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UNDESCRIBED SPECIES IN THE OSTEN SACKEN COLLECTION OF NEW ZEALAND CRANE-FLIES

(Diptera, Tipulidæ)

BY CHARLES P. ALEXANDER

Subsequent to his return to Europe and the selection of his final abode in Heidelberg in 1877, Baron Osten Sacken amassed a very considerable collection of the crane-flies of New Zealand, chiefly through the efforts of Prof. George V. Hudson. From these rich collections only a very few of the new species were described by Osten Sacken, but in the intervening period additional collections by Hudson have been carefully studied and reported upon by Captain Hutton, so that most of the species have now been diagnosed.

A proportion of this crane-fly material ultimately came into the possession of the German Entomological Museum at Berlin-Dahlem, and through the kindness of the Director, Dr. Walther Horn, the writer has been able to examine some of the doubtful species in this collection, and the new species resulting from this study are discussed in this paper. The types of the novelties are preserved in the collection of the German Entomological Museum, and paratypes of certain of the species in the collection of the writer.

I wish to express my sincere thanks to Dr. Horn for the privilege of examining this historical collection of crane-flies.

Genus LIMNOPHILA Macquart

Limnophila novae-zelandiae, new species.

Head gray; mesonotum brownish gray, the praescutum with four reddish brown stripes; wings nearly hyaline, the posterior half more brownish; a series of brown spots in cell R; a large blotch at the stigma; Rs long, r far from the tip of R_1 ; inner ends of cells R_3 and 1st M_2 more proximad than R_5 ; basal deflection of Cu_1 a short distance beyond the fork of M. Female.-Length, about 15 mm.; wing, 15 mm.

Rostrum light brown; palpi dark brown. Antennæ with the scapal segments brownish yellow, the flagellar segments indistinctly bicolorous, the base of each segment being a little darker than the rest, the segments elongate-cylindrical. Head light gray, rather strongly narrowed behind.

Mesonotal praescutum brownish gray with four reddish brown stripes, the intermediate pair narrow, indistinct anteriorly, running parallel to about midlength, then suddenly bent outward, from which point they converge to near the suture: lateral stripes short and broad; pseudosutural foveæ large but pale in color; remainder of the mesonotum reddish, gray pruinose. Pleura brown, gray pruinose. Halteres rather short, brown. Legs with the coxæ gray; trochanters obscure yellow; remainder of the legs dull yellow, the tarsi broken; pubescence of the legs moderately long, semierect. Wings nearly hyaline on the anterior half, the posterior half of the disk more brownish; a dusky clouding across the submarginal and posterior cells; cells C and Sc faintly more yellowish; a rather heavy brown pattern, arranged as follows: A series of small brown spots in cell R, arranged in two groups, the second at the origin of Rs; stigmal area large, extending obliquely back along Rs to near midlength of the latter; a subocellate blotch at the end of vein R_2 ; very narrow, but dark brown seams along the cord, outer end of cell 1st M_2 , fork of M_1+_2 , fork of R_2+_3 , r, the tip of Sc and at the ends of the longitudinal veins; veins brown, darker in the dark markings. Venation: Sc_1 extending to about opposite the fork of R_2+_3 , Sc_2 some distance from the tip, Sc_1 alone being about equal to the deflection of R_4+_5 ; Rs long, strongly arcuated at its origin; $R_2 + R_3$ very short, about as long as r-m; cell R_2 long and narrow, its inner end pointed, its outer end suddenly widened: r on R, some distance from its tip, R_1 beyond r being subequal to that section of R_2 before it; inner ends of cells R_3 and 1st M_2 much farther proximad than R_5 ; cell Ist M_{2} , long, the basal deflection of Cu_{1} a short distance beyond the fork of M; *m* one-half the outer deflection of M_3 ; petiole of cell M_1 only about one-third to one-half the cell and about one-half of cell *1st* M_2 ; vein *2nd* A gently sinuous.

Abdomen reddish brown. Ovipositor with the tergal valves long and slender, gently upcurved.

Habitat.-New Zealand.

Holotype, $\$, Otago (from Osten Sacken's collection). Paratopotype, 1, sex?

Genus GYNOPLISTIA Westwood

Gynoplistia bona, new species.

