

NEW OR LITTLE-KNOWN TIPULIDAE (DIPTERA).
CIX. ORIENTAL-AUSTRALASIAN SPECIES.

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IN continuing the study of the Tipulidae taken on the Third Archbold Expedition to New Guinea by the late Dr. Lambertus Johannes Toxopeus I am considering some primitive members of the tribe Hexatomini belonging to the genera *Epiphragma* and *Austrolimnophila*.

A brief discussion of this expedition, including the itinerary and consideration of the collecting stations, will be found in Part CVI of this series of papers.† As before, I am particularly indebted to Dr. M. A. Lieftinck, of the Government Museum of Natural History, Leiden, for the great privilege of retaining certain of the types of species herein described.

Epiphragma (Epiphragma) insperata, sp. n.

General coloration of thorax reddish brown, more or less pruinose; antennal flagellum bicoloured, yellow and brownish black; legs yellow, the femora and tibiae with brown rings; wings pale brown, with a restricted darker brown pattern, the areas bordered by cream-yellow; *m-cu* at near midlength of cell 1st M_2 .

Female.—Length about 11 mm.; wing 12 mm.; antenna about 3.4 mm.

Rostrum above medium brown, more greyish on sides; palpi brown, the incisures of the intermediate segments narrowly pale. Antennæ with scape brown, pruinose; pedicel small, dark brown; flagellar segments bicoloured, the bases brownish black, the apices yellow, on the first segment the pale colour including more than one-half the segment, decreasing in amount outwardly, on about the fifth segment the two colours subequal in amount; outer segments with the yellow pattern decreasing, the outer three or four uniformly pale brown; no fusion of segments, there being 14 distinct flagellar segments; segments sub-cylindrical, longer than the verticils. Head above chiefly fulvous, the posterior vertex more silvery pruinose.

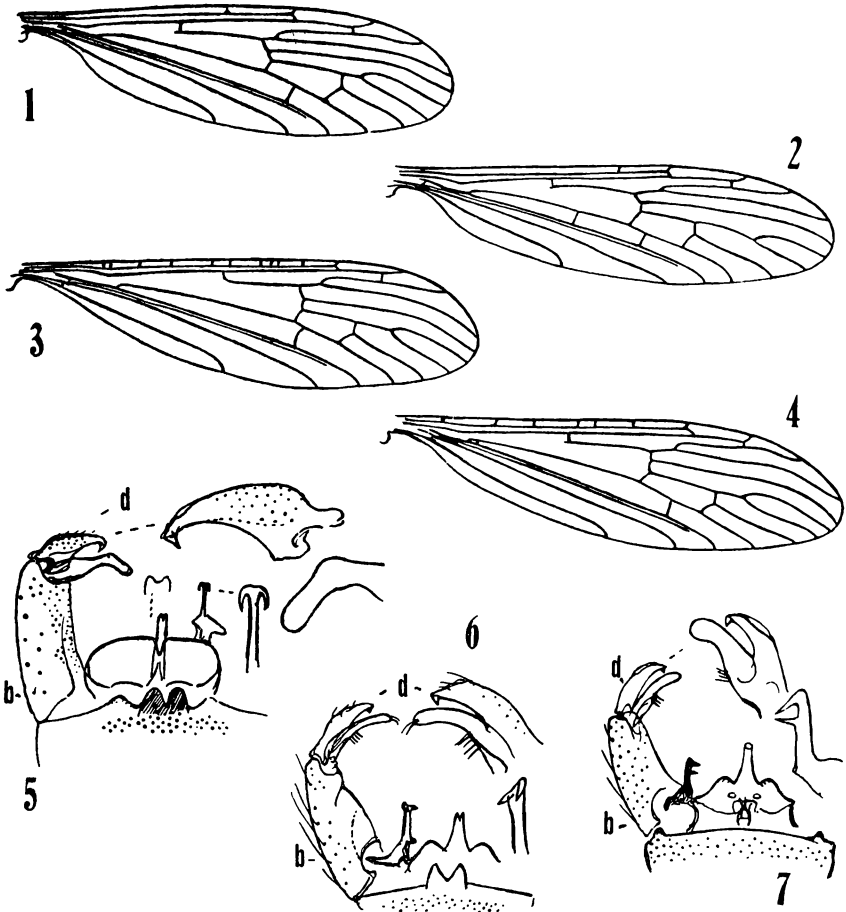
Thorax of the unique type crushed and not accurately describable. Pronotum brown, variegated with paler, darker on sides. Mesonotal praescutum with the humeral and lateral portions broadly reddish brown, the disk and remainder of notum heavily pruinose; praescutum with three brown stripes, the centres of the scutal lobes similarly darkened; scutellum with a depressed brown area at base on either side of midline; pleurotergite pale brown. Pleura chiefly infuscated, somewhat more variegated with paler above the midcoxae; dorsopleural

* Contribution from the Entomological Laboratory, University of Massachusetts.

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membrane reddish brown. Halteres yellow. Legs with the coxæ brown, more or less pruinose ; trochanters reddish brown ; femora yellow, the outer half paler yellow, with two brown rings, one postmedial, the other subterminal, both slightly narrower than the yellow apex and the enclosed ring between them ; tibiæ yellow, the extreme base, a narrow subbasal ring, a broader paler annulus at near midlength, and the tips brown, the subterminal yellow ring very broad ; tarsi obscure yellow to brownish yellow. Wings (fig. 1) with the ground pale brown, with a restricted

Figs. 1-7.



1. *Epiphragma* (*Epiphragma*) *insperata*, sp. n. ; venation. 2. *Epiphragma* (*Parepi-
phragma*) *perideles*, sp. n. ; venation. 3. *Epiphragma* (*Polyphragma*) *joculator*,
sp. n. ; venation. 4. *Epiphragma* (*Polyphragma*) *multiplex*, sp. n. ; venation.
5. *Epiphragma* (*Polyphragma*) *joculator*, sp. n. ; male hypopygium. 6. *Epiphragma*
(*Polyphragma*) *multiplex*, sp. n. ; male hypopygium. 7. *Epiphragma* (*Parepi-
phragma*) *perideles*, sp. n. ; male hypopygium.
(Symbols : b, basistyle ; d, dististyle ; t, tergite).

darker brown pattern, the areas with broad cream-yellow margins ; the markings lie at and before arculus ; origin of *Rs* ; supernumerary crossvein in cell *C* ; cord and outer end of cell 1st *M*₂, fork of *M*₁₊₂, and *m-cu* ; a further series of marginal darkenings, largest over *R*₁₊₂, *R*₃ and *R*₄, the remainder small, very reduced on *M*₁ ; axilla narrowly darkened ; veins yellow, chiefly darkened in the patterned areas, conspicuously pale at origin of *Rs*, form of *Sc*, cord, and tip of *R*₁₊₂. Venation : Supernumerary crossvein in cell *C* oblique or forked ; *R*₁₊₂ about twice *R*₂ ; *Rs* long, square and vaguely spurred at origin ; *R*₂₊₃₊₄ about one-third longer than the basal section of *R*₅ ; cell *M*₁ deep, its petiole only a trifle longer than *m* ; *m-cu* at near midlength of cell 1st *M*₂.

