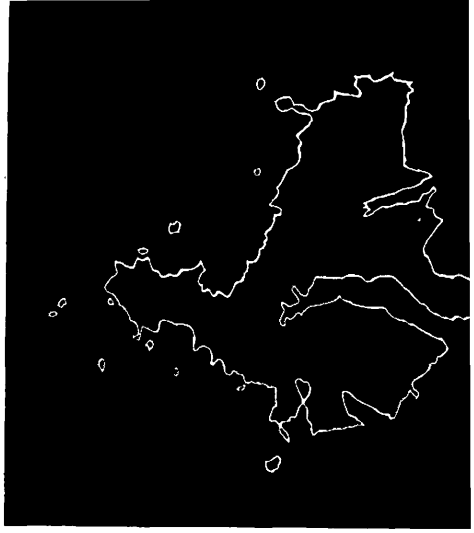

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By J. Linsley Gressitt and Collaborators

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INSECTS OF CAMPBELL ISLAND

By J. Linsley Gressitt and Collaborators

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INSECTS OF CAMPBELL ISLAND: INTRODUCTION[1]

By J. Linsley Gressitt

B. P. Bishop Museum, Honolulu, Hawaii

Abstract: The land arthropod fauna of Campbell I. (52°33′ S. Lat.; 169°8′ E. Long.) numbers about 300 species of about 105 families treated in this work, with a few groups remaining to be reported upon later. Eighty-two species and 13 genera are described as new from Campbell in this volume, and an additional 31 species and 5 genera are described as new from Auckland Is., Macquarie, Snares or Antipodes. The zoogeographical affinities of the Campbell fauna cannot yet be fully elucidated because of incomplete knowledge of the fauna of New Zealand, of neighboring islands, and of more distant faunally related areas, such as southern South America. However, close affinities with New Zealand are numerous and trans-Antarctic links seem to be in the minority. This suggests that the Campbell fauna is made up of relicts from a former larger subcontinent and/or that populating of the island was at least partly by post-glacial waif infiltration, perhaps largely by air transport from New Zealand and Tasmania. A number of elements are in common between Campbell and the Aucklands, and some also with Macquarie, but rather few with Kerguelen and Heard, although there are some analogous developments.

A nearly year-long experiment in dispersal is reported. Results indicate that insects fly more when wind is less strong, but that many of those which are caught up in sudden stronger gusts are carried out to sea. A very low percentage of wingless forms was trapped. This suggests that wing-loss is favored by natural selection. Variability in wing development of some species, such as *Kleidotoma* n. sp. and *Schoenophilus pedestris* Lamb, and other facts, suggest that wing-loss is proceeding rapidly on Campbell I., where strong winds prevail.

BACKGROUND

Campbell I. is the more central, in terms of latitude, of the three major and more southern groups of subantarctic islands south of New Zealand and SE of Australia and Tasmania. Macquarie I. is the more southern and the Auckland Is. the more northern group. North of the Aucklands and south of New Zealand also lie the Snares Is., Antipodes Is. and Bounty Is. These are more strictly subantarctic islands, whereas Stewart I., directly south of the South Island, and the Chatham Is., east of the South Island, are integral parts of the New Zealand faunal area.

The faunal relationships among the three main southern groups, Macquarie, Campbell and the Aucklands, and between them and other islands or continents, form a fascinating subject. The break between Macquarie (the southernmost isolated major subantarctic

1. This volume is principally the result of field work supported by grants from the National Science Foundation, especially from the Office of Antarctic Programs (G-18800, G-23720). Some of the research was supported in part by other grants: NSF GB-518; National Institutes of Health (AI 01723); U. S. Army Medical Res. & Devel. Comm. (DA-MEDD-60-1).

island) and the Antarctic continent is very great, with a ratio of about 12 to 5 orders, respectively, of true insects represented, as well as a reduction in the number of families of the orders of mites and insects common to both areas. Also, spiders occur on Macquarie, and probably do not occur on Antarctica. The contrast between Macquarie and Campbell is not quite so great as between Antarctica and Macquarie, in terms of numbers of orders of hexapods represented. There are about 5 additional orders, and many families, of true insects on Campbell which are not found on Macquarie. And there are additional orders of other classes of arthropods added. Probably Campbell has nearly three times as many species as does Macquarie. As much collecting has been done on Campbell as on Macquarie, but it is difficult to say whether an equally high percentage of the fauna has been made known, because of the richer biota on Campbell.

Between Campbell and the Aucklands there is again a great increase in fauna, with perhaps another 3 orders of hexapods added in the Aucklands. Many more families are found in the Aucklands than on Campbell, and perhaps twice as many species. The other neighboring subantarctic islands, the Snares, Antipodes and Bounty are much smaller islands, with apparently much less representation than on Campbell or the Aucklands.

Until the fauna of the Aucklands is better known, and until the faunal origins and relationships of all these islands is further clarified, it will be difficult to make an adequate zoogeographical appraisal of the Campbell fauna. A preliminary discussion is presented in a later chapter of this volume.

Among significant aspects of the Campbell I. fauna is the lack of many important groups found in most parts of the world. Among these absent groups are leafhoppers, true bugs, locusts, butterflies, leaf-beetles, wood-boring beetles, mosquitoes, ants, bees, and predaceous wasps, to mention only a few. Also, the fairly high ratio of wingless to winged species is conspicuous. These problems and the question of dispersal are discussed in a later chapter.

Field work

In recent years Bishop Museum has taken a special interest in the fauna of these subantarctic islands. In late 1960 I collected briefly on Macquarie I. More extensive work was done on Macquarie by Keith Watson for the Australian National Antarctic Research Expeditions, starting at the time of my visit and lasting for one year. Also, John Calaby collected for A. N. A. R. E. at the same time as my visit. The taxonomic results from all of this collecting combined has been appearing in "Pacific Insects", most of the articles in Vol. 4, no. 4, 1962, but some also in Vol. 5, nos. 2 and 4, and forthcoming issues. A preliminary discussion of the subantarctic arthropod fauna was presented in 1960 (Gressitt & Weber), and further zoogeographical data, particularly concerning Macquarie, in Gressitt (1961), and on all subantarctic islands (Gressitt, 1963 a, b and in press).

In late 1961 I collected for nearly 5 weeks on Campbell I. A visit of a few hours had been made shortly before my stay by Keith A. J. Wise, also of Bishop Museum. Mr. Wise returned again to Campbell in early 1963, after the Auckland Is. expedition, and also stayed for about five weeks. Between my visit and Wise's second visit, a period of about 13 months, and during the visits of both of us, Mr. Kelvin Rennell carried on periodic collecting during his free time while a member of the meteorological staff of the New Zealand research station. Mr. Rennell's contribution of assembling extensive collections during his term on the island has been a very significant one. He was able to accumulate extensive

series of species of which I had only obtained a specimen or two during my stay, and he was also able to investigate a number of environments, such as the nests of certain birds, which I did not have time or opportunity to sample. Rennell was also able to assemble biological information for a number of species, and continued the dispersal experiment I started.

During December 1962 and January 1963, for a period of not quite four weeks, Wise and I (representing Bishop Museum and the U. S. Antarctic Research Program) participated in the Auckland Is. expedition, organized by the the Dominion Museum and the New Zealand D. S. I. R. Various circumstances cut short the field time for the expedition and permitted work only in the northern half of the islands. The completion of the expedition is anticipated for the 1964–65 season. Further field work in the Aucklands is necessary before a thorough study can be made of the fauna of the group.

Collections

In the time available, it has not been possible to completely process all our Campbell I. collections. This is particularly true for the mites and Collembola. Extensive use of the Berlese funnel collecting method provided such abundant material that it could not all be slide-mounted and prepared for study. Thus some supplements will undoubtedly be necessary later, although these might be incorporated with future Auckland Is. studies. Also, time has not permitted all of the collaborators to complete their studies, and some papers will have to be published at later dates. Furthermore, certain collaborators wished to include available material from the Aucklands or other subantarctic islands in their papers for this volume. Thus some articles, such as those of Forster, Richards and Kuschel, concern not merely Campbell I., but a wider scope. In the zoogeographic treatment in the latter part of this volume a complete list is presented of the species known from Campbell I.

Most of the specimens reported in this volume are housed at Bishop Museum, Honolulu. Through an exchange agreement with the Dominion Museum, Wellington, and the New Zealand Department of Scientific and Industrial Research (D. S. I. R.), types of Campbell I. species from Bishop Museum collections are being deposited in the aforementioned New Zealand institutions in exchange for existing or future type specimens from Polynesia, Fiji and New Caledonia. Most of the arachnid and Collembola types are going to the Dominion Museum and most of the rest to the D. S. I. R. Duplicates of many species are being deposited in the aforementioned collections, and in the British Museum (Nat. Hist.), th U. S. National Museum, the California Academy of Sciences and the Canterbury Museum, Christchurch.

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and work on Campbell Island, and for extensive facilities put at our disposal. We are specially indebted to New Zealand Meteorological Service staff and other personnel stationed on Campbell I. over the past few years. We are particularly grateful to Kelvin Rennell for his great contribution to the success of this undertaking. Mr. K. A. J. Wise has also made a major contribution to the project. We are indebted to the U. S. Navy (Task Force 43) for providing most of the transportation to and from Campbell I., but also to the Royal New Zealand Navy. We are indebted to officers and crews of the USS Vance, USS Durant and HMNZS Endeavour II. We are grateful to the U. S. Antarctic Research Program for financial support for the field work and for some other aspects of the study. Some of the systematic research was financed by grants from the National Institutes of Health and the U. S. Army Medical Research and Development Command.

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HISTORY

Campbell I., though not prehistorically inhabited, as far as known, has had a number of attempts at colonization during the past century or more. These events have had a profound effect on the biota of the island, primarily through the establishment of several species of mammals—sheep, rats, cattle and cats—as well as a few birds.

The island was discovered in 1810 by Captain Frederick Hasselbourgh (Hasselburgh, Hazelburgh) of the "Perseverance," a sealing brig owned by Campbell & Co. of Sydney, while searching for new sealing grounds. As soon as the news of the discovery of Campbell I. (and of Macquarie I.) reached Sydney, several ships set sail to exploit the seals, and many visits were made to the island. The result was near extinction of fur seals, hair seals and elephant seals. Captain Hasselbourgh, on his second visit to Campbell, late in the same year, was drowned (4 November 1810) with two others in Perseverance Harbor when a gust of wind filled and sank their ship's boat. There are no printed records of many of the early sealing visits to the island. Of six men put ashore to seal by the "Mary and Sally" in 1811, only one was still alive when the "Cumberland" stop-

ped to pick them up a few months later. John Balleny, an early antarctic explorer, left London in the schooner "Eliza Scott", and by chance met John Briscoe, a sealer from London, with the "Tula" and "Lively" (wrecked) on Campbell on 17 January 1839. Sir James Ross, with the "Erebus" and the "Terror", arrived at Campbell on 13 December 1840 for a four day stop, during which Sir Joseph Hooker (with Dr. D. Lyall), collected plants. Captain T. Musgrave, in the "Grafton", spent a month prospecting on Campbell early in 1864. Then the ship was wrecked in the Auckland Is. and the crew was marooned for 20 months there. As a result of many shipwrecks, particularly in the Auckland Is., food depots were established at several points on the islands. Also, domestic animals were liberated on various islands, and periodical searches made for castaways. In 1865 Capt. Norman was said to have introduced pigs, game birds and guinea fowls to Campbell, but these did not survive.

A French expedition to study the transit of Venus went to Campbell on the "Vire" in December 1874. There was no visibility for this purpose, but much scientific data was collected, particularly by the naturalist H. Filhol, and a map of the island was made. In June 1878, E. Jennings from the Otago Museum had an hour and a half on the island, and his observations were included in a report by F. W. Hutton (Trans. New Zealand Inst. for 1879). In 1883 the crew of the "Sarah W. Hunt" was deliberately marooned on the island. The men were later rescued by the government steamer "Stella." Other visits of government steamers permitted J. Buchanan to do botanical work in 1884, and also T. Kirk, another botanist, in 1890. The "Hinemoa" visited Campbell in 1891 and the sealer "Antarctic" made two visits in 1894.

In 1883 goats, pigs and rabbits are said to have been introduced to Campbell, but they did not survive. In 1890 sheep and goats were introduced to the island. Of these, three goats were said to be alive a few years later, but they did not persist.

In 1895 an attempt was started to raise sheep on Campbell, and about 4500 or 5000 Lincoln and Romney sheep were brought down by 1896. In 1903 there were 4500 sheep on the island (Cockayne, 1904); and in 1907, there were said to be 8000 sheep (Laing, 1909). The shepherds lived at Tucker Cove and endured a miserable existence. The venture failed and the plan was abandoned in 1927, but some shepherds were on the island until 1931. Perhaps 3000 sheep then remained on the island, and these gradually decreased to between 1500 and 2000 in 1950. The lambing rate was said to have fallen to about 30 % (Sorensen, 1951b). The population was down to about 1000 or less in 1962, when an extermination program was planned by the New Zealand Government. This plan has not yet been put into effect. The island is a nature preserve and hunting or sealing are forbidden.

Rats were unintentially introduced, perhaps when the sheep were established. Cats were later introdued to control the rats; however, rats are still abundant.

A group of cattle (Ayrshire-Shorthorn cross) was colonized at about the beginning of this century. With the abandonment of the island, these maintained themselves to date at a population of nearly 20 head, while restricting themselves to a small area south of Northwest Bay.

F. W. Hutton visited in 1900 (Trans. N. Z. Inst. for 1901), and L. Cockayne in 1903. The expedition of the Philosophical Institute of Canterbury visited for eight days in November 1907 and the results were included in "The Subantarctic Islands of New Zealand" (Chilton

et al, 1909, 2 vols). C. Chilton and G. R. Marriner were the zoologists, and a number of species of arthropods were described from Campbell and the Aucklands. Between 1908 and 1914 a shore-based whaling station was maintained on Campbell.

During 1941–1945, a volunteer coast-watching group, also represented on the Auckland Is. and known as "Cape Expedition" carried on scientific observations and collecting. The group included some prominent New Zealand naturalists. Among those who spent periods on Campbell was J. H. Sorensen who spent four years on the island and collected many insects. As a result of the scientific work done on this program, a series of 26 publications, the "Cape Expedition Reports" were published. Nos. 4, 5, 14, 19, 20, 21 and 26 concern entomology (Brookes 1951; Dumbleton 1953; Forster 1955; Harrison (and Alexander, Richards, Oldroyd) 1955; Salmon 1949; Salmon (and Salmon & Bradley) 1956; Illies 1963.

Since World War II the New Zealand Government has maintained a permanently staffed weather and research station on the island, first at Tucker Cove where the "Cape Expedition" had its camp, and since 1959 at Beeman Point. There are generally about 11 men at the station during the summer and about 8 during the winter. Some of the men have collected insects for the Dominion Museum.

In the first week of 1952 the Danish round-the-world Galathea Deep Sea Expedition visited Campbell, with Dr. R. A. Falla, Director of the Dominion Museum, aboard. Some insects were collected and a few described (Viette, 1954).

In January 1958, the Denver Museum of Natural History sent an expedition to Campbell for six weeks, led by Alfred M. Bailey and including two New Zealand naturalists,

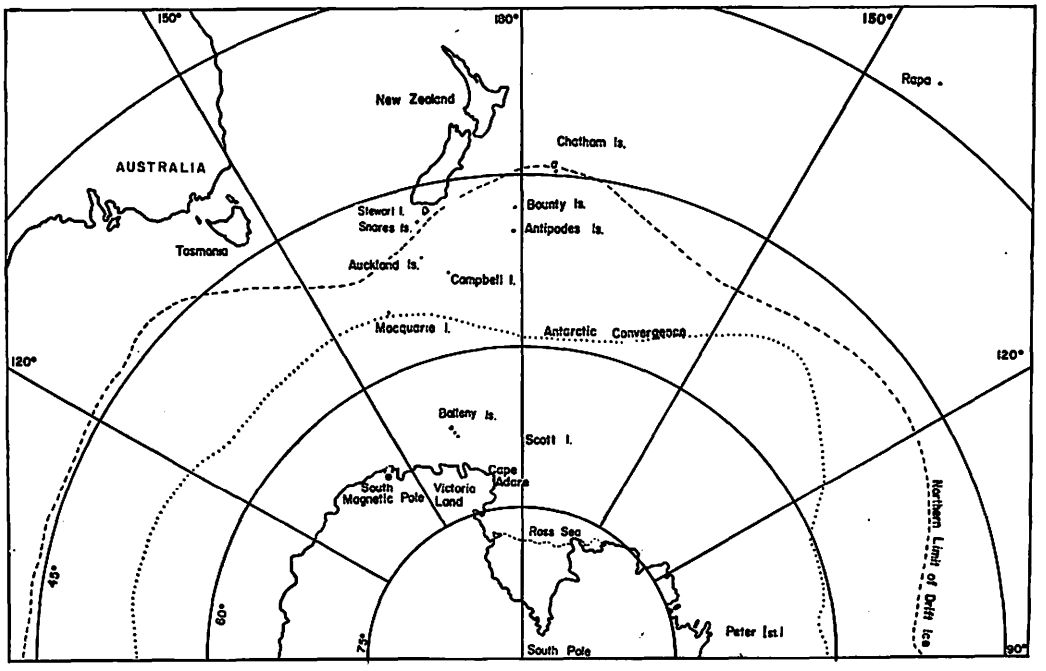

Fig. 1. Map of the 90° to 270° portion of the Antarctic-subantarctic area showing Campbell and nearby islands.

Kaj Westerkov and Robert Street (Bailey & Sorensen, 1962).

The Bishop Museum expedition consisted of a five-week stay by me in late 1961; a similar stay by K. A. J. Wise early in 1963 (plus a stop of a few hours just before my visit); and spare-time work by Kelvin Rennell from late 1961 to early 1963, while a weather observer on the island.

GEOGRAPHY

Campbell I. is situated 640 km S of the lower tip of South Island, New Zealand, about 590 km S of Stewart I., 300 km SSE of the Auckland Is., 730 km NE of Macquarie, and about 1760 km N of Antarctica. With an area of 109 sq. km, it is a deeply eroded, fairly small island with a number of hills. Most of the western coasts consists of high cliffs resulting from very strong wave and wind erosion. There are only a fews and beaches on the west, primarily inside Northwest Bay. In some cases, the cliffs cut mountains, such as Azimuth, Eboulé, Paris, and Yvon Villarceau almost in half. In other cases, only small fractions of mountains remain. This is evidence that the island was once much larger, and has lost much of its western portion from marine erosion, as with Macquarie and the Aucklands.

Much of Campbell is covered with peat, and is very marshy, even on fairly steep slopes and lower ridges. There are marine terraces, glaciated valleys, fairly regular conical hills, a few tarns, many small streams, but no rivers, and no volcanic activity. True soil is scarce, but the peat may be up to 12 m in depth. Soil is acid, with high organic and low nitrogen content.

The highest point is Mt. Honey, 569 m. Other peaks nearly as high are Mt. Fizeau, 505 m; Mt. Dumas, 503 m; Mt. Azimuth, 488 m; Mt. Paris, 465 m; Mt. Lyall, 413 m; Mt. Puiseux, 403 m. Ten peaks are higher than 300 m, and two others are nearly as high.

Campbell is situated on a submarine or "subcontinental" shelf, along with the Aucklands, Snares, Antipodes, Bounty and New Zealand. It is more separated from Macquarie. These islands were once larger and might possibly have formed a subcontinent. Or they might be fragments left after continental drift.

Knowledge of the ocean bottom contours (fig. 2) in the area of Campbell and Macquarie have been modified somewhat in recent months on the basis of preliminary reports (as in Dawson, 1963), pending publication of a new map by the New Zealand Oceanographic Institute (J. W. Brodie, *in litt.*). These modifications have only been guessed at in fig. 2, since precise data are not available. However, it is interesting that there is the suggestion of a submarine ridge connecting Macquarie with the New Zealand shelf joining Campbell, the Aucklands and Snares with the South Island of New Zealand. As will be shown below, there is great faunal difference between Macquarie and Campbell. Probably this submarine ridge, which rises in spots to 600–800 m below sea level, served only in the spread of bottom-living marine animals and plants. The ridge goes from Macquarie in the direction of the Snares, but it is not a continuous shallow ridge, but a ridge with a series of peaks. The new soundings have reduced the gaps between peaks by bringing to light new peaks.

One of the characteristics of Campbell I. is the prevalence of strong winds. This has a great effect on the island, primarily through wave and wind erosion, forming the westward cliffs (fig. 11 a, b). Also the effect on vegetation is conspicuous (figs. 8, 13c).

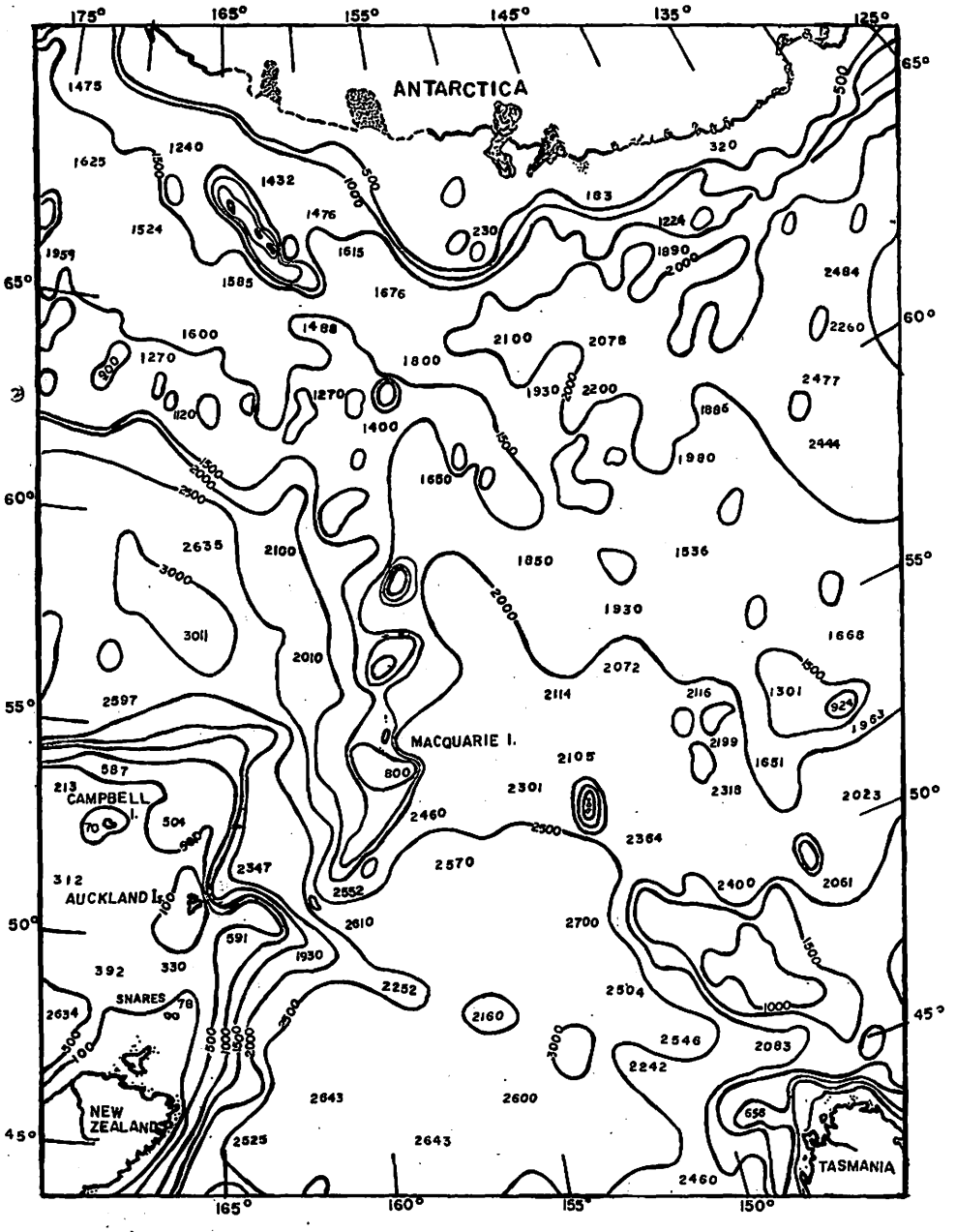

Fig. 2. Rough map of ocean bottom in area between Antarctica, New Zealand and Tasmania, showing submarine contours, with soundings in fathoms. North is towards the bottom of the map and slightly to the right (modified from U. S. Hydrographic Office #2562, 1956, revised 1962).

GEOLOGY

Campbell I. is a much dissected volcanic cone which was mildly glaciated during the Pleistocene. Underneath the volcano was a basement of schist, perhaps early Mesozoic in age. This basement is overlain with younger sediments, some Upper Cretaceous, and by lavas. Deposits of argillaceous limestone are dated at Lower Eocene to Mid Oligocene.

The evolution of the island has been characterized by the development of erosion caldera, by strong marine erosion, by glaciation, and by submergence. This geological history is similar to those of New Zealand, the Auckland Is., and Macquarie I.

The several major valleys on Campbell were formed by glaciers, probably in the Pleistocene. With subsidence, some of these valleys became inlets of the sea, such as Northeast Harbor, Perseverance Harbor and Southeast Harbor. Northwest Bay represents the

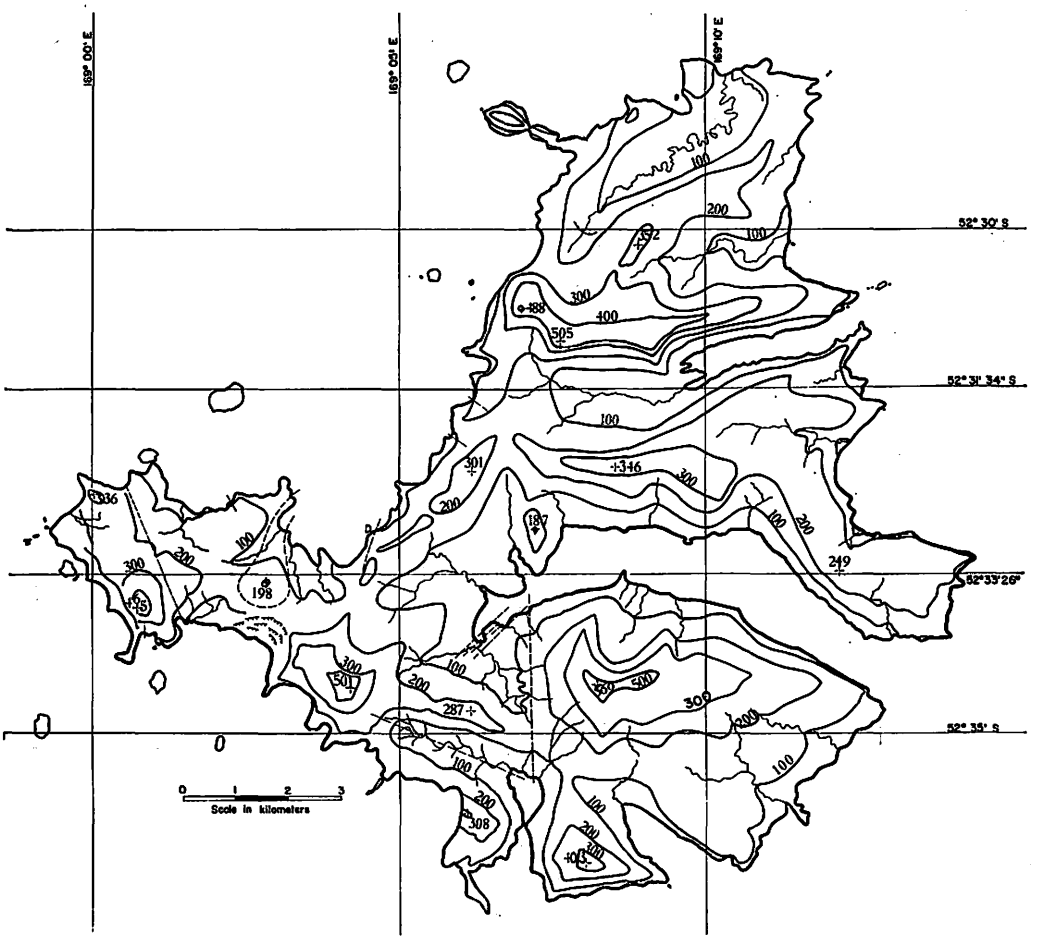

Fig 3. Map of Campbell I. showing 100 meter contours, peaks (+), some of fault lines (---), and landslides (TTTT), partly from Oliver, Finlay & Fleming, 1950. See fig. 14 for place names.

sunken center of the main original volcano. The island is essentially a sunken and eroded volcanic dome, of which much of the northern and western parts, particularly the northwestern, are gone.

Some of the characteristic formations on Campbell include schist, as at Complex Point; quartz sandstone, conglomerate and carbonaceous mudstone, as at Garden Cove; foraminiferal limestone, of Lower Eocene to Mid Oligocene age, in several areas; volcanic tuff and volcanic breccia of the Shoal Point (Perseverance Harbor) Formation. Also, much igneous rock is present, including gabbros, columnar basalt and dykes. Columnar basalt is conspicuous on Beeman Hill and dykes are in evidence on St. Col Ridge, Mt. Lyall, Mt. Dumas and elsewhere.

The history of the island may be roughly outlined as follows. In Late Cretaceous the schist land mass was eroded and submerged, with subsequent deposit of marine limestone.

