

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

IN the present paper, a portion of the Australian and Tasmanian species of crane-flies belonging to the tribe Hexatomini that were taken by Dr. André L. Tonnoir are discussed. A few additional specimens secured by Mr. Hardy (in the University of Queensland Collection) and Mr. Hill (in the National Museum, Victoria) are included. The rich Tonnoir collections have been returned to Dr. Tonnoir, and will presumably be placed in one of the leading Australian Museums. I wish to express my sincere thanks to Messrs. Hardy, Hill, and Tonnoir for the privilege of studying this abundant material.

The localities in New South Wales, Victoria, and Tasmania where Dr. Tonnoir collected have been discussed in a previous instalment (Ann. & Mag. Nat. Hist. ser. 9, vol. xix. pp. 18-19, 1927), which should be consulted for further information.

In the present paper and others under this general title, the writer has adopted the modifications of venation affecting the radial field, as discussed in detail in other papers now in press ("The Interpretation of the Radial Field of the Wing in the Nematocerous Diptera," Proc. Linn. Soc. New South Wales, 1927; "The Oriental Tipulidæ in the Collection of the Indian Museum," Part I., Rec. Indian Museum, 1927). These papers should be consulted by students interested in the problem.

TONNOIRELLA, gen. nov.

Rostrum long and slender, about twice as long as the head and only a little shorter than the antenna. Antennæ of moderate length, the flagellar segments cylindrical, with relatively short and inconspicuous verticils. Vertex at narrowest point conspicuously hollowed out. Cervical sclerites conspicuous. Pronotum massive. Pseudosutural foveæ small, placed far laterad; no tuberculate pits. Legs relatively long and slender; tibial spurs distinct. Wings with  $Sc$  long,  $Sc_2$  at its tip;  $Rs$  elongate, angulated at origin;  $R_{2+3+4}$  shorter than  $m-cu$ ; cell  $R_3$  very deep, veins  $R_3$  and  $R_4$  lying generally parallel; basal section of  $R_2$  near the tip of  $R_{1+2}$ ;  $R_{2+3}$  about one-half longer than  $R_3$  alone; cell  $M_1$  very deep, its petiole very reduced, subequal to or

shorter than  $m$ ; cell 1st  $M_2$  large, its inner end lying proximad of the remaining elements of the cord;  $m-cu$  transverse, in alignment with  $r-m$ , at a little less than its own length beyond the fork of  $M$ ; anterior arculus lacking. Macrotrichia relatively sparse and inconspicuous, there being none on  $Rs$ ,  $R_{2+3+4}$ , or the veins proximad of the cord, excepting  $R$  and the outer ends of the Anal veins. Male hypopygium massive, the segments fused into a ring. Ninth tergite with the median region produced into a flattened depressed ledge that is deeply notched medially, the lobes thus formed being obtusely rounded at their tips. Sternal region membranous, the median area only slightly produced into a low lobe. Basistyle short, stout, tumid, the outer face with setæ that are longer and stouter on distal third; ventro-mesal face of style with a cushion that is densely set with short golden setæ; no apical lobes. Dististyles two, united at base, the outer style stouter, more flattened outwardly. Gonapophyses appearing as powerful chitinized rods, near the tips a little expanded, terminating in a short, gently-curved hook. Anal tube conspicuous. Ovipositor with the valves elongate, heavily chitinized, the tergal valves more slender, gently upcurved.

Genotype, *Tonnoirella gemella*, sp. n. (Australian Sub-region).

The present group is named in honour of my friend, Dr. André L. Tonnoir, to whom our greatest advance in knowledge of the Nematocera of Tasmania and South-Eastern Australia is due. *Tonnoirella* should be placed with *Tinemyia*, Hutton, and *Rhamphophila*, Edwards, among the lower Epiphragmaria. The condition of the rostrum is somewhat intermediate between the two genera named. The hypopygium is relatively simple in structure, without the conspicuous outgrowths of the basistyle and ninth sternite of *Rhamphophila*. The venation is characterized by the unusual depth of the cells beyond the cord, the petioles of cells  $R_3$  and  $M_1$  being unusually short. The trichiation of the veins is sparse and inconspicuous.

Dr. Tonnoir has supplied the following field-notes:—

“This I collected on Mt. Field on the slope of the range that goes down towards the nearly unexplored part of the country extending towards the south-west. I had just arrived on the summit at noon, and the guide took me down in a deep valley where I expected to find some Blepharocerids. It was on the down track that this species was so abundant on the flowers of *Dracophyllum*. I collected the lot that was submitted to you, noted that there were three specimens

with marmored wings and looked for more, but we had to go on. I had in mind to come back the following day, but it turned so wet during the rest of my stay in the range that I could scarcely go out of the hut."

*Tonnoirella gemella*, sp. n.

Wings strongly tinged with yellow, the darker pattern very sparse.

*Male*.—Length (excluding rostrum) 13 mm.; wing 16 mm.; rostrum alone 2.5 mm.

Rostrum and palpi black, the former with short erect black setæ. Antennæ arising from before the eyes, black throughout. Head dark grey, the dished-out region of the vertex more yellowish.

Cervical sclerites dark grey. Pronotum dark brown, the anterior notum more pruinose. Mesonotal præscutum grey, with four dark brown stripes, the lateral margins of the sclerite similarly dark brown; scutum grey, the median area immediately behind the suture more brownish, the lobes nearly black; scutellum dark grey, with an impressed dark spot at base on either side of median line, the parascutella black; postnotum black, the sides dusted with grey. Pleura dark grey, the pleurotergite clearer grey. Halteres yellow, the base brighter yellow, the knobs dark brown. Legs with the coxæ dark brown, sparsely pruinose; trochanters obscure yellow, the tips darkened; remainder of legs brownish black, the femoral bases very narrowly obscure yellow, more extensively so on the fore femora. Wings with a strong yellow tinge, the base and costal region brighter yellow; stigma strongly yellow, the ends brown, the outer end more extensively so; an extensive brown blotch at the fork of *M*, this preceded and followed by a clear spot; anal angle narrowly margined with brown; veins brown. Venation as described under the generic diagnosis.

Abdomen brownish yellow, the lateral margins of the outer sternites brown; segments seven and eight brownish black; hypopygium obscure fulvous. Male hypopygium as described under the generic diagnosis.

*Hab.* Tasmania.

*Holotype*, ♂, Mt. Field, altitude 3500 feet, December 18, 1922 (*A. Tonnoir*).

*Paratopotypes*, 8 ♂♂, December 18, 1922.

*Tonnoirella gemella marmoripennis*, subsp. n.

*Female*.—Length (excluding rostrum) 16 mm.; wing 16.5 mm.; rostrum alone 2.8–3 mm.

Three females in the typical series are so very different from the males, both in wing-pattern and leg-coloration, that it is difficult to believe that the two forms can represent merely the two sexes of a single species. Until more evidence is forthcoming, it seems best to apply a separate subspecific name to these females, but the possibility of this being a single very variable or highly dimorphic species is not excluded.

Characters as in typical *gemella*, differing as follows:—

Legs yellow or fulvous-yellow, the femora with a conspicuous black ring that is nearly terminal, the apex beyond it dark red; median portion of femora broadly infused; tibial bases and tips infuscated; tarsal segments brownish yellow, the tips very narrowly infuscated, the terminal segments uniformly blackened. In a paratype female the legs are as in typical *gemella*, black, but the tips are narrowly but conspicuously reddish. Wings whitish subhyaline, with a handsome obliquely-banded brown pattern and ocellate rings at the origin of *Rs*, beyond the arculus and at the ends of veins *Cu*<sub>1</sub> to 2nd *A*; the outer oblique band includes the wing-tip, pale brown, margined internally with darker; the second band includes the outer brown spot of the stigma and the outer end of cell 1st *M*<sub>2</sub>, pale, the margins narrowly darker; the third band is irregular and diffuse, at the cord, extending from the proximal end of the stigma to *m-cu*; anal region broadly suffused. One female has the wing-pattern more yellowish and very pale, approaching the type of the males of *gemella*.

Abdomen light yellowish brown, the caudal margins of the segments very narrowly ringed with yellowish, the lateral margins dark brown; basal tergite uniformly dark, pruinose. Ovipositor as described under the generic diagnosis.

*Hab.* Tasmania.

*Holotype*, ♀, Mt. Field, altitude 3500 feet, December 18, 1922 (*A. Tonnoir*).

*Paratopotypes*, 2 ♀ ♀, December 21, 1922.

