

PLATE XII.

C. archiaci (Edwards & Haime), from Lower *Dibunophyllum* and *Seminula* Zones of the Carboniferous Limestone.

- Figs. 1 a-1 e.* "*Monense*" type. Sections of one specimen. *Figs. 1 a* and *1 c*, transverse sections, *fig. 1 b* longitudinal section, at the ephebic stage; *figs. 1 d* and *1 e*, transverse sections at the late neanic stage, all $\times 1$. S_2 - D_1 beds, Strandhall, Isle of Man.
- Fig. 2.* "*Monense*" type. Transverse section at the ephebic stage, $\times 1$. D_1 beds, Strandhall.
- Fig. 3.* "*Monense*" type. Transverse section at the early ephebic stage, $\times 1$. Sixth Limestone, D_1 , Stockhow Hall, near Kirkland, West Cumberland. Collected by Mr. C. Edmonds.
- Figs. 4 a-4 c.* "*Monense*" type. Transverse section at ephebic stage (*4 a*, $\times 1$), and transverse sections of one specimen at late neanic (*4 b*, $\times 1.4$) and middle neanic (*4 c*, $\times 3$) stages. S beds, Cliff top, near The Wash, Pembrokeshire.
- Fig. 5.* "*Bristolense*" type. Transverse section at late neanic stage (dissepiments destroyed), $\times 1.5$. S_1 , Avon Gorge, Bristol.

LX. — *New or little-known Tipulidæ (Diptera).*—XLIII.
Australasian Species. By CHARLES P. ALEXANDER, Ph.D.,
 F.E.S., Massachusetts Agricultural College, Amherst,
 Massachusetts, U.S.A.

THE crane-flies discussed in the present paper are all Australian members of the tribe Hexatomiini, chiefly species of the genus *Limnophila*, which is abundantly represented in the mountains of south-eastern Australia and Tasmania. The material was collected by my friends Messrs. Barrett, Borch, the late Dr. Ferguson, Heron, Hill, Mathews, and Wilson, to whom my sincere appreciation is extended. The most important series is that taken by Wilson on the Bogong High Plains, Victoria, under conditions that were discussed in the preceding part under this general title. Where not stated to the contrary, the types are preserved in the writer's collection.

HORISTOMYIA, Alexander.

1924. *Horistomyia*, Alexander, Ann. & Mag. Nat. Hist. (9) xiii. p. 504.

A few additional notes regarding the structure of the male hypopygium, based on the accession of two species described as new at this time, may be given. Basistyles very large and compressed, the mesal face hollowed out, at the outer end of the concavity with a single dististyle, this simple in

leucophæa and *victoriæ*, more or less T-shaped and slender in *occidentalis*; apex of basistyle beyond the point of insertion of the dististyle produced into a stout compressed lobe, more slender in *occidentalis*; proximal portion of basal region produced ventrad into a conspicuous lobe, very long and conspicuous in *occidentalis*. In the Eastern species the powerfully-constructed phallosomic structure is bent strongly dorsad, thence ventrad, forking into three arms as it leaves the body between the ventral lobes of the basistyle, the two simple arms (interpreted as being gonapophyses) variously constructed in the different species, the median arm (interpreted as being the ædeagus) again split toward its tip into two shorter arms that are weakly (*victoriæ*) to strongly (*leucophæa*) spatulate. In *occidentalis* this structure is shorter and wider, appearing as a highly-compressed blade, the ventral margin with an acute spine that is directed ventrad and cephalad; in addition to this median structure, there is a strongly-curved crook-like rod on the mesal face of each basistyle near base, this directed dorsad, the tip curved upon itself and directed ventrad.

Despite the lack of tibial spurs in the present genus, it would appear that it is most closely allied to *Phyllolabis*, Osten-Sacken, of the Holarctic Region.

Horistomyia victoriæ, sp. n.

Male.—Length about 5.5–6 mm.; wing 7–7.8 mm.

Female.—Length about 7 mm.; wing 7.5 mm.

Generally similar to *H. leucophæa* (Skuse), differing especially in the structure of the male hypopygium. Legs brownish black to black, including the tarsi. Wings with the stigma and a seam in cell *M* adjoining vein *Cu*₁ brown; veins and macrotrichia nearly black. Venation: *Sc*₂ close to the tip of *Sc*₁; *Rs* strongly arcuated to feebly angulated at origin; *R*₂₊₃₊₄ longer than *R*₄; cell 1st *M*₂ long and narrow, with *m-cu* at near mid-length of the lower face. Male hypopygium with the basistyles and dististyles much as in *leucophæa*, but the ædeagus and gonapophyses very different, all relatively slender at tips, the gonapophyses narrowed into spear-like points and quite unprovided with spinous armature.

Hab. Victoria.

Holotype, ♂, Ringwood, altitude about 400 feet, September 4, 1927 (*C. Barrett*).

Allotopotype, ♀, pinned with the type.

Paratopotype, 3 ♂ ♀, August 28, 1927 (*C. Barrett*); *paratype*, ♀, Eltham, August 25, 1928 (*F. E. Wilson*).

Horistomyia occidentalis, sp. n.

Allied to *H. leucophæa* (Skuse), differing conspicuously in the structure of the male hypopygium, the dististyles being very slender, more or less T-shaped.

Male.—Length about 5.5 mm.; wing 7-7.2 mm.

Female.—Length about 6.5-7.5 mm.; wing 7.2-8 mm.

Rostrum grey, the palpi black. Antennæ black, the basal segment sparsely pruinose; flagellar segments oval. Head greyish brown, the orbits clearer grey.

Pronotum brown, the lateral margins grey. Mesonotal præscutum brown medially, the lateral margins clearer grey, the interspaces poorly indicated; no tuberculate pits; pseudosutural foveæ comma-like to subcircular, black, lying near the margin of the sclerite; scutum light grey, the lobes more brownish grey; scutellum and postnotum clear light grey. Pleura light grey. Halteres relatively long, pale yellow, the knobs dark brown. Legs with the coxæ grey; trochanters dark brown; remainder of legs black, the femoral bases restrictedly paler. Wings whitish subhyaline, the oval stigma very pale brown; a longitudinal brown wash in cell; Cu_1 and M , adjoining vein Cu_1 ; veins dark brown, the prearcular veins more yellowish. Venation: Sc_2 close to or slightly removed from the tip of Sc_1 ; Rs strongly arcuated to angulated and short-spurred at origin; veins R_3 and R_4 moderately divergent at tips; cell 1st M_2 relatively long, its inner end arcuated; outer deflection of M_3 variable in length; $m-cu$ before or near mid-length of cell 1st M_2 .