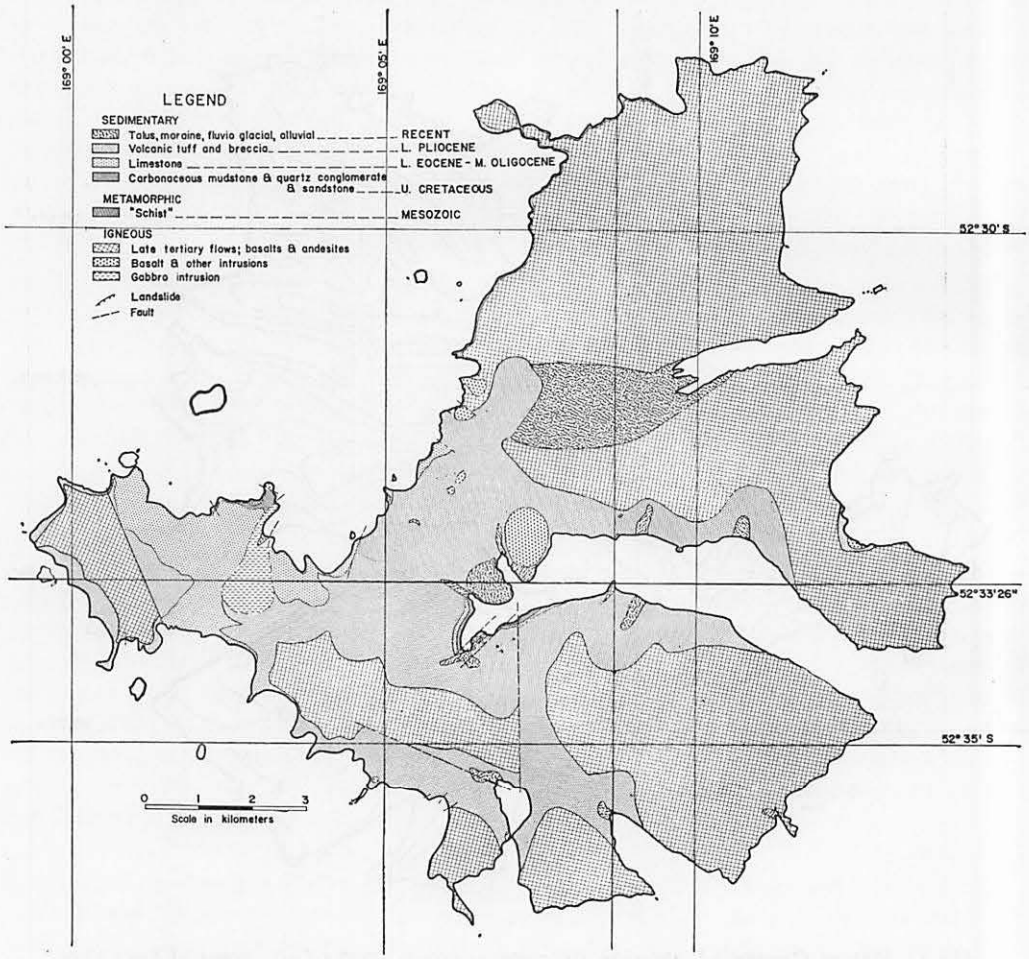

Fig. 4. Map of Campbell I. showing principal geological formations and remainder of fault lines (adapted from Oliver, Finlay & Fleming, 1950).

In Mid Oligocene there was some folding of limestone, probably with some elevation. In early Pliocene there was some explosive vulcanicity, depositing tuff. In late Pliocene there were lava flows. Subsequently there has been further erosion, including glacial erosion and marine and wind erosion. There are cirques as well as glacial valleys, but no proof of a continuous ice sheet (Largely after Oliver, Finlay & Fleming, 1950).

Campbell is generally classified as a continental island, or island on a subcontinental, or submarine, plateau, whereas Macquarie is generally termed an oceanic island.

FLORA AND VEGETATION

The native vascular plants of Campbell I. number about 116 species of ferns and higher plants. Of these, 22 are ferns and lycopods, 10 are grasses, 5 are sedges, and 79 are other flowering plants. In addition to these, there are at least 47 species of introduced plants (Oliver & Sorensen, 1951; Sorensen, 1951). Included in the nativa flora are 9 kinds of woody plants of 4 genera. Thus the flora is much more extensive than that of Macquarie I., which has only 35 species of vascular plants in its native flora, with no shrubs except one of insignificant size. The Auckland Islands, however, have about 50 % more kinds of vascular plants than Campbell. The Aucklands have two large trees, and several small trees or large shrubs. Although there are no native trees on Campbell, a planted spruce tree (*Picea* sp.) has survived for many years and has grown to a height of about 3 meters, with a trunk diameter of 35 cm, and a spread of about 4 meters.

The Campbell flora is closely related to that of Macquarie and the Aucklands. There are some 38 genera of vascular plants found on Campbell but not on Macquarie. One genus (*Azorella*) found on Macquarie is lacking on Campbell and the Auckland Is., and 14 genera occurring in the Auckland Is. are lacking on Campbell I. A number of the genera on Campbell are characteristically subantarctic, having a wide range around the Antarctic continent, while others are more widespread. Several are cosmopolitan.

Mosses, lichens and other lower plants are well represented on Campbell I. The mosses have been recently studied by Sainsbury & Allison (1962), and the hepatics by Hodgson (1962).

The vegetation of Campbell I. is in part distinctly zoned, although certain plants may occur from sea level to almost the highest altitudes on the island. Tussock grass covers this span, but has more than one genus involved. Shrubs of the genus *Hebe* are represented by one species along the shore and another on rocky ridges and cliffs. *Dracophyllum*, the tallest shrubs (2 species), form dense stands on gentle or protected slopes from near shore to about 180 meters in altitude (fig. 13e). The other shrubs, *Coprosma* and *Myrsine*, occur in this altitudinal range, partly in more exposed situations where their form may be "molded" by the prevailing wind directions. *Coprosma* and *Myrsine*, however, occur also within the tussock grass formation. *Coprosma pumila* is characteristic of tussock grassland and peat-bogs.

Among the herbs, *Bulbinella* (*Chrysobactron*), is conspicuous and extensive in occurrence, from low to high altitudes. It does not grow within the *Dracophyllum* scrub, but in clearings, along paths, and above the scrub. The three species of *Pleurophyllum* may occur from low to high altitudes, but *P. speciosum* is now largely limited to inaccessible rocky areas, and the top of Beeman Hill where sheep no longer come. *P. hookeri* occurs primarily on

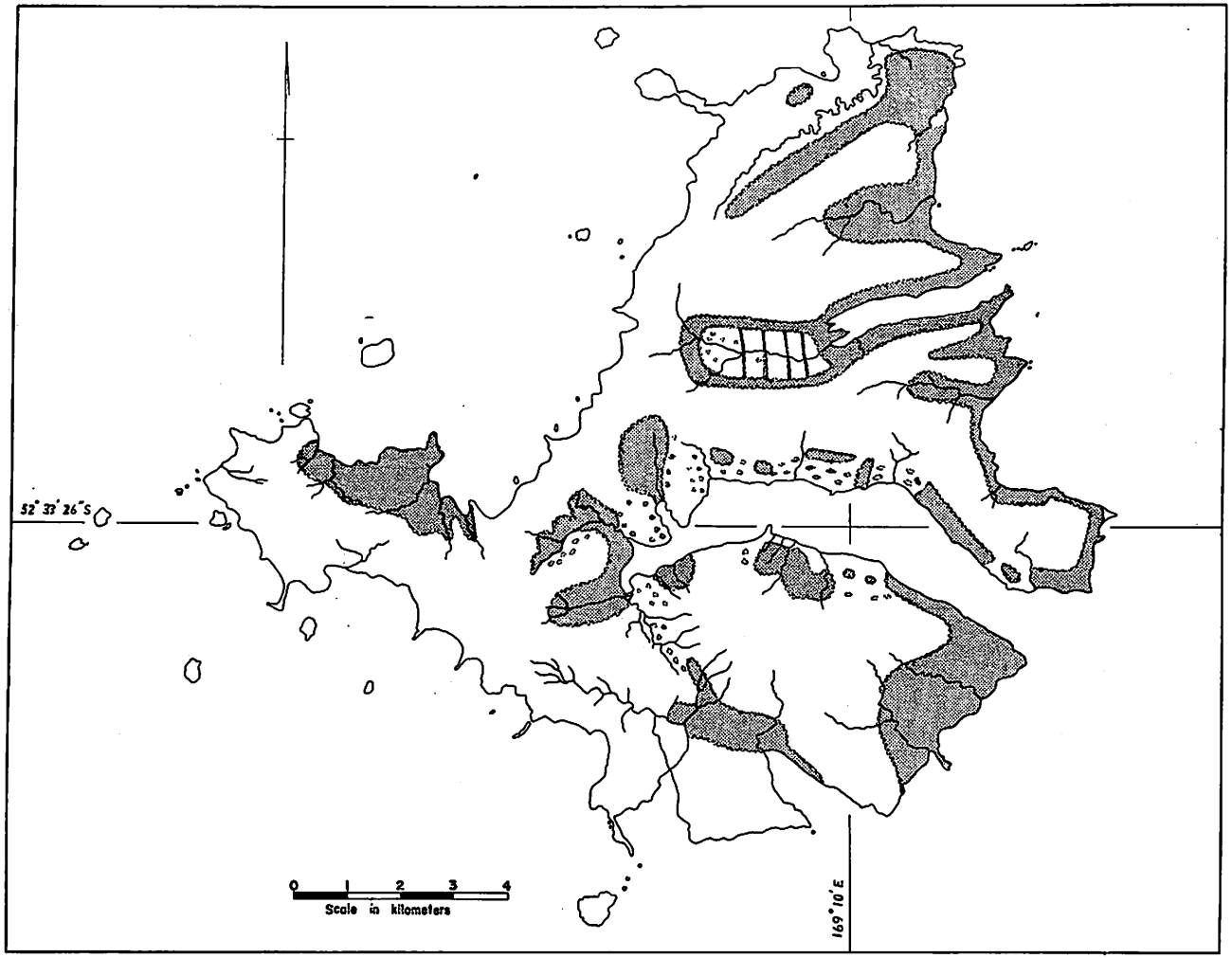

Fig. 5. Vegetation: distribution of *Dracophyllum* scrub on Campbell I. (by courtesy of Dr. E. J. Godley, Botany Div., D. S. I. R., Christchurch, New Zealand).

upland peat-bogs, and *P. criniferum* primarily among tussock. *Stilbocarpa polaris*, another large herb, occurs at low and medium altitudes, but is rare because of depredation by sheep.

Many of the other herbs are restricted in occurrence. Several of them are minute in size but occur as cushions or mats. These sometimes dominate locally, covering rocks, or ground between boulders, or covering peat-bogs. They, with many of the lower plants, are more conspicuous on ridges, steep slopes and at higher altitudes.

The *Rostkovia* Formation is a characteristic zone between the upper border of the tussock and the summit rocks. It comprises *Rostkovia gracilis* (Juncaceae), of meager height, and other herbs including *Luzula*, *Craspedia*, *Myosotis*, *Cardamine*, *Celmisia*, *Ranunculus*, and others.

The subalpine rock area, on the peaks and higher ridges, has a vegetation including many herbs, as well as ferns, mosses, lichens and others. *Anisotome antipoda* and *Hymenophyllum multifidum* are characteristic plants. Other plants of this formation are *Myosotis*, *Ranunculus*, *Abrotanella*, *Celmisia*, *Pleurophyllum speciosum*, *Grammitis*, *Hymenophyllum*, *Colobanthus*, *Phyllachne*, mosses and lichens.

Littoral vegetation includes a number of characteristic plants. Among large plants, *Hebe elliptica* and *Anisotome latifolia* were characteristic, but largely eliminated by sheep. *Dracophyllum scoparium* comes close to the shore in protected areas. *Poa foliosa* used to be dominant near the shore, but has been largely replaced by *P. litorosa* and introduced grasses, sedges or herbs. Other littoral plants include *Tillaea moschata*, *Scirpus aucklandicus*, *Cotula lanata*, *Urtica australis*, *Celmisia vernicosa*, and *Blechnum durum*. On steeper slopes and cliffs inaccessible to sheep, the following may occur near the shore: *Stilbocarpa polaris*, *Anisotome latifolia*, *Pleurophyllum speciosum*, *P. criniferum*, *Urtica australis*, *Asplenium obtusatum* and *Poa ramosisssima*.

Most of the introduced plants are confined to coastal areas in Perseverance Harbor. Some, including *Poa annua*, *Stellaria media*, *Cerastium vulgatum* and *Sagina procumbens*, have spread over wide areas of the island. *Holcus lanatus*, *Dactylis glomerata* and *Rumex obtusifolius* are tending to spread.

(Preceding data largely from Oliver & Sorensen 1951 and Sorensen 1951, augmented and corrected by Dr. E. J. Godley.)

Affect of man and domestic animals: A great change has taken place in the vegetation of Campbell I. over the past half century and more. The most conspicuous aspect of the change has been the great reduction in extent of tussock grass and its substitution by the large herb *Bulbinella*. This is particularly true at the medium-high altitudes, where the tussock *Chionochloa* has been almost eliminated by sheep-grazing. The *Bulbinella*, not eaten by sheep, replaced the tussock (fig. 8). At lower altitudes, tussock grasses of genus *Poa* are still common, but there has been replacement of *P. foliosa* by *P. litorosa* and other grasses, as well as sedges or herbs.

The *Rostkovia* formation at higher altitudes has also suffered in recent decades. The sheep have also largely exterminated the *Pleurophyllum speciosum*, *Stilbocarpa polaris*, and other large herbs, except in steep areas inaccessible to them.

In some areas the *Dracophyllum* scrub has been reduced by activities of man. Introduced plants have tended to replace native plants in the areas disturbed by man, particularly near the shores at the inner end of Perseverance Harbor. The increase in the population

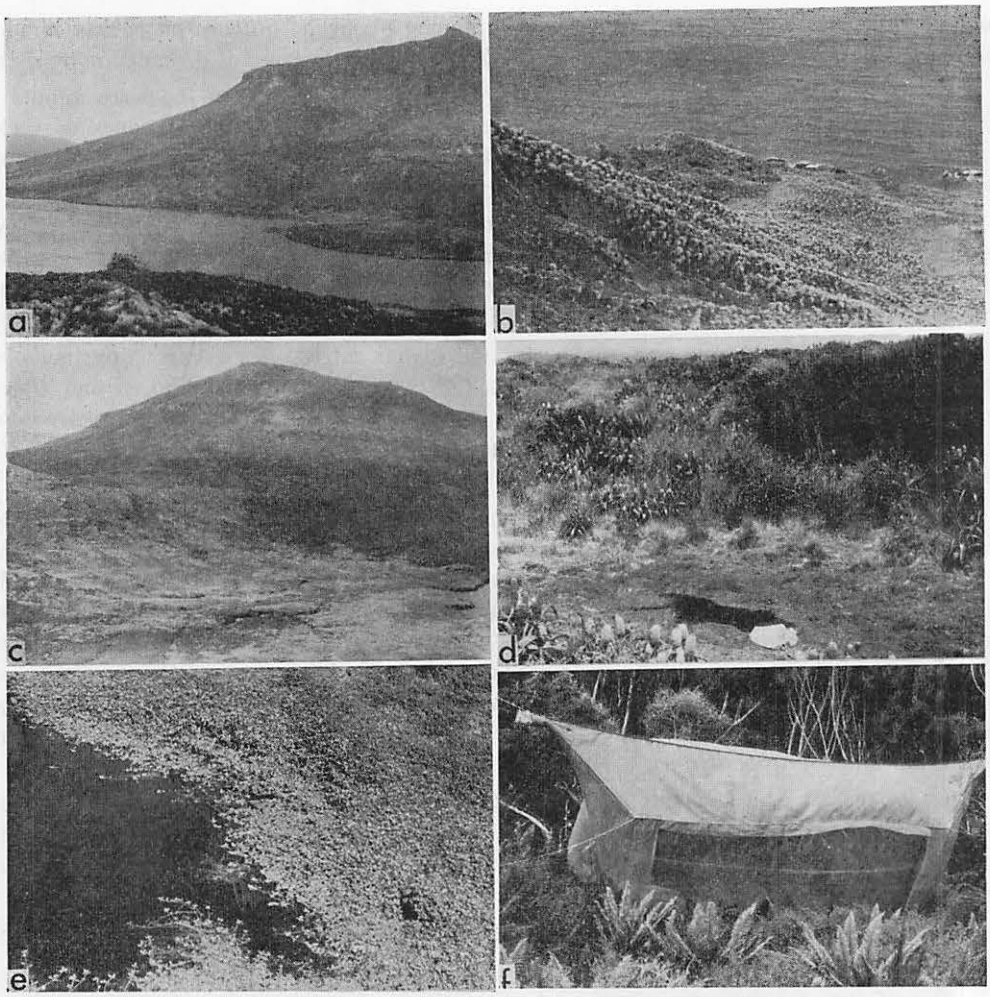

Fig. 6. a, Mt. Honey from nr. Camp Cove (Perseverance Hbr.): dark areas are *Dracophyllum* scrub; b, less precipitous portion of northwest coast, showing tussock (pale) and *Bulbinella* (dark); c, S. side of Mt. Honey from slope of Mt. Eboulé, with dark *Dracophyllum* scrub and Six Foot Lake at lower right; d, small pond among herbs in old elephant seal wallowing area, with *Dracophyllum* upper right and *Bulbinella* upper and lower left; e, pond in old elephant seal wallow with *Montia fontana*; f, modified Malaise trap in *Dracophyllum* scrub by stream below old camp, Tucker Cove, with *Myrcine* at left and far right, *Polystichum* in foreground.

of elephant seals has also resulted in encouragement of introduced plants where by their wallowing the seals have tended to destroy the native plants, particularly *Poa foliosa* (fig. 10a).

List of the vascular plants of Campbell I.

Native species: The following list of native higher plants of Campbell I. is after Soren-

son (1951) with corrections and nomenclatorial changes kindly supplied by Dr. Eric J. Godley.

Filices:	*Hymenophyllum villosum* Col.
	minimum A. Rich.
	multifidum Swartz
	Polystichum vestitum (Forst. f.) Presl.
	cystostegia J. B. Armstr.
	Asplenium obtusatum Forst.
	obtusatum var. *obliquum* Hook. f.
	obtusatum var. *scleropium* Moore
	Blechnum durum C. Christen
	penna-marina Kuhn.
	procerum Forst. f.
	minus (R. Br.) Allan
	banksii Matt.
	Hypolepis millefolium Hook. f.
	rugosula Labill.
	Histiopteris incisa J. Smith
	Grammitis billardieri Willd.
	pumila J. B. Armst.
	Schizaea fistulosa Labill.
Lycopodiaceae:	*Lycopodium varium* R. Br.
	fastigatum R. Br.
Gramineae:	*Hierochloe redolens* Vahl.
	brunonis Hook. f.
	Agrostis magellanica Lam.
	Deyeuxia filiformis (Forst.) Hook. f.
	Deschampsia chapmani Petrie
	Trisetum spicatum (Linn.) Richter
	Chionochloa antarctica (Hook. f.) Zotov.
	Poa foliosa Hook. f.
	litorosa Cheesm.
	ramosissima Hook. f.
Cyperaceae:	*Scirpus aucklandicus* Boeck.
	Oreobolus pectinatus Hook. f.
	Uncinia hookeri Boot.
	Carex appressa R. Br.
	trifida Cav.
Centrolepidaceae:	*Gaimardia pallida* Hook. f.
	ciliata Hook. f.
Juncaceae:	*Rostkovia gracilis* Hook. f.
	Juncus effusus Hook. f.
	bufonius Linn.
	antarcticus Hook. f.
	scheuchzeroides Gand.
	Luzula campestris var. *crinita* Buch.

Liliaceae:	*Astelia subulata* Cheesm.
	Bulbinella rossii Hook. f.
Orchidaceae:	*Aporostylis bifida* Hook. f.
	Lyperanthus antarcticus Hook. f.
	Chiloglottis cornuta Hook. f.
	Corybas oblongus Hook. f.
	trilobus Hook. f.
Urticaceae:	*Urtica australis* Hook. f.
Portulaceae:	*Claytonia australasica* Hook. f.
	Montia fontana Linn.
Caryophyllaceae:	*Stellaria decipiens* Hook. f.
	Colobanthus muscoides Hook. f.
	hookeri Cheesm.
	apetalus (Labill.) Druce.
	apetalus var. *alpinus* (Kirk) L. B. Moore
Ranunculaceae:	*Ranunculus pinguis* Hook. f.
	subscaposus Hook. f.
Cruciferae:	*Cardamine subcarnosa* (Hook. f.) Allan
	corymbosa Hook. f.
	depressa Hook. f.
	depressa var. *stellata* Hook. f.
Droseraceae:	*Drosera stenopetala* Hook. f.
Crassulaceae:	*Tillaea moschata* D. C.
Rosaceae:	*Acaena pusilla* var. *antarctica* (Ckn) Allan
	minor Hook. f.
Geraniaceae:	*Geranium microphyllum* Hook. f.
Callitrichaceae:	*Callitriche antarctica* Engelm.
Onagraceae:	*Epilobium confertifolium* Hook. f.
	alsinoides A. Cunn.
	linnaeoides Hook. f.
	findlayi Allan.
Haloragidaceae:	*Haloragis uniflora* T. Kirk
Araliaceae:	*Stilbocarpa polaris* A. Gray
Umbelliferae:	*Hydrocotyle* sp.
	Anisotome latifolia Hook. f.
	antipoda Hook. f.
Epacridaceae:	*Dracophyllum longifolium* R. Br.
	scoparium Hook. f.
Myrsinaceae:	*Myrsine divaricata* A. Cunn.
Gentianaceae:	*Gentiana antarctica* T. Kirk
Boraginaceae:	*Myosotis antarctica* Hook. f.
	capitata Hook. f.
	pygmaea var. *drucei* L. B. Moore
Scrophulariaceae:	*Hebe elliptica* Forst.
	benthami Hook. f.
Rubiaceae:	*Coprosma parviflora* Hook. f.

ciliata Hook. f.
cuneata Hook. f.
pumila Hook. f.

Campanulaceae: *Pratia arenaria* Hook. f.
Stylidaceae: *Phyllachne clavigera* F. Muell.
Compositae: *Lagenophora pumila* Cheesm. (Forst. f.)
Brachycome radicata Hook. f.
Pleurophyllum speciosum Hook. f.
criniferum Hook. f.
hookeri Buch.
Celmisia vernicosa Hook. f.
Helichrysum bellidioides Willd.
Craspedia uniflora Forst.
Cotula plumosa Hook. f.
lanata Hook. f.
minor Hook. f. (?sp.)
Abrotanella spathulata Hook. f.
rosulata Hook. f.
Taraxacum magellanicum Comm.

Introduced species: This list is taken directly from Sorensen (1951). These plants were noted growing on the island, but some may not have survived. Many are limited to the camp areas.

Pinaceae: *Picea* sp. Spruce.
Gramineae: *Anthoxanthum odoratum* Linn. Sweet Vernal.
Alopecurus geniculatus Linn. Foxtail.
Agrostis tenuis Sibth.
Holcus lanatus Linn. Yorkshire Fog.
Avena sativa Linn. Common Oat.
Arrhenatherum elatius (L.) Mert. et Koch. False Oat-grass.
Cynosurus cristatus Linn. Dogstail.
Dactylis glomerata Linn. Cocksfoot.
Poa annua Linn. Annual meadow-grass.
pratensis Linn. Meadow-grass.
trivialis Linn. Roughish Meadow-grass.
Festuca rubra Linn.
Lolium perenne Linn. Rye-grass.
multiflorum Lam.
Liliaceae: *Phormium tenax* Forst. New Zealand Flax.
Polygonaceae: *Polygonum persicaria* Linn. Willow-weed.
aviculare Linn. Wire-weed.
Rumex obtusifolius Linn. Common Dock.
crispus Linn. Curled Dock.
acetosella Linn. Sheep's Sorrel.
sp.
Caryophyllaceae: *Cerastium vulgatum* Linn. Mouse-ear Chickweed.
Stellaria media (L.) Vill. Common Chickweed.

	graminea Linn. Lesser Stitchwort.
	Sagina procumbens Linn.
	Spergula arvensis Linn. Yarr or Spurrey.
Ranunculaceae:	*Ranunculus repens* Linn. Creeping Buttercup.
Papaveraceae:	*Fumaria officinalis* Linn. Fumitory.
Cruciferae:	*Capsella bursa-pastoris* Medic. Shepherd's Purse.
	Coronopus didymus (L.) Sm. Wart-cress.
Leguminosae:	*Trifolium repens* Linn. White Clover.
	pratense Linn. Red Clover.
	dubium Sibth. Yellow Suckling Clover.
Ericaceae:	*Calluna vulgaris* Salisb. Ling or Heather.
Primulaceae:	*Anagallis arvensis* Linn. Pimpernel.
Convolvulaceae:	*Convolvulus ?arvensis* Linn. Smaller Bindweed.
Labiatae:	*Prunella vulgaris* Linn. Self-heal.
Solanaceae:	*Solanum tuberosum* Linn. Potato.
	sp.
Scrophulariaceae:	*Veronica tournefortii* Gmel.
	agrestis Linn.
	Digitalis purpurea Linn. Foxglove.
Plantaginaceae:	*Plantago lanceolata* Linn. Ribwort.
Compositae:	*Bellis perennis* Linn. Daisy.
	Achillea millefolium Linn. Yarrow.
	Hypochaeris radicata Linn. Catsear.

ARTHROPOD ENVIRONMENTS ON CAMPBELL ISLAND

The niches of insects and other arthropods on Campbell are largely terrestrial or involve low-lying plants such as mosses, lichens, other primitive plants, and cushions or mats consisting of higher plants in low dense growth form like mosses, as well as the extensive tussock grass. The few taller plants such as *Dracophyllum*, the tallest and most predominant woody plant, and *Coprosma*, *Hebe*, and *Myrsine* (fig. 6f), are to some extent less populated by insects, although they do provide a significant environment. Other important environments are the various bird rookeries, the stony beaches, particularly under decomposing *Durvillea* kelp, as well as seal wallows, streams and various herbs, large and small in size.

Mosses and cushion plants: Various herbs appear like mosses, have low dense growth form, forming cushions or mats (fig. 7b), and provide quite an important environment. Important plant elements are: *Colobanthus*, *Gaimardia*, *Oreobolus*. Under these, as well as mosses, including tundra, may be found some of the richest arthropod assemblages on the island. Springtails, and various beetles, particularly tenebrionids of the genus *Pseudhelops*, carabids of the genus *Pseudoopterus*, staphylinids of the genus *Omalium*, and weevils of the genus *Gromilus*, are fairly abundant under these plants. Most of them may be found at the bottom of the plants or their roots, next to the ground, when the plants are pulled upward. Of most of the beetles, larvae, pupae and adults occur in more or less the same layer, and may be observed more or less together. Often these mat plants grow on boulders, or rocky ground, and when lifted up they more or less separate from the rock at

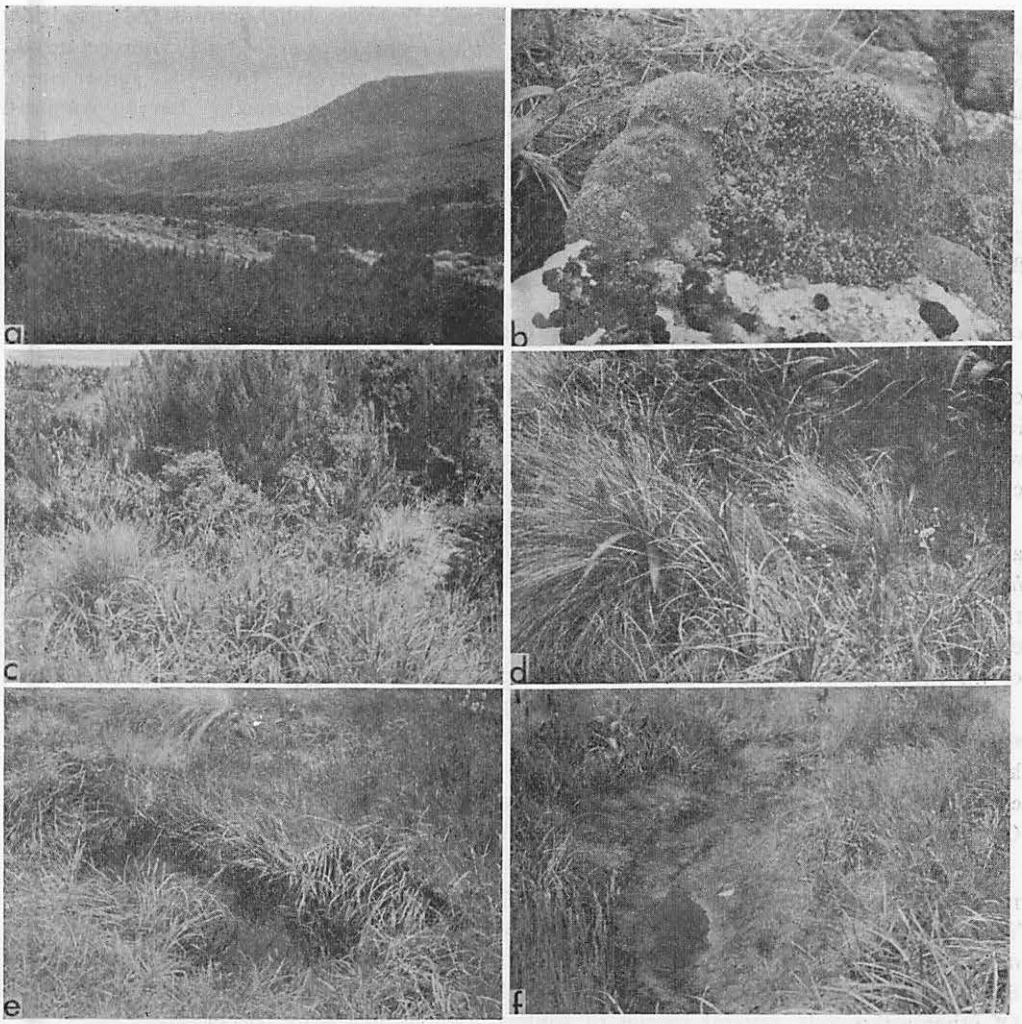

Fig. 7. a, valley above old camp, Tucker Cove, showing saddle between St. Col Ridge and Mt. Lyall, with pale tussock, dark *Dracophyllum* and old sheep path; b, cushion vegetation (mosses and lichens) on rocks on W. side Beeman Hill; c, mixed *Dracophyllum scoparium* and *Coprosma* in background, *Bulbinella* lower left and *Carex appressa* to its right, grass at right: in Beeman-Lyall Saddle; d, *Poa, Bulbinella,* sedge, *Helichrysum bellidioides,* Beeman-Lyall Saddle; e, old elephant seal wallow with sedges, *Carex appressa* and *Bulbinella,* nr. Tucker Cove; f, old elephant seal wallow with sedges, *Poa, Carex appressa* and *Bulbinella,* nr. Tucker Cove.

the substrate, with often a thin layer of soil between the plants and the rock. It is in this layer, or higher among the roots, where most of the insects are found. In addition to the above there are several other families of beetles, mealybugs, lepidopterous larvae, various flies and undoubtedly some Hymenoptera. Besides the insects, there are various mites, small spiders, millipedes, centipedes, a pseudoscorpion, and isopods.