*Austrolimmophila relictæ*, sp. n.

Belongs to the *argus* group; general coloration brown; antennæ (♂) elongate; halteres elongate, the knobs yellow; femora with a narrow black terminal or nearly terminal ring that is preceded by a vague obscure yellow ring; wings with a yellowish tinge, sparsely spotted with brown; *m-cu* sinuous, oblique; male hypopygium with the inner margin of the gonapophyses microscopically serrulate.

*Male*.—Length 12 mm. ; wing 14 mm. ; antennæ about 6 mm.

Rostrum brown, obscure yellow laterally; palpi dark brown. Antennæ (♂) elongate, approximately one-half the length of the body, the segments elongate-cylindrical; first scapal segment dark brown; flagellar segments brown; darker outwardly, the incisures vaguely and narrowly paler; segments with a dense erect pubescence and short relatively inconspicuous verticils. Head brown, the centre of the vertex darker, the anterior vertex more yellowish.

Pronotum yellowish brown. Mesonotal præscutum with the restricted ground-colour brownish yellow to greyish with four dark brown stripes, the anterior and lateral margins of the sclerite in some specimens similarly margined with dark brown; scutum greyish brown, the centres of the lobes extensively dark brown; scutellum lighter brown, the parascutella darker; postnotum dark brown, very sparsely pruinose. Pleuræ yellowish brown, with a broad conspicuous dark brown longitudinal stripe extending from the cervical sclerites to the postnotum, passing between the wings and the halteres, the sternopleurite somewhat darkened. Halteres elongate, the stem pale, the outer third or less darker, the knobs yellow. Legs with the coxæ and trochanters obscure brownish yellow; femora brown, the bases paler, immediately before or at the tips with a narrow black ring, preceded by a very vague yellowish ring of slightly greater extent; remainder of legs brown with dark setæ, the terminal tarsal segments dark brown. Wings with a strong yellowish tinge, the base and costal region somewhat brighter; a sparse pattern of small brown spots distributed as follows: At *h*; arculus;  $Sc_2$ , base of  $R_{2+3}$ ;  $R_2$ ; tips of veins  $R_{1+2}$ ,  $R_3$  and  $R_4$ ; basal deflection of  $R_5$ ; fork of  $M_{1+2}$ ; very vaguely on *m-cu* and outer end of cell 1st  $M_2$ ; gradually increasing marginal spots on the longitudinal veins from  $M_2$  caudad; veins brown, more yellowish in the costal region. Venation:  $Sc_2$  oblique, at tip of  $Sc_1$  and exceeding the latter in length, ending shortly beyond origin of  $R_{2+3}$ ;  $R_s$  angulated and short-spurred at origin;  $R_2$  very pale, some distance from the tip of  $R_{1+2}$ ;  $R_{2+3}$  a little shorter than the sinuous  $R_3$ ; basal deflection of  $R_5$  long, arcuated; cell  $M_1$  about twice its petiole; cell 1st  $M_2$  gently widened distally, the oblique, sinuous *m-cu* placed at or before mid-length of its lower face; vein 2nd *A* long; anterior arculus broken.

Abdominal tergites brown, the lateral margins narrowly darker brown; hypopygium and subterminal segments dark; sternites obscure brownish yellow, their bases narrowly ringed with brown, on the outer segments the margins darker.

Male hypopygium with the ninth tergite evenly notched medially; basistyle short and stout, with long coarse setæ. Dististyle small, the outer style terminating in a slender curved hook. Gonapophyses appearing as flattened blades, the apex of each extended into a slender chitinized hook, the inner margin microscopically serrate.

*Hab.* Tasmania.

*Holotype*, ♂, Hartz Mts., December 10, 1922 (*A. Tonnoir*).

*Paratypes*, ♂, Mt. Farrel, February 8, 1923; ♂, Mt. Field, December 21, 1922; Adventure Bay, December 30, 1922 (*A. Tonnoir*).

The wings of the present species bear a conspicuous superficial resemblance to those of *Austrolimnophila interventa* (Skuse), but the coloration of the body and antennæ, and the venational details, are very different in the two species.

*Epiphragma meridionalis*, sp. n.

General coloration brown; antennæ relatively elongate, the flagellum bicolorous; pleura dark brown, narrowly lined with yellow; femora and tibiæ yellow, each with two brown rings; wings yellowish brown, with a sparse darker brown pattern, the spots ringed with paler; a single supernumerary cross-vein in cell *C*.

*Male*.—Length 7·5–10 mm.; wing 8–10·8 mm.

Rostrum and palpi dark brown. Antennæ relatively elongate, if bent backward extending to shortly beyond the base of the halteres; first segment brown, sparsely pruinose; second and third segments orange; remaining flagellar segments brownish black, the apices of the segments light yellow, on the basal segments including about the distal third of the segment, the amount decreasing outwardly, the terminal segments more uniformly infuscated. Head brownish grey, variegated with brown.

Pronotum fulvous, the anterior notum with a small brown dash, the lateral margin of the sclerite infuscated. Mesonotal præscutum cinnamon-brown in front, variegated with dark brown along the cephalic margin and at the humeri, the extreme humeral angle obscure yellow; posterior portion of the præscutum more yellowish brown with four dark brown stripes that do not attain the suture; scutum obscure yellow, the lobes variegated with brown; remainder of mesonotum yellow, the postnotum greyish yellow, with a capillary brown vitta extending from the transverse suture to the abdomen; a small brown spot on either side of the scutellum at base; postnotum with a small brown spot on either side of the median vitta before mid-length. Pleura

largely dark brown, with two or three narrow and sometimes subobsolete obscure yellow longitudinal stripes, the dorso-pleural membrane dark brown. Halteres yellow, the basal half of the knobs brown, their apices yellow.<sup>1</sup> Legs with the fore coxæ yellow, traversed by two narrow brown lines; middle and hind coxæ yellow, the extreme bases dark brown; trochanters yellow; femora obscure yellow, with two broad brown rings, the first just beyond mid-length, the second narrower, subapical, the yellow ring enclosed being relatively broad, clearer yellow; tibiæ brownish yellow, clearer yellow at base, with a narrow dark brown subbasal ring and a broader more diffuse paler brown ring before mid-length; tip of tibiæ slightly darkened; tarsi brownish yellow, the last segment darker. Wings with a yellowish-brown tinge, with a sparse pattern of larger dark brown spots that are narrowly ringed with whitish subhyaline; these spots are arranged as follows: At *h*; arculus; origin of *Rs*; at supernumerary cross-vein in cell *C*; a broad oblique band extending from *Sc*<sub>1</sub> along the anterior cord to the fork of *M*; tip of *R*<sub>1+2</sub>; *m-cu*; outer end of cell 1st *M*<sub>2</sub>; fork of *M*<sub>1+2</sub>; a continuous series of marginal spots at ends of longitudinal veins, these becoming larger posteriorly; anal angle narrowly darkened; veins pale brownish yellow, a little darker in the infuscated areas. Venation: A single supernumerary cross-vein in cell *C*; *Rs* square and spurred at origin; *R*<sub>2</sub>' pale, subobsolete; *R*<sub>2+3</sub> longer than *R*<sub>3</sub>; inner ends of cells *R*<sub>4</sub>, *R*<sub>5</sub>, and 1st *M*<sub>2</sub> in transverse alignment; cell *M*<sub>1</sub> one-half longer than its petiole; cell 1st *M*<sub>2</sub> long, widened outwardly, *m-cu* at one-third its length.

Abdominal tergites pale brown, the lateral margins narrowly darker; sternites yellow, the lateral margins of the segments narrowly dark brown, more extensively so on the basal sternites; hypopygium reddish brown to brown. Male hypopygium with the ninth tergite produced into a median lobe that is deeply notched, the lobes formed being relatively narrow. Inner dististyle longer than the outer, the apex flattened, obtusely rounded. Interbases slender, the apex terminating in two acute recurved spines.

*Hab.* Victoria, Tasmania.

*Holotype*, ♂, Strahan, Tasmania, February 5, 1923 (*A. Tonnoir*).

*Paratopotype*, ♂, February 1924 (*G. H. Hardy*), in Queensland University Collection; *paratypes*, 1 ♂, Tullah, Tasmania, November 8, 1922; 1 ♂, Zeehan, Tasmania, February 7, 1923; 3 ♂♂, Burnie, Tasmania, February 1, 1923 (*A. Tonnoir*); 1 ♂, Ferntree Gully, Victoria, February 22, 1924 (*G. F. Hill*), in National Museum, Victoria.