Abdomen light brown, the posterior borders of the segments narrowly reddish brown ; sternites somewhat paler, vaguely patterned with pale brown ; subterminal segments darker brown. Ovipositor with cerci reddish, strongly upcurved to the acute tips.

Hab. Netherlands New Guinea.

Holotype, ♀, Moss Forest Camp, altitude 2,800 metres, October 22nd, 1938 (*Toxopeus*).

The present fly is quite distinct from the other known regional members of the subgenus. Among such species the most similar is *Epiphragma* (*Epiphragma*) *gloriola* Alexander, which differs conspicuously in the coloration and in the details of venation.

Parepiphragma, subgen. n.

Characters as in typical *Epiphragma* Osten Sacken, differing in the presence of a supernumerary crossvein in cell *M* of the wing (fig. 2).

Type of the subgenus.—*Epiphragma* (*Parepiphragma*) *perideles*, sp. n. (Papuan Subregion).

The character of a supernumerary crossvein in cell *M* exactly parallels that of the subgenus *Elaeophila* Rondani in the genus *Limnophila* Macquart.

Epiphragma (*Parepiphragma*) *perideles*, sp. n.

General coloration of mesonotum brown, variegated with paler ; antennæ dark brown, fusion segment obscure yellow ; legs yellow, femora with two black rings, tibiæ with three ; wings pale yellowish white, heavily patterned with brown ; a supernumerary crossvein in cell *M* ; male hypopygium with the dististyles small and simple, the outer one densely setuliferous.

Male.—Length about 9–9.5 mm. ; wing 10.8–11 mm. ; antenna about 1.2–1.3 mm.

Female.—Length about 12.5–13 mm. ; wing 12–13 mm. ; antenna about 1.2 mm.

Rostrum and palpi black. Antennæ short in both sexes, 15-segmented, with two segments involved in the fusion unit ; dark brown, the fusion segment obscure yellow ; basal flagellar segments enlarged, the outer long and slender, subequal to their verticils ; terminal segment elongate. Head rich fulvous brown, centre of posterior vertex with a sparse grey

pruinosity ; anterior vertex broad, about five times the diameter of the scape.

Pronotum brown, variegated with obscure yellow. Mesonotal praescutum with the disk occupied by three confluent brown stripes, the humeral and lateral borders darker brown ; region of sublateral stripes more yellow pollinose ; scutal lobes brown, scutellum pruinose ; mediotergite dark brown, the posterior third with two paler brown areas, pleurotergite reddish brown. Propleura and anepisternum dark brown, the remainder of pleura paler brown, the dorsal sternopleurite more silvery pruinose. Halteres short, stem whitened, knob pale yellow. Legs with coxæ brown, sparsely pruinose ; trochanters light brown ; femora yellow with two black rings, the central one about twice as extensive as the subterminal annulus, the latter about three times the yellow tip ; tibiæ yellow, with three black rings, the central one broadest, nearly twice the subbasal one, the darkened tip narrow ; tarsi light yellow, the outer two segments darkened, especially the last. Wings (fig. 2) with the ground pale yellowish white, costal border slightly darker yellow ; an unusually heavy brown pattern, with very large spots that are chiefly confluent to form more or less complete bands at arculus, over the supernumerary crossvein in cell *M*, cord and outer end of cell 1st *M*₂ and at and near the wing tip, the dark colour more extensive than the pale, in cases much more so ; veins yellow, dark brown in the patterned fields. Costal fringe short. Venation : Supernumerary crossvein in cell *C* about opposite two-thirds the length of *Rs*, *Sc*₁ ending beyond the fork of *R*₂₊₃₊₄ ; *Rs* long, square and strongly spurred at bend ; *R*₁₊₂ from one and one-half to twice *R*₂ ; supernumerary crossvein in cell *M* about opposite midlength of *Rs* ; cell *M*₁ subequal to its petiole ; *m-cu* at near one-third *M*₃₊₄.

Abdominal tergites dark brown, sternites similarly darkened, the posterior borders of segments three to seven silvery ; hypopygium small, brownish yellow. Male hypopygium (fig. 7) with the posterior border of tergite gently convex, near either end with a small obtuse knob. Basistyle, *b*, with the interbase a straight rod, at tip bent at an acute angle into a spine, with a second erect paler spine on margin before the tip. Dististyles, *d*, small and simple, the outer one shorter, terminating in a small decurved point, the outer margin before apex with a low pale flange ; surface of style with dense microscopic setulæ.

Hab. Netherlands New Guinea.

Holotype, ♂, Moss Forest Camp, altitude 2,850 metres, August 23rd, 1938 (*Toxopeus*). *Allotopotype*, ♀, altitude 2,800 metres, October 11th, 1938. *Paratopotype*, 1 ♂, with the holotype. *Paratype*, 1 ♀, Ibele Camp, altitude 3,250 metres, November 8th, 1938 (*Toxopeus*).

The present fly is unique among the known species of the genus in the subgeneric character of a supernumerary crossvein in cell *M* of the wings.

Epiphragma (Polyphragma) jocator, sp. n.

Size large (wing of male over 11 mm.) ; mesonotal praescutum brownish yellow on sides, the central area and lateral borders darkened ; pleura

darkened dorsally ; antennæ short, 16-segmented ; femora and tibiæ yellow, each with three brownish black rings ; wings pale brown, conspicuously patterned with darker brown, including major areas that are broadly bordered by cream yellow ; numerous supernumerary crossveins in cell *C* ; male hypopygium with the interbase a straight rod that forks at apex into two equal divergent recurved spines.

Male.—Length about 11 mm. ; wing 12.5 mm. ; antenna about 1.8 mm.

Rostrum dark brown ; palpi black. Antennæ of male short ; scape brown, pedicel darker, first flagellar segment yellow, the remainder black ; all flagellar segments separate, there being no fusion of the basal ones ; segments elongate, the last very long, verticils conspicuous. Head rich fulvous brown ; anterior vertex about one and one-half times the diameter of the scape.

Pronotum fulvous brown. Mesonotal praescutum brownish yellow on sides, with two virtually confluent dark brown central stripes on posterior half or more ; anterior part brighter brown, the lateral borders dark brown, sublateral stripes paler ; scutum obscure yellow, the lobes extensively dark brown ; posterior sclerites of notum dark brown, scutellum still darker ; mediotergite paler on posterior third, pleurotergite light brown. Pleura chiefly dark brown, especially dorsally, with a golden yellow area on the dorsal sternopleurite and ventral pteropleurite. Halteres elongate, stem yellow, knob weakly infuscated basally, tip light yellow. Legs with the coxæ dark brown, the tips slightly paler ; trochanters brownish yellow ; femora yellow, with three brownish black rings, one near midlength, a narrow subterminal annulus and the apex, the last narrowest, about one-half the subterminal yellow ring ; tibiæ obscure yellow, similarly with three dark brown to brownish black rings, one subbasal, a broad central annulus and the narrower tip ; tarsi brownish yellow to yellow. Wings (fig. 3) with the restricted ground pale brown, conspicuously patterned with darker brown, all of the latter areas broadly margined with cream yellow ; the major dark areas are at arculus, origin of *Rs*, cord and outer end of cell 1st M_2 , the latter two broadly confluent ; a spot at fork of M_{1+2} ; large marginal areas at ends of all longitudinal veins, most extensive in the radial field and again on the anal veins ; axillary region darkened, the area involving the prearcular field ; a series of about twelve narrow dashes in cell *C* over the crossveins ; veins brownish yellow, slightly darker in the patterned areas. Venation : Numerous supernumerary crossveins in cell *C* ; *Rs* relatively long, nearly square at origin ; R_{2+3+4} nearly twice the basal section of R_5 ; R_{1+2} variable, from being subequal to R_2 to more than twice this length ; cell M_1 more than twice its petiole ; *m-cu* about opposite one-third to two-fifths M_{3+4} .