Abdomen dark grey. Male hypopygium relatively large and very complicated in structure. Basistyle with a small fleshy lobe on dorsal face at base; ventral portion of style produced ventrad into a conspicuous flattened lobe, a little dilated outwardly, the apex narrowed, the mesal margin and face microscopically spiculate. Outer apical angle of basistyle produced caudad into a relatively long and slender dusky lobe. The single dististyle is of very unusual form, somewhat resembling a versatile anther of certain grasses, the arcuated stem stouter, attached to the cross-bar slightly beyond mid-length, the short arm terminating in a few spinous setæ. Phallosome projecting ventrad and cephalad from between the ventral lobes of the basistyle as a large, very compressed, yellow blade, bearing a conspicuous acute spine on the margin; gonapophyses similarly conspicuous, appearing as strongly-curved yellow hooks, their tips acute. Ovipositor with the valves nearly straight, dark reddish horn-colour, more blackened at base.

Hab. West Australia.

Holotype, ♂, Bridgetown, August 29, 1926 (*E. W. Ferguson*).

Allotopotype, ♀.

Paratopotypes, 1 ♂, 2 ♀ ♀; *paratypes*, 1 sex?, Perth, August 22, 1926; 1 ♀, Donnybrook, August 29, 1926; 1 ♀, Narrogin, August 30, 1926 (*E. W. Ferguson*); 2 ♂ ♂, South Perth, August 18, 1927 (*W. H. Mathews*).

The type was returned to Dr. Ferguson.

The paratype from Narrogin has the three præscutal stripes more clearly defined; wings with a dusky cloud on the anterior cord.

Ischnothrix verticalis, sp. n.

Male.—Length about 6 mm.; wing 7 mm.; antenna about 10 mm.

Allied to *I. australasiæ* (Skuse) and *I. lawsonensis* (Skuse), and about intermediate between these two in the length of the antennæ of the male sex, which here are approximately one-half longer than the wing.

The chief further differences lie in the wing-venation and pattern and the structure of the male hypopygium.

Antennæ with the flagellar segments brownish black, the extreme tips pale. Head dark grey. Præscutum grey, more yellowish laterally, the brown stripes incomplete; intermediate stripes narrower, extending to near mid-length of the sclerite; sublateral stripes broader, occupying the posterior half of the sclerites; a narrow submarginal brown line behind the pseudosutural foveæ; lateral and mesal margins of the scutal lobes broadly dark brown, leaving the centres greyish. Halteres chiefly pale. Femora obscure yellow, the broad subterminal ring black, preceded by a brighter yellow subterminal ring; apex of femur narrowly light yellow; tibiæ obscure yellow, the tips broadly blackened; a narrow black basal ring on tibiæ. Wings with the ground-colour yellow; a sparse brown pattern, arranged as follows:—Small spots in base of cell *R*, origin of *Rs*, at *Sc*₂, and at near mid-length of cell *Cu*; cord, outer end of cell 1st *M*₂ and *R*₃ seamed with brown; conspicuous oval brown clouds just before the ends of veins *R*₄ to 2nd *A*, inclusive; axillary angle restrictedly darkened; veins dark, more yellowish in the prearcular and costal regions. Venation: *R*₃ vertical; cell 1st *M*₂ shorter and broader, the basal section of *M*₃ shorter than the second section of *M*₃₊₄; cells 2nd *M*₂, *M*₃, and *M*₄ more shallow than in *australasiæ*. Abdomen

brownish black, the hypopygium yellow. Male hypopygium with the mesal apical tubercle of the basistyle terminating in a single long seta. Outer dististyle entirely blackened, expanded distally, the outer half with teeth along the outer margin, small and appressed near the base, becoming more elongate outwardly. Inner dististyle pale, subangularly bent at near mid-length, the angulation a little produced and bearing about six long pale setæ. Gonapophyses appearing as pale plates, one obtusely rounded, the other terminating in two pale unequal spines.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, altitude 5600-6000 feet, January 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

Limnophila bathrogramma, sp. n.

General coloration dark brown; pseudosutural foveæ and tuberculate pits black; antennæ (♂) short; wings creamy-yellow, with a conspicuous brown pattern, including large areas in base of cell *M*; *Sc*₁ subequal to *m-cu*; cell *M*₁ present; male hypopygium with the gonapophyses terminating in a long apical spine.

Male.—Length about 5.8 mm.; wing 7.2 mm.

Female.—Length about 6.2-6.5 mm.; wing 6.2-7 mm.

Rostrum short, dark brown; palpi dark brown. Antennæ (♂) short, if bent backward ending far before the wing-root, dark brown throughout; outer flagellar segments elongate, with long verticils, the basal segments shorter. Head brown, with a sparse yellow pollen.

Mesonotum brown with scarcely indicated darker stripes, the surface of the interspaces with a sparse yellow pollen; tuberculate pits black, placed behind mid-distance between the cephalic margin of the sclerite and the level of the pseudosutural foveæ; pseudosutural foveæ relatively large, elongate, black, directed caudad and laterad; posterior sclerites of mesonotum more pruinose. Pleura dark, sparsely pruinose; dorso-pleural region dusky. Halteres pale yellow. Legs with the coxæ darkened basally, especially the middle coxæ; trochanters obscure yellow; remainder of legs yellow, the tips of the femora and tibiæ narrowly blackened; terminal tarsal segments passing into brownish black; legs with conspicuous erect setæ. Wings creamy-yellow, with a conspicuous brown pattern, including areas in the bases of cells *R* and *M*; a large area in cell *M*, sometimes confluent with the first-mentioned; origin of *Rs*; along

cord; outer end of cell 1st M_2 and a series of circular marginal spots on all veins except R_5 and, in some cases, M_1 ; in cases additional areas are found at fork of M_{1+2} and in the axilla; cell C sometimes infumed; stigma oval, dark brown; veins yellow, darker in the infuscated areas. Venation: Sc_1 ending shortly before the fork of R_3 , Sc_2 some distance from its tip, Sc_1 alone being equal to or longer than $m-cu$; R_{2+3+4} relatively long, nearly equal to cell 1st M_2 ; R_2 longer than R_{1+2} ; inner ends of cells R_4 , R_5 , and 1st M_2 in transverse alignment; cell M_1 present; $m-cu$ about two-thirds to three-fourths its length beyond the fork of M .

