

## INSECTS OF CAMPBELL ISLAND.

### DIPTERA: TRICHO CERIDAE AND TIPULIDAE

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*Abstract:* The crane-flies in the materials from Campbell I. represented 2 families, the Trichoceridae, or so-called winter crane-flies, and the Tipulidae. Of these, 2 species, *Nothotrichocera antarctica* (Edwards) and *Paracladura antipoda* (Mik), belong to the Trichoceridae, the remainder being Tipulidae. These include 6 species of which 2, both members of the genus *Molophilus*, were represented only by ♀♀, and are not further determinable. The other species include *Limonia (Dicranomyia) arthurlana* (Alexander) and *Limonia (Idioglochina) kronel* (Mik), in the tribe Limoniini, and *Erioptera (Trimicra) brachyptera* Alexander and *E. (T.) pilipes campbellicola* n. subsp., in the Eriopterini. The type of the novelty has been deposited in the collection of the Department of Scientific and Industrial Research, Nelson, New Zealand.

The crane-flies so far discovered on Campbell I. represent 2 families, the so-called winter crane-flies, Trichoceridae, and the true crane-flies, Tipulidae.

The first of these to be found was the trichocerid *Nothotrichocera antarctica* (Edwards), collected by the botanist, Professor L. Cockayne in July 1903 (Edwards, 1923). In 1943 and again in 1947, J. H. Sorensen secured a few further specimens, including the second trichocerid, *Paracladura antipoda* (Mik), originally described from the Auckland Is., and the first tipulid, *Erioptera (Trimicra) brachyptera* Alexander (1955).

No further materials were taken until 1961-1963 when the present investigation of the insect fauna of Campbell was undertaken by Dr. J. Linsley Gressitt, in charge of the entomological survey conducted through the auspices of the Bishop Museum, Honolulu. The field work was accomplished by Dr. Gressitt and by Messrs. K. P. Rennell, K. A. J. Wise, C. M. Clark, and A. Wright. The type of the only novelty in the material, *Erioptera (Trimicra) pilipes campbellicola* n. subsp., together with representatives of all other species, has been deposited in the collection of D. S. I. R., Nelson, while further material of all species, including paratypes of the new subspecies, has been placed in the Dominion Museum, Wellington, the Bishop Museum, and in the author's collection. I am greatly indebted to Dr. Gressitt, holder of the Linus Allen Bishop Distinguished Chair of Zoology at the Bishop Museum, and to Professor Roy A. Harrison, of Lincoln College, University of Canterbury, Christchurch, for this opportunity to study the present interesting series.

Although the total number of specimens secured was approximately 250, only 8 species were represented, and 2 of these, both members of the vast genus *Molophilus*, represented only by females, are not determinable beyond the genus in the absence of the male sex. Of the remaining species, *Nothotrichocera antarctica* and *Erioptera (Trimicra) brachyptera*,

were described from Campbell Island and at present are known only therefrom. Two others, *Paracladura antipoda* and *Limonia (Idioglochina) kroni*, were described from specimens taken on the Auckland Islands in 1875 by Hermann Krone and had not been recorded from Campbell. The representatives of *Molophilus* and the *Limonia (Dicranomyia) arthuriana* are new to the Subantarctic islands. The remaining species, *Erioptera (Trimicra) pilipes campbellicola* is a race or cline of one of the most widespread species of crane-flies, with a cosmopolitan distribution, and is closely allied to a comparable race on Macquarie I. but sufficiently different to warrant a new specific name.

#### Family TRICHOCERIDAE

##### 1. *Nothotrichocera antarctica* (Edwards) Figs. 1, 6, 7B.

*Trichocera antarctica* Edw. 1923, Ann. Mag. Nat. Hist. ser. 9, 12: 492.

*Nothotrichocera antarctica*: Edwards, 1928, Genera Insectorum, Fasc. 190: 35.—Alexander, 1955, Rec. Dom. Mus. 2: 234.