*Epiphragma wilsoniana*, sp. n.

General coloration brown; antennæ short, the flagellar segments beyond the second brownish black; femora and tibiæ yellow, the former with two brown rings, the latter with a darker brown subbasal ring; wings creamy subhyaline, the ground-colour almost obliterated by abundant spots and dots in all the cells; a series of about a dozen darker brown spots in cell *C*, these surrounding small spurs of cross-veins into the cell from vein *C*; petiole of cell *M*<sub>1</sub> short.

*Male*.—Length about 9.5 mm.; wing 10.5 mm.

Rostrum obscure yellow; palpi dark brown. Antennæ short, if bent backward scarcely attaining the wing-root; scapal segments brown, the basal segment slightly dusted, the second paler apically; basal flagellar segment orange-yellow; second flagellar segment brownish yellow; remainder of the flagellum brownish black, the segments with elongate verticils. Head yellowish brown, the vertex more greyish medially, with a brownish spot on either side.

Pronotum with the anterior sclerite fulvous, the postnotum obscure yellow. Lateral pretergites obscure yellow. Mesonotal præscutum with the usual stripes rather pale dull brown, the anterior portion and the usual interspaces and lateral margins deep chestnut-brown, the extreme cephalic margin of the sclerite narrowly blackened; humeral region restrictedly yellow; median line of the præscutum with a capillary brown vitta on the posterior half; scutum yellowish brown, the centres of the lobes extensively infuscated, the median area broadly darkened; scutellum dark, the surface pollinose, the median area dusky, with a conspicuous brown spot on either side at base; postnotum whitish, the median area with a brown line and with a brown spot on either side near mid-length. Pleura dark brown, very narrowly and vaguely lined longitudinally with yellow vittæ. Halteres yellow, the knobs infuscated. Legs with the fore coxæ dark brown, traversed by a yellowish line; remaining coxæ pale yellow, their bases narrowly dark brown; femora yellow with a brown subapical ring and a vague, sometimes scarcely defined, postmedial brown ring; tibiæ yellow, with a narrow but conspicuously dark brown subbasal ring; tips of tibiæ narrow and indistinctly infumed; tarsi yellow, the terminal segments darker. Wings creamy subhyaline, the ground-colour almost concealed by abundant brown spots and dots in all the cells, these so abundant as to be contiguous or confluent in most cases; a series of darker brown spots in



cell *C*, there being nine or ten between *h* and the supernumerary cross-vein, most of these spots encircling a short spur from costa into the cell; cell *Sc* nearly free from markings; the stigmal area and markings at ends of veins  $R_{1+2}$ ,  $R_3$ , and  $R_4$  somewhat darker than the other spots of the membrane; veins pale brown. Costal fringe short. Venation: A series of spurs of veins in cell *C* as described above;  $Sc_2$  longer than  $Sc_1$ ;  $R_2$  faint;  $R_{2+3}$  about one-half longer than  $R_3$  alone; cell  $M_1$  more than three times its petiole; cell 1st  $M_2$  with the proximal end narrowed, the cell widened outwardly, *m-cu* at near two-thirds its length.

Abdominal tergites obscure yellow, the lateral margins broadly infuscated; sternites whitish yellow, the bases and lateral margins of the segments narrowly dark brown; hypopygium obscure yellow. Male hypopygium as in the other Australian species of the genus; tip of the outer dististyle a short hook, the margin of which is truncated. Interbases appearing as straight rods that terminate in two short curved teeth.

*Hab.* New South Wales.

*Holotype*, ♂, Mt. Wilson, Blue Mts., November 19, 1921 (*A. Tonnoir*).

#### BERGROTHOMYIA, gen. nov.

Antennæ 16-segmented; first scapal segment relatively short; basal flagellar segments with the lower face strongly protuberant and here unprovided with verticils; outermost flagellar segments passing into oval, with the lower face only slightly produced; outer face of the flagellar segments provided with verticils that are longer on the basal segments, where they are approximately one-half longer than the segments; surface of flagellar segments with a short, dense, erect pubescence. In the female the flagellar segments are somewhat less protuberant. Rostrum as long as the remainder of the head. Pronotum massive. Pseudosutural foveæ conspicuous, remote from the lateral margins of the præscutum; tuberculate pits present, placed at the extreme cephalic margin of the sclerite, separated from one another by a distance a little less than the diameter of one. Tibial spurs present. Wings with *Sc* relatively short, ending before the fork of *Rs*,  $Sc_2$  close to the tip of  $Sc_1$ ; *Rs* angulated and spurred at origin;  $R_{2+3+4}$  long (*diemenensis*) to very long (*rostrifera*);  $R_{2+3+4}$  a little shorter or longer than  $R_{3+4}$  (*rostrifera*) or  $R_2$  longer than  $R_{2+3}$  (*diemenensis*);  $R_{1+2}$  a little longer than  $R_2$  alone; inner ends of cells  $R_4$ ,  $R_5$ , and

1st  $M_2$  in transverse alignment; distal section of  $M_{1+2}$  in alignment with  $M_2$ ; cell 1st  $M_2$  large,  $m-cu$  at or before mid-length; anterior arculus present. Male hypopygium with the basistyles relatively slender; outer dististyle small, terminating in an acute spine, the outer margin before the apex with numerous smaller appressed spines. Gonapophyses appearing as flattened plates on either side of the ædeagus, the tips produced into short recurved spines. Ovipositor with the valves long and slender, especially the very elongate, nearly straight tergal valves.

Genotype, *Limnophila rostrifera*, Skuse (Australian Sub-region).

Besides the genotype, the new species *Bergrothomyia diemenensis* belongs here. The other species of Hexatomine flies with the rostrum moderately elongate (*Rhamphophila*, Edwards, *Tonnoirella*, gen. nov.) belong to the subtribe Epiphragmaria, in which the anterior arculus is lacking. The present genus belongs to the subtribe Limnophilaria, with the anterior arculus preserved. The structure of the antennæ and male hypopygium, and the venation, especially the relative lengths of  $Sc$  and  $R_{2+3+4}$  and the position of  $R_2$ , offer additional generic characters that point toward the genus *Pilaria*, Siutensis. This new genus is named in honour of the late Dr. Ewald Bergroth, distinguished Heteropterist and profound student of the Tipulidæ, to whom I express my most sincere thanks for much kindly advice in earlier years.

*Bergrothomyia diemenensis*, sp. n.

General coloration blue-grey, the præscutum with four brown stripes; wings whitish subhyaline, with a heavy brown pattern, cell  $Cu$  and the Anal cells washed with paler brown;  $R_2$  at or beyond the fork of  $R_{3+4}$ , in rare cases placed shortly before this fork.

*Male*.—Length about 8 mm.; wing 7·8 mm.

*Female*.—Length about 11 mm.; wing 8·6 mm.

Rostrum light blue-grey; palpi dark brown. Antennæ one-half longer than the rostrum, black, the basal segment pruinose; flagellar segments as in the genus, the basal seven or eight flagellar segments strongly produced on the lower face. Head light blue-grey, with a conspicuous brown mark on the vertex.

Pronotum blue-grey. Mesonotal præscutum blue-grey with four brown stripes, the intermediate pair closely approximated, not reaching the suture; pseudosutural foveæ black; lateral margins of præscutum slightly infumed;

scutum blue-grey, the lobes very faintly marked with darker; scutellum and postnotum blue-grey. Pleura clear blue-grey, the dorso-pleural membrane narrowly buffy, suffused with brown behind. Halteres yellow, the knobs infuscated. Legs with the coxæ light brownish yellow, sparsely pruinose; trochanters obscure yellow, the tips infuscated; femora obscure yellow, the tips broadly blackened; tibiæ and basitarsi similar, the tips narrowly blackened; remaining segments of the tarsi passing into brownish black. Wings whitish subhyaline, with a heavy brown pattern; cell *C* yellowish brown to brown, with still darker clouds at *h* and the outer end; stigma oval, dark brown; conspicuous brown spots at origin of *Rs*; along the cord; fork of  $R_{2+3+4}$ ; outer end of cell 1st  $M_2$ ; fork of  $M_{1+2}$ ; marginal spots on the longitudinal veins, large and conspicuous on  $R_3$ , smaller on  $R_4$ , the others very reduced; cell *M* largely suffused with paler brown; basal two-thirds of cell *Cu*, the end of cell 1st *A*, and the outer two-thirds of cell 2nd *A* similarly clouded; remaining veins in the caudal and outer parts of the wing more or less clouded with brown; veins brown, scarcely darker in the infuscated areas. Venation:  $Sc_2$  at tip of  $Sc_1$ ; *Rs* conspicuously spurred at origin;  $R_{2+3+4}$  long, but still much shorter than  $R_3$ , nearly twice *m-cu*;  $R_{1+2}$  and  $R_2$  subequal;  $R_2$  subequal to  $R_{2+3}$ ; cell  $M_1$  longer than to nearly twice its petiole; *m-cu* at one-third to shortly before mid-length of cell 1st  $M_2$ ; cell 2nd *A* broad on basal half, narrowed apically. In a few cases  $R_2$  is at or very close to the fork of  $R_{3+4}$ , in one paratype (Lake Margaret) before this fork, being subequal to  $R_{3+4}$  alone.