Of the flies in this environment, some of the small flightless dolichopodids and ephydrids were most numerous, though rarely abundant. Their larvae were largely unrecognized, but may live higher among the denser parts of the same plants. In good weather these small flies run about on the surface of the cushion plants or the rocks. Larger wingless or short-winged flies, such as the anthomyid *Coenosia* are also sometimes found in this environment, although the adults are most often seen on the flowers of *Bulbinella*, where they walk about on the flower heads and run or jump downward when disturbed. The completely wingless dolichopodid, *Acropsilus borboroides*, is also found on the *Bulbinella* flowers.

The small slender wingless ichneumonid wasp was also found on one or two occasions under cushion plants. Presumably it parasitizes larvae of a moth or fly.

Peat bogs: These occur at both low and high altitudes (fig. 8). They are generally covered with cushion plants and mosses. These are wet environments less favorable to insects than the cushion plants and mosses on rock or soil. Though the bogs are always wet and spongy, they are not as wet as the occasional *Sphagnum* "sumps", which are composed entirely of mosses.

Tussock: Tussock grasses (figs. 6b, 7a) dominate much of the surface of Campbell except at the higher altitudes, and except for much of the medium-low altitudes where *Dracophyllum* scrub may predominate. Actually, tussock was even more predominant originally, and the grazing of sheep for several decades has reduced the tussock and tended to produce dominance by *Bulbinella* in many of the medium higher altitudes, particularly on the tops of the more gently rounded and lower hill-tops.

Dense growth of tussock still occurs to the tops of even some of the higher hills, to slightly over 300 m alt., but becomes much lower in growth and sparser or lacking at higher altitudes. The dominant species of the tussock is *Poa litorosa*. *Poa foliosa*, however, has a much larger growth form, and seems to be particularly rich in insect fauna. *Chionochloa antarctica* grows at the higher altitudes (fig. 6b).

The insect fauna of larger heads of tussock at low to medium altitudes may be quite rich. Much of the fauna occurs among the bases of the stems and among the roots. These include as many as four species of mealybugs in both of these niches, carabid beetles of the genus *Pseudoopterus*, occasional staphylinid beetles and weevils, lepidopterans, some flies, and at least two species of wasps (wingless ichneumonid; shorter wingless diapriid). Of other arthropods, several species of spiders, and various mites, occur.

Other grasses: Certain species of grasses (*Hierochloe*, *Agrostis* and *Deschampsia*) more or less cover the ground or develop mat-like growth. Among these may be found adults of some of the brachypterous moths, and presumably their larvae may live in the grass stems, or among the roots.

Sedges: One of the small, pale, slender-winged jumping moths (*Euproteodes*) is particularly abundant on common sedges (mostly *Scirpus* and *Carex*) on protected lowland slopes, as at Tucker Cove and Beeman Point (fig. 7 d-f). A leaf-mining larva found also to be abundant in the same sedge is probably the larva of this species (reported from tussock by Sorenson, but "tussock" may also include sedges). Some of the common flies (including *Pseudohaeterella*) were frequently taken from the same sedges.

Larger herbs: *Bulbinella rossii* (figs. 6b, 12a) is at present the most abundant larger herb on Campbell. It is surprisingly poor in insects. The adult of the brachypterous anthomyid

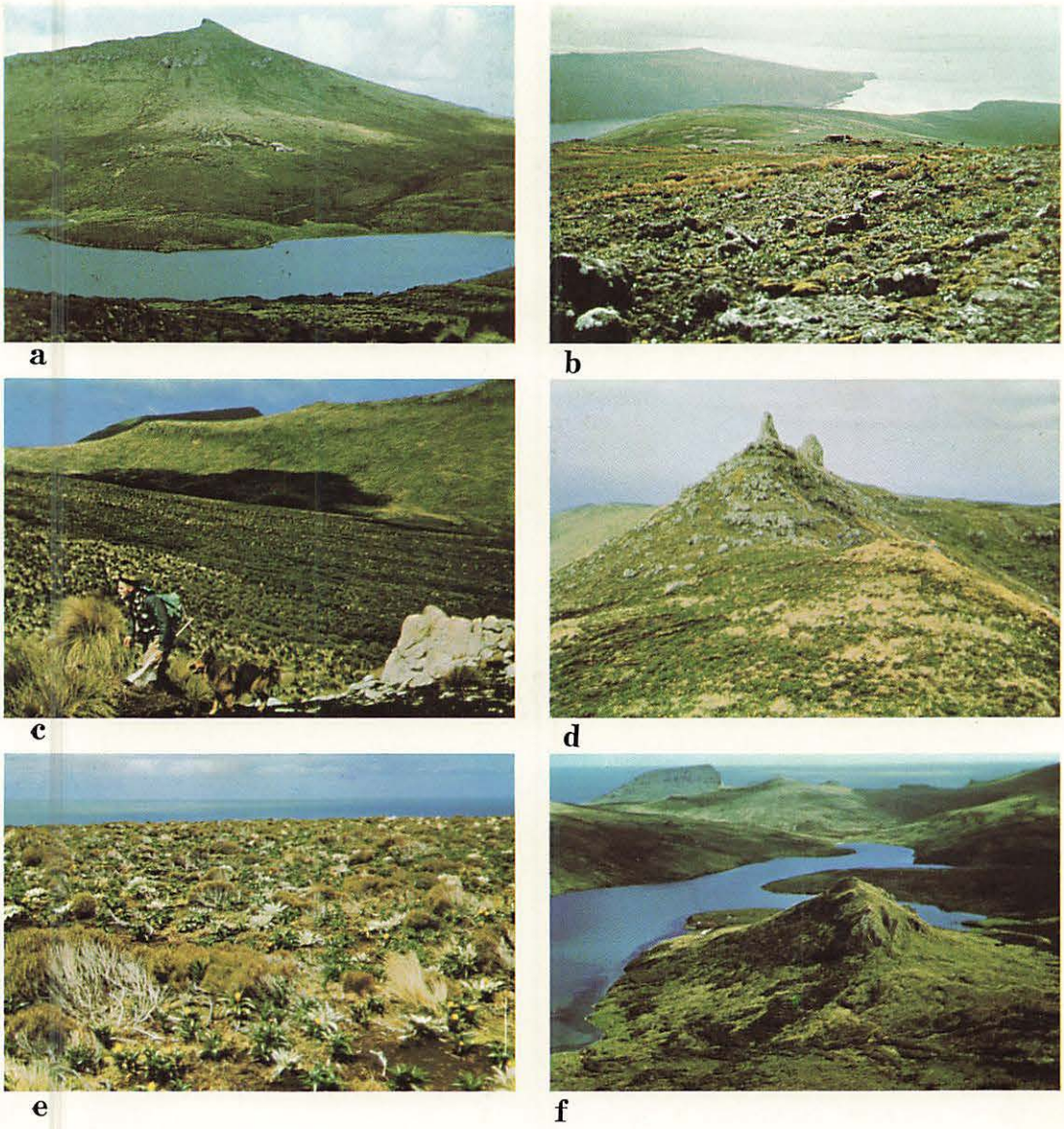

Fig. 8. a, Mt. Honey across Perseverance Hbr. from Mt. Lyall: lower dark areas are *Dracophyllum* scrub; b, looking towards mouth of Perseverance Hbr. from nr. summit of Mt. Honey: mostly moss and lichens (almost feldmark) in foreground; c, between Mt. Honey and Filhol Peak: Rennell between tussock and volcanic outcrop, low *Dracophyllum* scrub interspersed with tussock in center and tussock with *Bulbinella* in back; d, summit of Mt. Lyall with tussock and *Bulbinella* in foreground; e, plateau towards Mt. Lyall from Moubray Hill, with dwarfed *Bulbinella*, tussock, *Coprosma* and *Dracophyllum*, and bared peat at lower right; f, Beeman Hill looking down from Mt. Lyall: Beeman Camp at left center and inner end of Perseverance Hbr. with Lookout Bay at lower left, Tucker Cove at far right center, Camp Cove behind it, Garden Cove at end and Venus Bay in upper center; Mt. Honey at left, Mt. Eboulé in left distance, Filhol Peak in middle distance and Mt. Dumas slopes at far right.

Fig. 9. a, Collecting site in mollymawk rookery on N. side Courrejolles Pen.: gray-headed mollymawks in foreground and black-browed mollymawks in center; b, rockhopper penguin rookery behind boulder beach in Rocky Bay; c, wind-contoured *Coprosma* bush in center, with *Polystichum* fern in front, tussock at side, *Bulbinella* at left and *Dracophyllum* behind; d, boulders with lichens, moss, mat plants and scattered *Bulbinella* (yellow flowers) on SW slopes of Mt. Lyall; e, cushion of *Phyllachne clavigera* with *Pleurophyllum hookeri* above and *Bulbinella rossi* at left; f, air-borne insect nets on frame nr. Beeman Point on windy day with waves going out from shore; one net downed by wind.

fly *Coenosia* is frequently seen on the flower heads, and jumps or runs downward when disturbed. Presumably its larva might live among the roots, or in rotten stems and leaves. The small wingless dolichopodid (*Acropsilus borboroides*) was found on the flower heads near the summit of Mt. Azimuth, although at lower altitudes it was found among mat plants. The largest weevils (*Oclandius*) feed on *Bulbinella*.

Large herbs of the genus *Pleurophyllum* (Compositae) are rich in insects. The largest, *P. speciosum* is a particular favorite, but being especially prized by sheep, it is rare except in inaccessible spots. Among the fauna of this species are several spiders, mites, springtails, mealybugs, a common greenish caterpillar, occasional carabids, staphylinids and weevils, several flies (maggots feeding in decaying leaves and stems), and the wingless ichneumonid wasp. Two other species, *P. hookeri* (fig. 9) and *P. criniferum* are more abundant, but slightly poorer in fauna.

One of the small herbs, *Cotula plumosa*, which is particularly abundant around elephant seal wallows and low protected places, is a favorite host of some of the common species of aphids. The large herb *Stilbocarpa polaris* is a host to a number of kinds of insects, but the plant has been badly eaten out by sheep and only grows in inaccessible places.

Two species of the large herb *Anisotome* are conspicuous where safe from sheep, one in rocky places at higher altitudes. Their abundant flowers were not noted to attract many insects. Nor were insects found feeding on the plants. Rather few of the plants were closely examined, however, because of their scarcity, primarily occurring on inaccessible cliffs.

Dracophyllum: This is a dominant woody plant, and includes two abundant species. They grow on the lower slopes in slightly protected environments. Often the *Dracophyllum* scrub forms a dense band along the lower slopes of the hills (figs. 5, 6 a, c, f, 13e). In favorable places it grows to a height of more than 3 meters. The long slender leaves accumulate in a thick layer beneath the shrubs, and the lower portions of this layer provide a rich environment when sufficiently damp and decaying. Here there may be large numbers of springtails and mites, and sometimes some spiders and certain beetles. On the leaves, some green and brown caterpillars are fairly abundant. These may be the young of some of the abundant geometrid moths. A slender pale-winged weevil (*Peristoreus*) is abundant on the pale flowers of *Dracophyllum*. This is possibly the only flying beetle on the island. A medium-small winged chalcidoid (Eulophidae: *Ardalus*) is also found on the flowers. The larger winged ichneumonid and a braconid (*Rogas*) are both quite abundant around this shrub, and probably parasitize the above moth larvae. Two species of Psocoptera occur on the branches.

Streams: Water insects are rather few on Campbell, but interestingly there are three species of stoneflies. However, only two of these occur in streams. One of the latter has aquatic nymphs and winged adults; the other has aquatic nymphs and wingless terrestrial adults. One species of simuliid fly ("black fly", "sand fly") is moderately common near the lower portions of streams, but is rarely very abundant.

Ponds: There are rather few ponds on Campbell, and the few tarns (fig. 11b) seem to harbor rather little insect life—perhaps only a few chironomid midges. The bogs and elephant seal wallows, however, are richer, and support chironomid midges as well as other types of midges and flies. Insect life does not seem to be abundant in Six-foot Lake (fig. 6c).

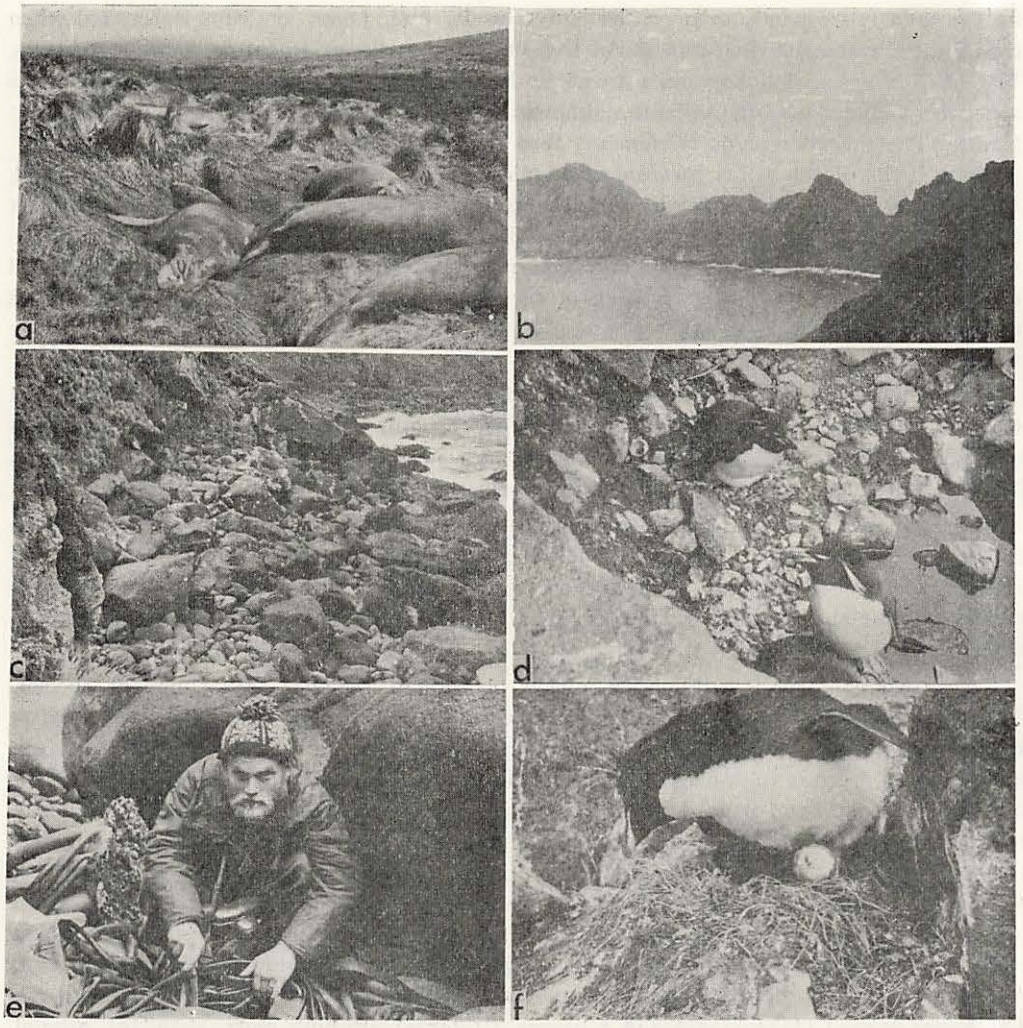

Fig. 10. a, young male elephant seals showing effect on *Poa* tussock, with low *Dracophyllum* in mid background; b, S. side of major portion of Courrejolles Pen. (most of slopes covered with mollymawk nests); c, boulder beach, Rocky Bay with rockhopper penguin rookery in left center and four penguins on boulder at lower right; d, rockhopper penguin rookery showing nests largely of stones, Rocky Bay; e, K. Rennell searching for flightless coelopid flies in *Durvillea* kelp washed up on shingle-boulder beach, Rocky Bay, with coelopid egg masses at lower left; f, rockhopper penguin with egg, on nest partly of grass in upper portion of rookery, Rocky Bay.

Rocks on hills: Under rocks at higher altitudes (fig. 8) a few kinds of insects may be fairly abundant, even though vegetation may be scarce. One of these is the third stonefly, which is terrestrial both as a nymph and wingless adult, and is found quite high up under flattish rocks even in only slightly damp places. Others commonly found under rocks are tenebrionids (*Pseudhelops*), carabids (*Pseudoopterus*), weevils and others. Some of these live under thin growth of grass, and move under the rocks to pupate.

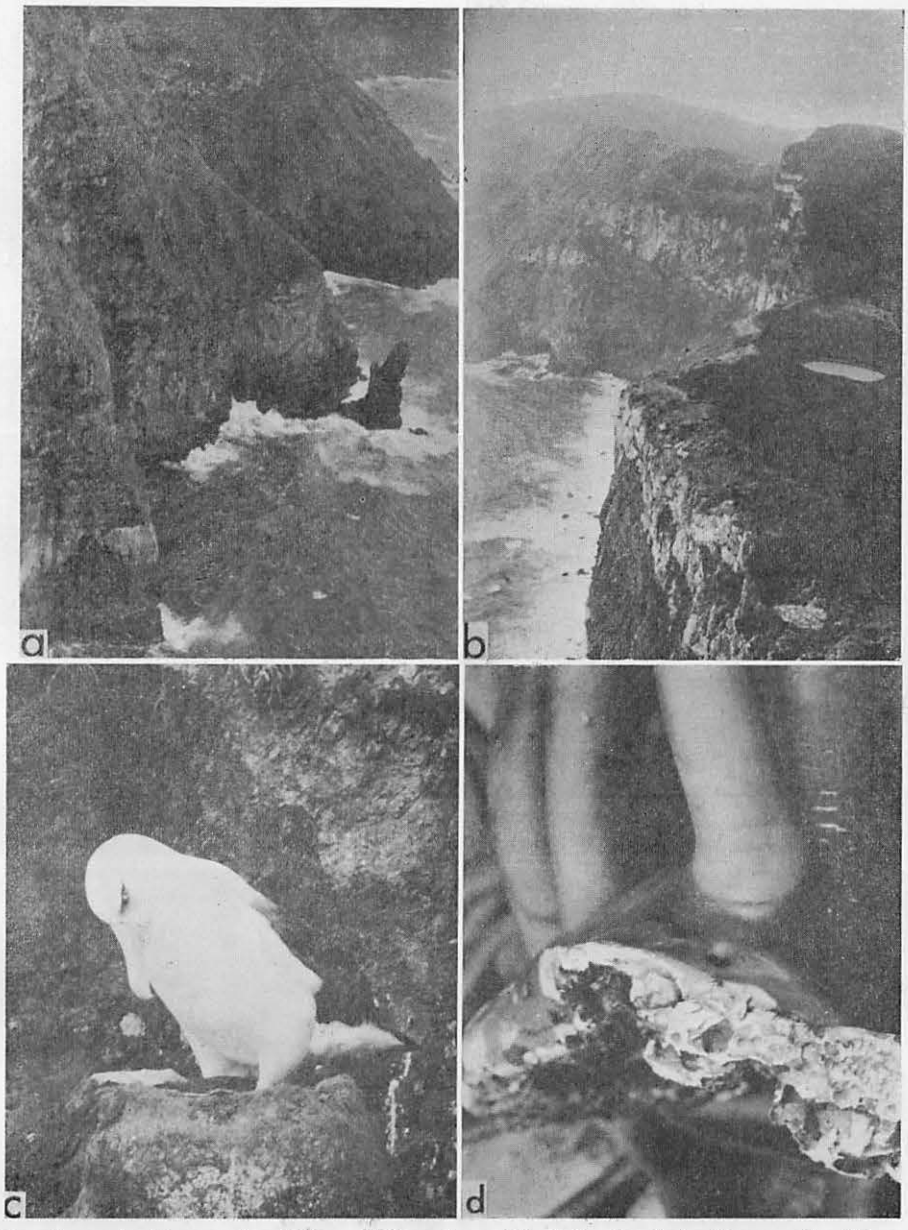

Fig. 11. a, looking south, cliffs on NW coast nr. Mt. Azimuth; b, looking north, cliffs on NW coast N of Mt. Azimuth; c, black-browed mollymawk on nest, N. side of Courrejolles Pen.; d, holdfast of washed up *Durvillea* kelp with winged coelopid flies (center and upper left), Rocky Bay.

Rocks in inter-tidal zone: A fairly rich fauna occurs under rocks in the inter-tidal zone in coves in Perseverance Harbor. In cavities under some of the larger rocks in Tucker Cove, we found springtails, including a bright purple species, mites, including a bright red

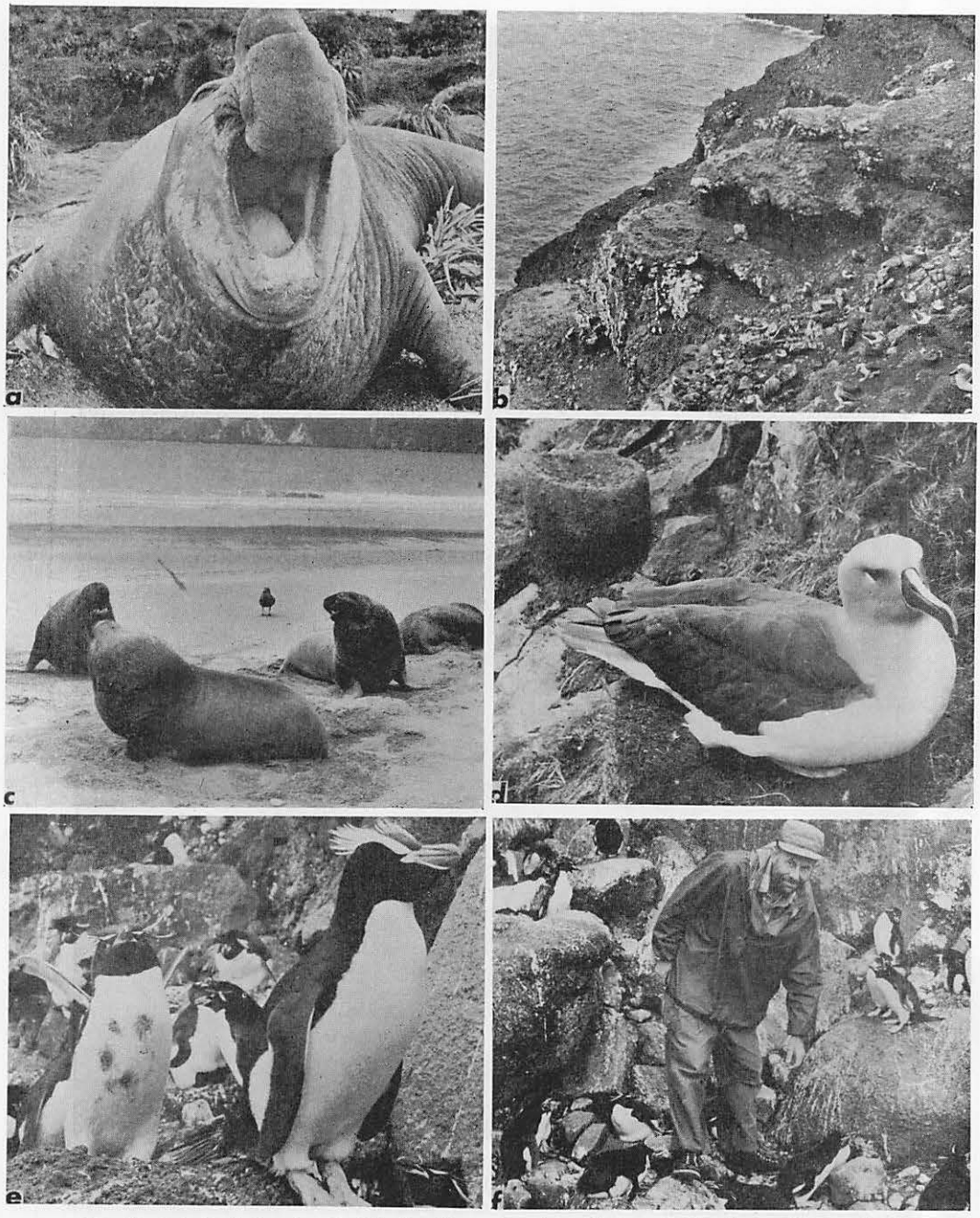

Fig. 12. a, bull elephant seal at Tucker Cove, showing effect on *Bulbinella*, and *Poa* and other grasses; b, rookery of gray-headed mollymawk (right foreground) and black-browed mollymawk (below) on north side, Courrejolles Pen.; c, New Zealand sea lion, bulls fighting on middle beach, Northwest Bay, with skua in center and red-billed gull at far right; d, gray-headed mollymawk on nest, with abandoned nest at upper left, N. side of Courrejolles Pen., nr. ridge (type locality for a number of arthropods); e, rockhopper penguin rookery, Rocky Bay, with erect-crested penguin visitor at right; f, Gressitt in rockhopper penguin rookery, Rocky Bay (latter taken by Rennell).

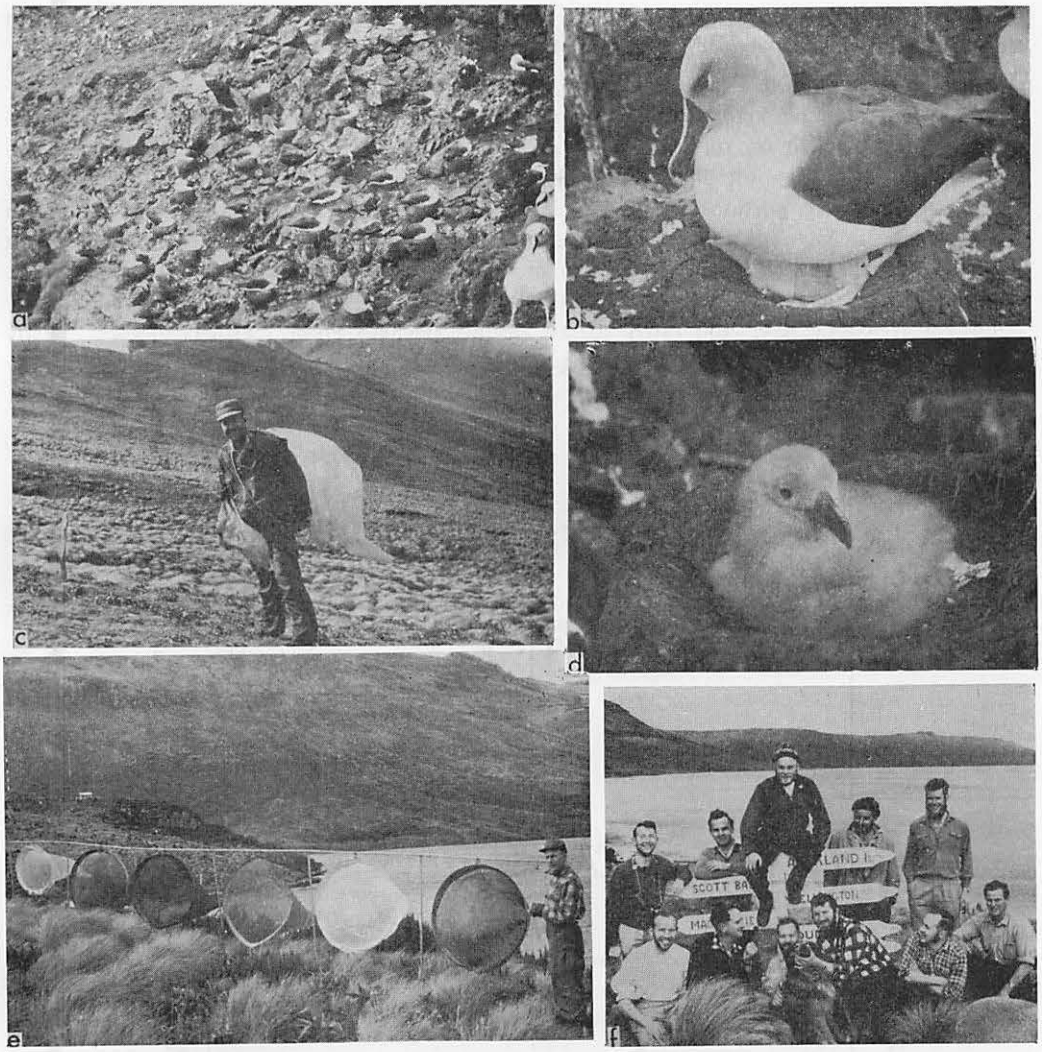

Fig. 13. a, rookery on N. side Courrejolles Pen.: black-browed mollymawks, with two gray-headed mollymawks in lower right corner; b, gray-headed mollymawk on nest, with chick, Courrejolles Pen.; c, Gressitt with nets leeward of tops of cliffs between St. Col Ridge and Mt. Azimuth, showing effect of wind on tussock and *Bulbinella*, and wind erosion on old sheep fence post; d, young mollymawk in nest, where fleas were abundant; e, Beeman Point, with battery of nets for dispersal study (before elevation), with Gressitt, and slopes of Mt. Lyall in background with *Dracophyllum* scrub at left center (b-e taken by Rennell); f, summer 1961–62 population of Campbell I.; front row (L to R): S. Smith, I. G. Fisher, I. Johnson, D. Polson, R. Lamb, G. Voigt; back row: R. B. Goffin, L. Rush, K. Rennell, C. Clark (officer in charge), L. Cooper; pet dog and pet lamb in front.

kind, carabid beetles (particularly *Kenodactylus*), several species of staphylinid beetles, the pselaphid, and others.