Abdomen dark brown, the surface vaguely pruinose. Male hypopygium with the outer dististyle having the general structure of the *jucunda* group, but longer and more slender. Gonapophyses with the long apical spine much shorter than in the *jucunda* group, but longer than in the *lepida* group. *Ædeagus* short.

Hab. New South Wales.

Holotype, ♂, Brooklana, Eastern Dorrigo, altitude about 2000 feet, April 15, 1928 (*W. Heron*).

Allotopotype, ♀, February 19, 1928 (*W. Heron*).

Paratopotype, ♀, March 1928 (*W. Heron*).

In its general appearance and wing-pattern *L. bathrogramma* agrees most nearly with *L. subjucunda*, Alexander, differing in the long Sc_1 and the differently-constructed gonapophyses.

Limnophila polymoroides, sp. n.

General coloration dull brownish yellow; pseudosutural foveæ very reduced; tuberculate pits lacking; legs yellow, with conspicuous suberect setæ; wings greyish yellow, the outer ends of the radial cells darker; stigma dark brown, with a cream-coloured area at either end; cord narrowly seamed with dark brown; cell M_1 present.

Female.—Length about 8 mm.; wing 8.5 mm.

Rostrum very short, dark brown, pollinose; palpi short, brownish black. Antennæ relatively short, if bent backward ending far before the root of the halteres; first scapal segment dark brown; second segment brownish yellow; basal segments of flagellum pale yellow, the outer ones passing into dark brown; basal flagellar segments a little enlarged, the outer ones becoming long-cylindrical, with conspicuous verticils that exceed the segments. Head yellowish brown.

Mesonotum dull brownish yellow, unmarked; pseudo-sutural fovea reduced to a tiny circular dot near the lateral margin of the præscutum; no tuberculate pits. Pleura more infuscated, the sternopleurite and pteropleurite a little brighter. Halteres obscure yellow, the knobs infuscated. Legs with the coxæ large, brownish testaceous; trochanters obscure yellow; remainder of legs yellow, the tips of the tibiæ and the outer tarsal segments vaguely infuscated; legs stout, with very long, conspicuous, suberect setæ. Wings with a strong greyish-yellow suffusion; stigma long-oval, preceded and followed by conspicuous cream-coloured areas; cells R_2 , R_3 , and the extreme tip of R_4 more strongly infused than the remainder of the ground-colour; narrow but conspicuous dark brown seams at fork of Sc , origin of Rs , along the cord and outer end of cell 1st M_2 ; a conspicuous white longitudinal streak in cell R adjoining vein M , passing through cell 1st M_2 into the base of cell M_3 ; veins pale yellowish brown, dark brown in the infuscated areas. Macrotrichia of the veins very long and conspicuous. Venation: Sc_1 ending opposite the fork of Rs , Sc_2 at its tip; Rs elongate; R_{2+3+4} longer than $m-cu$; R_2 a trifle shorter than R_{1+2} ; inner ends of cells R_4 , R_5 , and 1st M_2 in nearly transverse alignment; cell M_1 about one-half longer than its petiole; cell 1st M_2 elongate, $m-cu$ at near mid-length.

Abdomen dark brown, the sternites a little brighter. Ovipositor with the valves long and slender, gently upcurved to the acute tips, reddish horn-colour.

Hab. Victoria.

Holotype, ♀, Millgrove, altitude 1600–1700 feet, in dense shade, close to the fast-flowing mountain stream (the Dee), flushed by beating dead fronds beneath tree-ferns, April 7, 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

In the wing-pattern and hairy legs *L. polymoroides* bears a rather notable resemblance to species of the Chilean genus *Mesolimnophila*, Alexander (*Polymoria*, Philippi, olim).

Limnophila austroalpina, sp. n.

General coloration grey; antennæ black throughout; legs yellow, the tips of the femora and tibiæ darkened; wings yellowish subhyaline, heavily marked with brown; conspicuous white areas before and beyond the stigma.

Male.—Length about 7.5 mm.; wing 8.5 mm.

Rostrum short, grey; palpi black. Antennæ black throughout; flagellar segments conspicuously shorter than in *obscuripennis*, the basal flagellar segments especially crowded. Head grey.

Pronotum grey, the posterior portions of the scutellum a little brighter. Mesonotal præscutum almost uniformly dark grey, the usual interspaces and a median line pale brown, very delicate, and scarcely indicated; no tuberculate pits; pseudosutural foveæ very small, marginal in position; scutum grey, the centres of the lobes slightly darkened; scutellum and postnotum grey. Pleura uniformly grey, the dorso-pleural membrane dusky, paler above the spiracle. Halteres dusky, the base of the stem obscure yellow. Legs with the coxæ dark, pruinose, the tips pale yellow; trochanters obscure yellow; femora yellow, the tips infuscated; tibiæ yellowish brown, the tips narrowly dark brown; tarsi dark brown; legs conspicuously hairy. Wings yellowish subhyaline with a heavy brown pattern; stigma long-oval, dark brown; the brown clouds include areas in the bases of cells *Sc* and *R*; origin of *Rs*; along cord, outer end of cell 1st *M*₂ and fork of *M*₁₊₂; extensive broken clouds in cells *R*₁ and *R*, and in the extreme outer ends of cells *R*₄ and *R*₅; other somewhat paler washes in the medial, cubital, and anal cells; cell *C* clouded; whitish pre-stigmal and post-stigmal areas; veins dark brown, the obliterative areas along cord relatively extensive. Venation: Inner ends of cells *R*₄ and *R*₅ in transverse alignment; inner end of cell 1st *M*₂ lying far proximad of the rest of the cord; *m-cu* in oblique alignment with the anterior cord and nearly its own length beyond the fork of *M*.

Abdomen above brown; sternites yellow, narrowly brownish black laterally; hypopygium dark. Male hypopygium as in *obscuripennis*.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, altitude 5600–6000 feet, January 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

L. austroalpina is allied to *L. obscuripennis*, Skuse, differing especially in the shorter, entirely black antennæ and the almost uniform grey thorax.

Linnophila obscuripennis neptuna, subsp. n.

Male.—Length 10 mm.; wing 11 mm.

Distinguished from typical *obscuripennis*, Skuse, chiefly by the large size and more uniformly darkened wings.