Abdomen dark greyish brown, the sternites paler, especially the basal sternites, which are obscure yellow; tergites with an oblique row of impressed dots on either side. Male hypopygium with the outer dististyle stout, the outer margin with conspicuous appressed to subappressed spines, these becoming smaller basally, but continued basad to beyond mid-length of the style. Gonapophyses with the spines long and slender, gently curved, the long tips acute.

*Hab.* Tasmania.

*Holotype*, ♂, Zeehan, February 1924 (*G. H. Hardy*), in Queensland University Collection.

*Allotype*, ♀, Strahan, February 1924 (*G. H. Hardy*).

*Paratopotypes*, 6 ♂ ♀; *paratypes*, 2 ♂ ♂, Lake Margaret February 3, 1923 (*A. Tonnoir*).

## DIEMENOMYIA, gen. nov.

Antennæ with from 16 (*bulbosa*, sp. n., ♀) to 21 (*pratenuis*, sp. n.) segments; lower or ventral face of the flagellar segments strongly produced to give a serrate appearance to the organ; verticils relatively short and inconspicuous. Rostrum and palpi short. Pseudosutural foveæ small and inconspicuous, weakly lunate in form; tuberculate pits lacking; meron small. Tibiæ spurred. Wings with or without conspicuous macrotrichiæ in the outer cells.  $Sc_1$  elongate;  $R_2$  about one-half  $R_{1+2}$  and subequal to nearly twice  $R_{2+3}$ ; inner ends of cells  $R_4$ ,  $R_5$ , and 1st  $M_2$  in transverse alignment; cell  $M_1$  present; *m-cu* about its own length beyond the fork of *M*; anterior arculus preserved. Male hypopygium with the outer dististyle chitinized, weakly bifid at apex; inner dististyle smaller, fleshy. Gonapophyses appearing as flattened blades that terminate in a long recurved hook. Ovipositor with both tergal and sternal valves very long and nearly straight.

Genotype, *Diemenomyia bulbosa*, sp. n. (Australian Sub-region).

*Diemenomyia pratenuis*, sp. n., likewise belongs here. The characters of the group point toward *Tanymera* (Loew), Alexander (Lower Oligocene; Baltic Amber), in the produced flagellar segments, but in other respects the two genera do not seem to be very closely allied.

*Diemenomyia bulbosa*, sp. n.

General coloration grey; antennæ (♂) 18–20-segmented, in ♀ 16-segmented; lower face of flagellar segments strongly produced; wings tinged with brown, stigma dark brown.

*Male*.—Length about 6.5–7 mm.; wing 8–8.8 mm.

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

Rostrum dark; palpi dark brown. Antennæ (♂) 18–20-segmented, black throughout; basal and intermediate flagellar segments strongly produced, the terminal segments passing into oval; verticils moderately elongate, much exceeding the short dense pubescence. Head broad, dark brown, with a sparse yellowish pollen, heaviest in front.

Pronotum dark brown, dusted with yellowish grey. Mesonotal præscutum grey with three subconfluent brownish-black stripes that are more sparsely dusted and appear somewhat shiny; scutum and scutellum dark brown, sparsely pollinose; postnotum heavily dusted. Pleura dark brown, with a sparse greyish pollen. Halteres yellow. Legs with

the coxæ brownish yellow, fore coxæ darker; trochanters obscure yellow; femora brownish black, their bases broadly obscure yellow; tibiæ and tarsi brownish black. Wings with a strong brownish tinge, the costal region somewhat darker; stigma oval, dark brown; a dusky cloud on the anterior cord; vein  $Cu_1$  more or less distinctly seamed with dusky; veins dark brown. Macrotrichiæ in the apices of cells  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ , 2nd  $M_2$ ,  $M_3$ , and, in cases, even  $M_4$  and all of  $M_1$ . Venation:  $Sc_1$  extending just beyond the fork of  $Rs$ ,  $Sc_2$  some distance from its tip, variable in position,  $Sc_1$  ranging from a little less than to much exceeding  $m-cu$ ;  $R_2$  about one-half  $R_{1+2}$  and subequal to  $R_{2+3}$ ;  $R_{2+3+4}$  about one-third longer than  $m-cu$ ; cell  $M_1$  present, varying from a little more than one-half to fully as long as its petiole;  $m-cu$  varying from a distance equal to its own length to slightly less beyond the fork of  $M$ .

Abdomen dark brown, including the hypopygium. Male hypopygium with the basistyle stout. Outer dististyle relatively slender, heavily blackened, more thickened basally, narrowed to the slightly bifid apex; surface of style with long yellow setæ, especially on the outer face; inner style shorter, with basal setæ, the apex narrowed, smooth, terminating in a single strong seta. Gonapophyses terminating in a strong hook at the caudo-lateral angle, this directed strongly mesad. Ædeagus elongate.

In the female the antennæ are only 16-segmented, the segments but slightly produced, the terminal segment much larger than the penultimate. Macrotrichiæ of the wing more restricted, confined to the radial field. Ovipositor with the valves long and straight, the tips acute.

*Hab.* Tasmania.

*Holotype*, ♂, Mt. Wellington, November 28, 1922 (*A. Tonnoir*).

*Allotopotype*, ♀, November 30, 1922.

*Paratopotypes*, 5 ♂ ♀, November 26–30, 1922; *paratypes*, 2 ♂ ♂, Hartz Mts., December 9–10, 1922; ♂ ♂, Cradle Valley, January 10–27, 1923 (*A. Tonnoir*).

*Diemenomyia bulbosa multifida*, subsp. n.

*Female*.—Length about 7 mm.; wing 8 mm.

Resembling the typical form, differing as follows:—

Antennæ, ♀, 18-segmented, feebly serrate. General coloration of head and thorax strongly blue-grey pruinose. Pseudosutural foveæ lying close to the lateral margin of præscutum. Wings without macrotrichiæ in the cells.

*Hab.* Tasmania.

*Holotype*, ♀, Cradle Valley, January 22, 1923 (*A. Tonnoir*).

*Diemenomyia bulbosa teneraria*, subsp. n.

*Male*.—Length 4·5–5 mm.; wing 5–6 mm.

Resembling the typical form, differing as follows:—

A very small fly, with 18-segmented antennæ; macrotrichiæ either completely lacking (holotype) or weakly preserved (paratype).  $Sc_2$  removed from tip of  $Sc_1$ , the latter a little less than  $m-cu$ ;  $R_2$  subequal to  $R_{1+2}$  and  $R_{2+3}$ ; cell  $M_1$  very small.

*Hab.* Tasmania.

*Holotype*, ♂, Cradle Valley, January 27, 1893 (*A. Tonnoir*).

*Paratopotype*, ♂.

*Diemenomyia prætenuis*, sp. n.

*Male*.—Length about 6·5 mm.; wing 6·8–7·2 mm.; antennæ about 3·8 mm.

Closely allied to *D. bulbosa*, sp. n. Antennæ 21-segmented, very long and slender, if bent backward extending to nearly one-third the length of the abdomen; antennæ black throughout, the scapal segments slightly pruinose; flagellar segments long, moderately produced beneath, the appearance produced not markedly serrate; individual flagellar segments densely clothed with a short dense pubescence, the verticils short, scarcely longer than the pile. Wings with a brown tinge, the stigma relatively pale, not darker than the vague seam on the anterior cord and but little evident against the ground-colour; veins darker brown. Macrotrichiæ of the cells very scanty, confined to cells  $R_3$ ,  $R_4$ , and  $R_5$ , in the two latter cells restricted to a single row at or near mid-width of the cells, confined to the distal half or less.

*Hab.* Tasmania.

*Holotype*, ♂, Mt. Field, December 18, 1922 (*A. Tonnoir*).

*Paratopotype*, ♂.