Rocky shores: On rocky points and terraces above the normal waveline, a brachypter-

ous moth (*Tinearupa sorenseni* Salmon & Bradley) is fairly common, blending well with the rocks and lichens, its larvae presumably feeding on the latter.

Shingle beaches: On some of the fairly steep beaches, of large pebbles to large rounded rocks or boulders, kelp flies may be quite abundant. These are members of the Coelopidae. They oviposit on rotting *Durvillea* kelp (figs. 10e, 11d), and the maggots feed inside the kelp. The adult flies roam about on the kelp and within its cavities and the eaten or rotted-out portions. The largest species, *Baeopterus robustus*, which has much reduced wings, has slightly larger wings and body in the male, and was found only on windward beaches, such as at Rocky Bay on the SW. It occurred there in large numbers, however. *Icaridion nasutum*, a totally wingless species of quite variable size, was very abundant at Rocky Bay, and fairly scarce around Beeman Point. Other species, mostly belonging to the genus *Coelopa*, are winged, but do very little flying

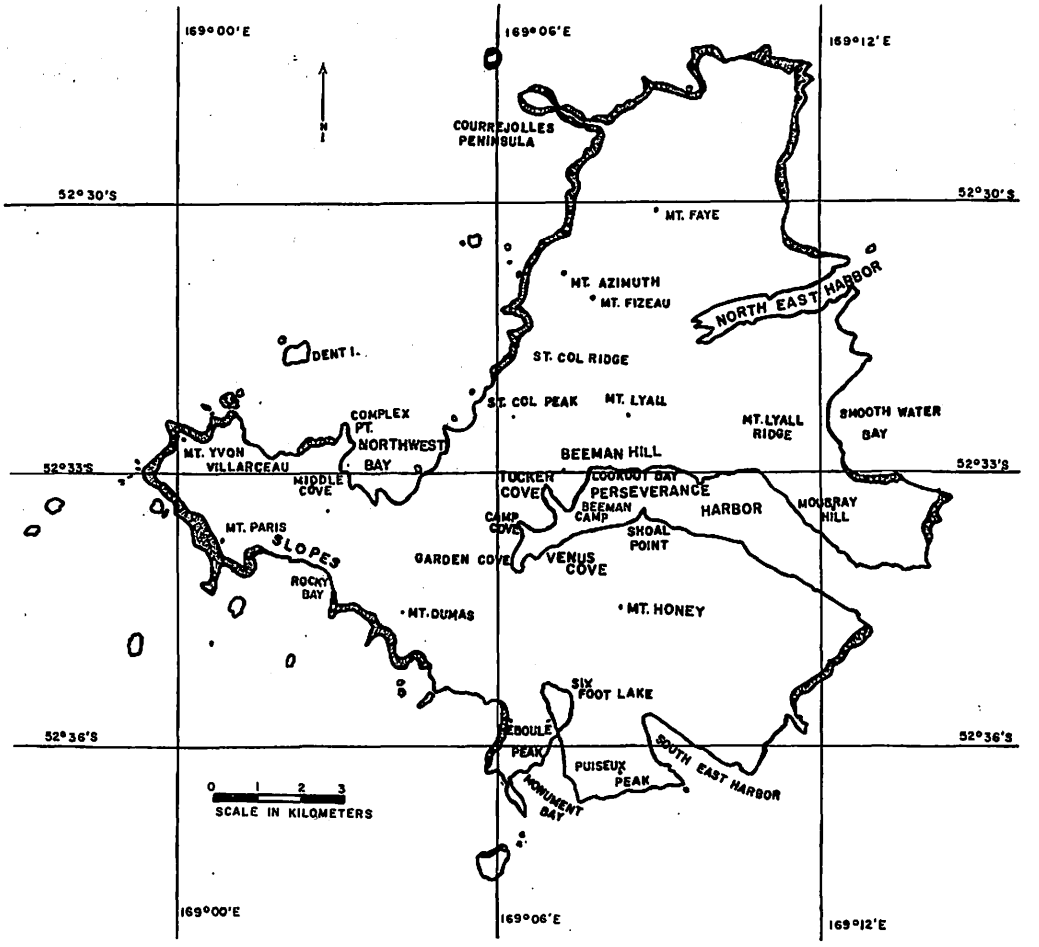

Fig. 14. Map of Campbell I. indicating principal arthropod collecting localities. "Slopes" by Rocky Bay indicates the locality "slopes above rocky Bay."

Carrion: In the corpses of seals maggots of various flies occur, including blow flies, psychodids and muscids. Also staphylinids and secondarily others occur here. Dead birds also attract more or less the same insects.

Bird nests: The environments of rookeries, particularly of mollymawks (*Diomedea chrysostoma, D. melanophrys*), provide some of the richest arthropod habitats on Campbell (figs. 11c, 12 b, d, 13 a, b, d). Although the most numerous bird species is the rockhopper penguin (several million), its rookeries are not as favorable for arthropods as are those of albatrosses or other birds, because its nests consist largely of rock and pebbles, with rather little soil, moss or other plants or materials. The mollymawk nests (both species nesting close together), as observed on Courejolles Peninsula, are cylindrical, being built up of moss, turf, excrement and debris, with a distinct cavity on the top. Within the nests fleas and their larvae were found to be quite abundant. Also mites were found in the nests. On the steep slopes around the nests there is an abundance of moss and other small plants. This environment was very rich in arthropods, with numerous adult ticks and their egg-masses in the moss (early December), various mites, spiders, moths (Sorenson found here the same species we found primarily lower on exposed rocks above the sea). Also there were various kinds of beetles, including carabids, staphylinids, the salpingid, weevils, and others. Flies including the wingless crane-fly, short-winged psychodid, some brachypterous dolichopodids, small-winged ephydrids, and others, were also found.

Other bird nests examined yielded varying results. Skua nests generally containing fairly dry loose grass, seemed rather poor. Sooty albatross nests were rather productive, being quite solid and matted, with quite a bit of vegetation, debris and soil. Arthropods typical of soil and cushion plants were found in these nests. Royal albatross nests are somewhat intermediate in consistency between those of sooty albatross and skua, and produced some insects.

Rockhopper penguin nests are much less rich than mollymawk nests, but have some variety of arthropods if not too wet. Lower and wetter nests (figs. 10d, 12 e, f) are poor in insects, but those higher and near vegetation (fig. 10f) have more species. Yellow-eyed penguin nests also vary in suitability for insects, sometimes being quite wet and slimy with mud and excrement.

VERTEBRATE FAUNA

There are no native land mammals or native land birds, and no reptiles, amphibians or true fresh-water fish (galaxids are present) on Campbell I. Thus the native vertebrate fauna is almost entirely associated with the sea, as characteristic of oceanic islands. Most of the mammals and all of the native sea birds breed on land. Disregarding whales (of which the right whale is most numerous), the native mammals are all seals. Elephant seal, hair seal (sea lion) and fur seal are most numerous, in that order. The leopard seal is an occasional visitor.

Introduced mammals still present include the Norway rat, cat, sheep and cattle. The rats are abundant, but the cats rather scarce. I saw many rats, but only two cats. There are about 1000 sheep and about 20 cattle on the island. There was one pet male dog on the island.

The native birds consist of many kinds of sea birds, particularly albatrosses, penguins,

petrels, shags, ducks, shore birds, skua, gulls and terns. Introduced birds (some perhaps spread by wind) include thrushes, sparrow, pipit, white-eye, finches and starling. Following is a systematic list of the mammals and birds of Campbell I. Those asterisked are stragglers and do not breed on the island (After Bailey & Sorensen, 1962).

MAMMALS

Pinnipedia: Otariidae: *Neophoca hookeri* (Gray). New Zealand sea lion
Arctocephalus forsteri (Lesson). New Zealand fur seal
Phocidae: *Hydrurga leptonyx* (Blainville). Leopard seal
Mirounga leonina (Linn.). Southern elephant seal

BIRDS

Sphenisciformes: Spheniscidae: *Aptenodytes patagonicus* Miller. King penguin*
Megadyptes antipodes (Homb. & Jacq.). Yellow-eyed penguin
Eudyptes c. crestatus Miller. Rockhopper penguin
chrysolophus schlegeli Finsch. Royal penguin*
p. pachyrhynchus Gray. Crested penguin*
p. sclateri Buller. Erect-crested penguin

Podicipediformes: Podicipedidae: *Podiceps cristatus australis* Gould. Southern crested grebe*

Procellariiformes: Diomedeidae: *Diomedea ex. exulans* Linn. Wandering albatross
ep. epomophora Less. Southern royal albatross
melanophris impavida (Mathews). Black-browed mollymawk
chrysostoma Forster. Grey-headed mollymawk
c. cauta Gould. White-capped mollymawk*
Phoebetria palpebrata (Forster). Light-mantled sooty albatross

Procellariidae: *Macronectes giganteus* (Gmelin). Giant petrel
Daption c. capensis (Linn.). Cape pigeon*
Pachyptila desolata alter (Mathews). Auckland Island prion*
belcheri (Mathews). Narrow-billed prion*
Puffinus griseus (Gmelin). Sooty shearwater
tenuirostris (Temminck). Short-tailed shearwater*
Procellaria cinerea Gmelin. Grey petrel
aequinoctialis steadi Mathews. White-chinned petrel
Pterodroma lessoni (Garnot). White-headed petrel*

Hydrobatidae: *Garrodia nereis* (Gould). Grey-backed storm petrel*
Fregetta tropica (Gould). Black-bellied storm petrel*

Pelecanoididae: *Pelecanoides urinatrix exsul* Salvin. Subantarctic diving petrel*

Pelecaniformes: Phalacrocoracidae: *Phalacrocorax carbo novaehollandiae* Stephens. Black shag*

melanoleucos brevirostris Gould. Whitethroated shag*

cam. campbelli (Filhol). Campbell Island shag

Ciconiiformes: Ardeidae: *Egretta alba modesta* (Gray). White heron*

Notophoyx novaehollandiae (Latham). White-faced heron*

Anseriformes: Anatidae: *Anas castanea nesiotis* (Fleming). Campbell Island teal*

s. superciliosa Gmelin. Grey duck

p. platyrhynchos Linn. Mallard*

Falconiformes: Accipitridae: *Circus approximans gouldi* Bonaparte. Australasian harrier*

Falconidae: *Falco novaeseelandiae* Gmelin. New Zealand falcon*

Gruiformes: Rallidae: *Porphyrio porphyrio melanotus* Temminck. Pukeko*

Charadriiformes: Haematopodidae: *Haematopus ostralegus finschi* Martens. South Island pied oystercatcher*

Charadriidae: *Lobibyx novaehollandiae* (Stephens). Spur-winged plover*

Charadrius bicinctus Jardine & Selby. Banded dotterel*

Scolopacidae: *Limosa lapponica baueri* Naumann. Bar-tailed godwit*

haemastica (Linn.). Hudsonian godwit*

Calidris c. canutus (Linn.). Knot*

Stercorariidae: *Catharacta skua lonnbergi* (Mathews). Southern skua

Laridae: *Larus dominicanus* Lichtenstein. Southern black-backed gull

novaehollandiae scopulinus Forster. Red-billed gull

Sterna vittata bethunei Buller. Antarctic tern

paradisaea Pontoppidan. Arctic tern*

striata (Gmelin). White-fronted tern*

Apodiformes: Apodidae: *Chaetura c. caudacuta* (Latham). Spine-tailed swift*

Passeriformes: Hirundinidae: *Hirundo neoxena* Gould. Welcome swallow*

Turdidae: *Turdus philomelos* Brehm. Song thrush

merula Linn. Black thrush; blackbird

Prunellidae: *Prunella modularis occidentalis* (Hartert). British hedge sparrow

Motacillidae: *Anthus n. novaeseelandiae* (Gmelin). New Zealand pipit

Zosteropidae: *Zosterops lateralis* (Latham). White-eye

Fringillidae: *Chloris chloris* (Linn.). Greenfinch*

Carduelis carduelis britannica (Hartert). Goldfinch*

flammea cabaret (P.L.S. Mueller). Lesser redpoll

Fringilla coelebs gengleri Kleinschmidt. Chaffinch

Emberiza c. citrinella Linn. Yellow hammer*

Sturnidae: *Sturnus v. vulgaris* Linn. Starling

Note: For references cited, see BIBLIOGRAPHY, page, 596.

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WEATHER AND CLIMATE OF CAMPBELL ISLAND

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Abstract: The position of Campbell I. relative to the large-scale weather systems of the subantarctic oceans and its rugged terrain make it a cloudy, bleak, windswept island with a moderate rainfall spread over more than 300 days a year.

Some typical meteorological situations affecting Campbell I. are described and the individual elements of its climate are considered in detail.

Lying 640 km south of New Zealand (lat. 52.5° S, long. 169° E), Campbell I. is situated north of the latitudes usually traversed by the centers of the great cyclonic storms of the southern oceans and south of the paths usually taken by the travelling anticyclones of subtropical latitudes. It is in a region of strong and persistent westerly winds. The island is about 120 sq. km in area and the coastline mainly precipitous. The surface is rugged and hilly, with 10 peaks over 300 m in height. The highest is 569 m. The combination of its position relative to the large-scale weather systems and its broken terrain makes Campbell I. a cloudy, bleak, wind-swept island with a moderate rainfall, which however, is spread over more than 300 days a year.

The extensive areas of peat with which the island is mainly covered are a consequence of the climate with its low temperatures, low annual sunshine amounts and moderate rainfall. There is little soil and the peat varies in depth from a few cm to over 12 m (Bailey and Sorensen, 1962).

Although the island was discovered in 1810, meteorological observations were not made in a systematic fashion until 1904 when some instruments were installed at the sheep station in Tucker Cove on Perseverance Harbor. Monthly averages for some climatic elements during January 1905–October 1907, together with a short account of the climate are given by Marshall (1909). Although there were shepherds on the island until 1931 no further observations appear to have been published until after 1945. Since 1945, a summary of climatological observations on Campbell I. has been published each year in the "Meteorological Observations" of the New Zealand Meteorological Service (Misc. Pub. 109).

In 1941, the New Zealand Government established coast watching stations on both Campbell and Auckland Is. to report on the presence of any enemy shipping. Regular meteorological observations were made at two sites on Auckland I. (Port Ross, July 1941–March 1945, and Carnley Harbor, May 1941 – April 1944) and at Tucker Cove, Campbell I. (lat. 52°33′ S, long. 169°06′ E). After the war, the station at Campbell I. was established on a permanent basis under the control of the New Zealand Meteorological Service and since then has provided regular weather reports, both of surface and upper air conditions. With its companion Australian station at Macquarie I., together they have furnished the only regular synoptic reports from a vast area of the Southern Ocean. These reports are

of the greatest value not only for day-to-day weather forecasting in the New Zealand area, but also in adding to a general understanding of the meteorology of the region.

Because of the broken nature of the island surface, it is impossible to find an observing site which would be unaffected by local conditions. From July 1941 to March 1957 observations were made on a small level area 500 m from the head of Tucker Cove in Perseverance Harbor. This site is in a sheltered valley oriented almost N–S. Since April 1957 the observing site has been at a less protected position on a spur in Perseverance Harbor about 650 m S of Beeman Hill (lat. 52°33′ S, long. 169°07′ E). It is somewhat sheltered from winds between NW and NNE and between SE and S. Winds here are generally gusty and the converging valleys sometimes give rise to violent squalls. Surface, radiosonde and radio-wind observations are now made at this site.

Weather systems affecting Campbell Island

A better understanding of the weather and climate of Campbell I. can be gained by considering the progression of the weather systems, between sub-tropical and subantarctic latitudes, which pass over the Australia–New Zealand area. If a series of surface weather maps for this area is studied, it is found that a succession of anticyclones moves across Australia, the Tasman Sea and New Zealand at intervals predominantly of 6 or 7 days. The centers of the anticyclones may pass to the N of New Zealand, across or sometimes even to the S of the country. The first type of path is more likely in winter and spring and the other two in summer and autumn. Not all of these anticyclones directly affect Campbell I.

Each anticyclone is separated from the next by a trough which is a zone of relatively low pressure. On the eastward side of the trough the wind is from a northerly quarter and on the westward side from a southerly or westerly quarter. Any marked differences in temperature between the air masses on the eastern and western sides of the trough usually result in the appearance of a cold front separating them. It is generally oriented NW or N to SE or S. The front may extend southwards to a deep depression centered somewhere between latitudes 55° S and the Antarctic Continent (see fig. 1). Sometimes this whole system of anticyclones, intervening front and depression in the far south moves eastwards across the New Zealand–Campbell I. area unchanged. As the cold front moves over Campbell I. it is preceded by strong, gale force winds often accompanied by violent gusting. The frontal passage is marked by a period of rain followed by a wind change to a westerly or southerly quarter and shower or hail conditions. Although frontal passages across Campbell I. are frequent, the above straightforward sequence of events is rather rare. It is not usual for an anticyclone to move from Australia, across New Zealand and out to the east without changing its intensity, speed and direction of movement. Connected with these changes are developments in the low pressure trough, which is an unstable region where depressions may form.

Depressions may originate in the Tasman Sea or in the Australian Bight (fig. 1). From the region of formation they tend to move in a SE direction growing in intensity as they move and sometimes passing over or near Campbell I. on their way to the southern oceans. Also anticyclones, on paths well S of their usual positions, sometimes move over Campbell I.

Although for much of the time the weather on the island is controlled by the passage

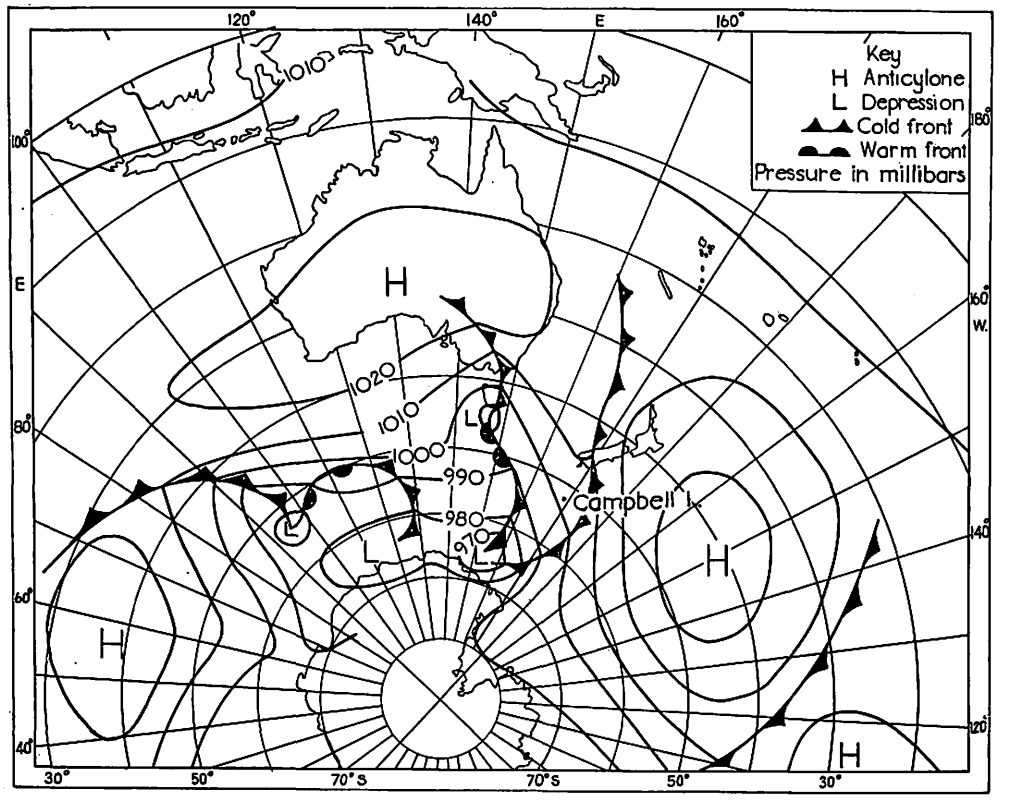

Fig. 1. Surface weather map for 00 GMT 18. V. 1962. Between each pair of anticyclones frontal systems extend southwards to depressions in the southern oceans. A new depression has formed S of Tasmania.

of cold fronts moving across from the west, it is not uncommon to find depressions or anticyclones in its neighborhood.

Anticyclones in the Campbell Island area

An estimate of the mean number of anticyclones passing over Campbell I. each month can be found from the surface pressure record. Having regard to the latitude of Campbell I., the passage of an intense anticyclone over the island is taken here as occurring when the 2100 GMT pressure is 1020 mb or more on one day or on several consecutive days.

In table 1 are given: a) the monthly mean number of anticyclone passages near Campbell I.; b) the mean daily (2100 GMT) M.S.L. pressure for each month and; c) the highest (2100 GMT) M.S.L. pressure in each month. All figures refer to the period 1941–62.

The highest pressure so far recorded on the island is 1038.6 mb. The above figures show that intense anticyclones are liable to move across Campbell in any month and that, on the average, the number of anticyclones crossing is greatest in winter and least in spring. During the passage over Campbell of an anticyclone, the weather usually remains overcast with periods of drizzle.

Table 1.

(a) Mean No. of anticyclone passages

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
1.1	1.2	1.3	1.7	1.8	1.3	2.0	2.0	1.4	1.0	0.8	1.0

(b) Mean daily M.S.L. pressure (mb) (2100 GMT)

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
1004.3	1005.2	1005.7	1005.2	1005.6	1003.8	1007.4	1005.9	1004.4	1003.2	1000.8	1002.8

(c) Maximum M.S.L. pressure (mb) (2100 GMT)

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
1028.2	1030.0	1029.0	1032.4	1037.0	1038.2	1038.1	1030.0	1035.0	1037.3	1028.2	1038.2

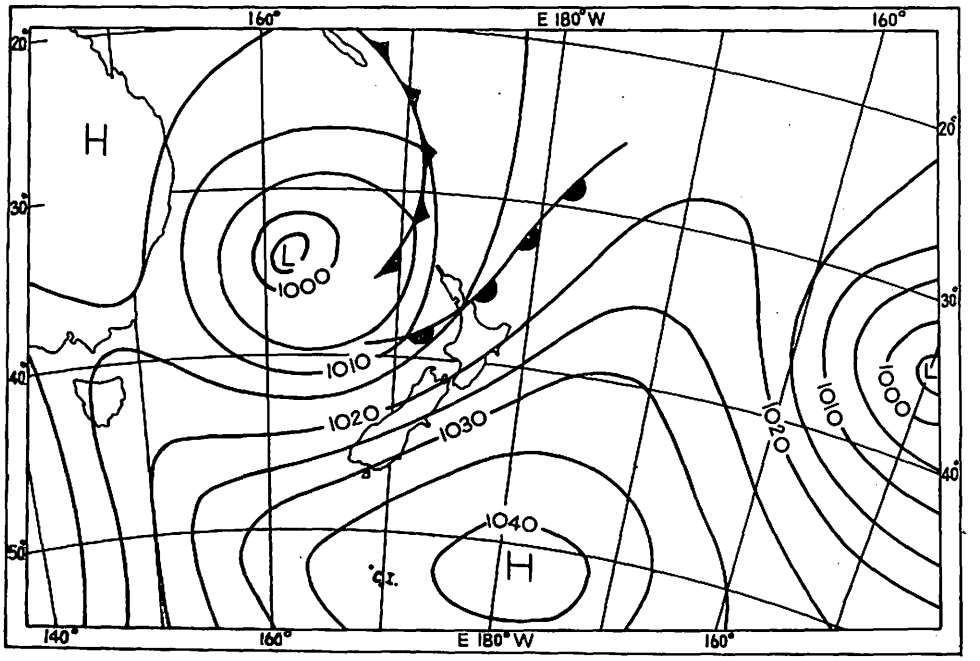

Fig. 2. Surface weather map for 00 GMT 26. VII. 1959, showing an intense anticyclone in high latitudes.

An intense anticyclone passed over Campbell I. in July 1959 (fig. 2). On 12 July and anticyclone moved on to northern New Zealand from the Tasman Sea. It was slow moving and by 21 July covered the whole of New Zealand being oriented NE–SW. A high pressure center formed in the far S on the 22nd. The northern center weakened while the southern center intensified. The anticyclone moved off Campbell on the 28th and from 22–27 July the M. S. L. pressure on the island was more than 1020 mb. During that period, however, there were only 2.8 hours of sunshine and the rainfall each day was as shown below:

Date: July	22	23	24	25	26	27
Daily rainfall (cm)	Trace	0	Trace	0.03	0.05	0.13

The almost continuous cloud cover during the passage of this intense anticyclone, which produced a maximum pressure of 1035 mb at Campbell I., was caused by a subsidence inversion in the upper air and moist air in the lower layers. The daily radiosonde flight showed that the temperature at 850 mb level (about 1500 m) was up to 5° C warmer than that at 900 mb level (about 900 m). Below the inversion the air was saturated, but above, the relative humidity had dropped to 20–35%.

Passage of depressions in the Campbell Island area

If we consider the passage of a deep depression as occurring when the 2100 GMT pressure was 990 mb or less either on one day or on two or more consecutive days, then an estimate of the average number of depression passages, per month during 1941–62 is given in table 2. The lowest minimum pressure each month is also given for the same period.

Table 2.

(a) Mean number of depression passages

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
1.9	1.7	1.5	2.3	2.1	2.2	1.4	1.9	2.1	2.2	2.3	2.2

(b) Lowest minimum M.S.L. pressure (mb) at 2100 GMT

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
968.0	970.5	966.5	965.4	966.5	965.3	963.7	948.2	953.6	970.1	961.7	959.9

The lowest pressure so far recorded is 947.4 mb. Deep depressions can be expected to

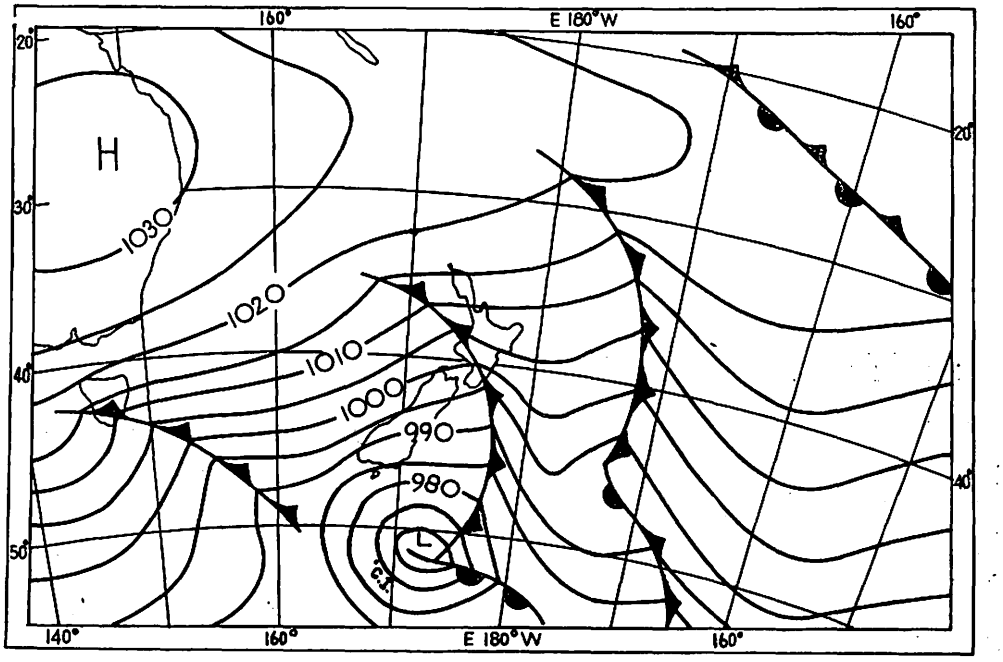

Fig. 3. Surface weather map for 18 GMT 26. VI. 1961, showing the movement of a deep depression over Campbell I.

pass near Campbell any time during the year and the number of depression passages tends to have not very marked maxima and minima in spring and winter respectively. An example of a depression crossing Campbell is shown in fig 3. On a cold front approaching the SW of the South Island of New Zealand, a wave depression formed on 26 June 1961, deepened rapidly and moved in a southeastward direction over Campbell. On the 26th the wind at Campbell was fresh WNW and the weather cloudy to overcast with intermittent rain. 2.9 cm of rain fell during the day. After the depression moved over on the 27th, the wind became fresh to strong SE and all day there was continuous rain accompanied with some snow. 4.9 cm of rain fell.

Climatic elements

The climate of Campbell I. is only the long-term effect of the passage of anticyclones, depressions and fronts as briefly described above. The climatic elements when taken together and considered from this long-term viewpoint make up the climate and are considered separately below:

Wind: Because of the broken and rugged nature of the island, the surface wind direction and speed is very much influenced by local effects. It is impossible to find a place where the measured surface wind would be representative of the flow over the whole island. Since 1961 upper winds have been regularly measured and in the lower layers of the atmosphere the mean flow is from WNW to W. The mean wind at the mid-season months for the years 1961–62 at a height of 1500 m is given in table 3.

Table 3. Mean wind at 850 mb (approx. 1500 m) for 1961-62
Direction (dd) in degrees true, speed (ff) in kts.

Jan.		Apr.		Jul.		Oct.	
dd	ff	dd	ff	dd	ff	dd	ff
273	27	272	33	265	23	282	32

At the surface, winds from a westerly quarter predominate in all seasons and the seasonal distribution of wind direction measured at 00 GMT during the period 1943–52 is given in table 4.

Table 4. Percentage distribution of surface wind direction
(by seasons) at Tucker Cove 1943–52.

	N	NE	E	SE	S	SW	W	NW	Calm (0–3 kts)
Spring	9.4	2.6	1.8	2.5	6.7	13.3	31.8	28.9	3.0
Summer	11.5	4.0	4.1	2.7	5.8	14.6	25.1	28.4	3.8
Autumn	12.5	2.4	1.8	2.1	4.8	14.0	32.8	26.3	3.3
Winter	10.8	3.0	2.6	2.5	6.2	16.3	27.2	24.4	7.0

Strong winds tend to be more frequent in spring than in other seasons and in all seasons tend to be more frequent in the middle of the day than in the early morning or at night. The percentage frequency of seasonal winds greater than 16, 33 and 47 knots at 6 a. m., noon and midnight is given in table 5.