Antennæ with 16 segments, flagellar segments 2 to 8 with very short pectinations; general coloration light gray, the abdomen with a delicate brown median line both above and below; wings long and narrow, subhyaline, cell M and the posterior cells pale brown; a few pale brown dots on the wing-surface; male hypopygium of a simple limnophiline organization.

Male.—Length about 14 mm.; wing, 11 mm., its greatest width, 2.2 mm.

Female.—Length about 14-15 mm.; wing, 9.5-9.6 mm., its greatest width, 1.9 mm.

Rostrum brown; palpi dark brown. Antennæ with the scapal segments reddish brown, the flagellum dark brown; flagellum with 14 segments, the pectinations very short, scarcely exceeding the length of the segments that bear them; the first flagellar segment is broadly produced; segments 2 to 8 pectinate, 9 to 14 simple. The pectinations are presumably short in both sexes, although the single authentic male is injured. Head brownish, the anterior part of the vertex, the inner margins of the eyes, and a conspicuous median line light gray.

Mesonotal praescutum reddish, light gray pruinose, with three ill-defined, pale brown stripes that are best indicated at their anterior ends, the median stripe more distinct; pseudosutural foveæ large and conspicuous, cherry-red, the proximal ends pointed; the humeral margin cephalad of the foveæ dark colored; remainder of the mesonotum light gray. Pleura clear light gray. Halteres short, brown, the knobs dark brown. Legs with the coxæ light gray; trochanters reddish brown;

122

remainder of the legs comparatively stout, reddish brown, the tips of the segments scarcely darkened, the tarsi darker brown. Wings comparatively long and narrow, subhyaline, the subcostal cell more yellowish; a pale brown suffusion near the middle of the wing, including cell M except at the ends; stigma dark brown; small, paler brown dots at the origin of R_s , along the cord, tips of veins R_s and R_s and less distinctly on the other longitudinal veins; a brown spot in cell 2nd A just beyond midlength; in other specimens there is sometimes a dot or two near the origin of Rs, near the base of cell R and in cell 1st A on a level with the end of vein 2nd A; veins dark brown, Sc more yellowish. Venation: Sc ending just beyond the fork of Rs, Sc_2 at the tip of Sc_1 but indistinct; Rs long, strongly arcuated to feebly angulated at origin; r about twice its length from the tip of R_1 and near one-third the length of R_2 ; $R_2 +_3$ very short to practically lacking, approximately as long as r; r-m very short; cell 1st M2 very small, subrectangular, the basal deflection of Cu_1 near the middle of its length; cell M_1 very narrow, a little longer than its petiole, which is about twice cell 1st M2; 2nd Anal vein slightly sinuous.

Abdomen reddish brown, sparsely gray pruinose; a narrow, dark brown median line on both the tergites and sternites. Male hypopygium black, of a simple limnophiline organization, the pleural appendages subequal in length, the outer appendage slender, the extreme apex split into two short, acute points; the inner pleural appendage is a flattened blade with the apex obtusely rounded; gonapophyses slender, acute, diverging rods. Ovipositor with the valves dark chestnut, very long and slender, the acute tips strongly upcurved.

Habitat.-New Zealand.

Holotype, & (from Osten Sacken's collection). Allotopotype, Q.

Paratopotypes, 7 & 9, some broken.

The specific name, *bona*, applied to this species is a manuscript name of Osten Sacken's, appearing on some of the pins. The fly is remarkably distinct from other New Zealand species, the long, narrow wings suggesting the early stages of wingatrophy. This may be the species mentioned by Osten Sacken (Berl. Ent. Zeitsch., vol. 31, pt. 2, p. 211, 1887) as having rudimentary wings in both sexes.

Gynoplistia sackeni, new species.

Antennæ of the male with 17 segments, the third to fifteenth with very long, slender branches; thoracic pleura light gray; wings subhyaline, the apex darkened; a large, subquadrate brown blotch at the origin of Rs; a conspicuous brown seam on the cephalic half of the cord; cell *1st* M_2 long-rectangular; male hypopygium light yellow with the outer pleural appendage bifid, the short arms nearly equal and parallel.

Male.-Length about 11 mm.; wing, 11 mm.