Antennæ with the basal two flagellar segments yellow, the remainder of the organ black. Thoracic pattern quite as in *obscuripennis*. Femora weakly infuscated at tips; tibiæ more narrowly and conspicuously darkened; terminal tarsal segments infuscated. Wings with the dark markings so extensive as to virtually cover the surface, restricting the creamy ground-colour to spots before the origin of *Rs*, on either side of the dark cross-band at the cord and less evidently in the bases of cells M_1 to M_3 ; the whitish pre-stigmal, post-stigmal, and apical areas very distinct; stigma almost black; veins along cord and outer end of cell 1st M_2 not conspicuously pale.

Hab. New South Wales.

Holotype, ♂, Brooklana, Eastern Dorrigo, altitude 2000 feet, August 8, 1928 (*W. Heron*).

Limnophila bogongensis, sp. n.

Antennæ short; wings with a strong yellow suffusion, the stigma slightly more brownish yellow; cell M_1 present; no macrotrichia in cells of wing; male hypopygium with the outer dististyle terminating in a single acute spine, the outer face with very long curved setæ.

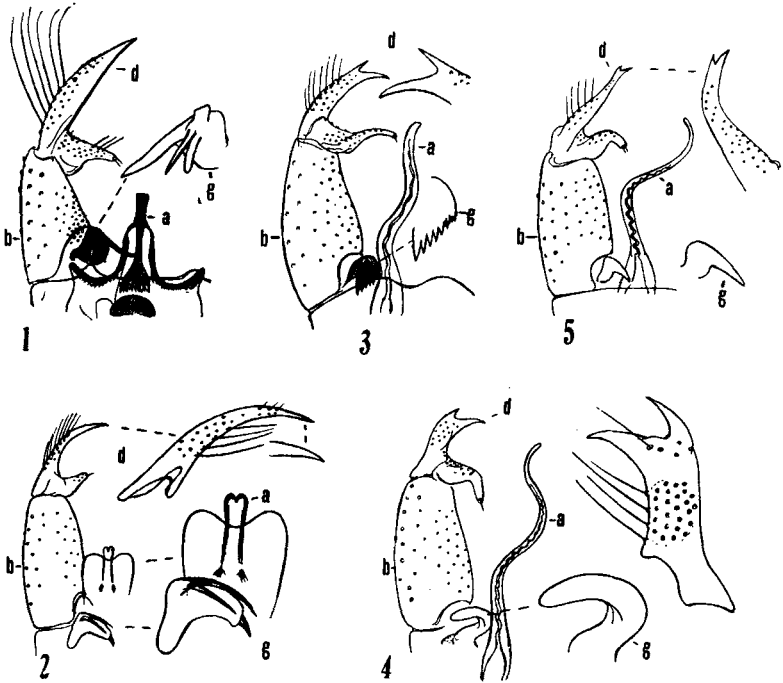
Male.—Wing about 7.5 mm.

Female.—Wing about 8 mm.

Rostrum and palpi dark brown. Antennæ dark brown throughout, short, if bent backward not extending far beyond the pronotum. Head light grey, with a vague capillary median brown line and scattered brown setigerous punctures.

Pronotum light grey. Mesonotum brownish grey medially, the remainder destroyed by psocids. Legs with the femora obscure yellow, the tips broadly dark brown; tibiæ and basitarsi obscure yellow, the tips infuscated; remainder of tarsi black. In the female the segments of the legs are slightly darker. Wings with a strong yellow suffusion, the oval stigma slightly more brownish yellow; veins still darker yellowish brown. Venation: *Sc* long, Sc_1 ending opposite the fork of *Rs*, Sc_2 at its tip and slightly longer; *Rs* long, weakly angulated and sometimes short-spurred at origin, in alignment with R_{2+3+4} ; cell R_3 deep, vein R_3 gently sinuous; R_2 very pale, a little more than one-half R_{1+2} ; inner ends of cells R_4 , R_5 , and 1st M_2 in alignment; cell M_1 present, from one-half to two-thirds its petiole; cell 1st M_2 small, the section of M_3 gently arcuated; *m-cu* at near mid-length of cell 1st M_2 .

Abdomen brownish black, the surface sparsely pruinose; hypopygium reddish castaneous. Male hypopygium (fig. 1) with the outer dististyle (*d*) nearly straight, dilated near mid-length, thence narrowed to the simple acute terminal spine; outer surface of style with conspicuous setigerous tubercles that bear very long pale curved setæ which are



Male hypopygia of Australian alpine species of *Limnophila*.

a=ædeagus; *b*=basistyle; *d*=dististyle; *g*=gonapophysis.

Fig. 1.—*Limnophila bogongensis*, sp. n.

Fig. 2.—*Limnophila implicita*, sp. n.

Fig. 3.—*Limnophila nebulicola*, sp. n.

Fig. 4.—*Limnophila angularis*, sp. n.

Fig. 5.—*Limnophila alpica*, sp. n.

approximately two-thirds as long as the entire style. Inner dististyle small, broad-based, arcuated to the obtuse tip. Phallosome a transverse rectangular chitinized plate. Gonapophyses (*g*) terminating in two spines, one much smaller than the other. Ædeagus (*a*) short.

Hab. Victoria.

Holotype, ♂, in poor condition, Bogong High Plains, altitude 5600–6000 feet, January 1928 (*F. E. Wilson*).

Allotopotype, ♀, in poor condition.

Paratopotype, ♂, in poor condition.

Type returned to Mr. Wilson.

The structure of the male hypopygium would indicate a relationship to the otherwise very distinct *L. intonsa*, Alexander (Tasmania).

Limnophila implicita, sp. n.

General coloration grey; antennæ short, the flagellum black; mesonotal præscutum with a brown median stripe; legs brown, the tips of the femora and tibiæ narrowly darkened; wings pale greyish; cell M_1 present; male hypopygium with the outer dististyle narrowed to a simple acute spine; gonapophysis with two long slender spines in addition to the main mass.

Male.—Length about 6 mm.; wing 7 mm.

Rostrum grey; palpi black. Antennæ short, the scape brownish black, the flagellum black; basal five or six flagellar segments incrassated, the succeeding segments more linear. Head dark grey, the anterior vertex and posterior orbits lighter grey.