Both the Tucker Cove and Beeman Hill observing sites are sheltered to some extent from the W and at the former site winds between N and W are channelled down the valley

Table 5. Diurnal variation of percentage frequency of strong winds at Tucker Cove 1943–52.

	06 NZST			12 NZST			24 NZST		
	Winds greater than			Winds greater than			Winds greater than		
	16	33	47 kts	16	33	47 kts	16	33	47 kts
Spring	46.4	7.0	0.2	52.9	5.2	0.1	45.8	7.3	0.3
Summer	41.8	4.5	0.2	46.5	3.5	0.3	42.2	5.2	0.3
Autumn	42.8	4.0	0.3	46.4	5.2	–	43.0	4.8	0.1
Winter	43.0	6.9	0.2	44.6	7.0	0.1	41.1	7.0	0.3

and tend to become very gusty. For experimental purposes an anemometer was temporarily erected on the summit of St. Col Peak (295 m) and comparisons were made between the wind force there and at a number of sites on the leeward side. The average ratios of wind force for different directions at St. Col Peak to that of Sheep Camp (a site near the old homestead in Tucker Cove) during May–August 1950 are given in table 6.

Table 6. Average ratio St. Col Peak wind to Sheep Camp wind according to direction during May–August 1950.

Wind Direction	N	NE	E	SE	S	SW	W	NW	No. of observations
Ratio $\frac{\text{St. Col}}{\text{Sheep Camp}}$	2.1	1.0	1.9	2.2	1.6	1.3	1.7	2.2	721

On one occasion, gusts estimated to be greater than 122 kts were recorded at the ex-

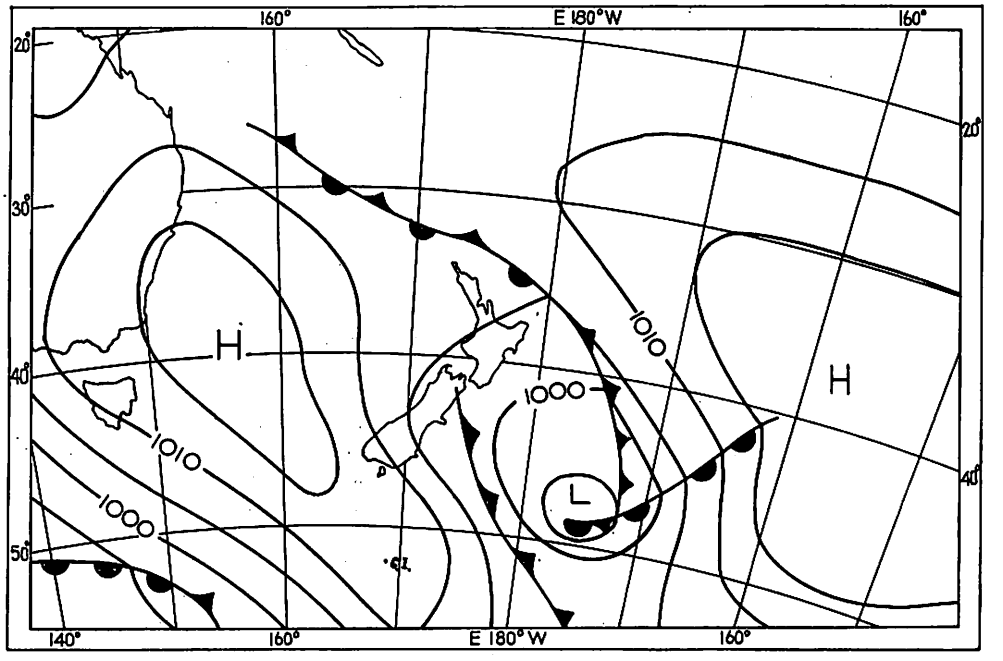

Fig. 4. Surface weather map for 18 GMT 12. II. 1962, showing a ridge of high pressure extending over Campbell I. which experienced 12.6 hrs. of sunshine on this day.

posed site on St. Col Peak and for a 6 hour period on the same day the wind at Sheep Camp averaged 55 kts. On peaks higher than St. Col even stronger winds will occasionally be experienced.

Cup counter anemometers were operated for two years at both the Sheep Camp and St. Col Peak sites. During this period the average daily wind run at St. Col Peak was 1190 km and at Sheep Camp 665 km. The highest daily run at St. Col Peak was 1711 km and at Sheep Camp 1044 km.

Sunshine humidity and cloud: The U. S. Navy, Marine Climatic Atlas of the World (1957) shows that S of New Zealand cloudiness increases considerably. Campbell I. receives on the average only 653 hours of bright sunshine each year compared with an average of 1670 hours at Invercargill in the S of the South Island of New Zealand. The mean monthly totals of sunshine during 1941–57 are given in table 7.

Table 7. Mean monthly hours of sunshine Tucker Cove, 1941–57.

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Hours of sunshine	92	80	61	36	21	12	15	27	54	67	89	99	653

The smallest number of sunshine hours yet recorded in any one year is 534 and largest number 830. There are on the average about 130 sunless days each year and 15 consecutive days without sunshine have been recorded. The smallest number of sunless days a year so far recorded is 109 and the greatest number 148. Skies are usually overcast in the early morning (there is an average of 291 days a year of overcast at 9 a.m.), but frequently the cloud breaks somewhat during the day. The island increases its own cloudiness by causing the normally moist airstream to be lifted in crossing its hilly surface. Overcast conditions are frequently observed over the island while only broken cloud is seen over the sea. From the sea, the island has been observed to have a cap of cloud which streams downwind.

At the surface the mean monthly relative humidity at 9 a. m. is more that 80% in all months, having its greatest value in late autumn and winter and its smallest in spring and early summer. On the average the relative humidity in spring and summer decreases from early morning to mid-afternoon each day by about 10%. In autumn and winter the decrease is about 5%.

The lowest 1000 m or so of the atmosphere which would be concerned in cloud formation by the lifting process are also usually moist. The average percentage of occasions each month when the relative humidity at the 900 mb level (about 900 m) during 1956–61 which was greater than or equal to 80% is shown in table 8.

For comparison purposes similar figures are given for Invercargill in the South Island of New Zealand. Both sets of figures are taken from the daily radiosonde flights.

Although skies are predominantly cloudy or overcast and the amount of sunshine small, there are by contrast occasional days of brilliant sunshine. During 1942–62 there were on the average 14 days each year when the daily sunshine amount was at least 8 hours and between 4 and 5 days when it was at least 10 hours.

On 13 February 1962 there were 12.6 hours of sunshine. On this occasion a ridge of high pressure extended on to Campbell I. which was covered by light, cool southwesterly winds up to 100 mb (about 16200 m) (fig. 4). The air was dry up to 500 mb (about

Table 8. Percentage of occasions on which the relative humidity at the 900 mb level equalled or exceeded 80% during 1956-61.

Campbell I.

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
76	66	72	68	75	70	71	72	69	67	64	73

Invercargill (South I., N. Z.)

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
24	33	41	35	38	40	37	38	25	30	28	32

5500 m) where humidity measurement ceased, and exceptionally good surface visibility was reported.

Rainfall: The average monthly rainfall and number of raindays at Tucker Cove during 1941–57 are shown in table 9.

Table 9. Mean monthly rainfall (cm) and number of raindays at Tucker Cove (1941-57).

	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Annual
Rainfall	12.5	10.7	14.2	12.4	13.7	12.2	10.2	11.4	12.2	12.2	11.9	11.7	145.3
Rain days	26	24	28	27	28	28	28	29	27	28	26	26	325

The variation of monthly rainfall is shown in fig. 5, where the rainfall exceeded on 90%, 50% and on 10% of occasions is plotted. The mean annual fall of 145.3 cm is spread fairly evenly throughout the year with a slight autumn maximum and the number of raindays great. Although much of the rainfall is in the form of light rain or drizzle, heavy falls are sometimes experienced during the passage across the island of a depression and its associated frontal system. The intensity of rainfall likely to be reached once every

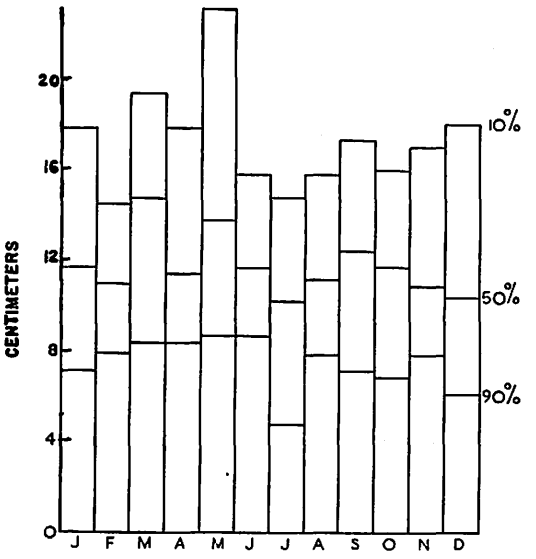

Fig. 5. Variation of monthly rainfall at Tucker Cove, Campbell I. during 1941-57. Rainfall exceeded on 90%, 50% and 10% of months is shown.

2, 5, 10, 20 and 50 years is shown in table 10. These figures were calculated, using the theory of extreme values, from 21 years of recording raingauge data.

Table 10. Computed rainfall intensity - frequency (cm) at Campbell I. (21 years record).

Return period (yrs.)	2	5	10	20	50
Duration of fall (hrs.)					
1	1.0	1.3	1.3	1.5	1.8
6	2.5	3.3	3.8	4.3	4.8
12	3.6	4.6	5.3	6.1	6.9
24	4.9	6.6	7.6	8.7	10.2
48	6.1	8.2	9.7	10.9	12.7
72	6.9	9.7	11.5	13.3	15.5

Because of the hilly surface of the island and the high winds experienced, the distribution of rainfall will be irregular.

Snow may fall in any month and on the average there are 41 days of snow a year. The falls however, are usually light and on only about 11 of these days does the snow lie on the ground. On about 63 days a year there are falls of hail which may occur in any month. Thunder and lightning are uncommon.

Temperature: As would be expected on a small island situated in a zone of strong and persistent westerly winds, both the annual and daily variations of temperature are small. The monthly mean temperature has its greatest value (9.4° C) in January and its smallest (4.5° C) in June-July. The mean daily range each month has its largest value (4.7° C)

Table 11. Temperatures (C.) at Tucker Cove 1941–1957.

Air Temperatures. Approximate mean ½ (Max. + Min.).

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
9.4	9.2	8.5	7.1	6.1	4.5	4.5	4.7	5.4	6.1	7.2	8.4

Mean daily max.

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
11.8	11.7	10.7	9.2	8.1	6.4	6.6	6.9	7.7	8.5	9.8	11.2

Mean monthly max.

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
15.8	15.1	14.6	12.4	11.1	9.2	9.8	9.4	10.1	11.6	13.6	14.3

Mean daily min.

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
7.0	6.8	6.2	5.1	4.1	2.5	2.4	2.6	3.1	3.7	4.4	5.7

Mean monthly min.

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
2.6	1.9	1.3	0.2	-1.4	-2.2	-2.9	-2.3	-2.5	-1.8	-0.9	0.3

Earth temperatures at 30 cm

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
10.6	10.2	9.2	7.6	6.2	4.6	4.2	4.4	5.2	6.3	8.1	9.8

Sea temperatures (1943–55)

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
9.7	9.5	9.2	8.2	7.4	6.2	5.9	6.1	6.5	7.0	7.8	9.2

in December and its smallest value (3.3° C) in June.

The greatest and least screen temperatures so far measured are 19.1° C and –6.3° C respectively. The mean and extreme monthly temperatures for Tucker Cove are summarised in Table 11.

Mean monthly earth temperatures taken at a depth of 30 cm and sea temperatures taken mostly in Tucker Cove during 1943–55 are also given in Table 11.

Both ground frosts and screen frosts can occur in any month. There are on the average at Tucker Cove about 44 ground frosts a year and the number per month ranges from 1 or fewer in summer to about 10 in July. At the same place there are about 27 screen frosts a year and the monthly maximum is about 6 in July. There have only been 3 occasions during 1941–60 when the maximum daily temperature failed to reach 0° C.

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Pacific Insects Monograph 7: 45-57 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
TALITRID AMPHIPOD CRUSTACEANS[1]

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Abstract: Analysis of 560 specimens from 80 collecting localities on Campbell I. revealed 6 species of terrestrial and semi-terrestrial amphipod crustaceans (superfamily Talitroidea). *Chiltonia minuta* and *Parorchestia campbelliana* are newly described and *Orchestia bollonsi* Chilton is newly recorded from the island. Descriptive notes on *Allorchestes compressus* Dana, *Orchestia aucklandiae* Bate, and *Parorchestia* (?) *insularis* Chilton are also given. The species (esp. *Chiltonia minuta*) exhibit morphological characteristics that are considered primitive and approximate those of hypothetical ancestral types, but persist even now in the faunas of the ancient geographically isolated subantarctic islands of New Zealand.

Seven species of terrestrial and semi-terrestrial amphipod crustaceans (Superfamily Talitroidea) have previously been recorded from Campbell I. of the subantarctic islands of New Zealand. These include *Orchestia aucklandiae* Bate, *Hyale hirtipalma* Dana, *Hyale campbellica* Filhol, *Allorchestes compressus* Dana from the littoral and intertidal zones; *Chiltonia mihiwaki* Chilton and *Parorchestia tenuis* Dana from sea-side fresh waters; and *Parorchestia insularis* Chilton from the supra-littoral and truly terrestrial habitats. The present material, consisting of about 560 specimens from 80 collections contains 6 species of which *Chiltonia minuta* and *Parorchestia cambelliana* are new to science, *Orchestia bollonsi* Chilton is new to the island, and *Orchestia aucklandiae*, *Parorchestia insularis*, and *Allorchestes compressus* have previously been recorded (above).

I gratefully acknowledge the assistance of Mr. John Tottenham, Ottawa, in the preparation of the figures.

SYSTEMATIC SECTION

Superfamily TALITROIDEA Bulycheva 1957

Family HYALIDAE Bulycheva 1957, Barnard 1958

Allorchestes compressus Dana 1852 Fig. 5.

MATERIAL EXAMINED: 1♂, Stn. #20, Monument Harbor, from fresh-water pool near beach, 10. XII. 1961, J. L. Gressitt.

DISTRIBUTION: The species was first recorded from Campbell I. by Stephensen (1927). It has previously been recorded from Auckland I. (Port Ross) by Stephensen (1927), and

1. Results of field work supported by National Science Foundation grants G-18800 and G-23720 from the U. S. Antarctic Research Program.

is elsewhere known from Tasmania and from the S. and W. coasts of Australia. Habitat: stony shores, from LW to HW levels.

Remarks: Hurley (1957a) distinguished this species from the closely related *Allorchestes novizealandiae* Dana by the finger of the ♂ first gnathopod, which, in *A. compressus* matches the palm and does not overlap it. Since the species has not been illustrated more recently than Bate (1862), a few diagnostic characters of the material at hand are shown in fig. 5.

♂ (10 mm): Head short, moderately deep, inferior antennal sinus shallow; eye small, drop-shaped, black. Antenna 1 exceeding peduncle of antenna 2 by 4 or 5 flagellar segments. Antenna 2, proximal flagellar segments setose posteriorly. Maxilla 1, terminal spine-teeth of outer plate tall, slender, multi-pectinate; palp conspicuously 2-segmented, outer segment elongate, pilose, reaching beyond base of spine teeth. Maxilliped, inner plate rectangular, rounded apex with 3 short subequal spine-teeth, inner margin with 5 plumose setae; palp segments moderately broad, dactyl prominent, slender, with slender seta in place of nail. Gnathopod 1, coxal plate very broad, lower margin broadly convex, minutely spinulose, inner shelf weak, with 4–5 posterior spines; segment 5 with lappet-like posterior lobe, margin delicately spinose; segment 6 slightly arched and distally broadening, palm short, gently convex, spinulose; dactyl heavy, closing evenly on palm, tip a little exceeding bispinose palmar angle. Gnathopod 2, coxal plate deep, with small proximal posterior excavation; gill a simple short pedunculate sac; segment 2 with several proximal posterior spines; segment 5 with a narrow elongate lappet-like lobe, marginally spinulose; segment 6 large, subtriangular, hind margin short, smooth; palm very oblique, slightly sinuous, with double row of close-set slender spines between which fits the short, slender dactyl, tip not reaching 2 strong spines at palmar angle. Uropod 1, rami subequal, outer smooth, inner with a few proximal marginal spines, both rami shorter than peduncle bearing 2–5 marginal spines on each side; no prominent inter-ramal spine. Uropod 2 similar, shorter. Uropod 3, peduncle stout with apical posterior spine group; ramus shorter, slender, terminal spines only. Telson short, broad, cleft to base, each lobe dorsally with several setules near distal margin.

Family HYALELLIDAE Bulycheva 1957

Chiltonia minuta Bousfield, n. sp. Figs. 1–2.

Chiltonia mihiwaki (Chilton) 1909 (partim)?

MATERIAL EXAMINED: Holotype (DOM. MUS.), 1♀ ovig., Stn. #14, Lookout Bay Beach, Perseverance Hbr., under kelp on beach, 19. XII. 1961, Gressitt.

Description: Although only a single specimen was obtained, the animal is a perfectly preserved adult ♀, and is sufficiently distinct from the 3 species previously known from New Zealand and the subantarctic islands, keyed and figured by Hurley (1954), that specific recognition is justified.

♀ (3.5 mm): Head shallow, interantennal lobe prominent, broad, sub-acute, inferior antennal sinus shallowly concave. Eye small, indistinct, weakly pigmented in the type. Antenna 1 a little longer than antenna 2; peduncular segments strong, successively smaller distally; flagellum 8-segmented, longer than peduncle. Antenna 2 peduncle relatively slender, segment 1 large, conspicuously bulging in front, segment 2 with prominent gland cone, segment 3 small, segments 4 & 5 subequal; flagellum 7-segmented, about equal to peduncle.

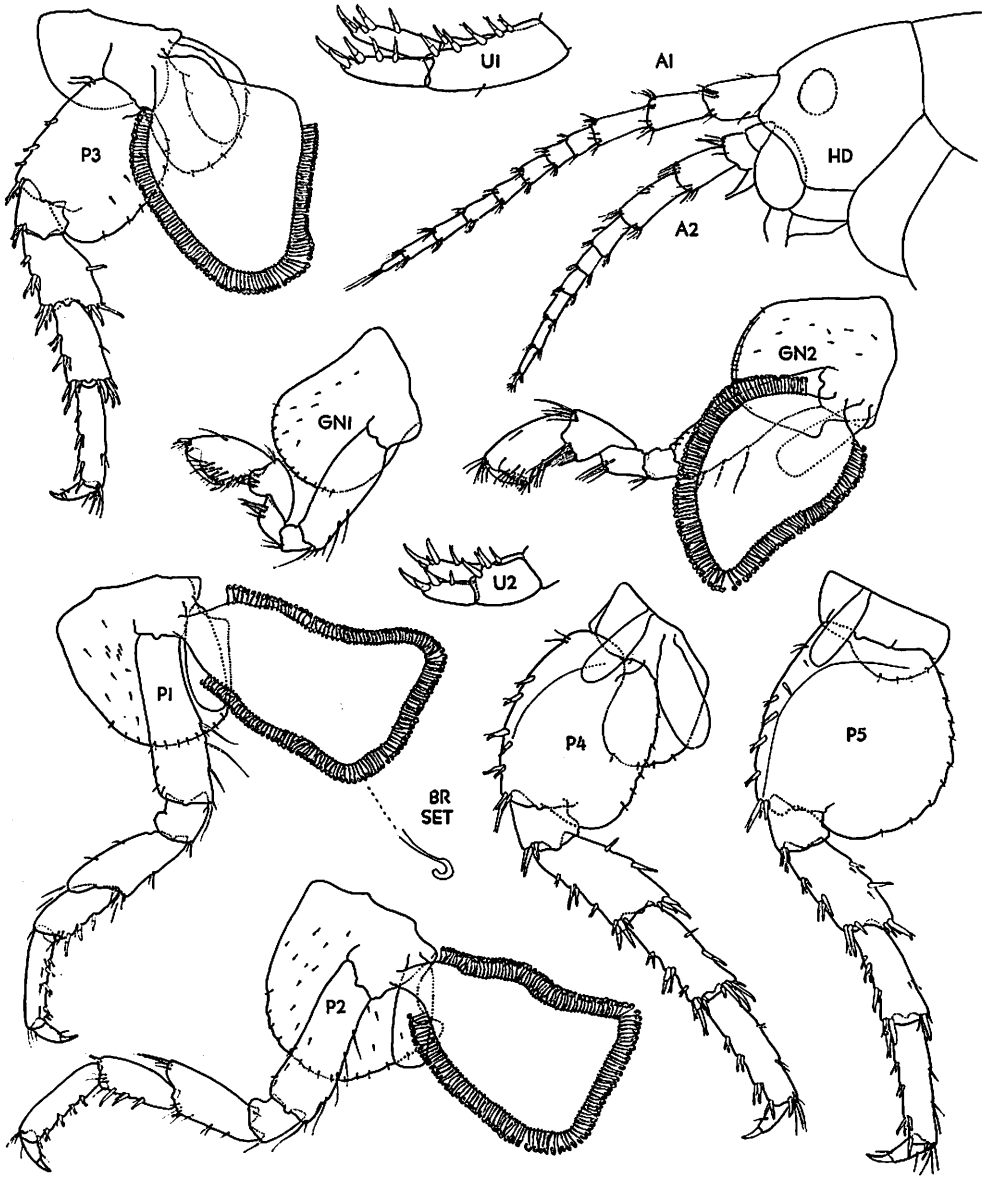

Fig. 1. *Chiltonia minuta* n. sp., holotype ♀, 3.5 mm, Perseverance Harbor, Campbell I.

Mouthparts about normal. Upper lip subquadrate, apex gently rounding, moderately pilose. Lower lip, lobes tall, broadest proximally, richly pilose along inner margin. Mandibles with slender 5–7-cuspate incisor, left lacinia long, 6-dentate, right lacinia short, trifid; 2 strong plumose accessory blades; molar process moderately strong, with about 25 facial striations. Maxilla 1, apical spine-teeth of outer plate tall, strongly pectinate, outer 3 teeth heavier, with fewer pectinations, palp "pit" about mid-way along outer margin; inner plate

short, with pair of strong plumose terminal setae, innermost slightly subapical. Maxilla 2, outer plate slightly longer, inner plate with apical slender spines and 2 proximal inner marginal plumose setae, stoutest proximally. Maxilliped, inner plate slender, rectangular, apex with 3 conical spine teeth, outer strongest, inner margin distally with 4–5 plumose setae; outer plate slightly exceeding inner plate, apex blunt, inner margin sinuous, richly spinose; palp strong, segments broad, terminal (4th) segment conspicuous, sub-conical, with stiff apical spines, one much longer than the others. Gnathopod 1, coxal plate broad and deep, lower margin lined with several spinules; segment 2 moderately strong with a few posterodistal setae; segment 5, hind lobe with stiff simple setae; segment 6 broadening distally, palm oblique, gently convex, dactyl closely approximating palm, tip closing between 2 stout spines at palmar angle. Gnathopod 2, coxal plate deeper than broad, proximally excavate and with blunt posterior process; segment 2 slender, slightly sinuous; segment 5, posterior lobe with several long stiff simple setae; segment 6 slightly broadening distally, palm slightly oblique, gently convex, dactyl closely fitting, tip reaching exactly to palmar angle. Peraepods 1 & 2 very similar; coxal plates somewhat deeper than broad, that of P2 more deeply excavate and with a more deeply excavateand with a more prominent posterior process; segments 5 & 6 with stout posterior spines; dactyls short, strong. Peraeopods 3–5 similar, short, moderately spinose, increasing successively. Peraeopod 3, posterior coxal lobe deeper than anterior lobe, hind margin sparsely spinose; segment 2 moderately expanded, evenly convex behind. Peraeopod 4, coxal hind lobe deep, sharply rounding below; segment 2, hind margin nearly straight, weakly scallope. Peraeopod 5, coxal plate shallow, broad; segment 2 broad, posterior margin strongly convex, noticeably scalloped. Primary (coxal) gills short and sac-like, present on gnathopod 2 and peraeopods 1–4 inclusive. Slender sac-like accessory gills anteriorly on coxal bases of peraeopods 4 & 5. Brood plates very large, laminar, sub-triangular, margins lined with numerous short, strong, hooked setae (more than 100 per plate). Abdominal side plates smoothly rounded below, posterior margins smooth, with 1–3 weak setae, hind corners of 2 & 3 little produced. Pleopods somewhat reduced, 3rd strongest; peduncles short and relatively broad, with 2 coupling spines (vestigial in pleopod 1) and margins variously pilose; outer ramus (7–8 segments) a little longer than inner ramus (5–6 segments). Uropod 1 short and stout, subequal rami with a few heavy marginal spines, shorter than peduncle. Uropod 2 very short and stubby, rami and peduncle subequal, each with 1 or 2 stout posterior marginal spines. Uropod 3 short, sub-conical, apex with 3 stout spines and 1 slender seta. Telson very broad, plate-like, posterior margin gently incised and nearly straight, bearing a few minute setae dorso-laterally.

Remarks: The strongly excavate coxal plate 2, entire telson, and short uropods would ally the present species most closely with *Chiltonia enderbeyensis* Hurley 1954. This species was first recorded by Chilton (1909) from a fresh-water pool on Enderby I. and from a pool outflow on Auckland I. Stephensen (1927) noted closely similar but somewhat larger specimens from under stones and wood on Auckland I. which Hurley tentatively assigned to *C. enderbeyensis*. However, *Chiltonia minuta*, in addition to being much the smallest of all known species, is distinguished by the smooth epimeral plates, the absence of marginal spines on uropod 3, the extremely broad telson, and subequal peduncular segments 4 & 5 of antenna 2.

The present material demonstrates several important features that link the genus *Chiltonia* variously with *Austrochiltonia*, *Afrochiltonia*, and *Hyalella* (see Hurley, 1959), and that justify

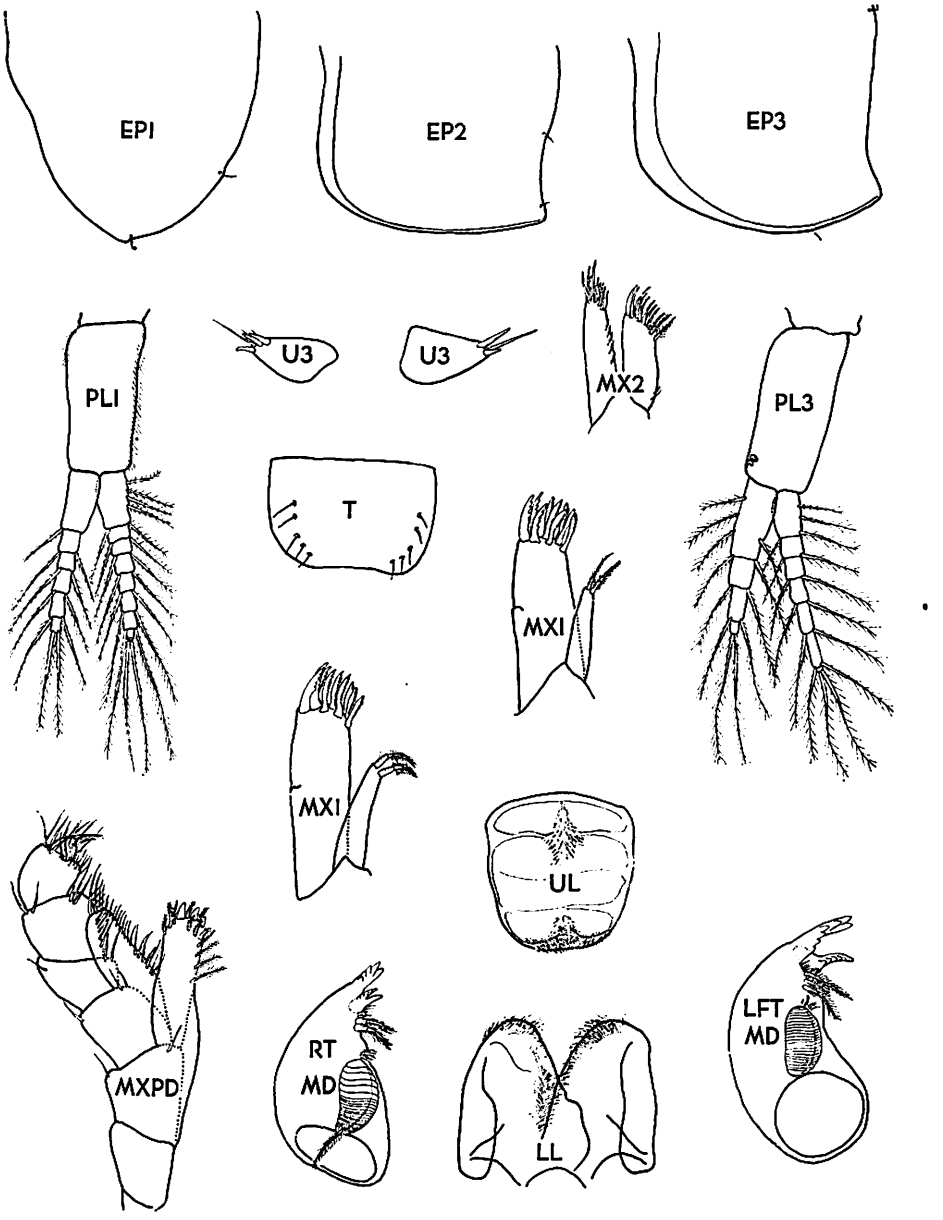

Fig. 2. *Chiltonia minuta* n. sp., holotype ♀, 3.5 mm, Perseverance Harbor, Campbell I.