Rostrum and palipi light brown. Antennæ with the first segment reddish brown; flagellum dark brown; antennæ with 17 segments, the first to thirteenth flagellar segments with long, flabellate branches, the longest exceeding in length the basal four flagellar segments taken together; terminal two segments simple; the pectinations are provided with long, erect pubescence, each tipped with one or two bristle-like verticils; the pectination of the first flagellar segment is about three times the length of the segment that bears it, that of the thirteenth segment about as long as the segment that bears it. Head dull gray; a large blackish spot behind each antennal base; occiput reddish.

Mesonotum light gray, the praescutum with three reddish brown stripes, the median stripe broadly divided by a gray line; remainder of the mesonotum brown, heavily gray pruinose. Pleura reddish, heavily light gray pruinose. Halteres light brownish yellow, the knobs darker brown. Legs with the coxæ light gray pruinose; trochanters light yellow; femora brownish yellow, the tips indistinctly darkened; remainder of the legs light brown, the outer tarsal segments darker. Wings subhyaline, the wing-tip darkened; cells C and Sc light brown; stigma long-oval, dark brown; conspicuous brown markings arranged as follows: A blotch at the base of cell R_j a large, subquadrate area at the origin of Rs_j a conspicuous seam extending from the stigma to cell *1st* M_2 ; basal deflection of Cu_1 , the outer end of cell *ist* M_2 and the fork of M_1+_2 narrowly seamed with brown; pale brown clouds in cell Cu_1 along vein Cu_i ; one or two spots in the basal half of cell M_i ; a small brown cloud along vein *ist* A beyond midlength; veins dark brown. Venation: Sc_2 at the tip of Sc_1 ; Rs long, angulated at origin; r at the tip of R_1 and on R_2 beyond midlength; R_2+_3 a little shorter than the deflection of R_4+_5 ; r-m about one-half m; cell *ist* M_2 long-rectangular, about equal to vein Cu_1 beyond it; petiole of cell M_1 a little more than one-half the length of the cell; basal deflection of Cu_1 at from two-fifths to one-half the length of cell *ist* M_2 .

Abdomen brown, dusted with light gray, especially the sternites; hypopygium light yellow. Male hypopygium with the outer pleural appendage leg-shaped, the foot split into two subequal, parallel points; inner pleural appendage slender, suddenly constricted at about three-fifths the length, the apex cylindrical.

Habitat.-New Zealand.

Holotype, &, Wellington, June, 1895 (G. V. Hudson).

Gynoplistia sackeni is presumably the species mentioned by Hutton ('Trans. New Zealand Inst., vol. 32, p. 46, 1900) as a variety of G. wakefieldi Westwood in which the flagellar pectinations are unusually elongate; the antennæ are but 17 segmented, however, and this latter may pertain to still another species. It is clear that several species are confused under the names of G. subfasciata Walker and G. wakefiieldi Westwood, the number and degree of pectination of the flagellar segments being far too great to fall within the definitions of the above species.

Gynoplistia fimbriata, new species.

Generally similar to G. sackeni; wings with the spot at origin of Rs small; wing-tip evenly darkened; cell 1st M_2 small, subquadrate; male hypopygium with the outer pleural appendage profoundly branched, the inner branch very long and sinuous, the tip acute.

Male.—Length about 14 mm.; wing, 11.5 mm.

Rostrum and palpi reddish brown. Antennæ with the scapal

segments reddish brown; the flagellum broken. Head dull gray, lighter gray on the anterior part of the vertex and adjoining the inner margins of the eyes.