Pronotum grey. Mesonotal præscutum yellowish grey with a median dark brown stripe, the lateral stripes much paler and ill-delimited; pseudosutural foveæ black, linear, the cephalic end curved laterad; no apparent tuberculate pits; scutum grey, the lobes infuscated; posterior sclerites of mesonotum dark grey. Pleura grey. Halteres pale. Legs with the coxæ light grey; trochanters testaceous-yellow; femora and tibiæ brown, the tips narrowly dark brown; tarsi black. Wings pale greyish, the stigma only a little darker than the ground-colour; veins pale brown. No macrotrichia in cells of wing. Venation: Sc_1 ending opposite the fork of R_s , Sc_2 at its tip; R_s relatively short, strongly arcuated at origin, in alignment with R_{2+3+4} , the latter shorter than R_{2+3} ; R_2 subequal to R_{1+2} ; veins R_3 and R_4 rather strongly diverging; inner ends of cells R_4 , R_5 , and 1st M_2 in approximate transverse alignment; cell M_1 small, approximately one-third the length of its petiole; cell 1st M_2 small, *m-cu* just before mid-length.

Abdomen blackish, sparsely pruinose; hypopygium paler, yellowish brown. Male hypopygium (fig. 2) much as in *bogongensis*, the outer dististyle (*d*) being narrowed to a simple acute spine; outer surface of style at near mid-length

and before apex with conspicuous setæ; style not at all dilated near mid-length, being gradually narrowed from base to apex. Inner dististyle very short, dusky, the base broad, the narrow apex obtuse. Gonapophyses (*g*) stout, each with two slender spines, the outer one longer and very slender, the main body of the structure stout, terminating in a more decurved spine. Ædeagus (*a*) relatively short, superimposed over a pale, median, flattened structure.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, on the Little Plain, altitude 5600–6000 feet, January 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

Limnophila nebulicola, sp. n.

General coloration grey; antennæ short, black throughout; halteres pale; legs black, the femoral bases brightened; wings with cell M_1 present but very small; male hypopygium with the outer dististyle relatively broad, blackened, with a conspicuous subterminal spine on outer margin; ædeagus elongate, spiralfiform.

Male.—Length about 5.8 mm.; wing 6.6 mm.

Rostrum pruinose; palpi black. Antennæ short, if bent backward not extending beyond the end of the pronotum, black throughout; basal five flagellar segments subglabrous, the outer segments more linear, with conspicuous white setæ. Head light grey, the posterior vertex more infuscated.

Pronotum grey. Mesonotal præscutum grey, the three usual stripes poorly delimited and confluent, or nearly so, light brown; posterior sclerites of mesonotum dark grey. Pleura grey throughout, the dorso-pleural region a little lighter. Halteres pale. Legs with the coxæ dark brown, pruinose; trochanters obscure brownish yellow; femora black, the bases obscure yellow, very narrowly so on the fore femora, more extensive on the posterior femora; remainder of legs black. Wings with a yellowish tinge, the oval stigma brown; veins brown. No macrotrichia in the cells of wing. Venation: Sc_1 ending opposite the fork of R_s , Sc_2 slightly removed from tip, Sc_1 alone a little longer than R_2 ; R_2 at or just beyond the fork of R_{2+3+4} ; R_{1+2} approximately three times R_2 ; inner ends of cell R_4 , R_5 , and 1st M_2 in nearly transverse alignment; cell M_1 very small to subevanescent, about one-fourth its petiole; cell 1st M_2 rectangular; $m-cu$ about one-half its length beyond the fork of M .

Abdomen black, pruinose, the hypopygium obscure brownish yellow. Male hypopygium (fig. 3) with the basistyles

relatively long and slender. Outer dististyle (*d*) entirely chitinized, relatively broad and gently arcuated, terminating in a powerful black spine, with a smaller straight spine on outer margin just before apex; surface of style with abundant setiferous punctures that bear long conspicuous setæ. Inner dististyle broadly connected with the outer by pale membrane, gently arcuated. Gonapophyses (*g*) massive, the cephalic margin with several conspicuous denticles. *Ædeagus* (*a*) elongate, the penis spiraliform.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, Little Plain, at 5600–6000 feet, January 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

Allied to *L. effeta*, Alexander (Tasmania), differing in the wing-pattern, venation, and structure of the male hypopygium.

Limnophila angularis, sp. n.

Male.—Length about 4.4 mm.; wing 5.6 mm.

Closely related to *L. nebulicola*, sp. n., differing especially in the structure of the male hypopygium.

Size smaller. Wings greyish yellow, the stigma a little darker than the ground-colour; veins brown. Venation: *Sc*₂ only about its own length from the tip of *Sc*₁; *R*₂ subequal to *R*₂₊₃; cell *M*₁ about one-third its petiole; *m-cu* at mid-length of cell 1st *M*₂. Male hypopygium (fig. 4) with the details of structure very different from *nebulicola*. Outer dististyle (*d*) shorter and more broadly flattened; lateral spine more compressed, broad-based; surface of stem somewhat protuberant. Inner dististyle angularly bent at mid-length. Gonapophyses (*g*) appearing as stout lobes that are strongly bent upon themselves, the tips blunt and obtuse, not spinous as in *nebulicola*.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, altitude 5600–6000 feet, January 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

Limnophila alpica, sp. n.

General coloration brown to yellowish brown; antennæ short, dark throughout; wings with a yellowish tinge, the stigma scarcely indicated; cell *M*₁ present; no macrotrichia in cells of wing; male hypopygium with the outer dististyle slender, the apex blackened, terminating in two teeth that

are separated from one another by an acute notch; gonapophyses produced into a long pale blade; ædeagus elongate.

Male.—Length about 5 mm.; wing 5.5 mm.

Female.—Length about 6.5 mm.; wing 6.2 mm.

Rostrum and palpi dark brown. Antennæ dark brown, relatively short, if bent backward not attaining the wing-root. Head yellowish grey.

Pronotum greyish brown. Mesonotum and pleura almost uniformly brown, in the female more yellowish brown; præscutum with a short darker median vitta on the cephalic portion; pseudosutural foveæ small and inconspicuous; no tuberculate pits; central region of pleura darker, more greyish brown. Halteres pale, the knobs weakly infuscated. Legs with the coxæ obscure yellow; trochanters yellow; femora brown, the bases brightened, the tips passing into dark brown; tibiæ brown, the tips narrowly dark brown; tarsi dark brown; legs relatively long and slender, with appressed setæ. Wings with a yellowish tinge, the base and costal region even brighter; stigma scarcely indicated; veins brownish yellow. No macrotrichia in cells of wing. Venation: Sc_1 ending shortly before the fork of R_s , Sc_2 at its tip; R_s long, gently arcuated at origin; R_{2+3+4} shorter than R_{2+3} , the latter subequal to R_{1+2} ; R_2 less than one-half R_{1+2} ; cell M_1 present, small, about one-third to one-half its petiole; *m-cu* at near mid-length of the long-rectangular cell 1st M_2 .