Bulycheva's grouping of these primarily fresh-water aquatic animals in a distinct familial subdivision of the Talitroidea. These features include large subtriangular brood plates lined with numerous hooked marginal setae, the presence of sac-like accessory gills on some of the peraeopods, strongly developed segments 1 & 2 (with prominent gland cone)

of antenna 2, elongate antenna 1, and pronounced interantennal head lobe. Of the mouth parts, the mandibular incisor and lacinia are typically slender, maxillary palp is minute or lacking and apical spine-teeth are tall and strongly pectinate, and segment 4 of maxilliped palp is variously reduced, with nail vestigial. Many of these features, combined with the small, subequal, subchelate gnathopods (in ♀), are characteristic of other primarily aquatic amphipods, particularly members of Gammaridae (cf. *Crangonyx*, *Gammarus*). It is possible, therefore, that *Chiltonia* closely approximates the ancestral and transitional talitrid form, equally well adapted for aquatic and terrestrial existence, that has been replaced along seashores and in forest-floor habitats the world over by more recently evolved and more efficiently land-adapted "Orchestia" and "Talitroides" types. *Chiltonia* may thus be regarded as a "living fossil" type, preserved in fresh-water environments of the far southern hemisphere where it is geographically isolated from competing fresh-water gammarid-type animals of the northern hemisphere on the one hand, and physiologically removed from the competition of essentially terrestrial Talitridae on the other.

Family TALITRIDAE Bulycheva 1957

Parorchestia campbelliana Bousfield, n. sp. Figs. 3–4.

Parorchestia tenuis Chilton 1909, p. 642 (partim?).

MATERIAL EXAMINED: Holotype (DOM. MUS.), 1 ♀ ovig., Stn. #12, Courrejolles Peninsula, in mollymawk rookery, 14. XII. 1961, Gressitt.

Description: Although the ♂ is unknown, the present perfect adult ♀ specimen is readily distinguished from other known species of "Orchestia"—type animals (sens. Hurley, 1957b) and is accordingly newly described herewith.

♀ (9.5 mm ovig.): Head short, deep, front margin perpendicular, nearly straight, crown moderately convex. Eye relatively small, sub-elliptical, black. Antenna 1 slendar, reaching to mid-point of peduncular segment 5 of antenna 2, 5-segmented flagellum shorter than peduncle. Antenna 2 short, slender, peduncular segment 5 slightly longer than 4; flagellum about 12-segmented, longer than peduncle. Mouthparts somewhat atypical of terrestrial Talitridae. Upper lip lost. Lewer lip, "shoulders" broad, inner margins thickly pilose. Mandibular incisors strong, 5-dentate; left lacinia larga, 5-dentate, right lacinia trifid; 4–5 plumose accessory blades; molar process strong, triturating surface with about 35 striations. Maxilla 1, inner plate tall, taparing distally to apical and subapical plumose setae; outer plate with small bi-articulate palp beyond mid-point of outer margin; apical spine-teeth tall, multi-pectinate, outer 3 teeth much heavier and more coarsely pectinate. Maxilla 2, apical blade-spines of outer plate in tall outer series, inner plate with strong pilosity proximal to stout plumose seta. Maxilliped, inner plate sub-rectangular, broadly truncate apex with 2 large outer conical spine-teeth and a smaller one at inner angle; inner margin with about 7 plumose setae; outer plate short, inner margin straight, lined with slender spines; palp short and broad, segments 1 & 2 indistinctly separated, segment 4 prominent, apex blunt-conical. Gnathopod 1, coxal plate broadly rounding below, inner shelf with 6–8 slender spines; segment 2 slightly widening distally; segment 4 with small posterior blister and weak spines; segment 5 longer than 6, broadly tumescent below; segment 6 broadening distally and tumescent below, short stout dactyl closing exactly on setose palm. Gnathopod 2, coxal plate broad, smoothly convex below, with prominent posterior triangular process;

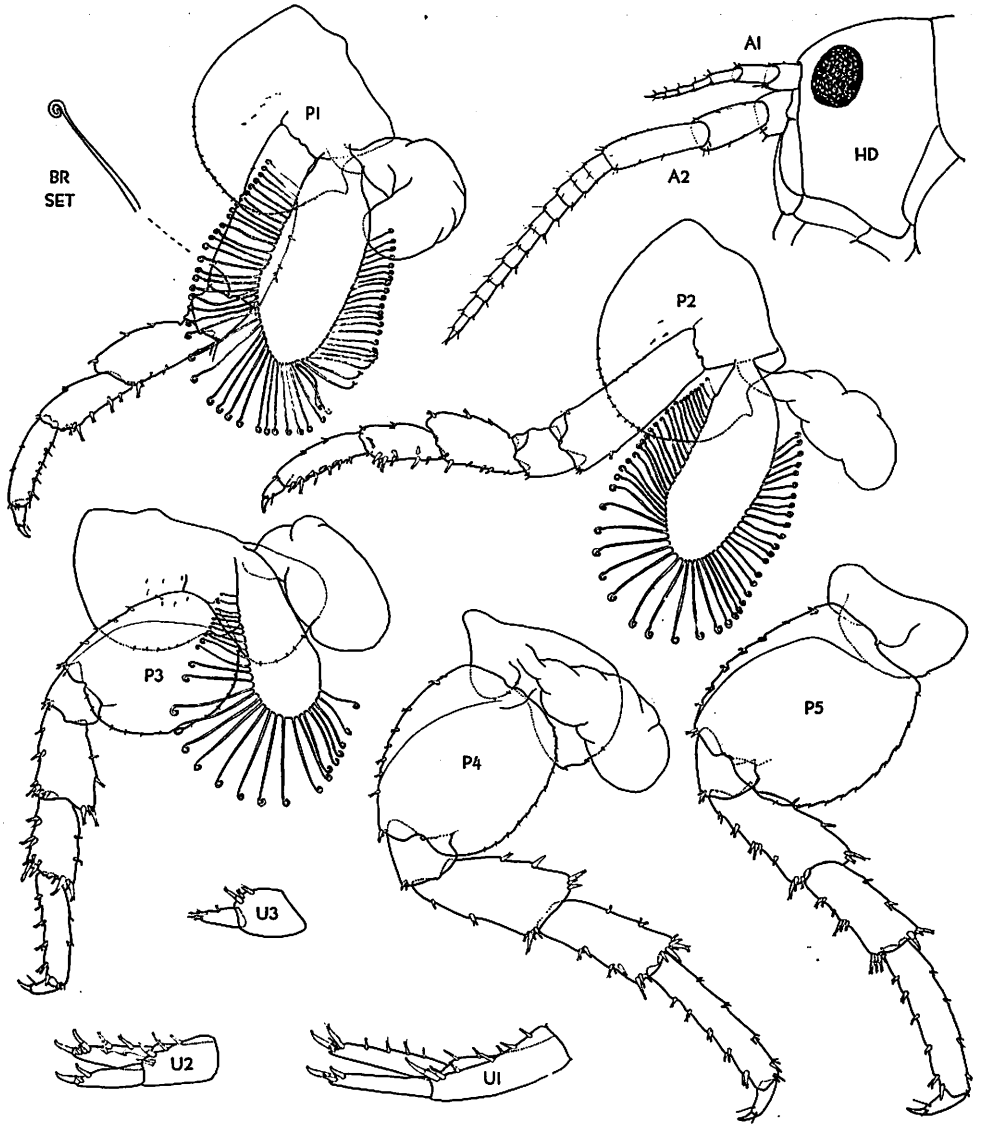

Fig. 3. *Parorchestia campbelliana* n. sp., holotype ♀, 9.5 mm, Courrejolles Peninsula, Campbell I.

segment 2 linear, margins bare; segment 4 broadly tumescent below; segment 5 slightly longer than 6, with posterior blister; segment 6, dactyl subterminal. Peraeopods 1 & 2 very similar, distal segments moderately spinose behind, dactyl short, stout; coxal plates very broad, smoothly convex below, hind margin with prominent triangular process and excavate proximally. Peraeopods 3–5 similar, moderately spinose, successively larger, dactyls short. Peraeopod 3, coxal plate shallow, broad, anterior lobe larger; segment 2 expanded, smoothly convex behind. Peraeopod 4, coxal plate with shallow posterior lobe weakly scalloped below; segment 2 convex and setulose behind. Peraeopod 5, coxal plate moderately deep,

with few posterior marginal setules; segment 2 moderately expanded, hind margin convex, weakly serrate. Coxal gills sac-like or weakly lobate, about equal in size on all 5 limbs; Brood plates rather large, subovate or sub-triangular, about as long as respective basal segment of limb, margins lined with numerous elongate, hooked (or curl-tipped) setae. Abdominal side plates 1–3 smooth below, hind margins with 1–2 weak setae, hind corners slightly produced posteriorly. Pleopods about normal and subequal; peduncle of 3 shorter but rami longer than in pleopods 1 & 2; peduncles slender, with a few facial spines, and 2 coupling spines; rami 10–12-segmented, outer ramus slightly longer. Uropod 1, peduncle longer than the rami, margins with 3–5 spines, inter-ramal spine about 1/3 the inner ramus which has 4 marginal spines and 4–5 terminal spines; outer ramus smooth, shorter than inner. Uropod 2, rami and peduncle short, stout, subequal; outer ramus, margins smooth, slightly shortly than inner ramus having both margins spinose. Uropod 3, peduncle short, stout, with 3 short dorsal (posterior) spines; ramus shorter, slender, with 1 dorsal and 4 small terminal spines. Telson short, basally broad, apex rounded, with paired subterminal spine groups, and dorsal surface with scattered minute spinules.

Remarks: In features such as the short sparsely setose antennae, short stout peraeopods, short thick dactyls, and long pleopods, the present material resembles material of *Parorchestia* previously recorded from the mouth of a small fresh-water stream on the sea-shore of Perseverance Hbr., Campbell I. by Chilton (1909). With reservations he assigned his "few small specimens" to *P. tenuis* Stebbing (1906) on the basis of their similarity to specimens from blackish and fresh-water streams in various parts of New Zealand where the type was found. Hurley (1957b) has lumped a number of New Zealand leaf-mold species under the name *P. tenuis* Dana, including such widely differing entities as *P. sylvicola* Dana and 2 forms of *P. stewarti* Stephenson. I have recently examined 5 lots from the Stebbing collection of "Parorchestia sylvicola" in the British Museum[2] and found 9 fully distinct species among the 18 specimens, only 1 of which was identifiable with *Parorchestia sylvicola* as defined by Stebbing (1906) and redefined by Hurley (1957b). In each of 2 lots of 5 specimens, 4 distinct species could be identified, even though each species was usually represented by a single mature ♀. It is likely, therefore, that many undescribed species of "Parorchestia" type leaf-mold species occur in New Zealand and the adjacent islands, many of which are highly localized or endemic in relatively small isolated regions. By the same token, specific differences between *Parorchestia tenuis*, *P. sylvicola*, *P. stewarti*, etc., noted by Stebbing and Stephenson (above), are very probably valid and further studies on this early material would undoubtedly serve to re-validate these names. Although the present species is difficult to separate morphologically from *Parorchestia tenuis* as described by Stebbing (1906), mainly because accurate figures of the species are lacking, the high degree of endemicity typical of insular leaf-mold species (see Stephenson, 1935) renders unlikely the conspecificity of Campbell I. and New Zealand material. The present material differs slightly from Stebbing's description in that the telson is broader than long, and the flagellum of antenna 1 is distinctly shorter than the peduncle.

This species closely resembles not only *P. tenuis* Dana from fresh-water streams in New Zealand, but is remarkably similar to ♀ specimens of an undescribed species of *Parorchestia* from stony streams and seashores of Victoria (submitted by W. D. Williams) and Tasmania (in Australian Mus. collections). It is also close to *Parorchestia rectipalma* Barnard 1940

2. Kindly loaned by Dr. Isabella Gordon.

from South Africa, the ♀ of which has smaller brood plates but the marginal setae are very long and curl-tipped as in the present species. Finally, *P. campelliana* is obviously closely related to *P. americana* Bousfield (in press) from the coast of Uruguay, of which only the ♂ is known. We might predict, therefore, that the ♂ of *P. campelliana* will be very similar to ♂♂ of the above species in having a relatively large subchelate gnathopod 1 and sub-triangular hand of gnathopod 2, characters which, interestingly, are shown by many intertidal marine species of Hyalidae (cf. *Allorchestes compressus*). It is further suggested that the genus *Parorchestia* Stebbing 1899 be restricted to *tenuis*-type animals having characteristics outlined above, and that new generic names be proposed for more typical leaf-mold complexes such as the "*sylvicola*" group, having slender delicately spinose antenna and walking limbs, highly modified gills, reduced brood plates with simple setae, and vestigial pleopods.

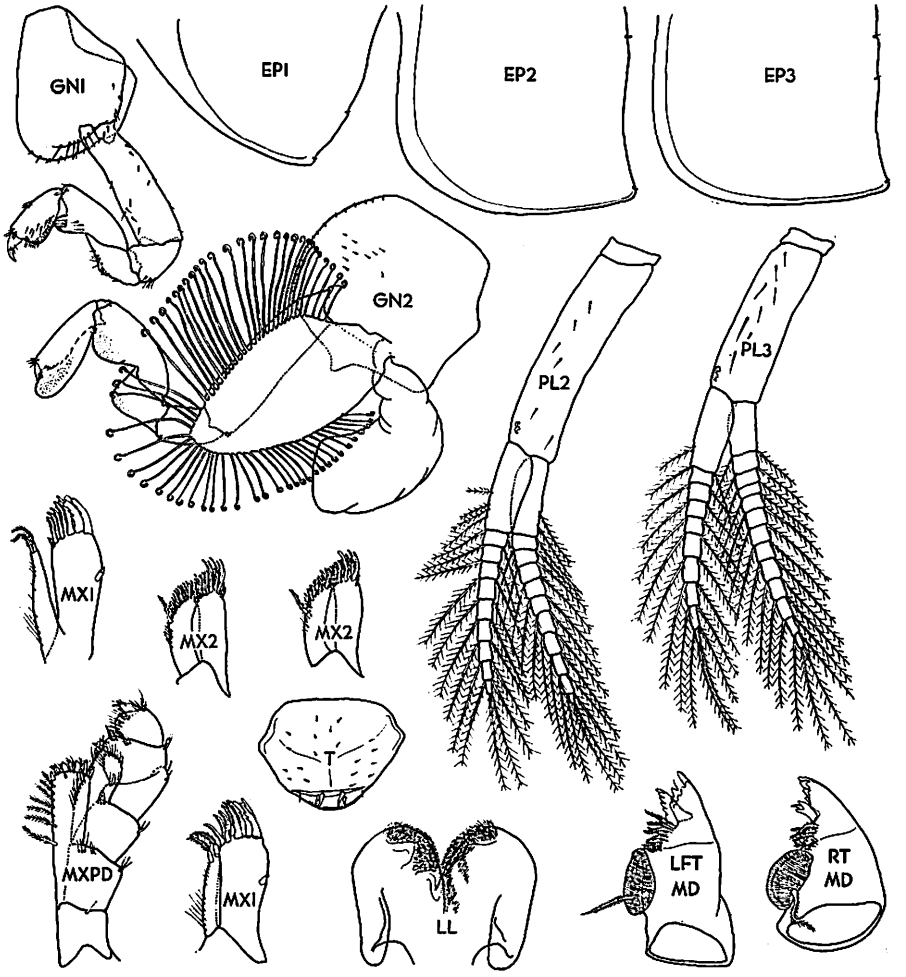

Fig. 4. *Parorchestia campbelliana* n. sp., holotype ♀, 9.5 mm, Courejolles Peninsula, Campbell I.

Orchestia aucklandiae Bate 1862 Fig. 5.

Orchestia aucklandiae Hurley 1957b

MATERIAL EXAMINED: 3♂♂ (to 30 mm), 6♀♀ (4 ov.), 2 imm., 12 juv., Stn. #26, Rocky Bay, under kelp on beach, 28. XI. 1961, Gressitt; 6♂♂ (1 adult), 7♀♀ (1 ov.), 25 imm. & juv., Stn. #26 Rocky Bay, shore, under kelp, 20. XII. 1961, Gressitt; 2♂♂, 2♀♀, 4 juv., Stn. #14, Lookout Bay, kelp on beach, 3. XII. 1961, Gressitt.

DISTRIBUTION: According to Hurley (1957b), *Orchestia aucklandiae* has been authentically recorded only from the Auckland Is., Campbell I., Stewart I. and the Otago Peninsula of South I., New Zealand. This species is not to be confused with *O. serrulata* Dana, a synonym of *O. chiliensis* M.-E., which is a more northern species and widely distributed in North and South Is. of New Zealand, Chatham Is., Juan Fernandez, and Chile.

Remarks: Large ♂♂ (up to 30 mm) in the present material show the characteristic dorsal ridging of the peraeon segments. The species exhibits several features that are characteristic of primitive members of the genus *Orchestia* (cf. *Orchestia traskiana*, Bousfield, 1961), including large brood plates with minutely curl-tipped marginal setae (fig. 5–4), distinctly subchelate ♀ gnathopod 2, and simple, sac-like gills. Maxilla 1, apical spine-teeth of outer plate are fairly tall and multi-pectinate; palp small, bi-articulate, distad of mid-point.

Orchestia bollonsi Chilton Fig. 5.

MATERIAL EXAMINED: A total of 126 specimens in 20 collections from 9 localities as follows: Stn. #2, Beeman-Tucker Beach, intertidal, under rocks, 8. X. 1961, Gressitt, 1♂; *Ibid.*, *Colobanthus*, 19. XII. 1961, K. Rennell, 2♀♀, 11 im.; Stn. #3, Tucker Cove, tidal rock, 21. XI. 1961, Gressitt, 1♀ ov.; Stn. #12, Courejolles Peninsula, 200 m, *Colobanthus*, 14. XII. 1961, Gressitt, 4♀♀, 4 juv. (in 2 lots); *Ibid.*, grey-headed mollymawk nests, Gressitt, 1♂, 1♀, 5 juv. (in 3 lots); *Ibid.*, *Tillaea*, among rocks, in mollymawk nests, 13. II. 1963, K. A. J. Wise, berlese, 22 imm.; Stn. #13, Smoothwater Bay, leaf-mold, under sedge, 16. II. 1963, Wise, berlese, 1♀, 9 juv.; Stn. #14, Lookout Bay Beach, kelp on beach, 3. XII. 1961, Gressitt, 2♂♂, 2♀♀, 4 juv.; *Ibid.*, (with *Chiltonia!*), 16–19. XII. 1961, 1♀ ov.; Stn. #16, Shoal Pt., *Tillaea* on shore rock, 1. II. 1963, Wise, berlese, 1♂, 1♀ ov., 25 juv.; Stn. #23, S. coast below Mt. Dumas, 10 m, in penguin colony, 18. II. 1963, Wise, berlese, 1♀, 5 juv.; Stn. #24, Middle Cove, Northwest Bay, kelp on rocks, 29. XI. 1961, Gressitt, 1 juv.; *Ibid.*, on sand, under kelp, 5 m, 5. II. 1963, Wise, 1 juv.; Stn. #26, Rocky Bay, under rock on slope, 28. XI. 1961, Gressitt, 5♀♀ ov.; *Ibid.*, 0–20 m, 20. I. 1962, Rennell, 1♂; *Ibid.*, from *Tillaea* in penguin colony, 10 m, 18. II. 1963, Wise, berlese, 1♀, 6 imm.

DISTRIBUTION: Hurley (1957b) has summarized existing records from Auckland I., Ewing I., Bounty I., Snares I., and Dog I., and also from Hooper's Inlet, Otago Peninsula. The present records are the first from Campbell I.

Remarks: The present material differs only slightly from the form originally described by Chilton from Snares and Ewing I., and, added to the fact that the present material occurs in much the same habitat (in or under vegetation, etc., within a few meters of the shore), does not justify specific separation from the type material. The brood plates of the ♀ are moderately large and the marginal setae are slightly thickened or knobbed at the tip, perhaps representing a late stage in the evolution from curl-tipped to simple form.

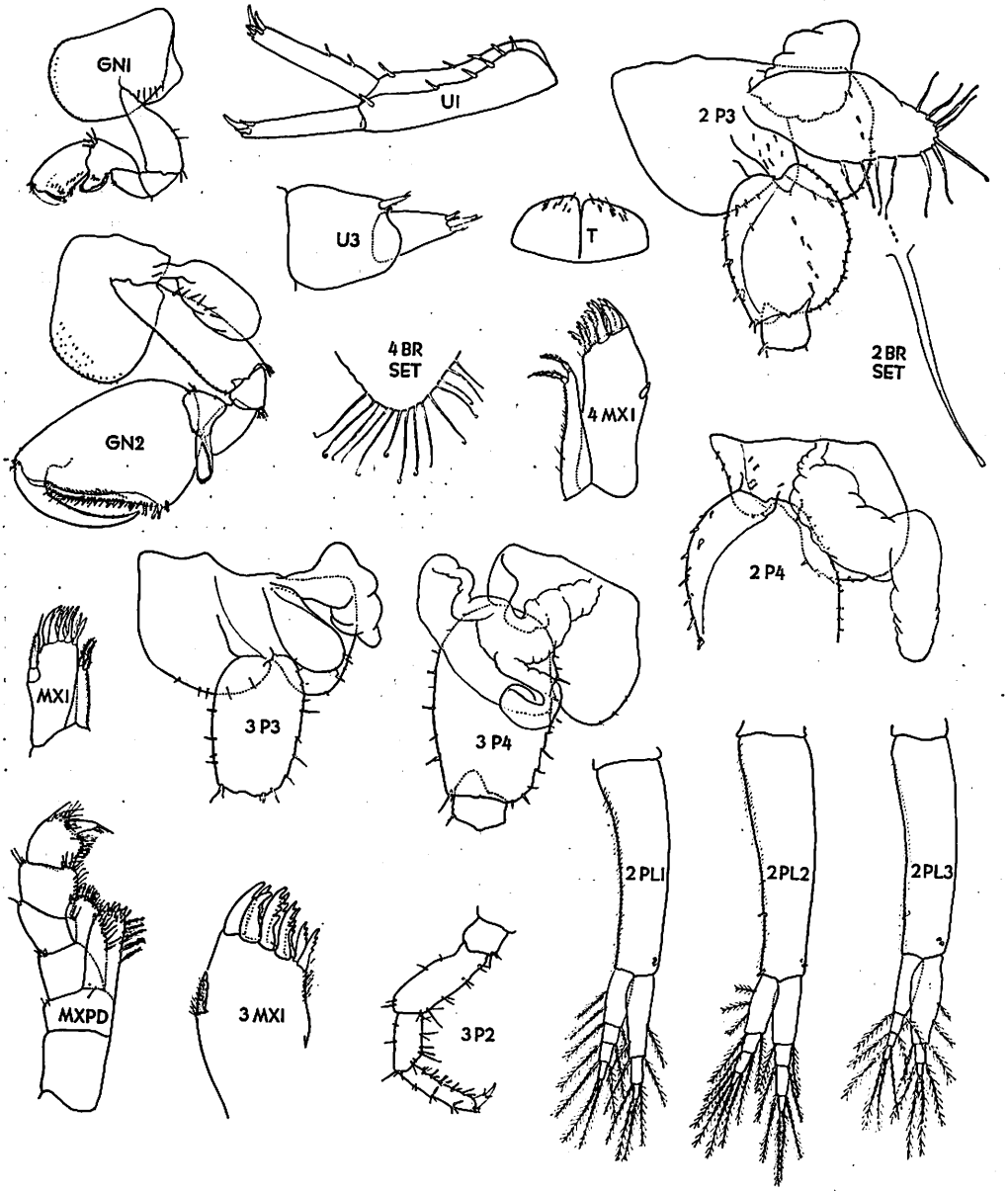

Fig. 5. 1, *Allorchestes compressus* Dana, ♂, 10 mm, Monument Harbor, Campbell I. (left and top middle); 2, *Orchestia bollonsi* Chilton, ♀, 12 mm, Rocky Bay, Campbell I. (right); 3, *Parorchestia (?) insularis* Chilton, ♀, 13 mm, Beeman Camp, Campbell I.; 4, *Orchestia aucklandiae* Bate, ♀, 16 mm, Rocky Bay, Campbell I.

The gills are somewhat modified from simple sacs, that of peraeopod 4 is rather slender, elongate, and L-shaped. The pleopods are subequal in length but the rami are considerably reduced, 3–4 segmented, inner ramus slightly the longer. The long peduncles are pilose

with a few small spines on the outer margin.

Parorchestia (?) insularis Chilton Fig. 5.

MATERIAL EXAMINED: More than 260 specimens in 53 collections from 18 localities, summarized as follows: Stn. #1, Beeman Hill, Gressitt, 4 coll'ns., 2–16. XII. 1961, 30–180 m, mostly in *Pleurophyllum* leaf-mold, moss, and *Poa* roots, 2♂♂, 2♀♀, 14 imm. & juv.; *Ibid.*, Rennell, 3 coll'ns., I–II. 1962, 30–120 m, in *Pleurophyllum* & sedge, 1♀ ov., 3 imm.; *Ibid.*, Wise, 2. II. 1963, 50 m, moss, lichens, low plants, 7 imm.; Stn. #2, Beeman Camp & Shore, Gressitt, 9 coll'ns., 26. XI. 1961, 2–50 m, among *Coprosoma*, *Poa* roots, *Bulbinella* roots, moss, turf, can traps, 3♀♀ (1 ov.), 16 imm. & juv.; *Ibid.*, Wise, 3 coll'ns., 11–29. II. 1963, 2–50 m, berlese samples from sedge leaf-mold, *Pittosporum* leaf mold, 2♂♂, 2♀♀ (1 ov.), 7 imm.; Stn. #3, Tucker Cove, Perseverance Hbr., Gressitt, 3 coll'ns, 21–26. XI. 1961, 1–100 m, berlese samples of moss, 5♂♂, 1♀, 4 imm.; *Ibid.*, Rennell, 27. II. 1962, lichens on *Dracophyllum*, 1 imm.; *Ibid.*, Wise, 7 coll'ns., 0–100 m, moss on *Dracophyllum*, *Pittosporum* leaf mold, tussock leaf mold, 1. II–3.III.1963, 1, 3♀♀, 40 imm. & juv.; Stn. #6, Moubray Hill, Wise, berlese, 200 m, base of tussock, 16. II. 1963, 1♂; Stn. #7, Lyall-Beeman Saddle, Gressitt, 70 m, *Pleurophyllum*, 3–12. XII. 1961, 1♀ ov.; Stn. #8, Mt. Lyall, Gressitt, 200–400 m, in moss, 3–12. XII. 1961, 1 imm.; *Ibid.*, Wise, 2 coll'ns., below summit, ca 390 moss & lichen on rocks, 19. II. 1963, 2♂♂, 2♀♀, 14 imm. & juv.; Stn. #9, St. Col Ridge, Gressitt, 180–180 m, in lichens on *Dracophyllum*, 4–13. XII. 1961, 1, 2 imm.; Stn. #10, St. Col Peak, Wise, 250 m, low plants on rock, 23. II. 1963, 1 juv.; Stn. #12, Courejolles Peninsula, Gressitt, 200 m, in *Colobanthus*, 14. XII. 1961, 2 imm.; Stn. #13, Wise, 2 coll'ns., in *Dracophyllum* leaf mold, 16. II. 1963, 3♂♂, 2♀♀, 5 imm.; Stn. #14, Lookout Bay, Perseverance Hbr., Wise, 2 coll'ns., base of *Bulbinella*, 24. II. 1963, 5♂♂, 3♀♀, 37 im.; Stn. #16, Shoal Pt., Perseverance Hbr., Wise, in tussock, 7. II. 1963, 9♂♂, 2♀♀, 10 juv.; Stn. #17, Mt. Honey, Wise, ca. 140 m, low plants on rock, 24. II. 1963, 2♂♂, 7 juv.; Stn. #24, Middle Cove, Northwest Bay, Wise, 2 coll'ns., in *Dracophyllum* leaf-mold, 5. II. 1963, 11 imm. & juv.; Stn. #26, Rocky Bay, SW shore below Mt. Dumas, Gressitt, in penguin nest, 28. XI. 1961, 2♂♂, 1♀, 14 imm.; *Ibid.*, Wise, 2 coll'ns., ca 10 m, from *Dracophyllum* leaf-mold & in penguin colony, 15, 18. II. 1963, 1♀, 9 imm.; Stn. #27, (?), Filhol Peak, Wise, summit, tussock and moss, 9. II. 1963, 1 imm.; Campbell I., (no locality), Gressitt, berlese sample, XII. 1961, 2 juv.; Wise (no locality), in tussock, 7. II. 1963, 2♀♀ (1 ov.).

DISTRIBUTION: The species was originally described from Campbell I. by Chilton (1909) who noted its extreme abundance, to the tops of the highest hills. A slightly different form has been described by Chilton and by Stephensen (1927) from the Auckland Is., which Hurley (1957b) regards as conspecific since he found both forms on Campbell and Auckland Islands. The present material contains less than 50♂♂, only 10 of which are mature or nearly mature; these do not show the strong palmar processes of the 2nd gnathopods typical of the Auckland I. material, but are more like the type material from Campbell I. illustrated by Chilton (1909) and Hurley (1957b).

This species has the slender bristly antennae and peraeopods, highly modified and convoluted gills, reduced pleopods, and slender uropods typical of leaf-mold Talitridae and thus removed from the littoral marine genus *Orchestia* as represented by *O. gammarella*, the generic type. These same features, coupled with small slender brood plates bearing short simple marginal setae, the sublinear propod of gnathopod 1 in both sexes, and the

relatively slender maxilliped palp, are likewise of sufficient taxonomic significance to remove the species from the genus *Parorchestia* as represented by the *tenuis* complex (above, p. 11). However, it is not the purpose of this short paper to propose new higher taxa to accommodate these major groupings, but rather to suggest new lines of approach to a major investigation and revision of the land-hopper fauna of the New Zealand and sub-antarctic islands region.

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Abbreviations for illustrations

A1—Antenna 1
A2—Antenna 2
Br. Set—Brood plate seta (e)
Ep—Epimeral plate (s)
Gn1—gathopod 1
Gn2—gnathopod 2
Hd—head region
Lft—left
LL—lower lip
Md—mandible
Mx—maxilla
Mxpd—maxilliped
P—peraeopod
Pl—pleopod
Rt—right
T—telson
U—uropod
UL—upper lip

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THE ARANEAE AND OPILIONES OF THE SUB-ANTARCTIC ISLANDS OF NEW ZEALAND

By R. R. Forster

OTAGO MUSEUM, DUNEDIN, N. Z.