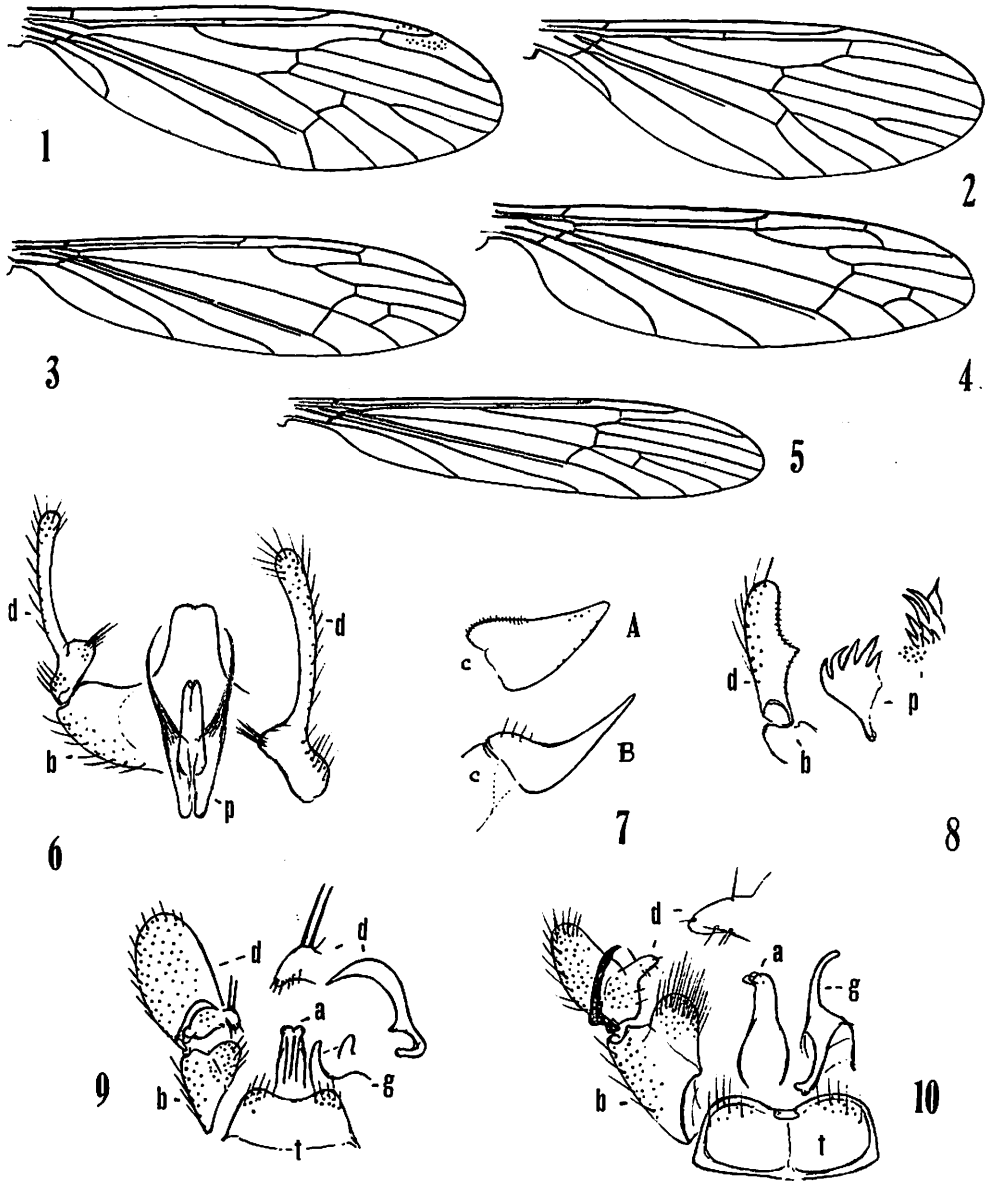
The unique type, a legless ♀, was taken on Campbell I., 17. VII. 1903, by L. Cockayne. A 2nd record from Campbell was in 1943 by Sorensen (Alexander, 1955). What seems certainly to be this same species, represented only by a fragment, was from Pigeon Bay, Auckland I., taken in November 1943, by R. A. Falla (Alexander, 1955).

The extensive series available shows an unusual range in size.

♀: Length about 4.5–8.5 mm; wing 5.2–9 mm. All specimens with the exception of 2 ♂♂ (in alcohol) and a single fragment are ♀♀, virtually all of which were taken in Malaise traps.