Abdomen dark brown, the hypopygium brighter. Male hypopygium (fig. 5) with the outer dististyle (*d*) slender, gradually narrowed to the tip, at base on outer margin with a pale flattened obtuse lobe; apex more heavily chitinized, bifid, the outer lateral tooth only a little smaller than the apical one, the two separated by a narrow V-shaped notch; surface of style with relatively long, conspicuous setæ. Inner dististyle small, arcuated, terminating in two stout setæ. Gonapophyses (*g*) appearing as compressed pale structures, each produced mesad into a straight pale blade. Ædeagus (*a*) elongate, the penis spiraliform. Ovipositor with the tergal valves broken; sternal valves long, straight, and slender.

Hab. Victoria.

Holotype, ♂, Bogong High Plains, altitude 5600–6000 feet, January 1928 (*F. E. Wilson*).

Allotopotype, ♀.

Type returned to Mr. Wilson.

Limnophila casta pallidithorax, subsp. n.

Female.—Length about 5 mm.; wing 5.6 mm.

Generally similar to typical *casta*, Alexander (Victoria), differing especially in the pale yellow coloration of the body and legs.

Head and antennæ brown. Mesonotum pale shiny yellow, the præscutum scarcely darkened medially; tuberculate pits placed only a short distance before the level of the pseudosutural foveæ, the latter dark brown. Pleura weakly infuscated. Legs yellow, only the outer tarsal segments infuscated. Wings pale yellow, the stigma scarcely darker; veins beyond the cord pale brown, the basal and costal veins yellow. Venation: cell 1st M_2 widened outwardly, M only a little shorter than the basal section of M_3 . Abdomen yellowish testaceous, the ovipositor with the elongate valves horn-coloured, the tergal valves very slender, gently upcurved to the acute tips.

Hab. Victoria.

Holotype, ♀, Belgrave, in a dark fern gully, altitude 900 feet, June 4, 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

Limnophila antennella, sp. n.

General coloration brown; antennæ (♂) elongate, approximately two-thirds the length of the body; wings with a faint brown tinge, the stigma dark brown; cell M_1 present; basal abdominal segments bicolored, especially the sternites; male hypopygium with the ædeagus long, beyond the base spiralfiform.

Male.—Length about 6.2–6.5 mm.; wing 7.2–7.6 mm.; antenna about 4–4.2 mm.

Rostrum brownish testaceous; basal segment of palpi pale, the remainder brown. Antennæ (♂) elongate, approximately two-thirds the length of body, dark brown, the second scapal segment paler; flagellar segments elongate-cylindrical, with a dense, erect, relatively short pubescence and inconspicuous verticils. Head dark brown, more greyish yellow laterally behind.

Pronotum brown, obscure yellow laterally. Mesonotal præcutum dark yellow, with a conspicuous median brown stripe; no tuberculate pits; pseudosutural foveæ reduced to linear marginal impressions; scutal lobes dark brown, the median area pale; scutellum testaceous-brown; postnotal mediotergite darker, except laterally. Pleura with the

dorsal membrane and anepisternum darkened, the ventral sternopleurite and posterior sclerites of the mesopleura yellowish testaceous. Halteres elongate, testaceous, the knobs weakly infuscated, the base of the stem restrictedly brightened. Legs with the coxæ and trochanters obscure yellow; femora brownish yellow; remainder of legs dark brown. Wings with a faint brownish tinge, the oval stigma dark brown; very vague brown seams at origin of *Rs* and on anterior cord; veins dark brown; macrotrichia of veins conspicuous. Venation: *Sc* long, *Sc*₁ ending some distance beyond the origin of *R*₂₊₃, *Sc*₂ not far from its tip, *Sc*₁ alone being a little shorter than *m-cu*; *Rs* long, feebly angulated at origin; *R*₁₊₂ about twice *R*₃ alone; inner ends of cells *R*₄, *R*₅, and 1st *M*₂ in oblique alignment, the last-named lying most basad; *m* strongly arcuated; cell *M*₁ present, subequal to its petiole; cell 1st *M*₂ long-rectangular; *m-cu* shortly before mid-length of the cell.

Abdominal tergites dark brown, the extreme caudal margins of the basal segments paler; basal sternites bicolorous, chiefly obscure yellow with the incisures narrowly infuscated, this darkening chiefly on the bases of the segments; hypopygium dark. Male hypopygium with the ninth tergite a little produced medially, this area with a broad U-shaped median notch, the lateral lobes small. Outer dististyle bifid at apex, the mesal face with long erect setæ. Inner dististyle with setæ to apex, those on basal two-thirds long and erect. Gonapophyses small, each with two large and two very small spines. Ædeagus long, beyond the base strongly spiraliform.

Hab. Victoria.

Holotype, ♂, Millgrove, altitude 1500 feet, frequenting a grass-choked drain through which a tiny trickle of water was flowing; open sunny situation, April 7, 1928 (*F. E. Wilson*).

Paratopotypes, 2 injured ♂♂, altitude 1200–1500 feet; *paratypes*, 1 ♂, Belgrave, in dark fern gully, June 4, 1928 (*F. E. Wilson*), 1 ♂, September 9, 1928 (*F. E. Wilson*).

Type returned to Mr. Wilson.

The Belgrave (June) paratype is much smaller than the type (♂, length about 5.3 mm.; wing 6 mm.), but undoubtedly represents the same species.

Limnophila nocticolor, sp. n.

Belongs to the *pilosipennis* group: general coloration black; antennæ short in both sexes; halteres elongate;

wings with sparse macrotrichia in the apical cells; cell M_1 lacking.

Male.—Length about 4.5 mm.; wing about 5.5 mm.

Female.—Length about 4.5–5.5 mm.; wing 5–5.6 mm.

Rostrum and palpi black. Antennæ short in both sexes, if bent backward ending some distance before the wing-root, dark brown; flagellar segments oval, with verticils that slightly exceed the segments in length; terminal segment about one-half longer than the penultimate. Head black, sparsely pruinose.

