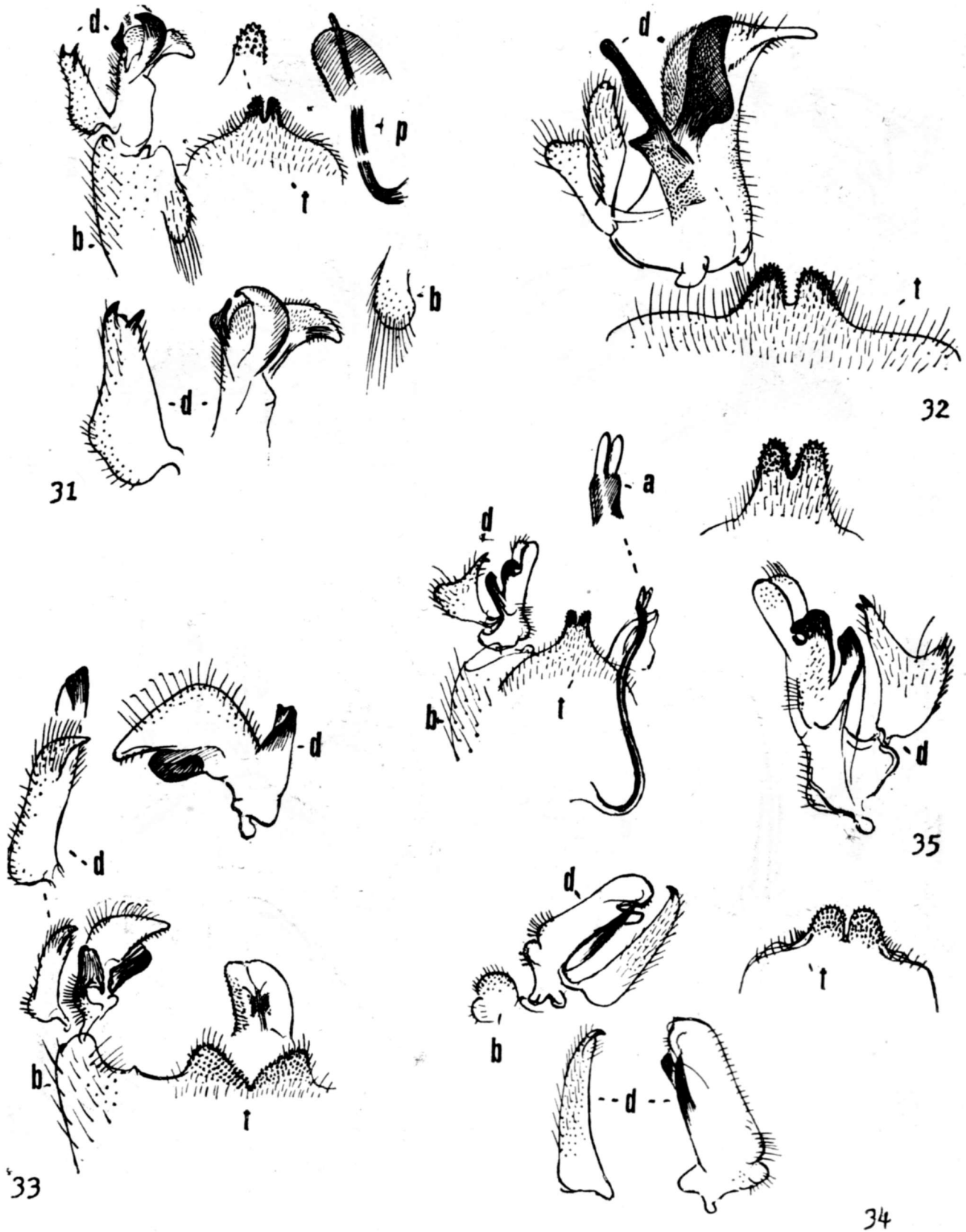


Fig. 31. *Tipula (Papatipula) pensilis* sp. n.; male hypopygium. — Fig. 32. *Tipula (Papatipula) satirica* sp. n.; male hypopygium. — Fig. 33. *Tipula (Papatipula) staryi* sp. n.; male hypopygium. — Fig. 34. *Tipula (Papatipula) strictistyla* sp. n.; male hypopygium. — Fig. 35. *Tipula (Papatipula) toxopeina* sp. n.; male hypopygium. — Symbols: a, aedeagus; b, basistyle; d, dististyle; p, phallosome; t, tergite.