Mesonotal praescutum reddish brown, with four indistinct dark stripes that are almost confluent behind; scutal lobes largely dark; scutellum reddish; postnotum gray. Pleura reddish, heavily light gray pruinose, the mesosternum darker. Halteres brown. Legs with the coxæ reddish, light gray pruinose; trochanters obscure yellow; femora brown, more yellowish basally; a conspicuous yellow ring before the subequal brown apex which is slightly enlarged, especially that of the hind legs; remainder of the legs yellowish brown, the tips of the tibiæ narrowly dark brown, the distal tarsal segments dark brown. Wings subhyaline, the costal cell concolorous, the subcostal cell slightly more yellowish; wing-tip strongly darkened, this including about the distal third of cells R_2 , R_3 , R_5 and 2nd M_2 ; the outer two-thirds of M_1 ; a small, dark brown spot at the origin of Rs; stigma dark brown, sending a conspicuous, narrow seam along the cord; outer end of cell Ist M_{o} and vein Cu_{o} likewise seamed with brown, the latter suffusing most of cell Cu_1 ; veins dark brown. Venation: Rs rather strongly angulated at origin; r at the tip of R_1 and on R_{2} beyond midlength; R_{2} comparatively short and oblique so cell R_2 is very wide at the wing-margin; deflection of $R_4 + 5$ gently arcuated, about one-half longer than $R_2 +_3$; cell 1st M_2 very small, only a little longer than wide, about as long as the petiole of cell M_1 , the latter about one-half as long as the cell; the basal deflection of $M_1 + _2$ is about two-thirds of the second section of this vein (anterior margin of cell *1st* M_2); basal deflection of Cu_1 beyond midlength of cell 1st M_2 .

Abdomen reddish brown, without distinct darker markings. Male hypopygium of the general type of G. sackeni but with the pleural appendages remarkably distinct; the outer appendage split into two branches that are divergent, the caudal branch almost straight, shorter than the base of the appendage, the apex obtuse and blackened; the cephalic or inner arm is nearly twice the length of the base of the appendage, sinuous,

128 INSECUTOR INSCITLÆ MENSTRUUS

the apex acute; the inner pleural appendage is constricted just beyond midlength, the long, slender apex blackened at the tip.

Habitat.-New Zealand.

Holotype, &, Greymouth (Helms).

The type specimen bears the name here adopted, *Gynoplistia fimbriata*, in Osten Sacken's writing. This species differs remarkably from all other species of the genus known to the writer in the deeply branched pleural appendages of the male hypopygium.

? Gynoplistia anthracina, new species.

Coloration shiny black; halteres brown, yellowish basally; wings dusky, with two broad, brown crossbands; valves of the ovipositor very long and slender.

Female.-Length about 5.8 mm.; wing, 6 mm.

Rostrum and palpi black. Antennæ with the first segment black, the second segment slightly more reddish; flagellum broken. Head shiny black, the vertex between the eyes very broad.

Thorax shiny black. Halteres brown, the base of the stem light yellow. Legs with the coxæ black; trochanters obscure brown; remainder of the legs brown, the distal tarsal segments blackened. Wings with a slight dusky tinge, a spot at the wing-base and two broad crossbands darker brown; the basal spot includes the bases of cells R and M; the basal band begins at the origin of Rs, extending from cell R and $Ist R_1$ completely across the wing, ending in cell Ist A; the outer band lies at and just beyond the cord, completely traversing the wing but slightly interrupted at cell 1st M_2 which is slightly of the ground-color; a small brown spot at the fork of $M_1 + _2$; veins dark brown. Venation: Sc_1 ending a short distance before the fork of Rs, Sc2 at its tip; r very indistinct, not far from the tip of R_1 and on R_2 at about one-third its length; Rs long; R_2+_3 a little shorter than the deflection of R_4+_5 ; cell 1st M_2 small, subrectangular; petiole of cell M_1 more than one-half the length of this cell; m and the outer deflection of M_{2} subequal; basal deflection of Cu_{1} beyond midlength of cell Ist M₂.

Abdomen black, with a reddish tinge, especially on the sternites. Ovipositor with the valves light horn-color, very long and slender, the tips acute.

Habitat.--New Zealand.

Holotype, 9, Greymouth (Helms) (from Osten Sacken's collection).

The reference of this interesting fly to *Gynoplistia* is rendered somewhat doubtful since the antennal flagellum of the unique type is lacking. The other details of structure of the fly seem to indicate that this reference is correct. If this insect is not a *Gynoplistia* it will fall in the genus *Limnophila*, s. l.

Austrotipula, new genus.