Abdomen relatively long ; tergites dark brown, their posterior borders narrowly obscure yellow, the base of the third segment more broadly so ; sternites more diffusely bicoloured, brown basally, the apices paling to obscure yellow ; hypopygium dark brown. Male hypopygium (fig. 5)

with the posterior border of tergite, *t*, produced into two flattened glabrous dark coloured blades, separated by a narrower V-shaped notch ; a concentration of setæ immediately behind the blades. Basistyle, *b*, not clearly produced into an apical lobe ; interbase a straight rod from a dilated base, at apex forking into two equal divergent recurved spines. Dististyles, *d*, terminal ; outer style stout at base, narrowed into an irregular decurved apical hook, outer surface with scattered setæ and abundant short setulæ ; inner style a little longer, appearing as a foot-shaped blade, its tip obtuse. Aedeagus small and slender, tip weakly bilobed, with a very extensive superimposed chitinized plate which is deeply notched over the aedeagus, the lateral margins rounded.

Hab. Netherlands New Guinea.

Holotype, ♂, Moss Forest Camp, altitude 2,800 metres, October 29th, 1938 (*Toxopeus*). *Paratopotype*, ♂, 2,700 metres, October 19th, 1938 (*Toxopeus*).

Epiphragma (Polyphragma) jocularis is very different from the only other member of the subgenus so far discovered in New Guinea, *E. (P.) multiplex*, sp. n., differing in all details of coloration of the body, legs and wings and in the structure of the male hypopygium, particularly the interbase and aedeagus.

Epiphragma (Polyphragma) multiplex, sp. n.

Size medium (wing of male nearly 10 mm.) ; general coloration of mesonotum brown, patterned with paler ; dorsal pleurites darkened ; knobs of halteres infuscated ; legs yellow, femora with three narrow brown rings, tibiæ with two ; wings cream yellow, the entire surface virtually covered by very numerous light brown dots, with a few larger spots that are costal in distribution ; a series of about six supernumerary crossveins in cell *C* ; male hypopygium with the tergal lobes triangular in outline ; apex of interbase with two short points.

Male.—Length about 9.5 mm. ; wing 9.8 mm. ; antenna about 2 mm.

Rostrum brown ; palpi brownish black. Antennæ of male relatively short, as shown by the measurements ; scape and pedicel brownish yellow, basal segment of flagellum light yellow, the remainder brownish black ; flagellar segments cylindrical, the outer ones becoming much longer, with conspicuous verticils. Head brown ; anterior vertex nearly twice as wide as the diameter of the scape.

Pronotum yellow above, abruptly blackened on sides. Mesonotal praescutum with a broad cinnamon brown central area, behind enclosing three linear brown lines, lateral stripes broader and entire ; remainder of praescutum obscure yellow, more or less patterned with reddish brown, the extreme lateral border narrowly yellow ; scutal lobes reddish brown, central area and base of scutellum darker, remainder of notum brown, heavily grey pruinose. Pleura brownish black above, more reddish brown on ventral half. Halteres moderately long, stem obscure yellow, knob infuscated. Legs with fore coxæ chiefly darkened, with a band of grey bloom, remaining coxæ silvery grey, narrowly dark brown at base ; trochanters yellow ; femora yellow, with very narrow and incomplete

brown rings, basal, postmedial and subterminal in position, the apex broadly yellow ; tibiae yellow with two comparable darkened rings, subbasal and medial, the tip, with the tarsi, yellow. Wings (fig. 4) with the very restricted ground cream yellow, the surface virtually covered by very numerous light brown dots in all the cells, virtually all more or less confluent ; slightly larger and darker areas at cord, fork of Sc , R_{1+2} and at tips of veins R_3 and R_4 ; a series of about a dozen darkened dashes in cell C , including the heavier ones over the supernumerary crossveins ; veins yellow in the ground areas, slightly darker in the patterned parts. Costal fringe of male moderately long. Venation: A series of about six supernumeraries in cell C ; Rs relatively long, square and spurred at origin ; R_{2+3+4} nearly three times the basal section of R_5 ; cell M_1 nearly three times its petiole ; $m-cu$ at near midlength of M_{3+4} .

Abdominal tergites medium brown ; sternites dark brown, the intermediate ones with more silvery posterior borders ; hypopygium brownish yellow. Male hypopygium (fig. 6) with the tergite, t , transverse, its posterior border with two triangular lobes that are separated from one another by a slightly broader notch. Basistyle, b , with its interbase a stout rod, at tip with two short points, the outer one more recurved. Dististyles, d , relatively small, the outer terminating in a small decurved point, surface roughened, with a few long pale setae and very short setulae ; inner style longer, the lower margin at near midlength with five or six long setae. Phallosomic plate broad ; aedeagus strongly emarginate at apex.

Hab. Netherlands New Guinea.

Holotype, ♂, Moss Forest Camp, altitude, 2,800 metres, October 14th, 1938 (*Toxopeus*) ; Alexander Collection through Doctor Lieftinck.

Epiphragma (*Polyphragma*) *multiplex* is quite different from the only other regional members of the subgenus so far described, *E. (P.) jocularis*, sp. n., and *E. (P.) staplesi* Alexander, of Bourgainville Island. The very abundantly dotted brown wing pattern is distinctive.

Austrolimnophila (*Austrolimnophila*) *amatrix*, sp. n.

Size medium (wing of male about 8.4 mm.) ; mesonotal praescutum with the anterior and central parts yellow, the sides, posterior sclerites of notum and the pleura black ; antennal flagellum weakly bicoloured ; halteres and legs yellow ; wings yellow, the prearcular and costal regions broadly and conspicuously saturated yellow ; a restricted but showy brown pattern, including four large paler brown areas in the outer radial field ; male hypopygium with the ventral tergal plate heavily blackened, lobes smooth, separated by a very small and narrow notch ; aedeagus largely free, without subtending wings.