Prothorax and mesonotum dull black, in cases with the scutellum obscure brownish yellow. Pleura black, sparsely pruinose. Halteres elongate, nearly twice as long as the antennæ, brownish white, the knobs darker brown. Legs with the coxæ brownish black, the posterior coxæ paler; trochanters dark brown; remainder of legs brownish black, the femoral bases restrictedly paler; tibial spurs small but distinct. Wings with a faint dusky tinge, the stigma barely evident; veins pale brown. Sparse macrotrichia in the outer ends of cells R_3 , R_4 , R_5 , and 2nd M_2 , and in some cases in M_3 ; the females have these trichia somewhat more restricted in area and not involving the extremes as listed above. Venation: Sc_1 elongate, exceeding $m-cu$; R_{2+3+4} very short; R_2 faint, about two-thirds R_{1+2} ; cell M_1 lacking; cell 1st M_2 relatively short, with $m-cu$ before mid-length; m longer than the outer deflection of M_2 and more arcuated.

Abdomen black, the basal sternites obscure brownish yellow. Male hypopygium with the outer dististyle blackened, narrowed to the acute terminal spine. Gonapophyses appearing as strongly-curved rods that terminate in spear-like points. Ovipositor brown, the tergal valves long and slender.

Hab. Victoria.

Holotype, ♂, Ringwood, altitude 400 feet, May 27, 1927 (C. Barrett).

Allotype, ♀, Cockatoo, May 14–19, 1927 (G. F. Hill).

Paratypes, 1 ♀, with the allotype; 2 ♂♂, Bayswater, May 20, 1928 (F. E. Wilson).

Limnophila nocticolor and the three species next described are allied to *L. egena*, Alexander (Victoria), differing among themselves in the coloration and structure of the antennæ and male hypopygium.

Limnophila hilli, sp. n.

Male.—Length about 4.5–4.8 mm.; wing 6–6.8 mm.

Female.—Length about 5.5–6.2 mm.; wing 6.3–7 mm.

Related to *L. nocticolor*, sp. n., differing in the somewhat larger size, paler coloration of the body, slight differences in venation, and in the structure of the male hypopygium.

Antennæ short, slightly longer than in *nocticolor*, if bent backward not attaining the wing-root, brownish black, the flagellar segments oval. Head black, heavily pruinose, the disk of the vertex only sparsely pruinose to subnitidous.

Mesonotum light reddish brown, the præscutum with a darker brown median stripe, the lateral stripes barely evident; scutellum a little darker. Pleura reddish brown, the surface sparsely pruinose. Halteres elongate, pale, the knobs a little darker, the extreme base of the stem restrictedly brightened. Legs with the coxæ and trochanters brownish yellow; remainder of legs black, the bases of the femora restrictedly pale. Wings with a dusky tinge, the stigma a little darker; veins darker brown. Sparse macrotrichia in the apices of cells R_3 to 2nd M_2 , very rarely with a few in cell M_3 . Venation: *Sc* relatively short, Sc_1 ending before the fork of R_s , Sc_2 some distance from its tip, Sc_1 being subequal or longer than *m-cu*; cell 1st M_2 elongate-rectangular, with *m-cu* usually at some distance before mid-length, in a few instances beyond mid-length.

Abdomen black, the basal sternites obscure brownish yellow, margined laterally and caudally with black; hypopygium brown to brownish black. Male hypopygium with the outer dististyle longer and more slender than in *nocticolor*, terminating in an acute spine, the outer margin with sparse long erect setæ. Inner dististyle longer, the outer third conspicuously narrowed. Gonapophyses small, the apex of each stout and microscopically denticulate.

Hab. Victoria.

Holotype, ♂, Cockatoo, May 14–19, 1927 (*G. F. Hill*).

Allotopotype, ♀.

Paratopotypes, 5 ♂ ♀; *paratypes*, 8 ♂ ♀, Belgrave, in open sunny situations beside railway station, altitude 740 feet, June 4, 1928 (*F. E. Wilson*), 2 ♂ ♀, *in copula*, altitude 900 feet, flying just over grass-tops; 1 ♂, Bayswater, May 20, 1927 (*F. E. Wilson*); 2 ♂ ♂, Warburton, altitude 3500–4000 feet, April 9, 1928 (*C. H. Borch*).

I take great pleasure in naming this interesting *Limnophila* in honour of my friend, Mr. Gerald F. Hill.

Limnophila borchi, sp. n.

Belongs to the *pilosipennis* group; build slender; general coloration of mesonotum pale brown, more yellowish laterally; head black, pruinose; antennæ short; halteres long and slender; wings with a faint brown tinge; sparse macrotrichia in distal ends of cells R_3 to 2nd M_2 ; Sc_1 long, cell M_1 lacking.

Male.—Length about 4.4–5.2 mm.; wing 5–6 mm.

Female.—Length about 5.3 mm.; wing about 6 mm.

Rostrum and palpi dark brown. Antennæ short, if bent backwards ending far before the wing-root, much shorter than the halteres, black throughout; flagellar segments short-cylindrical, the verticils exceeding the segments. Head black, pruinose, the centre of the disk more lightly pruinose to be subnitidous to polished black.

Mesonotum uniformly brown, more yellowish brown laterally, without markings; pseudosutural foveæ and tuberculate pits very reduced or lacking. Pleura and posterior sclerites of mesonotum more yellowish brown. Halteres very long and slender, obscure yellow basally, passing into dark brown. Legs with the coxæ and trochanters yellowish testaceous; femora brown, the bases restrictedly yellow; tibiæ and tarsi black. Wings with a faint brownish tinge, the stigma only a little darker; veins brown. Sparse macrotrichia in outer ends of cells R_3 to 2nd M_2 . Venation: Sc_1 ending opposite or just beyond the fork of R_s , Sc_2 some distance from its tip, Sc_1 alone being longer than $m-cu$; inner ends of cells R_4 , R_5 , and 1st M_2 in subtransverse to oblique alignment; cell R_3 widened at distal end; cell M_1 lacking; $m-cu$ at or shortly before mid-length of cell 1st M_2 .

Abdomen brownish black, the basistyles of the male hypopygium obscure brownish yellow. Male hypopygium with the outer dististyle slender, terminating in a simple gently-curved spine. Gonapophyses with the apical hook relatively long and slender, with a simple twist near mid-length, the tip acute.

Hab. Victoria.

Holotype, ♂, Millgrove, altitude 1500 feet, April 7, 1928 (F. E. Wilson).

Allotopotype, ♀.

Paratopotypes, several ♂ ♀, altitude 1200–1500 feet; *paratype*, 1 sex?, Ferntree Gully, April 15, 1923 (F. E. Wilson).

Type returned to Mr. Wilson.