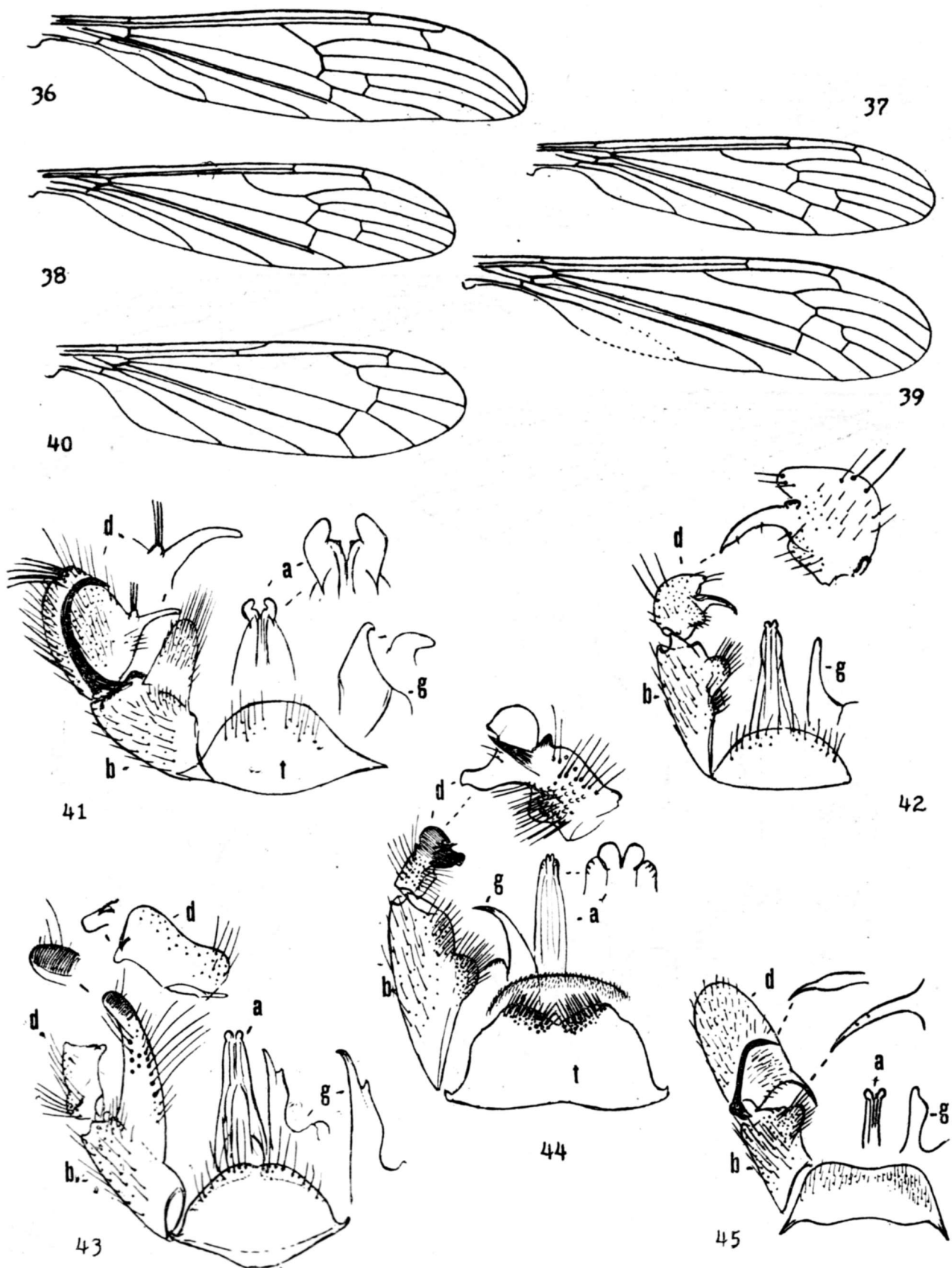
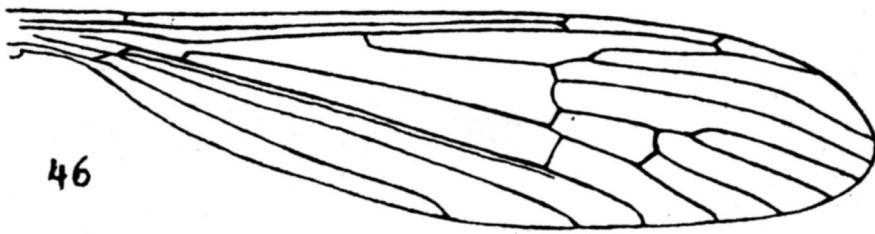
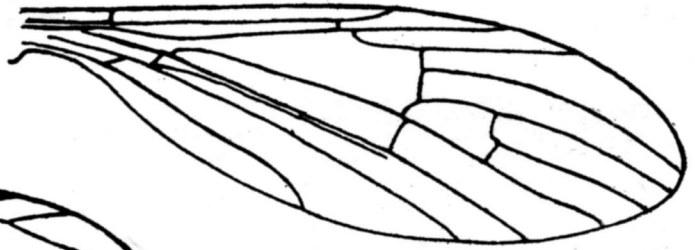