*Limnophila cingulipes*, sp. n.

General coloration grey, the præscutum with brown stripes; antennæ short, obscure yellow, the basal segment dark; femora yellow, with two narrow dark rings; wings relatively narrow, whitish, with a heavy brown pattern; cell 1st  $M_2$  elongate;  $m-cu$  at near mid-length.

*Male*.—Length about 13 mm.; wing 12·5 mm.

Rostrum brown, with a sparse grey bloom, the nasal region tufted with a few dark setæ. Antennæ relatively short, if bent backward not attaining the wing-root; basal segment elongate-cylindrical, dark brown; remainder of antennæ obscure yellow, the flagellar segments long-oval, becoming smaller and somewhat darker outwardly. Head dark, heavily grey pruinose.

Pronotum light grey, the median area with an interrupted brown line. Mesonotal præscutum light grey, with three brown stripes, the median stripe very pale brown, its anterior half divided by a very conspicuous dark brown capillary vitta; lateral stripes broad, dark brown, extending from behind the large circular pseudosutural foveæ to the suture; foveæ pale reddish; lateral margins of præscutum weakly infumed; scutum light grey, each lobe with a large mesal and a very small lateral spot of dark brown; scutellum grey, the parascutella darker; postnotal mediotergite grey, darker caudally and laterally. Pleura grey, with a broad dark brown stripe, extending from the pronotum across the dorsal pleurites, passing above the halteres and beneath the wing-root; dorso-pleural membrane obscure yellow. Halteres pale, the knobs weakly darker. Legs with the coxæ dark brown, sparsely pruinose, especially the hind coxæ; trochanters brownish yellow; legs long and slender, femora yellow, with a broad subterminal blackish ring and a narrower similar postmedial ring, the two enclosing a broad obscure yellow annulus; extreme tip of femora pale; tibiæ obscure yellow, the extreme base and the tips darkened; tarsi brownish yellow, the tips of the individual segments infuscated, the terminal segment uniformly dark. Wings relatively narrow, whitish, with a heavy brown pattern, including a prearcular mark that also includes the extreme base of cell *R*; a large spot at origin of *Rs* that does not reach vein *M*; a somewhat smaller spot at mid-distance between arculus and origin of *Rs* that reaches *M*; a small circular spot at *Sc*<sub>2</sub>; stigma oval, confluent with extensive brown areas on the anterior cord; a large spot at end of vein *R*<sub>3</sub>, completely crossing cell *R*<sub>3</sub>; smaller spots at the ends of the longitudinal veins; outer end of cell 1st *M*<sub>2</sub>, fork of *M*<sub>1+2</sub>, and on *m-cu*, the latter broader; brown washes occupy cell *M* except at outer end and cell *M*<sub>4</sub> except the narrowed cephalic portion; other brown washes in the basal half of cell *Cu*, distal third of cell *R*<sub>5</sub>, near outer end of cell 1st *A*, beyond mid-length of cell 2nd *A*, and the margin from this latter mark outward to vein *Cu*<sub>1</sub>; anal angle vaguely darkened; wing-base and cells *C*, *Sc*, and much of *Sc*<sub>1</sub>

yellowish; veins dark in the infuscated areas, more yellowish in the pale areas. Macrotrichiæ of the veins sparse, there being none on  $R_s$ ,  $R_{2+3+4}$ ,  $R_{2+3}$ , or  $R_3$ ; trichiæ present on  $R_4$ ,  $R_5$ ,  $M_1$ ,  $M_2$ , and the extreme outer end of  $M_3$ . Venation:  $Sc_2$  some distance from the tip of  $Sc_1$ , the latter alone longer than  $m-cu$ ;  $R_s$  long, angulated at origin, in alignment with  $R_{2+3+4}$ ; cell  $R_3$  deep, the veins diverging at ends;  $R_2$  about two-fifths of  $R_{1+2}$  and one-half or more of  $R_{2+3}$ ;  $r-m$  very short; cell 1st  $M_2$  long and narrow, rectangular; cell  $M_1$  more than twice its petiole;  $m-cu$  near mid-length of cell 1st  $M_2$ ; vein 2nd  $A$  elongate, gently sinuous; anterior arculus present.

Abdominal tergites brown, paler brown medially, the lateral margins darker brown to form longitudinal stripes; hypopygium dark; sternites reddish brown, the lateral margins and caudal margin of sternite 2 darker brown. Male hypopygium with the basistyles relatively slender. Dististyles two, the outer style nearly straight, slender, narrowed to the simple acute blackened apex; inner style very broad and flattened, with a more chitinized outer margin that is densely provided with microscopic erect setulæ, the outer margin of the style with long coarse setæ.  $\text{\AA}$ eдеagus constricted before the tip, subtended on either side by acute gonapophyses.

*Hab.* Tasmania.

*Holotype*, ♂, Cradle Valley, January 10, 1923 (*A. Tonnoir*).

*Limnophila mirabunda*, sp. n.

General coloration yellowish grey, the præcutum with three conspicuous brownish-black stripes; antennæ (♂) short; halteres entirely pale yellow; legs yellow, the tips of the femora abruptly blackened; tips of the tibiæ and the segments of the tarsi narrowly blackened; wings tinged with yellow, the prearcular region brighter, the disk with conspicuous brown spots; male hypopygium with the  $\text{\AA}$ eдеagus long and slender.

*Male*.—Length about 11 mm.; wing 12 mm.

Rostrum dark, with a yellowish bloom; palpi brownish black. Antennæ short, if bent backward ending far before the wing-root; first segment brown, sparsely pruinose; flagellar segments brownish black; basal three segments of the flagellum subglobular, the first largest, the others gradually smaller; fourth flagellar segment a little bulging; remaining segments elongate-cylindrical, the verticils near



mid-length, these latter long, unilaterally arranged and exceeding the segments in length. Head strongly narrowed behind, greyish in front, more yellowish grey behind, the centre of the vertex extensively infuscated.

Pronotum brownish grey. Mesonotal præscutum greyish yellow, with three conspicuous brownish-black stripes, the median stripe very vaguely divided by a more reddish-brown line, the stripe a little constricted at the pseudosutural foveæ, widened behind, not attaining the suture; pseudosutural foveæ irregularly oval, black; tuberculate pits not evident; scutum grey, each lobe with two confluent brownish-black spots; scutellum broad, grey, the parascutella very small, dark; postnotal mediotergite dark brown, with a basal grey triangle, the point directed caudad. Pleura dark, the surface heavily grey pruinose, the dorso-pleural membrane buffy. Halteres entirely pale yellow. Legs with the coxæ dark brown, the posterior coxæ paler apically, all coxæ heavily pruinose; trochanters obscure yellow; femora yellow, the tips abruptly and rather narrowly but conspicuously blackened; tibiæ yellow, the extreme bases and broader tips blackened; basal three tarsal segments obscure yellow to brownish yellow, the tips narrowly blackened; terminal tarsal segments black; segments of legs with long, conspicuous, suberect setæ. Wings with a strong yellowish tinge, the prearcular region brighter yellow; cell *C* dull yellow, cell *Sc* similar, the distal portion a trifle more infumed; conspicuous brown spots and washes arranged as follows: Postarcular, in cells *R* and *M*; at origin of *Rs*, barely reaching *M*; stigma oval, confluent with a broad seam at the cord; outer end of cell 1st *M*<sub>2</sub>; spots at fork of *M*<sub>1+2</sub> and marginal spots at ends of veins *R*<sub>3</sub>, *R*<sub>4</sub>, *M*<sub>3</sub>, *Cu*<sub>1</sub>, and 2nd *A*; paler brown washes along veins *M* and *Cu*, suffusing the middle of cell *M*, basal half of *Cu*, outer end of 1st *A* opposite the end of vein 2nd *A*, the anal angle of the wing, and near mid-length of cell 2nd *A*; veins dark brown, more yellowish in the prearcular region and the clear areas on *Rs*; one wing of the type shows a brown spot in cell *R*<sub>1</sub> at mid-length of *Rs*. No macrotrichia on veins *R*<sub>3</sub>, *R*<sub>2+3</sub>, *R*<sub>2+3+4</sub>, or *Rs*; numerous trichia on distal two-thirds of *R*<sub>4</sub>. Venation: *Sc* long, *Sc*<sub>1</sub> ending just beyond the fork of *Rs*, *Sc*<sub>2</sub> at its extreme tip; *Rs* long, shortly angulated and weakly spurred at origin; *R*<sub>2+3+4</sub> longer than *m-cu*; veins *R*<sub>3</sub> and *R*<sub>4</sub> divergent, the former relatively short; *R*<sub>2</sub> about two-thirds *R*<sub>1+2</sub> and twice as long as *R*<sub>2+3</sub>; inner ends of cells *R*<sub>4</sub>, *R*<sub>5</sub>, and 1st *M*<sub>2</sub> in alignment; cell *M*<sub>1</sub>

a trifle longer than its petiole; cell 1st  $M_2$  small,  $m-cu$  close to mid-length; anterior arculus present.