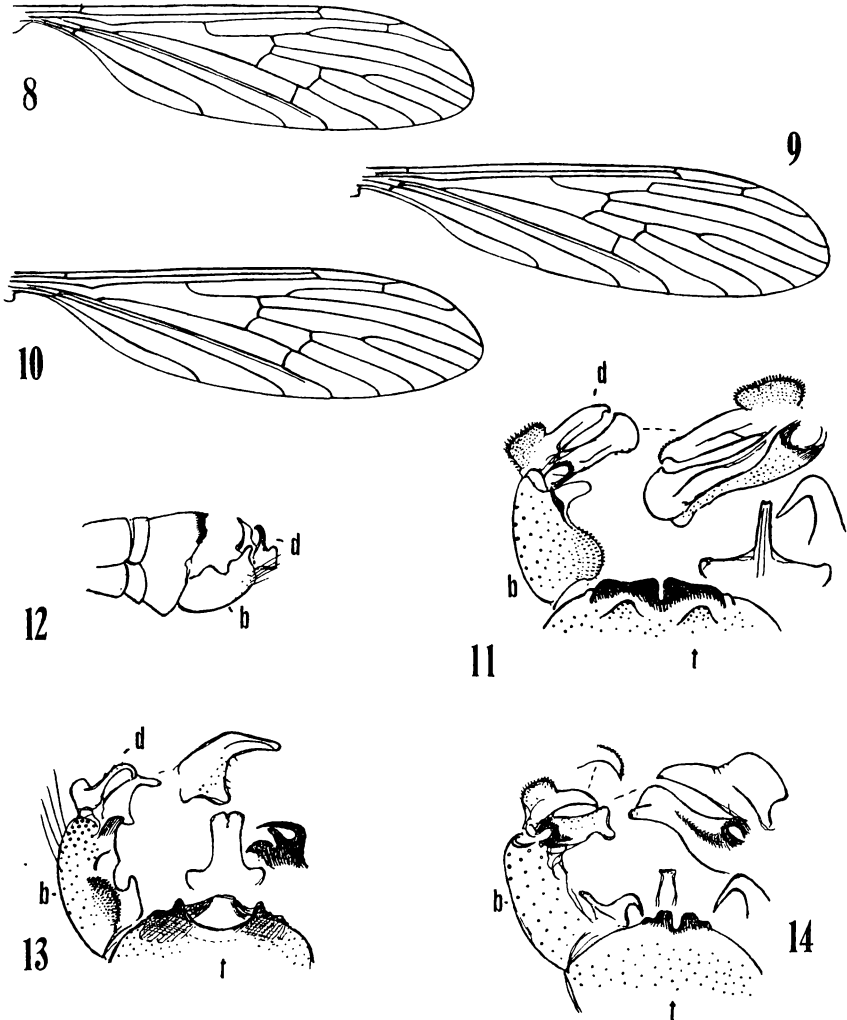
Male.—Length about 8.5 mm. ; wing 8.4 mm. ; antenna about 4.2 mm.

Rostrum and palpi black, the former slightly pruinose. Antennae of male elongate, about one-half the wing ; scape and pedicel light brown, flagellum in part bicoloured ; segments beyond the first two yellow with narrow brown bases, the amount of the latter not increasing on the outer

segments; flagellar segments long-cylindrical, much exceeding the verticils. Head dark grey; anterior vertex very narrow.

Pronotum concealed in the unique type. Mesonotal praescutum with the anterior and central parts yellow, the sides of the praescutum behind

Figs. 8-14.



8. *Austrolimnophila* (*Austrolimnophila*) *amatrix*, sp. n.; venation. 9. *Austrolimnophila* (*Austrolimnophila*) *lætabunda*, sp. n.; venation. 10. *Austrolimnophila* (*Austrolimnophila*) *polydamas*, sp. n.; venation. 11. *Austrolimnophila* (*Austrolimnophila*) *amatrix*, sp. n.; male hypopygium. 12, 13. *Austrolimnophila* (*Austrolimnophila*) *excelsior*, sp. n.; male hypopygium. 14. *Austrolimnophila* (*Austrolimnophila*) *superstes*, sp. n.; male hypopygium.
 (Symbols: *b*, basistyle; *d*, dististyle; *t*, tergite).

the humeri abruptly blackened ; scutal lobes brownish yellow, posterior sclerites and the pleura black. Halteres yellow. Legs with the coxæ brownish black, pruinose ; trochanters brownish yellow ; femora yellowish brown ; tibiæ and tarsi yellow. Wings (fig. 8) yellow, the prearcular and costal regions conspicuously saturated yellow ; wings patterned with brown, the areas restricted to the veins, including four paler brown spots at tip of *Sc*, R_{1+2} and ends of R_3 and R_4 , all but the last large and conspicuous ; smaller but darker brown spots at origin of *Rs*, cord, outer end of cell 1st M_2 , fork of M_{1+2} , and as small marginal areas at ends of all longitudinal veins excepting R_5 and M_1 , largest on 2nd *A* ; basad of the origin of *Rs* with no dark pattern excepting a small vague cloud at arculus ; veins yellow, brown in the more heavily patterned areas. Venation : *Rs* square at origin ; cell M_1 about twice its petiole ; *m-cu* lying far distad, about one-third its length before the fork of M_{3+4} .

Abdominal tergites dark brown, sternites and hypopygium obscure brownish yellow. Male hypopygium (fig. 11) with the posterior border of the tergite, *t*, heavily blackened, the smooth lobes low and broad, separated by a very small and narrow U-shaped notch ; dorsal surface with a low rounded pale lobe on either side. Mesal face of basistyle, *b*, at apex with a flattened blade and accessory spine, at proximal end with the usual scabrous area. Dististyles, *d*, two, the outer with a large, more or less bilobed basal cushion, the outer blade moderately broad ; inner style longer and wider, dilated at apex. Phallosome with the interbase stout, narrowed outwardly, the tip strongly recurved ; ædeagus largely free, without subtending wings as in some species.

Hab. Netherlands New Guinea.

Holotype, ♂, Rattan Camp, altitude 1,150 metres, February 13th, 1939 (*Toxopeus*) ; Alexander Collection.

This attractive fly is most similar to *Austrolimnophila* (*Austrolimnophila*) *terpsis*, sp. n., differing in the coloration and in the structure of the male hypopygium.

Austrolimnophila (*Austrolimnophila*) *excelsior*, sp. n.

Size large (wing of male about 14 mm.) ; general coloration of thorax yellow, conspicuously patterned with brown ; antennal flagellum bicoloured ; halteres pale yellow throughout ; femora yellow, with a conspicuous dark brown subterminal ring ; wings light yellow, with a very abundant dotted and spotted brown pattern ; abdomen yellow ; male hypopygium with the posterior border of the tergite blackened and precipitous ; ædeagus unusually stout.

Male.—Length about 12–13 mm. ; wing 14–14.5 mm. ; antenna about 4.7–4.8 mm.

Female.—Length about 12.5–14 mm. ; wing 12–14 mm.

Rostrum brownish black ; palpi black. Antennæ of moderate length, about one-third the wing ; scape brownish black, pedicel and first flagellar segment yellow, succeeding segments bicoloured, yellow, with blackened bases, the amount of the latter increasing on the outer segments,

finally including the whole segment; flagellar segments elongate-cylindrical with short verticils and still shorter abundant pale setulæ. Head dark brown on anterior vertex and posterior orbits, yellowed on the posterior part; anterior vertex slightly broader than the diameter of scape.