Frontal prolongation of the head relatively short; nasus stout. Terminal segment of palpi about as long as the basal three segments taken together. Antennæ short, of peculiar structure, 14-segmented; first scapal segment elongate; basal three flagellar segments elongate-oval, tumid, with the verticils comparatively short, sparse and arranged unilaterally; flagellar segments 4 to 12 suddenly narrowed, long and slender, each with about six very long verticils that are as long as four or five of the flagellar segments taken together; these verticils are distributed over the whole length of the segments; terminal segment with the tip suddenly narrowed, the verticils grouped around the base of this tip. Vertex with a small, bifid, vertical tubercle. Wings with Rs elongate, longer than R_3 alone; vein R_{2} comparatively short, oblique, with numerous macrotrichiæ; R_3 nearly straight, parallel to R_4+_5 ; cell M_1 sessile; m-cu present. Male hypopgyium of simple structure. Ovipositor with the valves long and pointed, the tergal valves greatly exceeding in length the small sternal valves.

Genotype.-Pachyrhina hudsoni Hutton (New Zealand).

This striking crane-fly, the largest as yet discovered in New Zealand, was originally described as a *Tipula* but later referred by Hutton to the genus *Pachyrhina* (*Nephrotoma*) to which it is but distantly allied. From *Tipula* it is readily told by the peculiar antennæ and sessile cell M_1 . From *Macromastix* it

differs in these same characters, as well as the structure of the ovipositor.

Genus MACROMASTIX Osten Sacken

Macromastix maori, new species.

Nasus lacking; mesonotum brownish buff, the praescutum with four brown stripes; wings cream-colored, with a pale gray pattern that is, in part, ocelliform; a short spur on vein M, jutting into cell M; abdomen dark brown.

Male.-Length about 15 mm.; wing, 25.5 mm.

Frontal prolongation of head short, brown; nasus lacking; palpi brown. Antennæ with the first scapal segment grayish brown; second pale; flagellum broken. Head bright brown, narrowly paler adjoining the inner margins of the eyes.

Mesonotal praescutum brownish buff with four brown stripes, the interspaces with long, erect hairs; scutum brownish buff, the centers of the lobes dark; scutellum and postnotum brownish testaceous, the latter with a capillary pale line. Pleura light brown; a conspicuous white stripe extends obliquely across the lateral sclerites of the postnotum onto the mesepimera. Halteres pale, the knobs broken. Legs with the coxæ pale brownish buff, clothed with an abundant long pubescence; trochanters pale; remainder of the legs brown, the tarsi darker brown; tips of the femora and tibiæ scarcely darkened; claws simple. Wings cream-colored, the costal and subcostal cells more yellowish; a pale gray, partly ocellate, pattern, arranged as follows: Base of the wing, including the bases of cells R. M. Cu (narrowly) and the Anal cells; a spur on Minto cell M at about midlength of the vein, this spur the center of a large, circular mark in cells R, M, Cu and 1st A; base of Rs with a small solid area; a second, larger, circle centers about cell *ist* M_2 , passing through the ends of the basal cells, the bases of cells 2nd M_2 , M_4 and Cu_1 , and less distinctly across the bases of cells R_3 and R_5 ; conspicuous gray clouds at the ends of veins M_1 , M_2 , M_3 , Cu_1 , Cu_2 and the Anal veins; stigma small, brown; veins brown. Venation: Rs rather long, about equal to R_{a} ; R_{a} semiatrophied, diverging strongly from

 R_3 ; petiole of cell M_1 short, about two-thirds of m; m-cu punctiform.

Abdomen dark brown, the basal tergite pale brownish buff. Hypopygium simple, the ninth tergite with a deep and very narrow V-shaped notch, the lateral lobes densely covered with coarse, black bristles. Ninth pleurite incomplete; inner pleural appendage shaped as a long, chitinized beak jutting into the ninth tergite, the proximo-caudal face provided with minute, blackened points. Ninth sternite with a narrow and profound, parallel-sided, median notch. Eighth sternite unarmed.

Habitat.-New Zealand.

Holotype, & (from Osten Sacken's collection).

Paratypes, 2 & s, Tisbury, July 10-August 3, 1912 (A. Philpott).

Macromastix zeylandiae, new species.

Antennæ of the male short; mesonotal praescutum light gray, with four narrow, dark brown stripes; wings light gray, stigma brown; second anal cell comparatively broad; abdomen with a broad, dark brown median stripe that practically covers the terminal segments; ninth tergite of the male hypopygium with a deep V-shaped median notch.

Male.-Length about 10-11 mm.; wing, 13.3-13.5 mm.