General coloration of thorax light brown, scutellum and postnotum more yellowed, abdomen darker. Wings (fig. 1) strongly tinged with yellow, varied only by pale brown stigma. Vein  $R_3$  gently sinuous throughout its length; *m-cu* usually at fork of  $M_{3+4}$ , in cases shortly beyond on base of vein  $M_4$ . Range in numbers of macrotrichia in stigmal region unusually great, varying from fewer than 10 to more than 50, distributed chiefly along posterior margin of stigma with fewer on costal side of vein  $R_{1+2}$ . Ovipositor (fig. 7B) with cercus, *c*, longer and more slender than in *Paracladura*, strongly narrowed to subacute tip. Male hypopygium (fig. 6) with ventromesal lobes of basistyles, *b*, produced and fused on median line to form a depressed-flattened scoop, its apex very shallowly emarginate; surface of scoop with numerous groups of microscopic setulae, more or less stellate in appearance. Dististyle, *d*, dilated at base, produced into a long slender club, with delicate setae along outer margin, longer and more conspicuous at apex; on the basal dilated part the setae of mesal face concentrated to form a pencil. Phallosome, *p*, with gonapophyses appearing as very long slender spines that subtend the shorter aedeagus, the whole organ appearing more or less pyriform.

DISTRIBUTION: 1 ♀, Beeman Camp, on lighted window, 2. VIII. 1962, Rennell; 3 ♂♂, 15 m, off lighted window, 29. IX. 1962; 1 ♀, 5. X. 1962; Beeman Camp, 2–50 m, 26–30. XI. 1961, Gressitt; 2 ♂♂ (in alcohol), Beeman Cove, 15–20 m, ex *Coprosma*, 25. VIII. 1962; 1 ♀, Beeman Cove, on window, 31. VIII. 1962, C.M. Clark; 1 ♀ (alcohol), at light, 4. V. 1962, Clark; Middle Bay, Beach, 29. IX. 1961, Gressitt; 1 ♂, Camp Cove, bank of stream, 6. II. 1963, Rennell; 1 ♂, Lookout Bay, Perseverance Harbor, bank of stream, 3. II. 1963; 1 ♀,



Figs. 1-10. 1, *Nothotrichocera antarctica* (Edwards), venation; 2, *Paracladura antipoda* (Mik), venation; 3, *Limonia (Dicranomyia) arthuriana* (Alexander), venation; 4, *Limonia (Idioglochina) kroni* (Mik), venation; 5, *Erioptera (Trimicra) pilipes campbellicola*, n. subsp., venation; 6, *Nothotrichocera antarctica* (Edwards), ♂ hypopygium; 7, A, *Paracladura antipoda* (Mik), ovipositor, cercus lateral; 7, B, *Nothotrichocera antarctica* (Edwards), ovipositor, cercus lateral; 8, *Paracladura antipoda* (Mik), ♂ hypopygium; 9, *Limonia (Dicranomyia) arthuriana* (Alexander), ♂ hypopygium; 10, *Limonia (Idioglochina) kroni* (Mik), ♂ hypopygium. Symbols: ♂ hypopygium; a, aedeagus; b, basistyle; d, dististyle; g, gonapophysis; p, phallosome; t, tergite, ♀ ovipositor; c, cercus.

Mt. Lyall, ridge, in remains of Royal albatross carcass, 21. II. 1953, Wise; 1 ♀, Northwest Bay, 5 m, tussock, 30. XII. 1962, Gressitt. Tucker Cove, 1 ♀, 3–30 m, 8. V. 1952, Rennell; 1 ♂, 4 m, *Coprosma*, 6. VIII. 1962, Rennell; 1 ♀, 1–50 m, *Poa*, 21–25. XI. 1961; grass near seal wallow, 21–25. XI. 1961; 1 ♂, 5 ♀ ♀, 4 m, malaise trap, 27. XI–1. XII. 1961; 3 ♀ ♀, 1–3. XII. 1961; 1 ♂, 2 ♀ ♀, 16–18. XII. 1961; 5 ♀ ♀, 18–21. XII. 1961, Gressitt; 4 m, 27. XI–18. XII. 1961, Gressitt.