Pronotum brownish yellow, with a narrow dark brown central line. Mesonotal praescutum conspicuously variegated, the ground yellow pollinose, with a central brown stripe, very narrow on anterior half, widened and vaguely divided behind; sublateral stripes pale brown, the lateral border conspicuously darker brown, humeral region more fulvous; scutum buffy yellow, the lobes extensively dark brown; scutellum obscure brownish yellow; mediotergite brown, pruinose, the lateral borders, with the pleurotergite, yellowed. Pleura chiefly yellow, patterned with brown on the propleura, anepisternum, dorsal pteropleurite and again on the ventral sternopleurite, the dorsal part of the latter conspicuously pale; dorsopleural membrane dark, yellow surrounding the anterior spiracle. Halteres elongate, pale yellow throughout. Legs with coxæ and trochanters yellow; femora yellow, slightly more darkened on basal fourth, with a darker brown subterminal ring about one-half its length before the tip; tibiæ yellow, tips narrowly brown; tarsi yellow, the terminal two segments dark brown. Wings with the ground light yellow, the costal border more saturated yellow; a very abundant brown spotted and dotted pattern, the larger areas irregular, at arculus, stigma, cord, and as marginal darkenings at ends of the longitudinal veins with the exception of R_5 and M_1 , largest in the radial and anal fields, the latter with paler centres; smaller brown spots in series along the veins, in places confluent with one another; still smaller brown dots in many of the cells; veins yellow, darker in the patterned areas. Costal fringe very short. Venation: Sc long, Sc_1 ending some distance beyond the fork of R_{2+3+4} , Sc_2 slightly longer than Sc_1 ; R_{2+3+4} about two and one-half times the basal section of R_5 ; cell M_1 deep, nearly four times its petiole; $m-cu$ at from about one-half to two-thirds M_{3+4} .

Abdominal tergites chiefly yellow, the large hypopygium more orange yellow, basal tergite vaguely darkened; sternites light yellow, slightly darkened laterally behind, more evident on sternite eight. Male hypopygium (figs. 12, 13) with the posterior border of tergite, t , precipitous and heavily blackened on either side of the midline which is more yellowed and slightly produced; dorsal blackened lobes slender, separated from one another by a broad shallow notch. Basistyle, b , on mesal face with a slender basal lobe and a large more flattened outer one; corrugated area on face of style near base blackened and conspicuous; outer setæ long and conspicuous; interbase three-pronged, the longest outer spine very slender, especially on the long straight outer half. Dististyles, d , two, the outer part of the outer style very slender, curved to the acute tip. Aedeagus unusually stout.

Hab. Netherlands New Guinea.

Holotype, ♂, East of Wilhelmina Top, altitude 3,600 metres, September

8th, 1938 (*Toxopeus*). *Paratopotype*, ♂, August 30th, 1938 ; *paratypes*, 3 ♀♀, Moss Forest Camp, altitude 2,800–2,850 metres, July 23rd–October 31st, 1938 (*Toxopeus*).

The most similar large-sized member of the subgenus is *Austrolimnophila* (*Austrolimnophila*) *polydamas* sp. n., which differs evidently in the coloration of the body and wings. The male hypopygium shows distinct features in the tergite, basistyle, dististyles and aedeagus.

Austrolimnophila (*Austrolimnophila*) *laetabunda*, sp. n.

Size medium (wing of female 9 mm.) ; pronotum and anterior mesonotal praescutum yellow, sides of the latter with a darkened area that extends backward as a longitudinal stripe to the halteres, pleura light yellow ; antennal flagellum bicoloured ; halteres and legs yellow ; wings yellow with a clearly delimited brown pattern that is restricted to the veins and forks ; anterior cord oblique, the inner end of cell 1st M_2 the most basal element ; *m-cu* at near three-fourths the length of M_{3+4} .

Female.—Length about 8.5 mm. ; wing 9 mm. ; antenna about 2.8 mm.

Rostrum and palpi black. Antennæ with basal three segments light yellow, the remainder bicoloured, yellow with narrow black bases, the amount of the latter increasing very gradually on the outer segments ; flagellar segments cylindrical, a little exceeding the longest verticils. Head dark grey ; anterior vertex relatively narrow, about one and one-half times the diameter of the scape.

Pronotum yellow. Mesonotal praescutum with the disk greyish yellow, a division into stripes vaguely indicated near the suture ; sides of praescutum darkened before suture, this being the anterior end of a longitudinal stripe that extends backward to the root of the halteres, becoming broader and darker behind ; midregion of scutum yellow, lobes extensively dark brown ; scutellum light yellow ; postnotum with mediotergite brownish black, pleurotergite paler, especially near the suture, blackened on the ventral edge. Pleura light yellow except for the darkened stripe above described. Halteres yellow. Legs with all coxæ and trochanters yellow ; remainder of legs yellow, the fore and middle femora weakly darkened beyond their bases. Wings (fig. 9) yellow, the costal region slightly deeper yellow ; a clearly delimited brown pattern that is restricted to the veins and forks, distributed as follows : Beyond arculus, reaching *C* ; origin of *Rs*, reaching *C* ; fork of *Sc*, extending backward over the base of vein R_{2+3} ; oblique lines on anterior cord and outer end of cell 1st M_2 ; an elongate mark over fork of M_{1+2} ; other circular marginal spots at ends of longitudinal veins, lacking on R_5 , smallest near wing tip ; axillary border extensively darkened ; veins yellow, brown in the patterned parts. Venation : Sc_1 ending shortly beyond the fork of R_{2+3+4} , Sc_2 longer ; *Rs* relatively short, about one-third longer than R_{2+3+4} ; R_{2+3} perpendicular at origin, angulated and weakly spurred at the bend ; anterior cord oblique, cell 1st M_2 most basal in position ; cell M_1 about two and one-half times its petiole ; *m cu* at near three-fourths the length of M_{3+4} .

Abdomen yellow, the outer segments more infuscated.

Hab. Netherlands New Guinea.

Holotype, ♀, Top Camp, altitude 2,100 metres, January 23rd, 1939 (*Toxopeus*) ; Alexander Collection.

An unusually attractive crane-fly that is most like *Austrolimnophila* (*Austrolimnophila*) *amatrix*, sp. n., and *A. (A.) terpsis*, sp. n., differing conspicuously in the pattern of the thorax and wings.

Austrolimnophila (Austrolimnophila) polydamas, sp. n.

Size large (wing of female 13 mm. or more) ; antennal flagellum bicoloured, the bases of the segments blackened, the stems yellowed ; mesonotal praescutum with the lateral borders dark cinnamon brown, the disk with three brown stripes that are only narrowly separated by yellow pollinose lines ; femora yellow with a narrow brown subterminal ring ; wings yellow, with an unusually heavy solid brown pattern, the darkened areas more extensive than the pale ground ; *m-cu* unusually far distad, about opposite three-fourths the length of cell 1st M_2 or beyond ; abdomen brown, the posterior borders of the intermediate tergites more reddish brown.

Female.—Length about 13–15 mm. ; wing 13–15 mm. ; antenna about 4–4.2 mm.

Rostrum brownish black ; palpi black. Antennæ with scape brownish yellow, pedicel somewhat paler yellow ; flagellar segments bicoloured, the bases blackened, tips yellow, the dark colour faint to virtually lacking on the first segment, on the second and third involving less than half the segment ; succeeding segments with the amount of yellow gradually becoming reduced but the bicolourous nature persisting virtually to the end ; flagellar segments generally long-cylindrical, slightly narrowed on the yellowed outer portions, longer than the verticils. Head rich cinnamon brown, darker on the posterior vertex ; anterior vertex relatively narrow, less than twice the diameter of the scape.