Frontal prolongation of head rather long, light bronwish yellow; nasus long and slender; palpi short, dark brown. Antennæ of the male short, the scape brownish yellow, the flagellum dark brown; the antenna is shorter than the combined head and frontal prolongation; flagellar segments oval. Head fulvous, sparsely white pollinose, especially adjoining the inner margins of the eyes.

Mesonotal praescutum light gray, especially behind, the humeral angles narrowly more yellowish, with four narrow, dark brown stripes, the interspaces with short, pale hairs; scutal lobes gray, darker medially; scutellum and postnotum brownish yellow. Pleura pale, with two indistinct, grayish, longitudinal stripes, the surface sparsely pruinose. Halteres light brown, the knobs slightly darker. Legs with the fore coxæ

130

INSECUTOR INSCITLE MENSTRUUS

brownish yellow, more grayish basally, the other coxæ paler; coxæ clothed with rather long, pale hairs; trochanters yellow; femora light brown, the tips broadly dark brown; tibiæ and tarsi brown; posterior metatarsi very long, considerably exceeding the tibiæ. Wings light gray, the costal and subcostal cells indistinctly yellowish; stigma brown; obliterative areas before and beyond the stigma and across the base of cell *1st* M_2 ; veins dark brown. Venation: Rs and R_2+_3 subequal; R_2 oblique, the outer section in alignment with the base, R_2 subequal to r; petiole of cell M_1 equal to m; m-cu short but distinct; cell 2nd A comparatively broad.

Abdomen brownish yellow, the tergites with a broad, dark brown, median stripe that gradually broadens out to cover the entire segments on the outer half of the abdomen; the yellow color is the brightest on the sides of the basal two segments; sternites dark brown, the sides of the basal segments obscure vellow. Male hypopygium small and of simple structure as in the genus. Ninth tergite broad, the caudal margin with a conspicuous V-shaped median notch, the margins of the notch provided with short black bristles; in a paratype, this notch is considerably more rounded but evidently pertains to the same species. Pleural appendages simple, the outer appendage flattened, oval; inner appendage with the cephalic end subtruncate and provided with a comb of rather numerous tiny black spines; the caudal and dorsal surface of this lobe is provided with a row of seven or eight strong black spines that are subequally placed.

Habitat.--New Zealand.

Holotype, &, Otago (from Osten Sacken's collection). Paratopotypes, 1 &, 1 Sex?.

This interesting fly is readily told by the short antennæ and coloration. One of the specimens bears the following note in Osten Sacken's writing: "I saw \mathfrak{F} in Oxford Mus. The forceps is likewise small." The specimen to which this note was affixed was, however, a male, the hypopygium of this species being extremely small and resembling the fleshy ovipositor of the female.

Macromastix dichroithorax, new species.

Male.—Length about 9–9.2 mm.; wing, 12–12.5 mm. Female.—Length, 8.5–9.5 mm.; wing, 11.5–13 mm. Generally similar to M. zeylandiae, differing as follows: Size smaller.

Head rich fulvous, light gray adjoining the inner margins of the eyes.

Mesonotum light gray laterally, with three conspicuous fulvous to reddish stripes, the lateral stripes often much darker (brown) than the median stripe, this latter sometimes narrowly divided by a pale line; scutum light gray, the centers of the lobes dark brown, these markings being backward continuations of the lateral praescutal stripes; scutellum and postnotum obscure yellow, the latter darker posteriorly. Pleura clear gray. Legs with the coxæ clear light gray. Wings with Rs a little longer; *m-cu* short or punctiform; cell *2nd A* very narrow.

Abdomen with the basal tergites yellowish laterally, brown medially; second tergite broadly brown medially; remaining tergites rich fulvous orange with a narrow, dark brown, median stripe, the lateral margins of the segments broadly buffy gray; sternites dark brown, the caudal margins of the segments narrowly grayish. Male hypopygium differing in several conspicuous details from that of *M. zeylandiae*; ninth tergite wide, the caudal margin with a broad V-shaped median notch; inner pleural appendage with the cephalic end produced into a slender, cylindrical beak that is capped by a single powerful black spine; about twenty-five similar spines on the dorsal and caudal margins of the lobe, mostly arranged in a single row.

Habitat.-New Zealand.

Holotype, &, Otago (from Osten Sacken's collection). Allotopotype, Q. Paratopotypes, 8 Q's.

133