2. *Paracladura antipoda* (Mik) Figs. 2, 7A, 8.

*Trichocera antipodum* Mik, 1881, Verh. zool.-bot. Gesell. Wien 1881: 8, figs. 9, 10 (♂ hyp.), 11 (ovipositor), 12 (ven.).—Edwards, 1923, Trans. N. Z. Inst. 54: 270.

*Paracladura antipodum*: Alexander, 1955, Rec. Dom. Mus. 2: 234.

The types were from the Auckland Is., collected in 1875 by Hermann Krone. The figures by Mik are excellent.

Normally the wings have cell *1st M*<sub>2</sub> closed but in 1 specimen (fig. 2) cell *M*<sub>2</sub> is open by the atrophy of *m*. Ovipositor (fig. 7A) with cercus, *c*, short, in lateral aspect appearing subtriangular, apex obtuse. Male hypopygium (fig. 8) with dististyle, *d*, relatively short and stout, mesal face at basal 1/3 produced into a broad tubercle. Phallosome, *p*, including a pair of strongly divergent flattened plates, the outer margin of each with 4 or 5 powerful spines to present a comb-like appearance, the spines broader than intervening spaces; beneath these plates on either side with a compact group of spines, the outer ones largest, the inner or mesal series finally becoming reduced to microscopic points.

DISTRIBUTION: Campbell I., without exact data, collected in 1943 by J. H. Sorensen (Alexander, 1955: 234). Beeman Cove, at light, 4. V. 1962, Clark; Shoal Point, 29. VII. 1962, Rennell; 6. IX. 1961, Clark; Tucker Cove, 4 m, Malaise trap, 3–5. XII. 1961, Gressitt.

Family TIPULIDAE

Subfamily LIMONIINAE

Tribe Limoniini

3. *Limonia (Dicranomyia) arthuriana* (Alexander) Figs. 3, 9.

*Dicranomyia arthuriana* Alex., 1924, Ann. Mag. Nat. Hist. ser. 9, 14: 291.

The types were from Arthur's Pass, Canterbury, South I., New Zealand, at 900 m, taken 28. XII. 1923, by James W. Campbell. I can see no essential differences from the present materials. It seems probable that the fly will be discovered elsewhere in the intervening region of South I. This is an almost uniformly yellow fly of medium size, in life with strong greenish tints, in dead specimens persisting at the bases of the legs and wings. The wings (fig. 3) are entirely clear, with even the stigma lacking, the costal border more saturated, slightly yellow. Male hypopygium (fig. 9) with the ventral dististyle smaller than in *sulphuralis*; both the dorsal dististyle and gonapophyses pale and difficult to see on slide mounts.

The most similar species in New Zealand is *Limonia (Dicranomyia) sulphuralis* (Edwards), of North I., most readily told from the present fly by details of hypopygial structure. All other members of the subgenus so far discovered in the Subantarctic Islands have the wings variously patterned with brown, such species including *Limonia (Dicranomyia) insu-*

*laris* (Mik), of Auckland Is., and *L. (D.) vicarians* (Schiner), synonym, *annulata* Lamb, also described from the Aucklands.

DISTRIBUTION: Beeman Camp, taken in air nets and Malaise trap, 23.XI.1961–5.I. 1962, Gressitt & Rennell; Tucker Cove, 4 m, in greatest part taken in Malaise trap and chiefly ♀♀, 27.XI–21.XII.1961; one on *Coprosma*, Gressitt.

4. *Limonia (Idioglochina) kronei* (Mik) Figs. 4, 10

*Dicranomyia Kronei* Mik, 1881, Verh. Zool.-Bot. Gesell. Wien 1881: 7, figs. 5, 7 (♂ hyp.), 8 (venation).—Hutton, 1900, Trans. N. Z. Inst. 32: 50.—Edwards, 1923, *ibid.*, 54: 282. *Limonia (Idioglochina) kronei*: Alexander, 1955, Rec. Dom. Mus. 2: 235.

The type was from the Auckland Is., collected by Hermann Krone in 1875. Later also recorded from these islands by Alexander (1955).