Abdomen dark brown, sparsely pruinose; lateral margins of the tergites narrowly ochreous; hopopygium a little paler. Male hypopygium with the basistyles rather slender, the outer face with long, coarse, erect setæ. Outer dististyle a flattened black blade that is gradually widened outwardly, the outer apical angle terminating in an acute curved hook, the surface of the style beyond the base with long, conspicuous, subappressed setæ. Inner dististyle shorter, darkened, the outer surface with numerous setæ, the apex terminating in two powerful bristles. Gonapophyses appearing as slender, strongly-curved hooks. Ædeagus very long and slender.

*Hab.* Tasmania.

*Holotype*, ♂, Geeveston, December 8, 1922 (*A. Tonnoir*).

*Limnophila fundata*, sp. n.

Belongs to the *fundata* group; general coloration brownish yellow; centre of vertex shiny black; antennæ short; halteres pale; wings with a pale brown tinge;  $Sc$  long,  $Sc_2$  at tip of  $Sc_1$ ; cell  $M_1$  lacking; sparse macrotrichia in ends of cells  $R_4$  and  $R_5$ ; male hypopygium with the outer dististyle slender, bifid at apex; gonapophyses appearing as a semi-circler of chitinized spines surrounding the ædeagus.

*Male*.—Length about 5.3–5.6 mm.; wing 6.3–7 mm.

Rostrum and palpi brown. Antennæ short, if bent backward not extending far beyond the pronotum; scapal segments brown, the basal segments of the flagellum light brown, the terminal segments somewhat darker; flagellar segments oval, with verticils that are much longer than the segments; terminal segments more elongate. Head shiny black, dusted with yellowish grey, the centre of the vertex polished black.

Pronotum brown to brownish black, the posterior portion yellowish. Mesonotum obscure yellow, the præscutum pollinose, with three brown to dark brown stripes that are subconfluent; pseudosutural foveæ and tuberculate pits not evident; præscutal setæ small; scutal lobes infuscated, sparsely pollinose; scutellum broad, testaceous yellow; postnotum brown, with a sparse pale pollen. Pleura pale brown, with indications of darker brown markings on the pteropleurite and sternopleurite. Halteres pale, relatively short. Legs with the coxæ and trochanters brownish testaceous; remainder of legs pale brown, the terminal tarsal segments darker; tibial spurs small. Wings with a pale

brown tinge, the stigma only slightly darker; veins dark brown. Sparse macrotrichia in the apices of cells  $R_4$  and  $R_5$ . Venation:  $Sc_1$  long, extending to opposite one-third the length of  $R_{2+3+4}$ ,  $Sc_2$  about its own length from the tip and likewise beyond the fork of  $Rs$ ;  $Rs$  arcuated at origin, in alignment with  $R_{2+3+4}$ ;  $R_2$  about two-fifths  $R_{1+2}$  and one-half  $R_{2+3}$ ; inner ends of cells  $R_4$ ,  $R_5$ , and 1st  $M_2$  in alignment; cell  $M_1$  lacking; veins beyond cell 1st  $M_2$  elongate;  $m-cu$  less than its length beyond the fork of  $M$ ; anterior arculus present.

Abdomen brown, the basal sternites somewhat paler; hypopygium yellow. Male hypopygium with the basistyles elongate, with conspicuous setae on outer face and at apex. Two dististyles, the outer long and slender, strongly curved, the apex bifid, the distal half with conspicuous setae; at base with a small lobule; inner style shorter, the basal portion with conspicuous setae. Gonapophyses in the form of a conspicuous flattened plate, the mesal margin with several conspicuous spines. Penis very long, sinuous within the aedeagus.

*Hab.* Tasmania.

*Holotype*, ♂, Cradle Valley, January 14, 1923 (*A. Tonnoir*).

*Paratopotype*, ♂, January 13, 1923; *paratype*, ♂, King River, February 4, 1923 (*A. Tonnoir*).

*Limnophila nitidiceps*, sp. n.

Belongs to the *fundata* group; general coloration yellow, the praescutum with a median black stripe; pleura brownish yellow; antennae elongate; legs black, the femoral bases paler; wings with a faint brown tinge; macrotrichia in ends of cells  $R_4$  and  $R_5$ ; cell  $M_1$  lacking.

*Male*.—Length about 4.6 mm.; wing 5.8–6 mm.

*Female*.—Length about 5.5 mm.; wing 6.2–6.7 mm.

Rostrum and palpi dark brown. Antennae (♂) elongate for a member of the group, if bent backward extending to some distance beyond the wing-root; black throughout; flagellar segments elongate-cylindrical to fusiform, the verticils a little shorter than the segments. In the female the antennae are a little shorter but still longer than in either sex of the other members of the group (*fundata*, sp. n.; *morula*, sp. n.). Head grey, the vertex extensively shiny polished black.

Pronotum dark brown, paler laterally, the posterior notum yellow. Mesonotal praescutum yellow with a conspicuous median black stripe and less conspicuous brown lateral

stripes, the interspaces obscured, with a sparse yellow pollen; pseudosutural foveæ faint and pale in colour; tuberculate pits lacking; scutal lobes infuscated anteriorly, the median area and remainder of the lobes yellowish; scutellum and postnotum brownish yellow. Pleura brownish yellow. Halteres relatively elongate, the knobs weakly infuscated. Legs with the coxæ yellow, the fore coxæ a little infuscated; trochanters yellow; femora dark brownish black, the bases narrowly obscure yellow; tibiæ and tarsi brownish black. Wings with a faint brownish tinge, the stigma pale, ill-defined; veins darker brown. Sparse macrotrichia in apices of cells  $R_2$  and  $R_5$ . Venation:  $Sc_1$  ending shortly before the fork of  $Rs$ ,  $Sc_2$  varying in position, from a little more than its own length to about twice its own length from the tip;  $Rs$  rather strongly angulated at origin;  $R_2$  approximately one-half or less  $R_{1+2}$  and one-half or more  $R_{2+3}$ ; veins  $R_3$  and  $R_4$  strongly divergent,  $R_3$  sinuous, bent strongly toward  $R_{1+2}$  at tip, markedly narrowing cell  $R_2$ ; inner ends of cells  $R_4$ ,  $R_5$ , and 1st  $M_2$  in alignment; cell  $M_1$  lacking;  $m-cu$  less than its own length beyond the fork of  $M$ .

Abdominal tergites dark brown, the basal sternites conspicuously yellow; hypopygium yellowish. Male hypopygium as in *fundata*, the gonapophyses of different shape, appearing as two opposable many-toothed combs. Ovipositor with the valves elongate, nearly straight, the tergal valves gently upcurved.

*Hab.* Tasmania.

*Holotype*, ♂, Eaglehawk Neck, Tasman Peninsula, November 18, 1922 (*A. Tonnoir*).

*Allotopotype*, ♀, November 23, 1922.

*Paratopotypes*, 2 ♀ ♀, November 25–30, 1922 (*A. Tonnoir*).

*Limnophila morula*, sp. n.

Belongs to the *fundata* group; general coloration grey, the præscutum with three shiny brownish-black stripes; pleura heavily pruinose; antennæ short; tips of femora narrowly infuscated; wings with a faint brown tinge, the stigma darker; sparse macrotrichia in the ends of the radial cells; cell  $M_1$  lacking.

*Male*.—Length about 5.3 mm.; wing 6.6 mm.

*Female*.—Length about 6.3 mm.; wing 7.3 mm.

Rostrum and palpi brown. Antennæ of moderate length, in male if bent backward extending to shortly before the wing-root; basal segment of scape a trifle paler than the remainder of the organ; flagellar segments short, basal ones

globular, passing into oval; verticils longer than the segments. Head clear light grey, the centre of the vertex extensively polished black.