Abstract: This paper covers the spiders and opiliones from all the subantarctic islands of New Zealand. Forty-three species are enumerated, of which 21 are new (7 n. spp. from Campbell I.). Three genera are described as new.

This paper is based on large collections which have become available over the last few years from both the Auckland and Campbell Islands. Other collections from the Snares and Chatham Islands have also been referred to in the preparation of this paper in an attempt to elucidate some of the taxonomic problems involved. In an earlier paper (Forster, 1955) I listed 19 species of spiders from the Auckland Islands and 9 from Campbell I. This paper increases these totals to 24 species recorded from the Auckland Is. and 16 from Campbell I., besides Opiliones. Nine species are found in both Auckland and Campbell Is. but only 4 of these, *Gohia wenhami*, *Hina delli*, *Icona alba* and *Clynotis barresi* are considered to be endemic. *Mynoglenes insolens*, *M. marrineri* and *Amaurobioides maritima* are recorded from a number of other Subantarctic islands and also from the extremities of some of the Southern Continents and New Zealand and undoubtedly possess the ability to cross easily the wide stretches of ocean between the areas in which they occur. *Araneus pustulosus* has probably been introduced by man to these islands from New Zealand and the occurrence of *Oramia charybdis* on Campbell I. may be explained in the same way. In general the fauna is a characteristic extension of the New Zealand fauna and is related directly to the elements typical for the southern portion of the South Island. The facies of the fauna is not characteristic of an oceanic island fauna but appears to be an attenuated relict fauna from an earlier period when these islands were part of the New Zealand land area or when the extension of land greatly reduced the sea barriers present today. It is of interest to note that of the 31 species recorded from these islands 25 are endemic although in each case closely related species occur in New Zealand. Clear evidence of divergence between the populations of Campbell and Auckland Is. is shown in *Oramia crucifera* and *O. hoggi* and also within the Auckland Is. themselves by the species groups *Gohia falxiata*, *G. enderbyensis*, *G. wenhami* and *Huara antarctica*, *H. sorenseni*, *H. grossa*. The high degree of endemism shown in this fauna would seem to indicate that it is not to be explained by post-Pleistocene colonization but is in fact a fauna of considerable age.

Acknowledgments: I am deeply indebted to Dr. J. L. Gressitt for the opportunity to study the material collected for the Bishop Museum in recent years, and also to Mr. Ian Mannering and Mr. Peter Johns who arranged for supplementary material collected from

the Snares and Auckland Islands to be made available.

Order ARANEAE

Family DICTYNIDAE

Genus **Oramia** Forster, n. gen.

Large dictynid spiders with thickset carapace, usually reddish brown darkening anteriorly. Cribellum divided, calamistrum uniserial. Chelicerae with 2 teeth on retromargin, 3 on promargin. Epigynum usually with a pair of stout spinous projections near the epigastric furrow. Internal genitalia simple, with 1 pair of seminal receptacles. ♂ palp with a simple bifid or trifid process on tibia and a distal plate. Median apophysis of bulb well developed and free.

Type species: *Ixeuticus rubrioides* Hogg 1909.

The dictynid spiders of the N. Z. area have recently been revised by Marples (1959), who studied the genus *Ixeuticus* Dalmas in New Zealand, increasing the number of New Zealand and Subantarctic I. species to 12, and at the same time suggesting that these could be separated into 4 species-groups. In the course of a revision of the spider fauna of New Zealand by the present author, all the specimens which were available to Marples have been re-examined, and much additional material, collected subsequently, has been examined. It would appear that the genus *Ixeuticus* is somewhat heterogeneous. The type species of the genus *Ixeuticus* is *I. martius* which is probably of Australian origin and has perhaps been introduced into New Zealand in the same way as the species had been introduced into North America, where it is recorded as *Hesperauximus sternitzii* Gertsch.

The species found on the subantarctic islands are closely related to each other and to N. Z. species of the *charybdis* group. These I have grouped together under a new generic name *Oramia* which is equivalent to group 2 as suggested by Marples.

The opportunity has also been taken in this paper to clarify the status of the New Zealand, Chatham, and Snares Is. species, in relation to those found on the Auckland and Campbell Is. The unavailability of specimens from Snares I. in the past has resulted in considerable confusion. It has been assumed by all previous authors that the Snares I. species was identical with a single species found on the Auckland and Campbell Is. An examination of material now available from Snares shows that the Snares I. species is more closely related to that from the Chatham Is., and is also restricted to Snares. Furthermore, a detailed study of the material now available from the Aucklands and Campbell Is. shows that there is yet another species on the Auckland Is. related to *Oramia mckerrowi* (Marples) and that the Auckland and Campbell I. populations previously known under the name *rubrioides* are in fact quite distinct and represent 2 species. The present collections also show the presence of a population of the New Zealand *O. charybdis* at Tucker Cove on Campbell I., where it was most probably introduced during the period of early settlement.

Oramia rubrioides (Hogg) Fig. 11–12.

Amaurobius rubriodes Hogg, 1909, Subantarct. Is. of N. Zeal. **1**: 159.

Badumna scylla Hogg, 1909, *Ibid.* **1**: 160.

♀. The following characteristics separate this species from the other known forms: Ratio of AME. ALE. PME. PLE=11. 14. 14. 12. The AME are separated from each other by a distance equal to 23/11 and from the ALE by 27/11 of the diameter of an AME. The lateral eyes are separated by a distance equal to 4/11 of the diameter of an AME. The PME are separated from each other by 14/11 and from the PLE by 18/11 of the diameter of an AME. Median ocular quadrangle wider in front than behind in ratio of 44.38 and longer than wide in front in ratio of 51.44. Epigynum heavily chitinised and shown in fig. 11. Internal genitalia shown in fig. 12. No mature ♂♂ are known.

Types: The type of *Amaurobius rubriodes* Hogg is an immature ♂ from Snares while the type specimen of *Badumna scylla* Hogg is a ♀ specimen from the same locality. These types are both in the Otago Museum collections.

Records: SNARES I., under log, 28. I. 1961, I. Mannering; Snares I., under debris, 28. I. 1961, Mannering.

There seems little doubt that only 1 species is found on Snares and this should be now known under the name *Oramia rubrioides* (Hogg) which has page precedence over *scylla*. The Auckland and Campbell forms have been placed in this species previously but the resurrection of the name *crucifera* for the Auckland species and the description below of the Campbell species as new clarifies the situation.

Oramia chathamensis (Simon) Figs. 13, 14, 21, 22.

Amaurobius chathamensis Simon, 1899, Zool. Jahrb. Syst. **12**: 433.
Ixeuticus chathamensis: Dalmas, 1917, Ann. Soc. Ent. France **86**: 334.

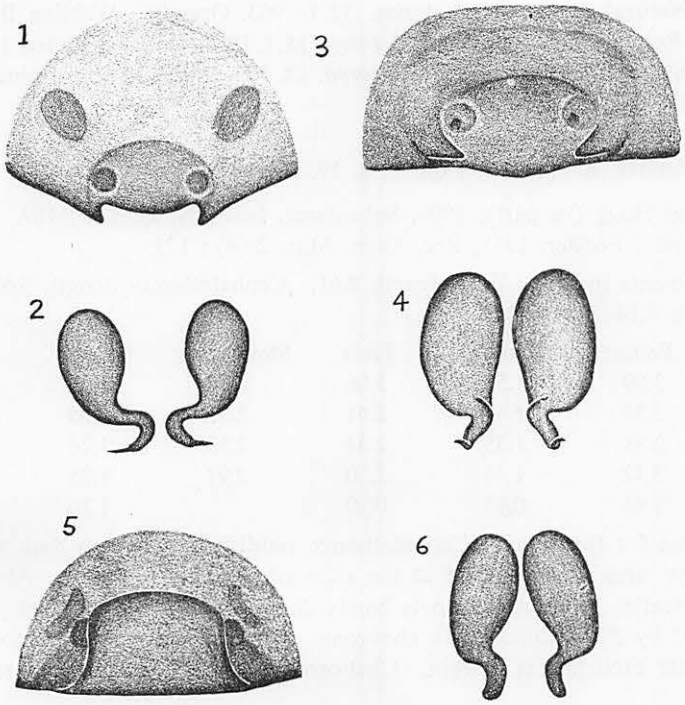
This species is related to *rubrioides* and is very similar to it in appearance. Apart from the ♂ and ♀ genitalia, which are quite distinctive, the relative sizes and spacing of the eyes is characteristic.

Ratio of AME. ALE. PME. PLE=7. 13. 10. 10. The AME are separated from each other by 10/7 and from the ALE leg 13/7 of the diameter of an AME. Lateral eyes separated by 5/7 the diameter of AME while the PME are separated from each other by 15/7 and from the PLE leg 21/7 the diameter of AME. Median ocular quadrangle wider behind than in front and longer than wide in front in the ratio of 17. 12. Epigynum as in fig. 13. This species is intermediate between *Oramia mckerrowi* and *O. rubrioides*. This relationship is seen in the internal genitalia (fig. 14, 10). Embolus, conductor and median apophysis, are shown in fig. 21. Tibial process is a bifid spine with a small boss at fork and the distal plate is straight-sided (fig. 22). ♂♂ are not known for *mckerrowi* or *rubrioides*.

Oramia crucifera (Hogg) Figs. 3, 4, 17, 18.

Rubrius cruciferus Hogg, 1909, Subantarctic Is. of N. Zeal. **1**: 169.
Ixeuticus rubrioides: Berland, 1931, Rec. Cant. Mus. **3**: 357.—Forster, 1955, Rec. Dom. Mus. **2** (4): 172.

When Hogg originally described this species he failed to recognise that the specimens were cribellate and wrongly placed them in the family Agalenidae under the name *Rubrius*



Figs. 1-6. *Oramia* spp. 1, *O. hoggi* n. sp., epigynum; 2, same, internal genitalia from above; 3, *O. crucifera* (Hogg), epigynum; 4, same, internal genitalia from above; 5, *O. charybdis* (Hogg), epigynum; 6, same, internal genitalia from above.

cruciferus. Berland (1931), examining further collections, recognised the cribellate nature of this species and placed it in *Ixeuticus* Simon but did not realise that the species was identical with Hogg's *Rubrius cruciferus* but instead considered it identical with *Amaurobius rubrioides* from the Snares. I (1955) realised that Hogg's specimens and the material examined by Berland were of the same species, but following Berland's conclusions on the synonymy of the species, retained the name *rubrioides* which had page priority over *cruciferus*. The type specimen of *Rubrius cruciferus* Hogg is from the Auckland Is. and is now the type of *O. crucifera* (Hogg) while the Campbell I. species not recognised previously as a distinct species is described below as new. *O. crucifera* (Hogg) has been fully described in an earlier paper by me (1955) under the name *Ixeuticus rubrioides* (Hogg).

Records: AUCKLAND IS. Ranui Cove, under logs, 27.XII.1962, 30.XII.1962, P. Johns; Ranui Cove, under logs, 14. I. 1963, P. James; Ranui Cove, 15 m, under fallen branches in mixed scrub, 15. I. 1963, K. A. J. Wise; Ranui Cove, ex rata forest, I. 1963, Wise; Observation Point, under logs, 27. XII. 1962, R. A. Falla; Bivouac, 400 m, under rocks, 15. I. 1963, Wise; Meggs Hill to Mt. Eden, 120–400 m, 5. I. 1963, J. L. Gressitt; Laurie Harbor, Grey Duck Creek, under rotting wood, 9. I. 1963, Wise: Stony Peak to Bleak Hill, under stones, 1 in case with stonefly, 11. I. 1963, Gressitt; Hooker Hills, 300 m, under stones, 11.

I. 1963, Wise; Natural Arch, under stones, 12. I. 1963, Gressitt; Webling Bay, 13. I. 1963, Wise; Lindley Point, from supralittoral zone, 18. I. 1963, Johns; Ewing I., 4, 6. I. 1963, Gressitt; Ocean I., under logs and *Stilbocarpa*, 28. XII. 1962, Johns; French I., ex petrel burrow, 2. I. 1963, Gressitt.

Oramia hoggi Forster, n. sp. Figs. 1, 2, 19, 20.

Rubrius cruciferus Hogg (in part), 1909, Subantarct. Is. of N. Zeal. **1**: 169.
Ixeuticus rubrioides: Forster, 1955, Rec. Dom. Mus. **2** (4): 172.

♀: Measurements in mm. Total length 8.61. Cephalothorax, length 4.68; width 3.60. Abdomen, length 4.14; width 2.88.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.60	1.55	3.06	2.88	1.53	12.62
2	3.34	1.44	2.61	2.52	1.35	11.16
3	2.88	1.35	2.34	2.52	1.26	10.35
4	3.42	1.44	2.70	2.97	1.35	11.88
Palp	1.44	0.63	0.90		1.26	4.23

Color: Typical for the genus. Cephalothorax reddish brown with dark shading anteriorly, so that the area in front and at the sides of the eyes is black. Abdomen greyish brown with 2 parallel, longitudinal, pale bands down the anterior 1/2 of the mid-dorsal surface, followed by 3 indistinct, pale chevrons. Ventral surface with a longitudinal row of pale spots near each lateral margin. Chelicerae black, legs pale yellow, sternum reddish brown.

Carapace: Head region broad, widest portion of thoracic region only slightly wider than head region. *Eyes*: The eye group occupies 2/3 of the width of the head in that region. From above the anterior row is straight and the posterior row is procurved. Ratio of AME. ALE. PME. PLE=7. 11. 10. 11. The AME are separated from each other by 10/7 and from the ALE by 14/7 of the diameter of an AME. The lateral eyes are separated by a distance equal to 5/7 of the diameter of an AME. The PME are separated from each other by 16/7 and from the PLE by 22/7 times the diameter of an AME. Median ocular quadrangle, wider behind than in front and longer than wide in the front in the ratio of 19.12. *Chelicerae*. Typical. Stout, vertical, promargin with 3 teeth, retromargin with 2 teeth. *Maxillae*. Longer than wide. Distal portion curved in over the labium. *Labium*. Slightly longer than wide, anterior margin slightly indented. *Sternum*. Longer than wide in ratio of 11.9, produced to a point posteriorly between coxae IV. *Legs*: The spination as in *crucifera*. Trichobothria as follows: Leg 1, tibia 2.2.2, proximal, metatarsus 1.1.1, distal, tarsus 1.1.1.1.1.1; leg 2, tibia 2.2.2.2.2, metatarsus 1.1.1.1.1, tarsus 1.1.1.1; leg 3, tibia, 2.2.2.2.2, metatarsus 1.1.1.1, tarsus 1.1.1.1; leg 4, tibia, 2.2.2.2.2.2, metatarsus 1.1.1.1.1, tarsus 1.1.1.1. Tarsal organ absent. Superior claws similar, with 10 teeth. Inferior claw with 2 long curved teeth. *Palp*: Tibia with 8 trichobothria arranged 2.2.2.2. Claw slender and smooth. *Abdomen*. Heavily clothed with relatively short hairs but with long erect hairs down the anterior dorsal surface. Epigynum as in fig. 1. Internal genitalia simple, as shown in fig. 2.

♂: Measurements in mm. Cephalothorax, length 4.68; width 2.88. Abdomen, length 4.14; width 2.34.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.78	1.35	3.60	3.42	1.62	13.77
2	3.24	1.26	2.88	2.70	1.44	11.52
3	2.70	1.17	2.16	2.45	1.26	9.74
4	3.06	1.26	2.70	2.88	1.35	11.25

Similar to ♀. Bifid process on tibia of palp (fig. 19), slightly different from *crucifera* (fig. 18) while the distal plate is indented along the dorsal margin where in *crucifera* it is evenly curved. The embolus, conductor and median apophysis are quite distinct from *crucifera* as shown in figs. 17 and 20.

Types: Holotype ♂, allotype ♀, Campbell I., X. 1961, V. O'Neill, Dominion Museum, Wellington.

Records: CAMPBELL I. Rocky Bay, on rock slope, NE, 28. XI. 1961, Gressitt; Rocky Bay, 0.2 m, 20. I. 1962, K. P. Rennell; Rocky Bay, ex *Colobanthus* on rock, 20. XII. 1961, Gressitt; St. Col Ridge, 180 m, ex moss on rocks, 7. XII. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss on rocks, 24, 26, 30. XI. 1961, Gressitt; St. Col Ridge, 180–280 m, on rock, 4, 7, 9, 13. XII. 1961, Gressitt; Courrejolles Peninsula, 200 m, ex *Colobanthus*, 14. XII. 1961, Gressitt; Courrejolles Peninsula, Mollymawk colony, ex moss, 14. XII. 1961, J. L. Gressitt; Courrejolles Pen., 200 m, Mollymawk nest, ex *Colobanthus*, 14. XII. 1961, Gressitt; Beeman Hill, 30–100 m, ex *Poa* roots and moss, 6. XII. 1961, Gressitt; Beeman Hill, 150 m, ex *Anisotome*, 2. XII. 1961, J. L. Gressitt; Beeman Hill, 190 m, ex *Pleurophyllum speciosum*, 11. XII. 1961, Gressitt; Beeman Hill, ex dry flower on stem of *Pleurophyllum*, Gressitt; Beeman Hill, 2. II. 1963, Wise; Beeman camp area, Perseverance Harbor, 1958–1959; Beeman Cove, water edge, 2. I. 1962, Rennell; Mt. Lyall, 300 m, under moss, 5. XII. 1961, Gressitt; Mt. Lyall, 200–400 m, ex moss, 3, 5, 12. XII. 1961, Gressitt; Monument Harbor, rocky shore, 20 m, 10. XII. 1961, Gressitt; Monument Harbor, 9. II. 1963, Wise; Monument Harbor beach, ex kelp, 17. XII. 1961, Gressitt; Lookout Beach, ex dead fern, 16, 19. XII. 1961, Gressitt; Shoal Point, tussock, 7. II. 1963, Wise; Mt. Honey, 500 m, 17. XII. 1961, Gressitt; Filhol Peak, 9. II. 1963, Wise; Beeman Hill, 25 m, 21. XI. 1961, Gressitt; Mt. Dumas, 500 m, under rock, 17. XII. 1961, Gressitt.

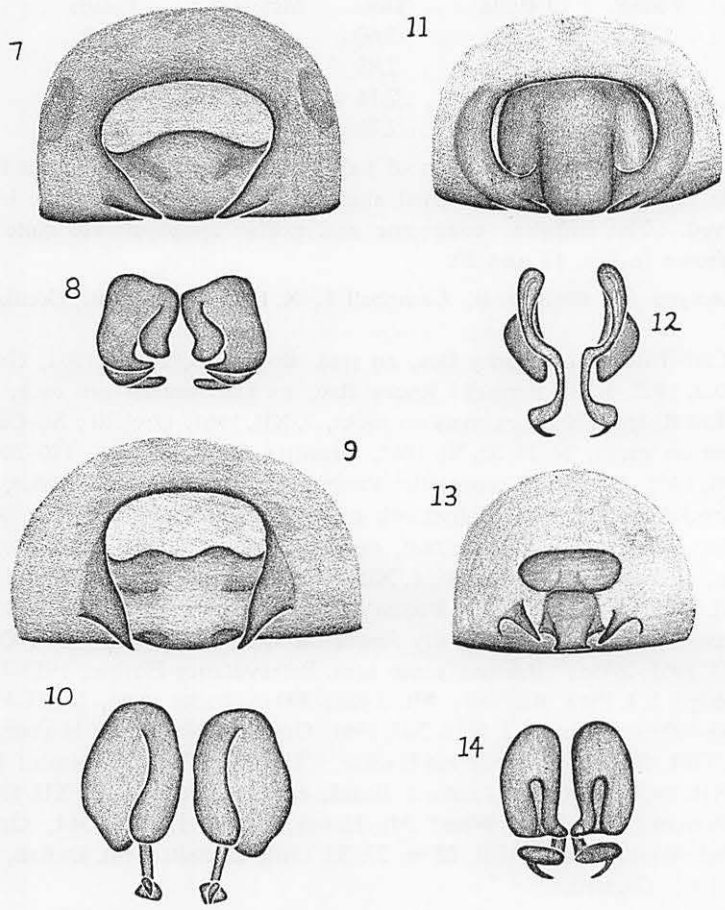
This species is closely related to *crucifera* from the Auckland Is. but can be readily separated by the form of the ♂ and ♀ genitalia.

Oramia marplesi Forster, n. sp. Figs. 7–8.

♀: Measurements in mm. Total length 8.86. Cephalothorax, length 4.04; width 3.08. Abdomen, length 5.28; width 3.52.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.64	1.32	2.64	2.64	1.32	10.56
2	2.28	1.15	2.21	1.99	0.96	8.59
3	2.43	0.96	1.76	2.03	0.92	8.10
4	2.91	1.12	2.64	2.43	1.08	10.18
Palp	1.15	0.44	0.88		1.21	3.64

Color: Carapace orange-brown, darkening to reddish brown anteriorly. Abdomen dark-brown with paler areas on the anterior dorsal surface, expanding into a chevron about midway, followed behind by 2 more rather indistinct chevrons. Legs and palp yellowish brown with a few darker patches. Chelicerae reddish brown.



Figs. 7–14. *Oramia* spp. 7, *O. marplesi* n. sp., epigynum; 8, same, internal genitalia from above; 9, *O. mackerrowi* (Marples), epigynum; 10, same, internal genitalia from above; 11, *O. rubrioides* (Hogg), epigynum; 12, same, internal genitalia from above; 13, *O. chathamensis* (Simon), epigynum; 14, same, internal genitalia from above.

Eyes: Ratio of AME. ALE. PME. PLE=6.10.10.9. The AME are separated from each other and from the ALE by 10/6 of the diameter of an AME. Lateral eyes separated by 3/6 of the diameter of an AME. The PME are separated from each other by 11/6 and from the PLE by 15/6 of the diameter of an AME. Median ocular quadrangle wider behind than in front and longer than wide in the front in the ratio of 29.22. Width of the clypeus equal to 2.5× the diameter of an AME. *Carapace.* Head region broad, equal in width to 2/3 maximum width of thoracic region. Numerous, long, erect, black hairs on the head and fewer more inconspicuous hairs elsewhere. Fovea distinct. *Chelicerae.* Stout, vertical, without prominent lateral boss. Retromargin with 2 small teeth, 3 stronger teeth on promargin. A prominent ridge extends back from the proximal tooth on the promargin to the base of the chelicera. There is a thick scopula behind promargin.

Maxillae. Longer than wide in ratio of 5.3, slightly convergent. *Labium.* As long as wide. Lateral margins evenly curved so that width at half-way is equal to 5/3 of the proximal and distal widths. Anterior margin straight with a row of long black hairs. *Sternum.* Scutiform, longer than wide in the ratio of 10.7. Terminated sharply posteriorly between coxae IV. *Abdomen*: Closely clothed with fine hairs, longer on the outer anterior dorsal surface. Cribellum small, division indistinct. Epigynum and internal genitalia as in figs. 7–8.

Types: Holotype ♀, Auckland Islands, Enderby I., Port Ross, 2. I. 1963, Wise, Dominion Museum, Wellington.

Records: AUCKLAND IS. Crozier Point, ex sedge, 28. XI. 1962, Gressitt; Crozier Point, 30. XII, 28. XII. 1962, Gressitt; Tucker Point, under rocks, 19. I. 1963, Gressitt.

Very closely related to *Oramia mckerrowi* (Marples) originally described by Marples (1959), as a subspecies of *rubrioides*, which at that time included both the Auckland and Campbell species. Epigynum and internal genitalia of *mckerrowi* are illustrated in fig. 9, 10 for comparison.

Oramia charybdis (Hogg) Figs. 5, 6, 15, 16.

Amaurobius charybdis Hogg, 1910, Trans. N. Zeal. Inst. **42**: 273.
Ixeuticus charybdis, Dalmas, 1917, Ann. Soc. Ent. France **96**: 334.—Marples, 1959, Trans. Roy. Soc. N. Zeal. **87**: 338.

Hogg's type specimen came from Stewart I. where the species is common. Marples (1959) has subsequently extended the range to cover most of the South I. of New Zealand. The specimens recorded below are probably part of a restricted population introduced into Campbell I. during an earlier period when the island was settled or during the recent war years.

Records: CAMPBELL I. Tucker Cove area, under lichen on *Dracophyllum*, 9. II. 1962, Rennell; Tucker Cove, 1. II. 1963, Wise; Tucker Cove, old camp, under boards 15 m, 7. XII. 1961, Gressitt; Tucker Cove, from peat bank, 1. II. 1963, Rennell.

Family OONOPIDAE

Genus **Subantarctia** Forster, 1955

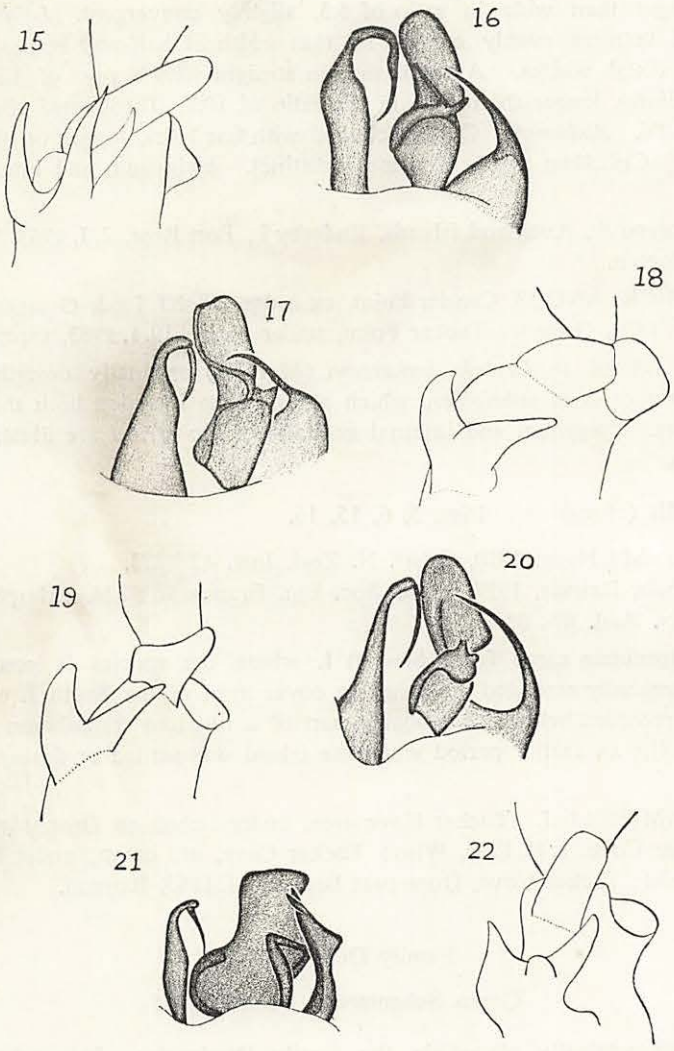
This genus was originally placed in the family Dysderidae. In a subsequent revision (Forster, 1955) of the N. Z. spiders of the family Oonopidae, 4 further species of this genus were described from the South I. of New Zealand and *Subantarctia* was then transferred to this family.

Subantarctia turbotti Forster Figs. 23–25.

Subantarctia turbotti Forster, 1955, Rec. Dom. Mus. **2** (4): 170.

Only 2♀♀ specimens were available when this species was established. The present collections include a good series of both ♂ and ♀ specimens. The description of the ♂ is as follows:

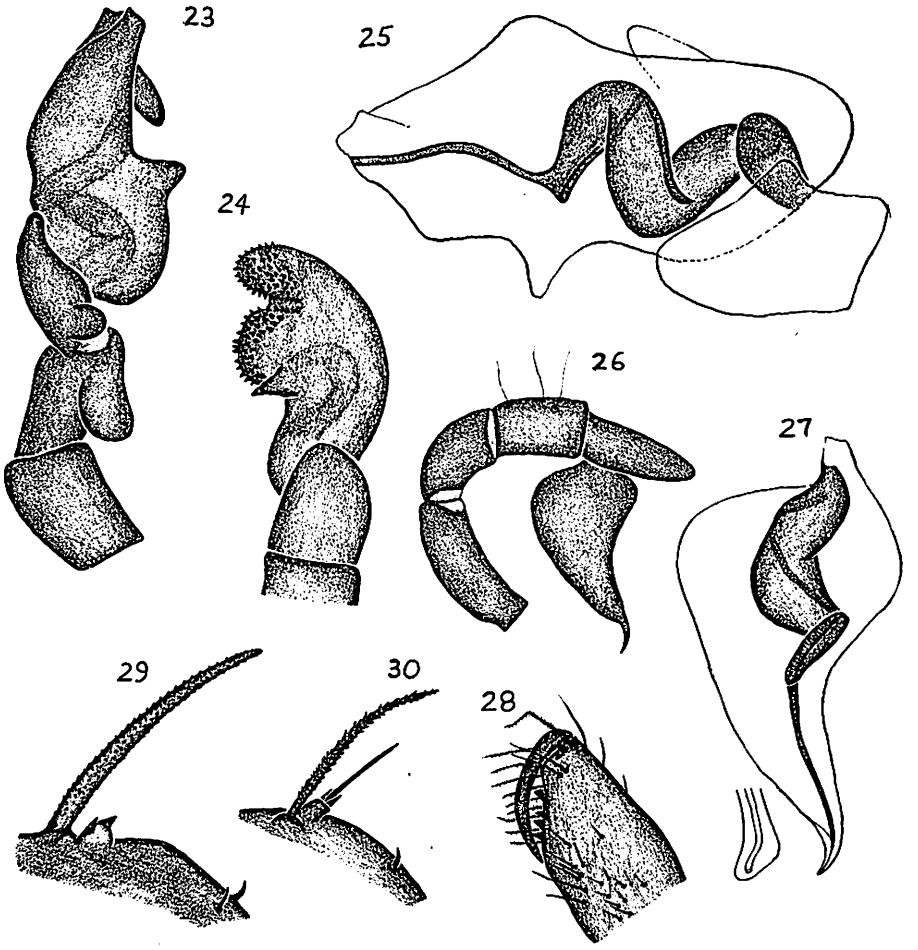
♂: Measurements in mm. Cephalothorax, length 1.80; width 1.29. Abdomen, length 1.73; width 1.17.