Pronotum brown. Mesonotal praescutum with the lateral borders dark cinnamon brown, the disk with three brown stripes that are narrowly and vaguely separated from one another by yellow pollinose lines ; centres of scutal lobes dark brown, the central part more pollinose ; posterior sclerites of notum dark brown, sparsely pollinose. Pleura with a broad dark brown dorsal stripe, extended backward over the pleurotergite ; dorsopleural membrane, ventral pleurites and sternum more reddish brown. Halteres elongate, yellow. Legs with the coxæ dark brown ; trochanters obscure brownish yellow ; femora yellow with a narrow brown subterminal ring, this varying somewhat in width and intensity, in cases darker and nearly as broad as the yellow apex ; remainder of legs yellow. Wings (fig. 10) with the ground yellow, the prearcular and costal fields even more saturated ; an unusually heavy solidly brown pattern that exceeds the ground areas in amount, including broken bands at arculus, origin of *Rs*, cord and outer end of cell 1st M_2 , with other marks at R_2 and fork of M_{1+2} ; marginal spots at ends of all longitudinal veins ; further small spots along the veins, particularly those beyond the cord,

in the more heavily patterned individuals, these spots confluent with one another or with adjoining major areas ; veins light yellow, brown in the patterned parts. Venation : *m-cu* lying unusually far distad, at near three-fourths the length of the long cell 1st M_2 or even beyond, in extreme cases almost opposite the outer end of the cell ; cell M_1 deep, approximately three times its petiole.

Abdomen brown, the posterior borders of the intermediate tergites narrowly more reddish brown ; sternites more uniformly of the latter colour.

Hab. Netherlands New Guinea.

Holotype, ♀, Moss Forest Camp, altitude 2,800 metres, October 11th, 1938 (*Toxopeus*). *Paratopotypes*, 8 ♀♀, October 11th to 29th and November 2nd, 1938.

Austrolimnophila (Austrolimnophila) polydamas has the wing pattern heavier than any of the other regional large-sized species discovered to this date. Among such forms it most resembles *A. (A.) excelsior*, sp. n.

Austrolimnophila (Austrolimnophila) superstes, sp. n.

Size large (wing of male up to about 14 mm.) ; mesonotum ashy grey, the anterior end and lateral borders of praescutum dark brown, the median stripe lighter brown ; antennæ of male elongate, basal flagellar segments bicoloured ; halteres elongate, yellow ; femora brownish yellow, tips brownish black, preceded by a somewhat clearer yellow ring ; wings faintly tinted, with a relatively sparse brown pattern, chiefly appearing as marginal areas at ends of the longitudinal veins ; R_{2+3+4} long, exceeding two-thirds the length of R_s ; R_{1+2} about three times R_2 ; inner end of cell 1st M_2 unusually arcuated, extended basad ; male hypopygium with the posterior border of tergite terminating in two blackened lobes that are separated by a narrow U-shaped notch ; outer dististyle with a large basal cushion, inner style stout, apex expanded and more or less bilobed ; interbase appearing as a strong hook.

Male.—Length about 11–12.5 mm. ; wing 10.5–14 mm. ; antenna about 5.3–5.5 mm.

Female.—Length about 12.5–14 mm. ; wing 13–14 mm. ; antenna about 3.8–4 mm.

Rostrum and palpi black. Antennæ of male elongate, as shown by the measurements ; scape and pedicel dark brown, pruinose ; proximal flagellar segments bicoloured, the bases black, tips yellow, the colours subequal on the first segment, the amount of black gradually increasing, the segments beyond the ninth uniformly blackened ; flagellar segments elongate-cylindrical, verticils relatively short, the longest slightly more than one-half the segments, much longer than the dense erect setulæ. Head dark brown, pruinose, clearer grey on the narrow anterior vertex which is slightly wider than the diameter of the scape.

Pronotum greyish brown. Mesonotal praescutum light ashy grey, the anterior fourth dark brown, this colour continued backward as a narrow lateral border, behind with a conspicuous light brown central stripe that widens behind, vaguely divided by a pale vitta ; sublateral

darkened stripes very reduced to scarcely evident ; posterior sclerites of notum light grey ; centres of scutal lobes light brown, in certain lights the pleurotergite appearing slightly infuscated. Propleura and areas on dorsal pleurites and ventral sternopleurite weakly infuscated, separated by a grey longitudinal stripe on the dorsal sternopleurite, ventral pteropleurite and meron ; dorsopleural region darkened behind, yellow at the anterior spiracle. Halteres elongate, light yellow, the stem weakly darkened before the brightened knobs. Legs with the coxæ brown, sparsely pruinose ; trochanters darker brown ; femora brownish yellow, tips brownish black, preceded by a somewhat clearer yellow ring ; tibiæ brown, tips narrowly more darkened ; tarsi brown, passing into black. Wings (fig. 15) subhyaline to faintly tinted, with a relatively sparse pale brown pattern, the larger marks at arculus, reaching costa and a marginal series of circular spots, larger on the anal veins, lacking on veins R_5 and M_1 ; spots on the disk smaller, including the origin of R_s , interrupted spots on cord and outer end of cell 1st M_2 , and at and near the forks of R_s , R_{2+3+4} and M_{1+2} ; veins brownish yellow, slightly darker in the patterned areas. Venation : R_s relatively short, strongly arcuated at origin ; R_{2+3+4} long, exceeding two-thirds the length of R_s ; R_{1+2} long, about three times R_2 ; inner end of cell 1st M_2 strongly arcuated ; cell M_1 nearly twice its petiole ; $m-cu$ beyond midlength of cell 1st M_2 .

Abdomen unusually long ; tergites yellowish brown, only vaguely patterned, the posterior borders slightly paler ; basal sternites and lateral margins of the others slightly darkened, the remainder yellow ; subterminal segment more uniformly darkened, hypopygium brownish yellow. Male hypopygium (fig. 14) with the tergite large, posterior margin gently convex, on either side of the midline produced into heavily blackened lobes separated by a deep U-shaped notch, the summit of the lobe vaguely emarginate. Basistyle, b , at apex of mesal face produced into a flattened blade. Dististyles, d , terminal, large ; outer style compressed-flattened, narrowed to an acute point, on outer margin of basal half with a large rounded cushion, clothed with abundant yellow setæ, including fewer larger ones ; inner style stout, apex expanded and more or less bilobed, the base heavily blackened. Interbase appearing as a simple strong hook.

Hab. Netherlands New Guinea.

Holotype, ♂, Mountain lake east of Mount Wilhelmina, altitude 3,600 metres, September 18th, 1938 (*Toxopeus*). *Allotopotype*, ♀, September 7th, 1938. *Paratopotypes*, 3 ♂♂, altitude 3,450–3,600 metres, August 15th–September 8th, 1938 (*Toxopeus*) ; *paratypes*, 1 ♂, Moss Forest Camp, altitude 2,800 metres, November 1st, 1938 ; 1 ♀, altitude 2,850 metres, October 17th, 1938.

Compared with other regional large-sized members of the genus, the present fly is most readily told by the structure of the male hypopygium, particularly the tergite and dististyles. The most similar species include *Austrolimnophila* (*Austrolimnophila*) *cyclopica* Alexander and *A. (A.) nebias* Alexander.