Pronotum dark brown, heavily grey pruinose. Mesonotal præscutum grey, with three shiny brownish-black stripes; scutellum and postnotum passing into clear light grey. Pleura light grey. Halteres pale. Legs with the fore coxæ dark brown, sparsely pruinose; remaining coxæ obscure yellow, the bases infuscated; trochanters obscure yellow; femora obscure brownish yellow, the tips infuscated; tibiæ brown; tarsi passing into dark brown. Wings with a faint brown tinge, the stigma darker brown; veins darker brown. Very sparse macrotrichia in the apices of cells  $R_3$ ,  $R_4$ , and  $R_5$ , in cases lacking in one or another of these cells. Venation:  $Sc$  relatively short,  $Sc_1$  ending about opposite four-fifths the length of  $R_3$ ,  $Sc_2$  variable in position, in some specimens retreated back from the apex, in others not far from the tip of  $Sc_1$ ; veins  $R_3$  and  $R_4$  strongly divergent, cell  $R_2$  being generally parallel-sided; cell  $M_1$  lacking;  $m-cu$  its own length or less beyond the fork of  $M$ .

Abdomen dark brown, sparsely pruinose; hypopygium yellowish. Male hypopygium almost exactly as in *L. fundata*, the gonapophyses with the spines relatively fewer and larger, the apophyses not formed into flattened blades.

*Hab.* Tasmania.

*Holotype*, ♂, St. Patrick River, November 4, 1922 (*A. Tonnoir*).

*Allotopotype*, ♀, October 30, 1922.

*Paratypes*, ♀, Geeveston, December 8, 1922; ♀, Cradle Valley, January 26, 1923; ♀, Mt. Field, December 18, 1922; ♀, Eaglehawk Neck, November 15, 1922 (*A. Tonnoir*).

*Limnophila referta*, sp. n.

Belongs to the *pilosipennis* group; general coloration dark brown, with a sparse yellow pollen; antennæ (♂) elongate, the flagellar segments with the lower face slightly protuberant, the verticils a little shorter than the segments; wings with the stigma oval, brown; distal cells of wing with macrotrichia; cell  $M_1$  present;  $Sc_2$  near the tip of  $Sc_1$ ; male hypopygium with the aedeagus elongate.

*Male*.—Length about 5.6 mm.; wing 7.2 mm.

*Female*.—Length about 6.5 mm.; wing about 6.8 mm.

Rostrum and palpi brown. Antennæ 16-segmented, elongate, if bent backward extending about to the base of the abdomen, dark brown throughout; flagellar segments

elongate-fusiform, the lower face of each segment a little more bulging than the upper; verticils a little shorter than the segments. Head dark brown, with a sparse yellow pollen.

Pronotum dark brown, sparsely pruinose. Mesonotal præscutum dark brown, subnitidous, with a sparse yellow pollen, more evident laterally, without distinct stripes; pseudosutural foveæ black, lying longitudinally close to the lateral margin; no tuberculate pits; scutal lobes dark brown, the median area and scutellum somewhat paler; postnotum dark brown, pruinose. Pleura pruinose. Halteres yellow, the knobs weakly darkened. Legs with the coxæ elongate, yellow, their bases infuscated, especially the fore coxæ; trochanters yellow; femora obscure yellow, the tips extensively infuscated; tibiæ light brown, the tips narrowly darkened; tarsi passing into dark brown. Wings with a faint dusky tinge, the stigma oval, brown; a very vague infuscation on the anterior cord; veins dark brown. Very sparse macrotrichiæ in apices of cells  $R_3$  to  $M_3$  inclusive. In the female these trichiæ are restricted to cells  $R_4$  and  $R_5$ . Venation:  $Sc_1$  ending immediately below the fork of  $R_s$ ,  $Sc_2$  a little more than its own length from the tip;  $R_2$  one-half to two-thirds  $R_{1+2}$  and  $R_{2+3}$ ; 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;  $m-cu$  about its own length beyond the fork of  $M$ .

Abdomen dark brown, the basal sternites paler brown; hypopygium obscure brownish yellow, the apices of the basistyles and the dististyles darkened. Male hypopygium with the basistyles narrowed outwardly; interbasal process slender, gently arcuated, dilated near mid-length, the distal half slender, curved. Dististyles small, connected basally by membrane; outer dististyle narrowed to the bifid tip, the surface with erect setæ; inner dististyle with numerous setæ on the fleshy basal portion. Phallosome complex, the ædeagus very long. Ninth tergite with a broad U-shaped caudal notch, the small lateral lobes formed blunt, weakly infuscated.

*Hab.* Tasmania.

*Holotype*, ♂, Mt. Wellington, November 25, 1922 (*A. Tonnoir*).

*Allotype*, ♀, Hartz Mts., December 10, 1922.

*Paratopotype*, ♂, November 30, 1922; *paratype*, ♀, Eaglehawk Neck, November 18, 1922 (*A. Tonnoir*).

*Linnophila subcylindrica*, sp. n.

Belongs to the *pilosipennis* group; general coloration reddish brown; antennæ elongate, if bent backward extending to shortly beyond the base of the abdomen, black, the second scapal segment usually paler; flagellar segments elongate, subcylindrical, a little narrowed at the ends; segments with verticils that are only about one-half the length of the segments themselves and with a conspicuous erect pale pubescence. Head dark brown, with a conspicuous yellow pollen.

Pronotum dark brown, with a sparse yellow pollen. Mesonotum reddish brown, without distinct stripes; scutellum darker brown; pseudosutural foveæ not evident; præscutal setæ small, erect. Pleura yellowish brown, the dorsal pleurites more infuscated. Halteres pale, the knobs weakly infuscated. Legs with the coxæ and trochanters brownish yellow; femora dark brown, the bases narrowly paler; tibiæ and tarsi brownish black. Wings with a strong brownish-yellow tinge; stigma conspicuous, oval, dark brown; pale brown seams at origin of *Rs*, along cord and outer end of cell 1st *M*<sub>2</sub>; veins *Cu*<sub>1</sub> and *Cu*<sub>2</sub> margined with brown; veins dark brown, with conspicuous bullate areas along the cord and on the outer deflection of *M*<sub>3</sub>. Macrotrichiæ in the cells of the wing beyond the cord, including all but the bases of the cells; stigma setiferous. Venation: *Sc*<sub>1</sub> ending just beyond the fork of *Rs*, *Sc*<sub>1</sub> from two to three times *Sc*<sub>2</sub> and varying from shorter to a little longer than *m-cu*; *Rs* in alignment with *R*<sub>2+3+4</sub>, the latter about equal to or a trifle longer than the basal deflection of *R*<sub>5</sub>; *R*<sub>2</sub> subequal to *R*<sub>1+2</sub>, *R*<sub>2+3</sub> about one-third *R*<sub>3</sub>; inner ends of cells *R*<sub>4</sub>, *R*<sub>5</sub>, and 1st *M*<sub>2</sub> in approximate alignment; cell *M*<sub>1</sub> present, a little shorter than its petiole; *m-cu* before mid-length of cell 1st *M*<sub>2</sub>; anterior arculus present.

Abdomen dark brown, the caudo-medial region of the tergites paler to produce an indistinct bicolorous effect; basal sternites obscure yellowish, the lateral margins conspicuously blackened; subterminal segments more uniformly darkened; hypopygium reddish brown. Male hypopygium with the basistyles moderately stout, each with a conspicuous interbasal process, these appearing as curved yellow blades. Outer dististyle relatively slender, entirely blackened, narrowed to the apex, which is only microscopically bifid; style with conspicuous erect setæ. Inner dististyle connected with the outer by membrane, and about one-half its length,

enlarged at base, the apex narrowed, the surface with conspicuous erect setæ. *Ædeagus* projecting far beyond the straight gonapophyses. Ninth tergite with the caudal margin having a broad U-shaped notch.

*Hab.* Tasmania.

*Holotype*, ♂, Cradle Valley, January 27, 1923 (*A. Tonnoir*).

*Paratopotypes*, 2 ♂ ♂, January 23, 1923 (*A. Tonnoir*).

*Limnophila novella*, sp. n.

Belongs to the *pilosipennis* group; general coloration black, sparsely yellowish to grey pollinose; antennæ elongate, black throughout; halteres yellow, the knobs weakly infuscated; legs largely brownish black; wings tinged with brown, the stigma conspicuous, oval; macrotrichiæ in cells  $R_3$  to  $M_3$ ; cell  $M_1$  lacking; male hypopygium with the caudal margin of the ninth tergite conspicuously notched medially.

*Male*.—Length 5.2–5.5 mm.; wing 6.3–6.8 mm.

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

Rostrum and palpi black. Antennæ elongate, black throughout, if bent backward extending to some distance beyond the base of the abdomen; flagellar segments sub-cylindrical to elongate-fusiform, with short verticils and a dense erect pubescence. Head dark brown, light grey pruinose.