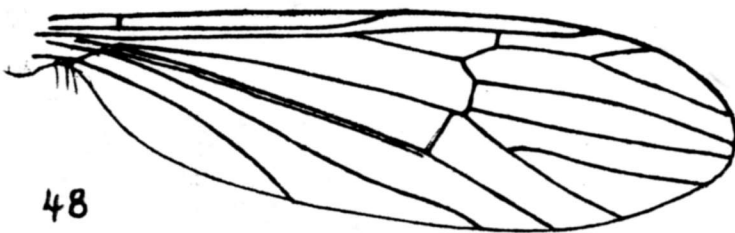
Fig. 36. *Limonia (Libnotes) elachista* sp. n.; venation. — Fig. 37. *Limonia (Limonia) bougainvilleana* sp. n.; venation. — Fig. 38. *Limonia (Limonia) perextensa* sp. n.; venation. — Fig. 39. *Limonia (Limonia) prolaxisetosa* sp. n.; venation. — Fig. 40. *Limonia (Nealexandriaria) scolopia* sp. n.; venation. — Fig. 41. *Limonia (Libnotes) elachista* sp. n.; male hypopygium. — Fig. 42. *Limonia (Limonia) bougainvilleana* sp. n.; male hypopygium. — Fig. 43. *Limonia (Limonia) perextensa* sp. n.; male hypopygium. — Fig. 44. *Limonia (Limonia) prolaxisetosa* sp. n.; male hypopygium. — Fig. 45. — *Limonia (Nealexandriaria) scolopia* sp. n.; male hypopygium. — Symbols: a, aedeagus; b, basistyle; d, dististyle; g, gonapophysis; t, tergite.



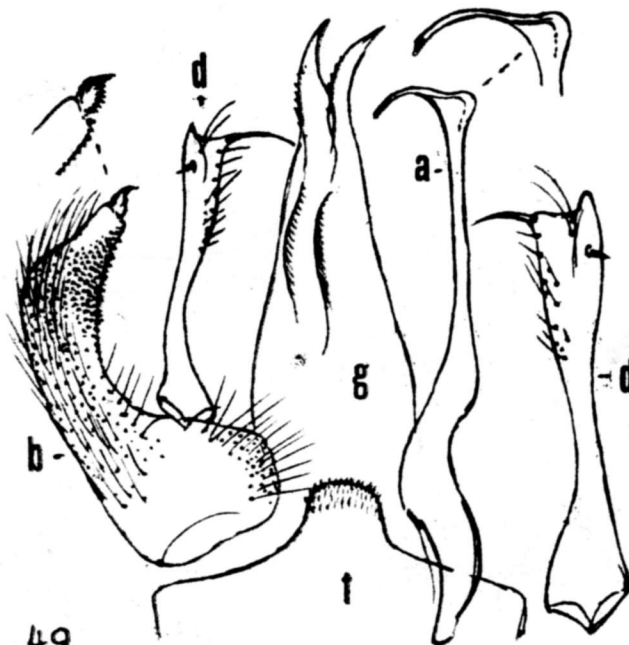
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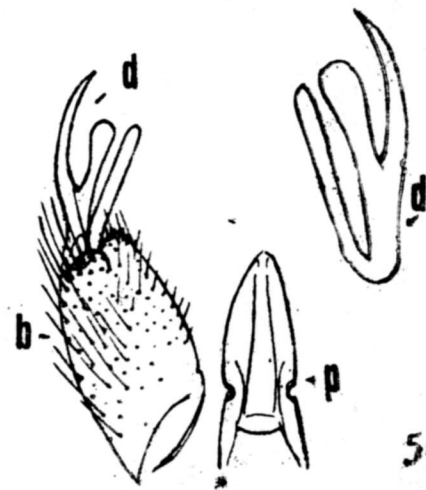
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*Epiphrognathus petulantia*

Fig. 46. *Austrolimnophila* (*Austrolimnophila*) *caledoniana* sp. n.; venation. — Fig. 47. *Gonomyia* (*Megalipophleps*) *nigripennis* Edwards; venation. — Fig. 48. *Cheilotrichia* (*Empeda*) *zimmermani* sp. n.; venation. — Fig. 49. *Gonomyia* (*Megalipophleps*) *nigripennis* Edwards; male hypopygium. — Fig. 50. *Cheilotrichia* (*Empeda*) *zimmermani* sp. n.; male hypopygium. — Symbols: a, aedeagus; b, basistyle; d, dististyle; g, gonapophysis; p, phallosome; t, tergite.