Austrolimnophila (Austrolimnophila) terpsis, sp. n.

Size small (wing of male 9 mm.) ; mesonotum brownish grey, the anterior and lateral parts of the praescutum darkened, the area continued backward over the dorsal pleurites to the abdomen ; antennal flagellum weakly bicoloured ; halteres and legs yellow ; wings pale yellow with a pale brown pattern that is restricted to the forks and margins of the veins ; male hypopygium with the posterior border of the tergite heavily blackened, the lobes separated by a microscopic linear median notch ; outer dististyle slender, the basal cushion low, inner style broad.

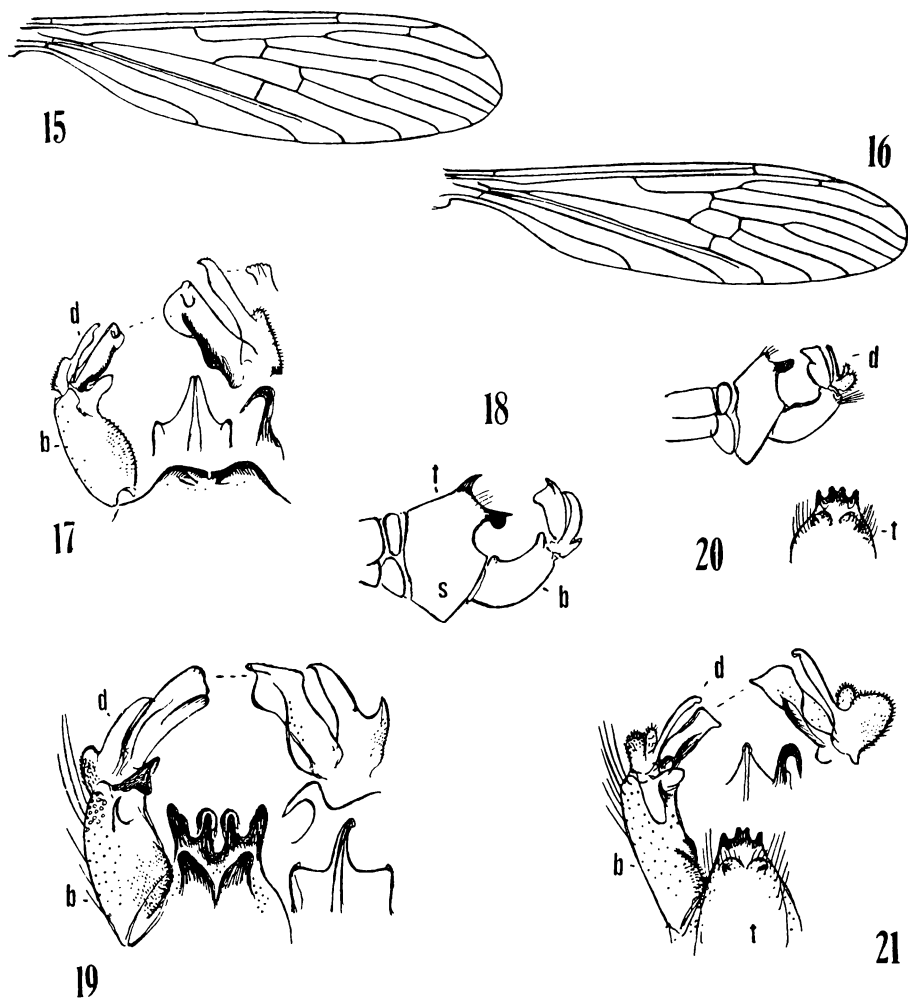
Male.—Length about 7.5 mm. ; wing 9 mm. ; antenna about 4.5 mm.

Rostrum buffy ; palpi black. Antennæ of male relatively long, approximately one-half the wing ; flagellum bicoloured, yellow, the bases of the segments narrowly and weakly infuscated, outer segments more uniformly darkened ; flagellar segments long-cylindrical, verticils short. Head grey ; anterior vertex narrow.

Pronotum yellow, the scutum weakly darkened above. Mesonotal praescutum brownish grey without distinct stripes, the anterior and lateral parts dark brown, this colour continued backward over the dorsal pleurites to the abdomen ; posterior sclerites of notum brownish grey, centres of scutal lobes vaguely darker. Pleura dark brown dorsally, as described, the ventral part, including the propleura and sternites, brownish yellow. Halteres elongate, obscure yellow. Legs with the coxæ and trochanters buffy yellow ; remainder of legs obscure yellow. Wings (fig. 16) pale yellow, the costal margin scarcely different ; a sparse but conspicuous pale brown pattern that is restricted to the forks and margins ; larger areas at arculus ; origin of *Rs*, extending from *C* to *M* ; a major mark from the fork of *Sc* across the bases of the radial cells to *r-m* ; R_{1+2} and R_3 ; narrower seams over cord, outer end of cell 1st M_2 and fork of M_{1+2} ; marginal clouds over all remaining veins excepting R_5 and M_1 , largest on 2nd *A* ; axillary angle narrowly darkened ; veins yellow, darker in the patterned areas. Venation : *Sc* long, both Sc_1 and Sc_2 beyond the fork of R_{2+3+4} , the latter long ; R_{1+2} nearly three times R_2 ; *Rs* moderately long, nearly square at origin ; R_{2+3+4} fully three times the basal section of R_5 ; cell M_1 varying from about two to two and one-half times its petiole ; cell 1st M_2 small, subrectangular, *m-cu* at near three-fifths the length.

Abdominal tergites dark brown, basal sternites slightly paler ; hypopygium brown. Male hypopygium (fig. 17) with the posterior margin of the tergite heavily blackened, subtruncate, with a microscopic linear median notch. Basistyle, *b*, with the apical blade on mesal face large and flattened, with no further subterminal spine ; interbase with the apical spine bent strongly backward. Dististyles, *d*, two, the outer style slender, its basal cushion low, with microscopic setulæ ; inner style longer and much broader, apex subtruncate, the upper part with a weak reflexed lobe, lower apical margin rounded ; lower edge of style heavily blackened. Aedeagus almost triangular in outline because of lateral wings, the apex very weakly emarginate.

Figs. 15-21.



15. *Austrolimnophila* (*Austrolimnophila*) *superstes*, sp. n.; venation. 16. *Austrolimnophila* (*Austrolimnophila*) *terpsis*, sp. n.; venation. 17. *Austrolimnophila* (*Austrolimnophila*) *terpsis*, sp. n.; male hypopygium. 18, 19. *Austrolimnophila* (*Austrolimnophila*) *trifidula*, sp. n.; male hypopygium. 20, 21. *Austrolimnophila* (*Austrolimnophila*) *wilhelmínæ*, sp. n.; male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *t*, tergite).

Hab. Netherlands New Guinea.

Holotype, ♂, Top Camp, altitude 2,100 metres, January 25th, 1939 (*Toxopeus*); Alexander Collection.

The most similar regional species is *Austrolimnophila* (*Austrolimnophila*) *amatrix*, sp. n., which differs in the coloration and especially in the structure of the male hypopygium, including virtually every part.

Austrolimnophila (Austrolimnophila) trifidula, sp. n.