Pronotum and mesonotum black, the colour obscured by a sparse yellow to greyish pollen; pseudosutural foveæ small and indistinct, lying close to the margin. Pleura dark, sparsely grey pruinose. Halteres moderately elongate, pale yellow, the knobs weakly infuscated. Legs with the coxæ dark, the posterior coxæ paler, all coxæ more or less pruinose; trochanters yellowish brown; remainder of legs brownish black, the femoral bases restrictedly obscure yellow. Wings with a brownish tinge, the stigma conspicuous, oval, dark brown; brown seams at origin of  $R_s$ , along the cord and outer end of cell 1st  $M_2$ ; paler washes in outer end of cell  $R$  and in the base of cell 1st  $A$ ; veins dark brown. Small and sparse macrotrichiæ in cells  $R_3$ ,  $R_4$ ,  $R_5$ , 2nd  $M_2$ , and  $M_3$ , these occupying approximately the distal half or more of each cell. Venation:  $Sc_1$  ending about opposite the fork of  $R_s$ ,  $Sc_2$  not far from its tip,  $Sc_1$  being equal to or shorter than  $m-cu$ ;  $R_2$  near mid-length of the stigma, a little shorter than  $R_{1+2}$  and from one-half to sub-equal to  $R_{2+3}$ ; inner ends of cells  $R_4$ ,  $R_5$ , and 1st  $M_2$  in



transverse alignment; cell  $M_1$  lacking;  $m-cu$  from one-half to nearly its own length beyond the fork of  $M$ ; anterior arculus preserved.

Abdomen brownish black, the hypopygium dark. Male hypopygium with the basistyles relatively stout; interbasal process bifid at apex. Outer dististyle relatively short, blackened, the apex bifid; inner style shorter, the base setiferous, the tip dusky, with microscopic setulæ and an elongate subterminal seta.  $\mathcal{A}$ edeagus elongate, extending caudad to the level of the apices of the basistyles. Ninth tergite with the caudal margin having a deep U-shaped notch, each lateral angle of which is slightly produced into a lobe.

*Hab.* Tasmania.

*Holotype*, ♂, Hartz Mts., December 10, 1922 (*A. Tonnoir*).

*Allotype*, ♀.

*Paratopotypes*, 3 ♂ ♂.

*Limnophila egena*, sp. n.

Belongs to the *pilosipennis* group; general coloration light testaceous brown; pleura yellow; antennæ (♂) extending to beyond the base of abdomen; wings uniformly pale brown, the stigma oval, slightly darker brown;  $R_{2+3+4}$  short; cell  $M_1$  lacking; sparse macrotrichiæ in the apical cells of the wing.

*Male*.—Length about 4.4–4.5 mm.; wing 5.2–5.5 mm.

*Female*.—Length about 4.3 mm.; wing 5.3 mm.

Rostrum brown, the palpi dark brown. Antennæ (♂) relatively long and slender, if bent backward extending to shortly beyond the base of the abdomen; flagellar segments subcylindrical to elongate-fusiform; verticils shorter than the segments; segments clothed with a conspicuous erect pubescence. Head shiny brownish black with a sparse pruinosity.

Mesonotum light testaceous brown, without markings, the scutellum darker brown. Pleura testaceous yellow. Halteres long and slender, pale, the knobs weakly infuscated. Legs with the coxæ obscure yellow; trochanters testaceous yellow; remainder of legs dark brown, the femoral bases narrowly paler. Wings with a pale brown tinge, the stigma oval, pale, slightly darker brown than the ground-colour; veins dark brown. Macrotrichiæ in the distal half of each of cells  $R_3$ ,  $R_4$ ,  $R_5$ , 2nd  $M_2$ , and  $M_3$ ; stigma without trichiæ. Venation:  $Sc_1$  ending shortly beyond the fork of  $Rs$ ,  $Sc_2$  some distance from its tip,  $Sc_1$  alone being longer than  $m-cu$ ;  $Rs$  long, arcuated at origin;  $R_2$  subequal or a little shorter than

$R_{1+2}$ ;  $R_{2+3}$  a little shorter than  $R_3$  alone;  $R_{2+3+4}$  shorter than the basal deflection of  $R_5$ ; cell  $M_1$  lacking; cell 1st  $M_2$  small, with *m-cu* before or near mid-length.

Abdominal tergites dark brown, the basal sternites paler; hypopygium yellowish brown. Male hypopygium with the basistyles relatively slender, with a conspicuous interbasal process, this latter chitinized, cylindrical, with a few small denticles at and before apex. Outer dististyle blackened, slender, curved, gradually narrowed to the simple apex, the surface with scattered setæ; inner dististyle about two-thirds the length of the outer, pale, the basal portion dilated and with conspicuous erect setæ, the distal third narrowed and provided with two apical setæ. Gonapophyses darkened, each apophysis appearing as an arcuated rod, the apical half directed laterad and caudad, narrowed to an acute point.  $\mathcal{A}$ edeagus bifid at apex. Ninth tergite with a broad U-shaped notch.

*Hab.* Victoria.

*Holotype*, ♂, Sassafras, Dandenong Range, October 20, 1922 (*A. Tonnoir*).

*Allotopotype*, ♀, in copula with the type.

*Paratopotypes*, ♂ ♀, October 19–21 (*A. Tonnoir*).

*Limnophila subapterogyne*, sp. n.

General coloration dark brown; nearly apterous, at least in the female sex, the wings only twice the length of the reduced halteres.

*Female*.—Length about 4 mm.; wing 0.5 mm.

Rostrum and palpi dark brown. Antennæ 16-segmented, of moderate length, if bent backward extending approximately to the wing-root, dark brown throughout; flagellar segments oval, the outer segments more elongate-oval. Head black, very sparsely pollinose.

Pronotum and mesonotum dark brown; mesonotum moderately depressed. Pleura brown, sparsely pollinose. Halteres reduced, obscure brownish yellow at base, the remainder dark brown. Legs with the coxæ elongate, especially the middle and hind coxæ, dark brown, very sparsely pruinose; trochanters dark brown, the fore trochanters a little brighter; remainder of legs yellowish brown, the tarsi passing into dark brown. Wings greatly reduced in size, only about twice the length of the halteres, dusky in colour, without distinct venation.

Abdomen elongate, dark brown. Ovipositor with the

valves very long and slender, the tergal valves gently up-curved to the acute tips, light horn-coloured, the sternal valves straight, blackened.

*Hab.* Tasmania.

*Holotype*, ♀, Hartz Mts., December 10, 1922 (*A. Tonnoir*).

The only species to which the present fly could possibly be referred is *Limnophila novella*, sp. n., with which a fully-winged female has already been associated, perhaps erroneously. Subapterism in the genus *Limnophila* usually involves both sexes, and it is very possible that the male of the present species is likewise subapterous.

VI — *Spirifer pennystonensis*, sp. n., from the Coal Measures of Coalbrookdale. By T. NEVILLE GEORGE, M.Sc., Fellow of the University of Wales, St. John's College, Cambridge.

[Plate IV.]

WHILE studying the Coal Measures of the Coalbrookdale Coalfield, Prestwich\* discovered a remarkable marine bed at the horizon of the Pennystone Ironstone, which contained a species of *Spirifer* †. This form was briefly described in a palæontological appendix by J. de C. Sowerby, who included it in the species *S. bisulcatus*, Sowerby ‡. Following him, several geologists have recorded *S. bisulcatus* from Coalbrookdale §, without, however, adding anything to his remarks.

It is the purpose of this paper to give a more detailed description of the form, the individuals of which, being generally found as perfectly-preserved casts in iron-stone nodules, display the internal features in minute detail.

The great majority of the specimens examined are preserved in the collections of the British Museum (Natural History) and the Museum of Practical Geology. For facilities while working in the former, I am indebted to Dr. F. A. Bather, F.R.S., and especially to Miss H. M. Muir-Wood, who on

\* J. Prestwich, "The Geology of Coalbrookdale," Trans. Geol. Soc. ser. 2, vol. v. p. 413 (1840).

† *Ibid.* p. 442.

‡ *Ibid.* pl. xxxix. fig. 21, and explanation.

§ W. W. Smyth, "Iron Ores of the Shropshire Coalfields," Mem. Geol. Surv. p. 242 (1862); E. Hull, "The Classification of the Carboniferous Series," Q. J. G. S. vol. xxxiii. p. 629 (1877).