Venation (fig. 4). ♂ hypopygium (fig. 10) with basistyle, *b*, having ventromesal lobe large, setae very long and numerous. Dorsal dististyle, *d*, a powerful blackened rod, nearly straight, apex narrowed into a spine; ventral style comparatively small, its area less than 1/2 that of basistyle; rostral prolongation obtuse, apical setae few and weak; a single weak, very slender rostral spine. Gonapophysis, *g*, with mesal-apical lobe very long and slender, nearly straight. Mik's figure (1881, figs. 5, 7) does not show the single weak erect rostral spine.

DISTRIBUTION: Beeman Beach, 1–2 m, under rocks, 11–15.XII.1961, Gressitt, 29.XII.1962, Rennell. Davis Point, 1–3 m, shore rocks, 12.XII.1961, Gressitt. Lookout Bay Beach, 14.XII.1962, Rennell, Perseverance Harbor, on shore rocks at low tide, 3.II.1963, Wise. Monument Harbor, nr. beach in kelp, 17.XII.1961, Gressitt, 9.II.1963, Wise. Northwest Bay, tidal pools on beach, 29.XI.1961, Gressitt. Shoal Point, above seaweed nr. low water mark, 7.II.1963, Wise. Smoothwater Bay, shore cliffs, 2.III.1963, Wise. Venus Bay, 2.II.1963, Wright.

The various records of occurrence at and close to the ocean support the belief that immature stages of this species are tidal and marine, a habitat that seems to be indicated for all members of the subgenus *Idioglochina* Alexander.

Tribe Eriopterini

5. *Erioptera (Trimicra) pilipes campbellicola* Alexander, n. subsp. Fig. 5.

♂: Length about 5–6.5 mm; wing 6–8 mm. ♀: Length about 4.5–7 mm; wing 5–8 mm.

Rostrum obscure yellow, in rare cases blackened, palpi brownish black. Antenna black, in cases the scape vaguely paler. Head clear light gray.

Mesonotal praescutal stripes light brown to darker brown, confluent; median region of scutum, with the scutellum and postnotum, yellowed. Pleura obscure yellow, in cases very weakly patterned with brownish gray on anepisternum and ventral sternopleurite, the surface in cases light gray pruinose; praescutal vestiture long and erect, black, more conspicuous behind. Legs almost uniformly yellow to brownish yellow, outer tarsal segments passing into black; erect vestiture in ♂♂ only moderately developed. Wings (fig. 5) whitened, very restrictedly patterned with brown, most evident as a narrow seam over cord and vein *R*<sub>2</sub>, stigma very pale brown; in cases, wings virtually unpatterned. Venation: *R*<sub>s</sub>, rela-

tively short, about  $1/4-1/5$  longer than  $R$ ; vein  $R_2$  just beyond fork of  $R_{2+3+4}$ ; cell  $1st M_2$  closed; vein  $2nd A$  curved evenly to margin (as shown) or slightly more lengthened (in holotype).

Abdominal tergites dark brown, posterior and lateral borders of segments narrowly yellowed, the former more narrowly so; sternites paler brown, the yellow borders more extensive; ♂ hypopygium large, deep yellow to fulvous; abdominal setae long, white.

Best distinguished from *macquariensis* by the much paler coloration of the body, legs and wings, and in details of venation, including the shorter  $R_s$ . The extensive series available shows a remarkable uniformity in size and color, without the extremely large ♂♂ occasionally found in other races.