Allied to *multitergata*; general coloration of mesonotal praescutum yellowish grey, the sides, with the posterior sclerites of the notum darker brown; pleura brown; antennæ with flagellar segments bicoloured; legs with femora light brown, tibiæ and tarsi yellow; wings light yellow with a conspicuous brown pattern that includes scattered dots on most of the veins; male hypopygium with the tergal armature blackened, the lower lobes on either side trifid; phallosome with the aedeagus elongate, only slightly expanded at base.

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

Rostrum and palpi brownish black. Antennæ of male elongate, slightly less than one-half the length of the wing; scape and pedicel yellow, flagellar segments bicoloured, brownish black basally, tips yellow, the pattern persisting throughout; flagellar segments elongate-cylindrical, with short verticils and a dense white pubescence. Head dark brownish grey; anterior vertex slightly wider than the diameter of the scape.

Pronotum obscure yellow. Mesonotal praescutum yellowish grey behind, anterior end more brownish yellow, sides conspicuously brown; posterior sclerites of notum more strongly infuscated, base of scutellum paler. Pleura chiefly brown, the propleura and metapleura more yellowed. Halteres elongate, obscure yellow, stem vaguely more darkened outwardly, knob brightened. Legs with coxæ and trochanters yellow; femora light brown, tibiæ and tarsi more yellowed. Wings light yellow, costal region slightly more saturated yellow; a relatively restricted brown pattern, including larger costal areas at *h*, origin of *Rs*, fork of *Sc*, extended backward across the fork of R_{2+3+4} , form of M_{1+2} , and as marginal areas at ends of longitudinal veins, smallest on R_5 and M_1 ; axillary region narrowly darkened; small scattered brown dots on most veins, lacking on certain sections; veins yellow, brown in the infuscated areas. Venation: *Rs* relatively short, arcuated at origin; both Sc_1 and Sc_2 ending beyond fork of R_{2+3+4} ; inner end of cell 1st M_2 only slightly arcuated; cell M_1 about two and one-half times its petiole; *m-cu* at near two-thirds to three-fourths M_{3+4} .

Abdominal tergites brown, their posterior borders narrowly pale; sternites similar, the basal rings conspicuously obscure yellow; hypopygium dark brown. Male hypopygium (figs. 18, 19) generally as in *multitergata*, differing in the details. Tergite, *t*, with conspicuous blackened lobes, including a dorsal divergent pair with obtuse tips; lower armature large and complex, on either side with three lobes, the outer longest, inner pair with the ventral blade large and rounded; space between the upper and lower armature with conspicuous setæ, somewhat as in *multitergata*. Basistyle, *b*, with mesal face of proximal end with an extensive scabrous area provided with minute curved setæ; at and before apex with a slender spine and a large more nearly apical flattened blade; interbase acute at tip. Outer dististyle, *d*, with the basal cushion obtuse at tip, outer surface roughened by microscopic setæ and points; inner style large, darkened, apex truncate. Phallosome

with the dilated basal plate truncate, ædeagus elongate, only slightly expanded at base, quite different from the structure in *multitergata*.

Hab. Netherlands New Guinea.

Holotype, ♂, Lake Habbema, altitude 3,300 metres, July 29th, 1938 (*Toxopeus*); Alexander Collection.

The closest regional ally is *Austrolimnophila* (*Austrolimnophila*) *multitergata* Alexander which differs especially in the structure of the male hypopygium, particularly the tergite, interbase and inner dististyle.

Austrolimnophila (*Austrolimnophila*) *wilhelminae*, sp. n.

Size medium (wing of male 11 mm.); mesonotum and pleura chiefly brown; antennal flagellum bicoloured; halteres and legs yellow; wings light yellow, with an abundant light brown pattern, including small spots and dots on most of the veins; *Rs* short, *m-cu* at near two-thirds the length of M_{3+4} ; male hypopygium with the dorsal armature of the tergite unblackened, ventral plate four-lobed; outer dististyle with basal cushion bilobed, densely setuliferous; apex of inner style obliquely truncated.

Male.—Length about 10 mm.; wing 11 mm.; antenna about 3.5 mm.

Rostrum and palpi dark brown. Antennæ moderately long, about one-third the wing; scape and pedicel yellow, flagellar segments bicoloured, brownish black basally, the tips more broadly yellow, the amount of dark colour not markedly increased on the outer segments; flagellar segments elongate-cylindrical, exceeding the verticils; dense pale erect setulæ over the entire segment. Head brownish grey, paler behind; anterior vertex relatively broad, slightly more than twice the diameter of the scape.

Pronotum reddish brown, the lateral margins and extreme anterior pretergites yellowed. Mesonotal praescutum with the very restricted ground yellow pollinose, the disk virtually covered by a central brown stripe and vaguely indicated sublateral ones; humeral and lateral borders broadly chestnut brown; posterior sclerites of notum light brown, scutellum darker. Pleura light brown, dorsopleural membrane more yellowed. Halteres elongate, yellow. Legs with the coxæ and trochanters yellow; remainder of legs yellow, even the last tarsal segment not or scarcely darker. Wings light yellow, costal border very slightly more saturated; an abundant light brown pattern that is restricted to the veins, none of the areas unusually extensive, the largest at arculus, origin of *Rs*, form of *Sc*, and as marginal clouds, largest on 2nd *A*, lacking on R_5 and M_1 ; very narrow seams at cord and outer end of cell 1st M_2 ; a series of about ten pale brown dashes on vein 1st *A*, crossing cell *Cu*; veins yellow, light brown in the clouded parts. Costal fringe very short. Venation: *Sc* long, both Sc_1 and Sc_2 ending some distance beyond form of R_{2+3+4} ; *Rs* short, nearly square at origin, only a little longer than R_{2+3+4} ; cell M_1 about twice its petiole; *m-cu* at or near two-thirds the length of M_{3+4} .

Abdominal tergites pale brown, their posterior borders narrowly pale; sternites with basal rings more broadly pale; hypopygium darker

brown ; abdomen with conspicuous setæ. Male hypopygium (figs. 20, 21) with the tergite, *t*, elongate, terminating in a blackened four-lobed ventral plate, the lateral points separated from the central pair by a broad U-shaped notch ; dorsal armature reduced to a small dark-coloured tubercle on either side, surmounting a large low lobe with long conspicuous setæ. Basistyle, *b*, on mesal face with the usual spiculate area at base, together with a glabrous blackened mark ; at apex with the usual slender spine and large more flattened blades ; outer apical angle with long conspicuous setæ ; interbases appearing as slender hooks. Outer dististyle, *d*, very slender, at base of outer face with two lobes, both conspicuously setiferous, the axillary one small ; inner style large and flattened, obliquely truncated at tip. Phallosome very broad at base, subtending the ædeagus, giving a triangular outline.

Hab. Netherlands New Guinea.

Holotype, ♂, East of Wilhelmina Top, altitude 3,600 metres, August 30th, 1938 (*Toxopeus*) ; Alexander Collection.

Austrolimnophila (*Austrolimnophila*) *wilhelminae* is quite distinct from the other regional medium-sized members of the genus in the structure of the male hypopygium, particularly the tergite and dististyles. It is more like *A. (A.) trifidula*, sp. n., than to the large forms with heavily patterned wings, such as *A. (A.) polydamas*, sp. n., and others.