This delicate *Limnophila* is named in honour of the Lepidopterist, Mr. Clarence H. Borch, who has collected several new or rare species of Tipulidæ. The following notes on the occurrence of this species have been supplied by Mr. Wilson:—"Plentiful but difficult to net. Keep very close to the earth, frequently actually alighting on ground. Difficult to capture owing to their keeping well down amongst the foliage of the introduced blackberry. Favour the damp shaded gullies where only tiny shafts of sunshine trickle through."

Limnophila mitocera, sp. n.

Belongs to the *pilosipennis* group; general coloration dark brown; antennæ (δ) elongate, nearly as long as the body, the segments with long outspreading setæ; halteres very long; wings with a dusky suffusion, the stigma very slightly darker brown; macrotrichia in apical cells of wing; cell M_1 lacking.

Male.—Length about 4.5 mm.; wing 5.3 mm.; antenna about 4 mm.

Rostrum and palpi dark brown. Antennæ (δ) elongate, nearly as long as the entire body, dark brown throughout; flagellar segments elongate-cylindrical, with long outspreading setæ throughout their length; terminal segment short, oval. Head black with a sparse grey pruinosity to produce an opaque to subnitidous appearance.

Mesonotum uniformly dark brown; no tuberculate pits; pseudosutural foveæ black, lunate; scutellum more testaceous-brown. Pleura brownish testaceous. Halteres very long (1.2 mm.), testaceous-brown, the base of the stem paler. Legs with the coxæ and trochanters brownish testaceous; remainder of legs dark brown, the femoral bases restrictedly paler. Wings broad, with a dusky suffusion, the stigma very slightly darker brown; veins dark brown. Macrotrichia in all apical cells of wing from R_2 to M_3 inclusive. Venation: Sc_1 extending to opposite the fork of R_{2+3+4} , Sc_2 some distance from its tip, Sc_1 alone being longer than $m-cu$; R_{2+3+4} shorter than the basal section of R_5 ; R_2 faint, R_{1+2} about twice R_2 alone; cell M_1 lacking; $m-cu$ shortly before mid-length of the rectangular cell 1st M_2 .

Abdomen dark brown, the central portions of the basal two sternites paler. Male hypopygium with the basistyles relatively long and slender. Outer dististyle entirely blackened, gradually narrowed to the unequally bidentate apex; surface of style with several very long erect setæ.

Inner dististyle shorter, the distal third or more glabrous, the apex obtuse. Gonapophyses with the free tips appearing as long slender rods, directed caudad, the tips laterad (in slide mounts).

Hab. Victoria.

Holotype, ♂, Warburton, April 9, 1928 (C. H. Borch).

Type returned to Mr. Wilson.

Limnophila mitocera is related to *L. egena* and several known allied forms, differing from all in the very long antennæ of the male sex.

Limnophila defecta, sp. n.

General coloration pale brown; præscutum with two sub-lateral blackened areas; tuberculate pits nearly on a level with the pseudosutural foveæ; wings greyish yellow; cell R_3 at margin very wide; cell M_1 lacking; cell 1st M_2 elongate.

Male.—Length about 3.3 mm.; wing 3.6 mm.

Female.—Length about 5 mm.; wing 4.6 mm.

Rostrum and palpi dark brown. Antennæ dark brown, relatively short in both sexes, if bent backward scarcely attaining the wing-root; flagellar segments oval, the lower face of each a little more protuberant than the upper face; segments clothed with a long erect white pubescence and long, unilaterally arranged verticils. Head greyish brown.

Pronotum buffy brown, variegated with darker brown. Mesonotal præscutum light brown with a sparse golden-yellow pollen; a sublateral blackened area before the pseudosutural foveæ and another behind these foveæ, the lateral margins again pale; tuberculate pits reduced to tiny dots that are separated from one another by a distance about equal to the diameter of one, situated just anterior to the level of the very reduced pseudosutural foveæ; posterior sclerites of mesonotum light brown, the postnotum slightly more pruinose, darker medially. Pleura pale, vaguely marked with darker spots. Halteres pale, the knobs brighter. Legs with the coxæ and trochanters testaceous; remainder of legs brownish testaceous, the tarsi scarcely darker. Wings with a greyish-yellow suffusion, the base and costal region clearer yellow; veins pale brownish yellow. No macrotrichia in distal cells of wing. Venation: Sc relatively short, Sc_1 ending shortly before the fork of R_3 , Sc_2 a little removed from its tip, Sc_1 alone a little shorter than $m-cu$; R_2 very faint to obsolete; R_{2+3} subequal to R_{1+2} ; R_{2+3+4} a trifle longer than $m-cu$; veins R_3 and R_4 strongly diverging, cell R_3 at wing-margin more than twice

as wide as cell R_2 ; inner ends of cells R_4 , R_5 , and 1st M_2 in transverse alignment; cell M_1 lacking; cell 1st M_2 unusually long, approximately equal to the veins beyond it; *m-cu* a little less than its length beyond the fork of M .

Abdomen of male testaceous with a conspicuous black subterminal ring; the hypopygium yellow. In the female the tergites are more variegated brown and testaceous, the outer segments being dark with pale caudal margins; basal sternites yellow. Ovipositor with the valves long and slender, nearly straight.

Hab. New South Wales.

Holotype, ♂, Brooklana, Eastern Dorrigo, altitude 2000 feet, November 6, 1927 (*W. Heron*).

Allotopotype, ♀.

Paratopotype, ♂, October 21, 1928 (*W. Heron*).

Limnophila defecta is a very interesting species whose strict affinities and generic position must be held as being in question.

LXI.—*Coryphæschna longfieldæ*, sp. n. (*Odonata*), from Brazil, and its Allies. By D. E. KIMMINS.

Coryphæschna longfieldæ, sp. n.

♂. Occipital triangle yellow, about one-third as long as the length of contact of the eyes. Frontal vesicle transverse, black, with fine black hairs. Face yellow, the anterior margin of the frons brownish, and more obtusely angled than in *C. (Æ.) januarina*, Hag.

Thorax dark brown, clothed with fine dark hairs. Dorsal bands green, about 1 mm. wide, interrupted above the middle by a narrow brown line. Lateral bands green, the anterior band about 1.5 mm. wide, the metepimeral band triangular, about 2 mm. in width at its broadest part. Legs black.

Abdomen nearly five times as long as the thorax, slender, the third segment moderately, and the fourth and fifth very slightly, constricted. Segment 1 raised dorsally to form a transverse tubercle. Tergal margins of segment 1 approximated ventrally, each forming a shining black tooth with a median carina, the tooth being less obliquely truncate than in *C. januarina*, Hag. In front of these projections is a transverse piliferous tubercle. Auricles with three or four