Holotype ♂ (D.S.I.R.), Smoothwater Bay, 16.II.1963, Wise. Allotype ♀, Tucker Cove, 0-30 m, swept above stream, 6.II.1963, Wise. Paratypes (D.S.I.R., Dom. Mus., BISHOP, Alexander Coll.): Beeman Camp, 2-50 m, on *Poa*, on sedge (*Carex trifida*) and under lumber, 1-5.XII.1961, 12-21.XII.1961, Gressitt, 28.II.1963, Wise. Lookout Bay, beach, 16.XII.1961, Gressitt. Lyall-Beeman Saddle, 30-70 m, on giant *Poa*, 13.XII.1962, Rennell. Mt. Lyall, 200-400 m, 5.XII.1961, Gressitt. Monument Harbor, nr. beach on kelp, 17.XII.1961, Gressitt. Northwest Bay, 5 m, rocks on beach and on tussock, 29.XI.1961, Gressitt & Rennell, 30.XII.1962, Rennell, 5.II.1963, Wise. Rocky Bay, on *Colobanthus* and among stones in penguin rookery, 20.XII.1961, Gressitt; in penguin colony, among *Tillaea*, 18.II.1963, Rennell & Wise. Shoal Point, 0-30 m, tussock, 1.XII.1962, Rennell. Six Foot Lake, 2 m, 10.XII.1961, Gressitt. Southwest Campbell I., without more exact data, 28, 29.XII.1961 (in alcohol). Tucker Cove, in Malaise trap, 21.XI-11.XII.1961, Gressitt. Windlass Bay, 100 m, 25.XII.1962, Rennell.

The status of members of the subgenus *Trimicra* Osten Sacken in the Subantarctic Islands has been discussed more fully in an earlier paper by the writer (Alexander, 1962: 939-44). As presently known there are 2 subapterous forms that appear to represent distinct species, *Erioptera (Trimicra) antipodarum* Alexander, of Antipodes I., and *E. (T.) brachyptera* Alexander, of Campbell I., as discussed later in this paper. The fully-winged species appear to represent geographical races or clines that seem to be restricted to certain of the islands. All such races show the characteristic great range in size and relative hairiness of the species, as discussed in the paper cited, but in the case of the present fly to a somewhat lesser degree.

#### 6. *Erioptera (Trimicra) brachyptera* Alexander

*Erioptera (Trimicra) brachyptera* Alex., 1955, Rec. Dom. Mus. 2: 237, fig. 2 (♂ hyp.).

The types were from Campbell I., in 1943 and 1947 by Sorensen.

DISTRIBUTION: A very few specimens, all from Courrejolles Peninsula, 200-230 m, 14.XII.1961, 12-13.II.1963, Gressitt & Rennell. All of these were found in a nesting colony of mollymawks (albatross) and bear the following labels: On ground and rocks, among moss, around mollymawk's nests; in mollymawk nesting colony beneath cushion plants; among remains of a dead mollymawk.

#### 7. *Molophilus (Molophilus) sp.*, near *jenseni* Alexander

*Molophilus jenseni* Alexander, 1924, Ann. Mag. Nat. Hist. ser. 9, 13: 568.

*Molophilus (M.) jenseni* was described from Half-moon Bay, Stewart I., New Zealand, collected in X-XI. 1923 by Norman J. Jensen.

The present materials include about 60 specimens, generally similar to *jenseni*, but not certainly determinable since all individuals are ♀♀. The ♂ sex is essential in the identification of members of this genus. Other species from Otago, South I., that bear a certain resemblance to the present fly include *M. (M.) analis* Alexander, *M. (M.) denticulatus* Alexander, and *M. (M.) luteipygus* Alexander. It seems probable that a further distinct species is involved but this must await discovery of the ♂. In this connection it should be indicated that there is the possibility that the species will be found to be parthenogenetic with no ♂♂ present. Such a condition seems to be the case in certain members of the genus in northeastern North America, including *M. (M.) pubipennis* (Osten Sacken) and *M. (M.) soror* (Alexander) as discussed by Alexander and Rogers<sup>1</sup>.

DISTRIBUTION: Beeman Camp, 2-50 m, 2-17.XII.1961, Gressitt, 1.I.1962, Rennell, with various labels, air nets, trap nets, on *Chrysobactron* and *Coprosma*. Lookout Bay, beach, 3.XII.1961; 16-19.XII.1961, on *Carex trifida*, Gressitt. Mt. Lyall, 150 m, on fern, 3.XII.1961, Gressitt. Tucker Cove, Malaise trap, 26.XI-18.XII.1961, Gressitt.

#### 8. *Molophilus (Molophilus)* sp.

Three ♀♀ specimens that evidently represent another species in this involved and difficult genus. The fly is much darker than the preceding species, the body being almost uniformly medium brown, with the appendages slightly different.

DISTRIBUTION: Tucker Cove, 0-100 m, 23. II, 2. III. 1963, Wise.

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