Figs. 15–22. *Oramia* spp. 15, *O. charybdis* (Hogg), distal retrolateral portion of tibia of ♂ palp; 16, same, embolus, conductor, and median apophysis of ♂ palp; 17, *O. crucifera* (Hogg), embolus, conductor and median apophysis of ♂ palp; 18, same, distal, retrolateral, portion of tibia of ♂ palp; 19. *O. hoggi* n. sp., distal retrolateral portion of ♂ palp; 20, same, embolus, conductor and median apophysis; 21, *O chathamensis* (Simon), embolus, conductor and median apophysis of ♂ palp; 22, same, distal, retrolateral, portion of ♂ palp.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.32	0.72	1.08	1.06	0.57	4.75
2	1.44	0.65	1.08	1.11	0.55	4.83
3	0.98	0.57	0.72	0.81	0.45	3.53
4	1.29	0.61	0.99	1.16	0.49	4.54
Palp	0.39	0.31	0.27		0.28	1.25

Cephalothorax and legs bright reddish brown. Abdomen creamy, without markings. Six eyes arranged in 3 contiguous pairs. Ratio of ALE. PME. PLE=8.6.8. The ALE are separated from each other by 13/8 of the PLE by 23/8 of the diameter of an ALE. The PME are placed behind the ALE so that they are separated from the ALE by 2/8 and from the PLE by 5/8 of the diameter of an ALE. Legs 2.1.4.3, clothed with both serrate and smooth hairs. All legs with 2 trichobothria on proximal 1/3 of tibia and a single distal trichobothrium present on metatarsus of the 1st 3 pairs of legs but absent from the 4th pair. Tarsal organ small with a single small bristle. Two distal "thorns" present. The palp is shown in figs. 23–25. The receptaculum seminis is provided with a well dev-



Figs. 23–30. 23, *Subantarctia turbotti* (Forster), retrolateral surface of ♂ palp; 24, same, prolateral surface of cymbium, and bulb of ♂ palp; 25, same, ♂ bulb showing the receptaculum seminis; 26, *Pounamua gressitti* n. sp., retrolateral surface of ♂ palp; 27, same, bulb cleared to show the receptaculum seminis; 28, same, ♀ chelicera; 29, same, distodorsal, surface tarsus I showing the tarsal tubercle, tarsal thorns and an adjacent hair; 30, *Pounamua australis* n. sp., distodorsal surface of tarsus I showing the tarsal tubercle, tarsal thorns and an adjacent hair.

eloped sieve plate.

Records: AUCKLAND IS. Crozier Point, ex sedge, 28. XII. 1962, Gressitt; Crozier Point, ex kelp on beach, 28. XII. 1962, Gressitt; Crozier Point, 30. XII. 1962, Gressitt; Observation Point, 27. XII. 1962, Gressitt; Ranui Cove, beating *Myrsine*, 27. XII. 1962, Johns; Ranui Cove, 4 m, ex Malaise trap, 16–18. I. 1963, Gressitt; Ranui Cove, 4 m, ex Malaise trap, 28. XII. 1962, Gressitt; same data, 30. XII. 1962, 27. XII. 1962 and 31. XI. 1962; Stony Peak, Bleak Hill, under stones, 11. I. 1963, Gressitt; Bivouac, 400 m, under rocks, 15. I. 1963, Gressitt; Bivouac, ex tussock, 16. I. 1963, Gressitt.

Form of palp quite distinctive but indicates close relationship with the 4 species known from the South I. of New Zealand.

Genus **Pounamua** Forster, 1956

This genus was established by me for 5 species from New Zealand. Specimens are present in the material studied from both Auckland and Campbell Is. In New Zealand these spiders are found in leaf detritus from forest but the present material shows that they can also thrive in leaf detritus under shrubby cover and also in tussock land. The 2 species described below conform closely to the New Zealand species but are readily separated from each other by the form of the tarsal tubercle.

Pounamua gressitti Forster, n. sp. Figs. 26–29.

♂: Measurements in mm. Total length 2.26. Cephalothorax, length 0.99; width 0.89. Abdomen, length 1.26; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.90	0.39	0.75	0.72	0.45	3.21
2	0.89	0.36	0.75	0.72	0.45	3.17
3	0.81	0.36	0.61	0.66	0.36	2.80
4	1.08	0.45	0.89	0.90	0.43	3.75
Palp	0.31	0.21	0.19		0.27	0.98

Color: Cephalothorax yellow-brown with dark brown shading. Abdomen purple, with a few pale lines.

Eyes: Six eyes of equal width. From above the AME are set back slightly from the ALE. Lateral eyes subcontiguous. PME subcontiguous, separated from the ALE by a distance equal to 1/4 the width of a PME. ALE are separated from each other by distance equal to 5/4 and PLE separated from each other by 10/4 of the diameter of a PME. Width of the clypeus is slightly less than the diameter of a PME. *Chelicerae* (fig. 28). Two strong teeth present on both pro- and retromargins. Four rows of setose hairs behind retromargin, but otherwise hairs present are smooth except for strong serrate hairs originating from the base of the fang. *Maxillae*: Parallel, margins straight, 3× as long as wide. *Labium*. As wide as long, anterior margin gently procurved. *Sternum*: Scutiform, longer than wide in the ratio of 33.31. Produced out to small points between coxae. Posterior margin clavate, extending behind coxae IV, which are separated from each other by a distance equal to 11/13 of the diameter of a coxa. *Legs*. Trichobothria distributed on tibiae and metatarsi as follows: Leg 1, tibia 1 at 2/3 length, metatarsus 1 distal; leg 2, tibia 1 pair on median surface, metatarsus 1 distal; leg 3, tibia 1 median, metatarsus 0;

leg 4, tibia 0, metatarsus 1 distal. Tarsal tubercle without a long median bristle but with 2–3 small bristles (fig. 29). Two claws, bipectinate, median claws of outer row on legs 3 and 4 longest as is characteristic for the genus. *Palp* (figs 26, 27). Clothed with setose hairs. Tibia with a row of 3 trichobothria. Bulb simple, as shown in figs. 26, 27. *Abdomen.* Ovoid, clothed with short hairs. The 2 pairs of spiracles are separated from each other by a distance equal to 1/15 of the length of the abdomen. Colulus small with 3 setae.

♀: Measurements in mm. Total length 2.47. Cephalothorax, length 1.01; width 0.90. Abdomen, length 1.44; width 0.90

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.99	0.39	0.81	0.72	0.43	3.34
2	0.91	0.43	0.81	0.72	0.45	3.32
3	0.81	0.36	0.63	0.66	0.36	2.82
4	0.08	0.45	0.88	0.90	0.38	3.69
Palp	0.36	0.27	0.21		0.33	1.17

Very similar to ♂. The tarsal tubercle appears to have a very small median bristle as well as 2 or 3 small marginal bristles. There are 3 trichobothria on the tibia of the palp, arranged 2.1. The claw is short, straight and smooth.

Types: Holotype ♂, Courrejolles Peninsula, 240 m, Campbell I., ex Berlese funnel, 13. II. 1963, Wise; allotype ♀, Beeman Hill, 30–100 m, ex *Poa* roots and moss, 1–6. XII. 1961, Gressitt, Dominion Museum, Wellington.

Records: CAMPBELL I. Courrejolles Peninsula, mollymawk colony, 14. XII. 1961, Gressitt; Beeman Hill, 30–100 m, ex *Poa* roots and moss, 1–6. XII. 1961, Gressitt; Beeman Hill, 100–180 m, ex yellow moss, Berlese funnel, 2–6. XII. 1961, Gressitt; Mt. Azimuth, 350 m, ex moss and lichen, Berlese funnel, 30. XI. 1961, Gressitt; Tucker Cove, ex grass 22. XI. 1961, Gressitt; Tucker Cove, 16–100 m, ex moss, Berlese funnel, 21. XI. 1961, Gressitt; Tucker Cove, ex leafmold under tussock, 3. III. 1963, Wise; Mt. Lyall, 200–400 m, ex moss, 3–5. XII. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss on rock, 4, 7, 9, 13. XII. 1961, Gressitt; same data, 24, 26, 30. XI. 1961, St. Col-Lyall-Beeman, ex moss, Berlese funnel, 3–5. XII. 1961, Gressitt; St. Col Ridge, 200 m, ex moss on rocks, 24. XI. 1961, Gressitt; Perseverance Harbor, Lookout Bay, ex leafmold under tussock, 3. II. 1962, Wise; Penguin Colony, Rocky Bay, South coast below Mt. Dumas, ex leafmold from base of tussock, 3. III. 1963, Wise; Campbell I., 6. VII. 1962, Clark.

Pounomua australis Forster, n. sp. Fig. 30.

♀: Measurements in mm. Total length 2.26. Cephalothorax, length 1.08; width 0.81. Abdomen, length 1.17; width 0.81.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.86	0.39	0.72	0.61	0.36	2.94
2	0.81	0.37	0.69	0.61	0.36	2.84
3	0.72	0.34	0.45	0.54	0.27	2.32
4	0.90	0.36	0.72	0.75	0.32	3.05
Palp	0.28	0.19	0.18		0.29	0.94

The general characters of this species are as in *P. gressitti.* The distribution of tricho-

bothria on the legs is slightly different. There is a trichobothrium on the median surface of the metatarsus of the 1st 2 pairs of legs and 2 trichobothria on the tibia and a single trichobothrium on the metatarsus of the 3rd and 4th pairs of legs. The tarsal tubercle bears a strong median bristle which is 2/3 the length of adjacent hairs in addition to 2 short accessory marginal bristles (fig. 29).

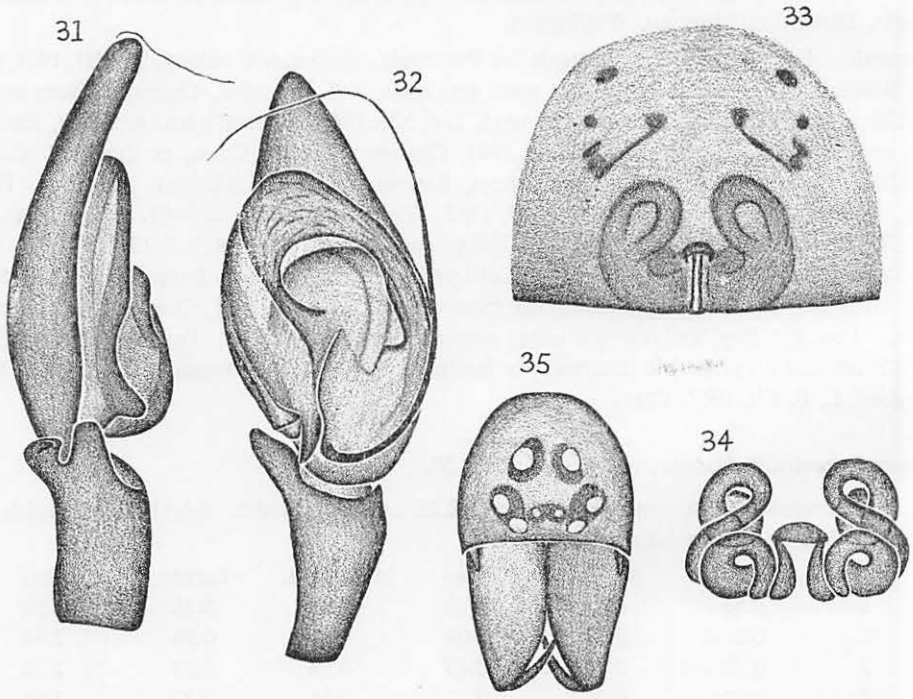
Type: Holotype ♀, Natural Arch, Auckland I., 2. I. 1963, Gressitt, Dominion Museum, Wellington.

Records: AUCKLAND IS. Bivouac Hill, near rocky stream, 10. I. 1963, Gressitt (immature ♀).

Family AGELENIDAE

Genus **Myro** Cambridge, 1876

The genus *Myro* was established by Cambridge in 1876 for *M. kerguelenensis*, a spider common on Kerguelen Island, which is now known to occur also in the Crozets, Heard and Macquarie Islands. Other species which have been placed in this genus have been recorded from South Chile, Scuth Georgia, South Africa, Tasmania and the Snares Island, and these spiders have been used in the past as evidence to support theories for ancient land-links between the Southern Continents. The opportunity has been taken in the pre-



Figs. 31–35. *Myro kerguelenensis* Cambridge. 31, retrolateral view of ♂ palp; 32, ventral view of ♂ palp; 33, epigynum; 34, internal genitalia from below; 35, head and chelicerae of ♀, from in front.

paration of the present paper to compare specimens of the type species with material now available from the Snares Island.

Myro kerguelenensis has been adequately described by previous authors but illustrations of the key characters (figs. 31–35) for this species are included in this paper. After a detailed examination I feel that there is a very close relationship between *Myro kerguelenensis* and *M. manneringi* n. sp. from Snares and a more distant relationship between *M. kirki* and *M. ovalis* also found on the Snares. This affinity is continued through to New Zealand by a number of as yet undescribed species and to the Auckland Is. by the 3 species of *Huara* which have very similar ♂ palps, and in my view are closely related. The main diagnostic character used to define the genus *Myro* is the position of the anterior median eyes which are situated behind the anterior lateral eyes, a character which has been carried to the extreme in some of the undescribed related New Zealand species where the AME is situated in the center of a circle formed by the remaining eyes. However, it would appear that this character could be rather misleading if too much emphasis is placed upon it and the revision of the New Zealand spiders related to *Myro* may well result in new generic groupings.

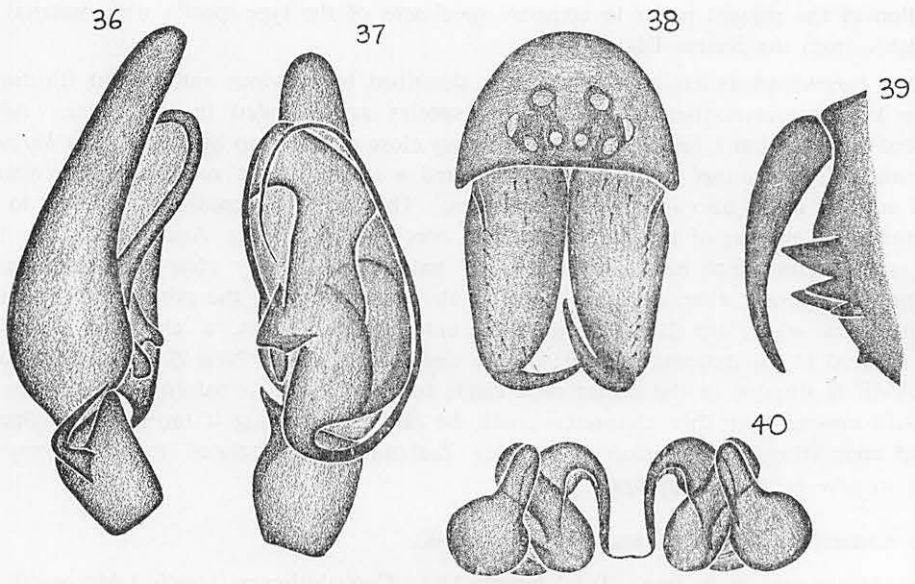
Myro manneringi Forster, n. sp. Figs. 36–40.

♂: Measurements in mm. Total length 2.90. Cephalothorax, length 1.44; width 0.98. Abdomen, length 1.44; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.17	0.54	1.08	0.99	0.63	4.41
2	1.08	0.54	0.81	0.82	0.57	3.82
3	0.90	0.45	0.64	0.81	0.51	3.31
4	1.08	0.48	1.04	0.99	0.56	4.15

Color: Cephalothorax pale yellow-brown, without markings, legs creamy white. Abdomen creamy white with faint black shading on lateral surfaces and with a faint black band, extending down the anterior 1/2 of the dorsal surface, followed by 4 incomplete chevrons down the posterior 1/2.

Eyes: The eye group takes up 2/3 of the width of the head in that region. From above the anterior row is straight and the posterior row procurved. From in front the AME are seen to be situated behind the level of the ALE, forming a procurved row as does the posterior row (fig. 38). Ratio of AME. ALE. PME. PLE = 6.10.9.8. AME are separated from each other and from the ALE by 2/6 and from the PME by 8/6 of the diameter of an AME. The lateral eyes are separated from each other by 5/6 and from the PLE by 6/6 of the diameter of an AME. The median ocular quadrangle is as wide as it is long. *Carapace.* Clothed with a few long hairs. Widening evenly from anterior margin to widest portion between the 2nd pair of legs. Head region not separated by a furrow, no higher that thoracic region. Fovea longitudinal, narrow, not deep. *Chelicerae* (fig. 39). Sharp ridge extending down anterior surface from base to 1/2 the length. Three, closely spaced, strong, teeth on retromargin, 2 on promargin, of which the distal is strong and the proximal small. *Labium.* Relatively broad, slightly wider than long. Anterior margin evenly rounded. *Maxillae.* Parallel, lateral margins straight. Longer than wide in ratio of 5 : 3. *Sternum.* Scutiform, longer than wide in ratio of 5 : 4. Pointed posteriorly behind the 4th pair of coxae which are separated from each other by a distance



Figs. 36–40. *Myro manneringi* n. sp. 36, retrolateral view of ♂ palp; 37, ventral view of ♂ palp; 38, head and chelicerae of ♀ from in front; 39, fang and teeth of ♂ chelicera, 40, internal genitalia from below.

equal to their width. *Legs.* 4. 1. 2. 3. Clothed with numerous setose hairs. Spines are distributed as follows: Leg 1, tibia ventral 2.2, metatarsus ventral 2.2.2, tarsus 0; leg 2, femur dorsal 1.2, 1 distal prolateral, tibia, ventral 1.1, dorsal 1.1, tarsus 0; leg 3, femur, dorsal 1.2, patella dorsal 1.1, tibia dorsal 1.1, prolateral 1.1, retrolateral 1.1, ventral 1.2, metatarsus, dorsal 1.2, ventral 2.1, prolateral 1.2, retrolateral 1.2, tarsus 0; leg 4, femur 1 mid-dorsal, 1 distal prolateral, tibia dorsal 1.2, ventral 1.1.1, prolateral 1.1, retrolateral 1.1, metatarsus dorsal 1.1, ventral 2.1, prolateral 2 distal, retrolateral 2 distal. Trichobothria are numerous and distributed on the tibiae metatarsi and tarsi as follows: Leg 1, tibia 1.1.2.1.1, metatarsus 1.1.1, tarsus 1.1.1; leg 2, tibia 1.1.2.1.1, metatarsus 1.1.1, tarsus 1.1.1.1; leg 3, tibia 1.1.1.1, metatarsus 1.1.1, tarsus 1.1.1; leg 4, tibia 2.2.1, metatarsus 1.1.1, tarsus 1.1.1. Tarsal organ present at 3/4 length of each tarsus. Superior claws similar with 9 short teeth. Inferior claw with 2 long, curved teeth. *Palp* (figs. 36, 37). Cymbium elongate, projecting well beyond the bulb. Distal surface of tibia with a long curved spinous process and a broad triangular plate. Conductor broad and expands into a thin curved bowl on the retrolateral margin into which the tip of the embolus normally rests. Median apophysis stout and not free. *Abdomen.* Closely clothed with short setose hairs. Colulus prominent.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.63	0.34	0.45	0.45	0.31	2.18
2	0.54	0.29	0.42	0.45	0.30	2.00
3	0.48	0.29	0.33	0.39	0.27	1.76
4	0.72	0.27	0.45	0.48	0.28	2.20
Palp	0.31	0.13	0.18		0.28	0.90

♀: Measurements in mm. Total length 2.62. Cephalothorax, length 1.08; width 0.72.

Abdomen, length 1.53; width 0.99.

Cephalothorax pale reddish brown. Abdomen heavily shaded with black, relieved by pale areas on dorsal surface which merge posteriorly to form a median band. Ratio of AME. ALE. AME. PLE=3.5.4.4. The spacing of the eyes is similar to that of the ♂ except that the PME are more widely spaced, the distance between them being equal to 4/3 the diameter of an AME. Epigynum simple, with a small rectangular median lobe. Internal genitalia is complex as shown in fig. 40. The structure of the ♀ otherwise corresponds to that of the ♂.

Types: Holotype ♂, allotype ♀, Snares Is. (10.1), South East Promontory, beating *Hebe*, 31. I. 1963, G. Knox. Canterbury Museum.

Records: SNARES IS. Near station beating *Senecio*, 2. II. 1961, Knox; Hoho Bay and East Coast, beating *Olearia*, 31. I. 1961, I. Mannering.

Myro ovalis Hogg Figs. 41–44.

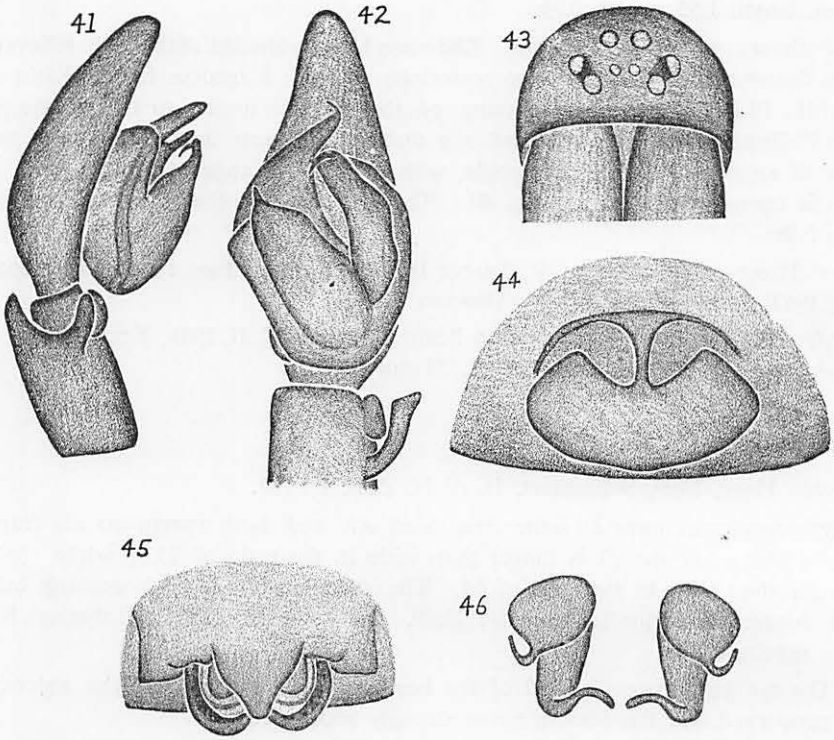
Myro ovalis Hogg, 1909, Subantarct. Is. of N. Zeal. **1**: 157.

The type specimens have at some time dried out and both specimens are fragmentary. The cephalothorax of the ♂ is longer than wide in the ratio of 15.8, while that of the ♀ is longer than wide in the ratio of 8.5. The abdomen of the ♂ is missing, but that of the ♀ is longer than wide in the ratio 13.10. The following data is all that can be secured from the specimens.

♂: The eye group occupies 1/2 of the head region. From above the anterior row is slightly procurved and the posterior row strongly procurved.

Eyes. The ratio of AME. ALE. PME. PLE=4.8.8.8. The AME are separated from each other and from 2/4 on the ALE by a distance equal to 1/2 the diameter of an AME. ALE and PLE are separated from each other by 4/4 the diameter of an AME. The PME are separated from each other by 5/4 and from the PLE by 4/4 of the diameter of an AME. Median ocular quadrangle wider behind than in front in the ratio of 21.10 and longer than wide in the front in the ratio of 19.10. The width of the clypeus is equal to 7/4 of the diameter of an AME (fig. 43). *Sternum.* Scutiform, as wide as long, terminating in front of coxae IV which are contiguous. *Maxillae.* With straight sides, parallel. Longer than wide in the ratio of 10.7. *Labium.* As long as wide, lateral margins parallel, anterior margin incurved. *Chelicerae.* Short and stout, with lateral boss. Both margins with 2 teeth. *Palp.* The form of the palp is shown in figs. 41, 42. The legs and abdomen are missing.

♀. *Eyes*: The eyes other than the AME, are much larger than the ♂. Ratio of AME. ALE. PME. PLE=4.11.11.11. The AME are separated from each other and from the ALE by a distance equal to the diameter of AME. The lateral eyes are separated by a distance equal to 6/4 of this diameter. The PME are separated from each other by 8/4 and from the PLE by 3/4 of the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 30.10 and longer than wide in the front in the ratio of 31.10. *Sternum.* This is scutiform but extends back to a narrow projection between coxae IV which are separated by a distance equal to 1/3 the width of a coxae. *Maxillae.* Similar in appearance to the ♂ but only slightly longer than wide. Labium and chelicerae as in ♂. *Legs.* One of the 2nd pair of legs is still attached to the speci-



Figs. 41–46. *Myro* spp. 41, *M. ovalis* Hogg, retrolateral view of ♂ palp; 42, same, ventral view of ♂ palp; 43, same, head of ♂ from in front; 44, same, epigynum; 45, *M. kirki* Hogg, epigynum; 46, same, internal genitalia.

men. The tibia has 4 pairs of spines on the ventral surface and the metatarsus with 3 pairs. *Abdomen.* There is a large oval colulus. The epigynum is shown in fig. 40.

Types: Syntypes, ♂ and ♀. Snares Is., Otago Museum.

It is unfortunate that the type material is in such bad condition and that no further material is available. The quite striking differences between the eyes and the form of sternum of the 2 specimens which were pointed out by Hogg in his original description could indicate that the type material does in fact represent 2 distinct species.

Myro kirki Hogg Figs. 45–46.

Myro kirki Hogg, 1909, Subantarct. Is. of N. Zeal. **1**: 173.

♀: Measurements in mm. Total length 12.16. Cephalothorax, length 7.48; width 4.84. Abdomen, length 4.84; width 3.52.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	4.12	1.76	3.08	3.08	1.76	13.80
2	3.52	1.32	2.47	2.64	1.54	11.49
3	3.08	1.41	2.24	2.87	1.32	10.92
4	3.96	1.55	3.52	3.96	1.76	14.75
Palp	1.99	0.67	1.24		1.36	5.26

Color: Cephalothorax, legs and palp, pale, reddish brown. Abdomen pale grey with broken white markings down the entire mid-dorsal surface and a further white area down the mid ventral surface.

Eyes: The eye group is compact, occupying less than 1/2 the head in that region. From above the posterior row is strongly procurved and the anterior more gently procurved. From in front the rows are both procurved. Ratio of AME. ALE. PME. PLE=5.9.9.8. The AME are separated from each other by 2/5 and from the ALE by 4/5 of the diameter of an AME. The lateral eyes are subcontiguous. The PME are separated from each other by 8/5 and from the PLE by 7/5 of the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 13 : 6 and longer than wide in the front in the ratio of 11 : 6. The width of the clypeus is slightly more than 2× the diameter of an AME. *Sternum.* Slightly longer than wide. Anterior and lateral margins almost straight, sloping sharply in from coxae II to form a sharp point posteriorly between coxae IV. Coxae IV separated by a distance equal to 1/4 the width of 1 of the coxae. *Labium.* Notched at base, as wide as long, lateral margins straight, anterior margin gently incurved. *Maxilla.* Larger than wide in ratio of 3.2, not converging. *Chelicerae.* Short and stout. Prominent lateral boss. There are 2 strong teeth on both pro- and retromargins and a ventral ridge extends back from the furrow. *Legs.* 4. 1. 3. 2. Spines distributed as follows: Leg 1, femur, dorsal 1.1, prolateral 2 distal, tibia, ventral 2. 1p. 3. 1p. 2, metatarsus, ventral 2.2.2.2; leg 2, femur, dorsal 1.1.1, prolateral 0.0.1.1, tibia, ventral 2.2.2, prolateral 0.1.1, metatarsus, ventral 2.2.2.2, prolateral 1.1.2; leg 3, femur, dorsal 1.1.2.1, tibia, dorsal 1.1.1, ventral 2.2.2, prolateral 1.1.1, retrolateral 1.1.1, metatarsus, dorsal 0, ventral 2.2.2, prolateral 2.2.2, retrolateral 2.2.2; leg 4, femur, dorsal 1.1.2.1, tibia, dorsal 1.1. 1, ventral 2.1.2, prolateral 1.1.1, retrolateral 1.1.1, metatarsus, dorsal 0, ventral 2.2.2, prolateral 2.2.2, retrolateral 2.2.2, trichobothria present in a double row on tibia and a single row on metatarsi and tarsi of all legs. Superior claws homogeneous with from 6–7 long teeth. Inferior claw with a single tooth. *Abdomen.* Clothed with numerous small, inconspicuous hairs. Spinnerets short, colulus well developed. The epigynum is shown in fig. 45, and the internal genitalia in fig. 46.

Type: Snares Is., Otago Museum (subadult ♀).

Records: SNARES I. Near Station Point, under *Olearia* logs, 22–28. I. 1961. Mannering; Near Station Point, sweeping *Polystichum vestitum*, 7. II. 1961, Mannering; Penguin Colony, under log in bush near colony, 28. I. 1961, Mannering.

Genus **Gohia** Dalmas, 1918

This genus was established by Dalmas for *Rubrius falxiatus*, described by Hogg from a single ♂ collected in the Auckland Islands. In 1955, I (1955) examined 3 further ♂♂ from the Auckland Is. and redescribed Hogg's type specimen. The present collections include a number of spiders similar to the type species but from many more localities in both Auckland and Campbell Is. It is now clear that speciation has taken place in this group and 2 further species are described below. The present known distribution of the 3 species now known seems allopatric and they could in fact be considered a single polytypic species. A re-examination of the spider described by me under the name *Chiracanthium wenhami* shows that this species should also be placed in *Gohia* and is recorded below from both the Auckland and the Campbell Is.

Gohia falxiata (Hogg) Figs. 47–50, 64.

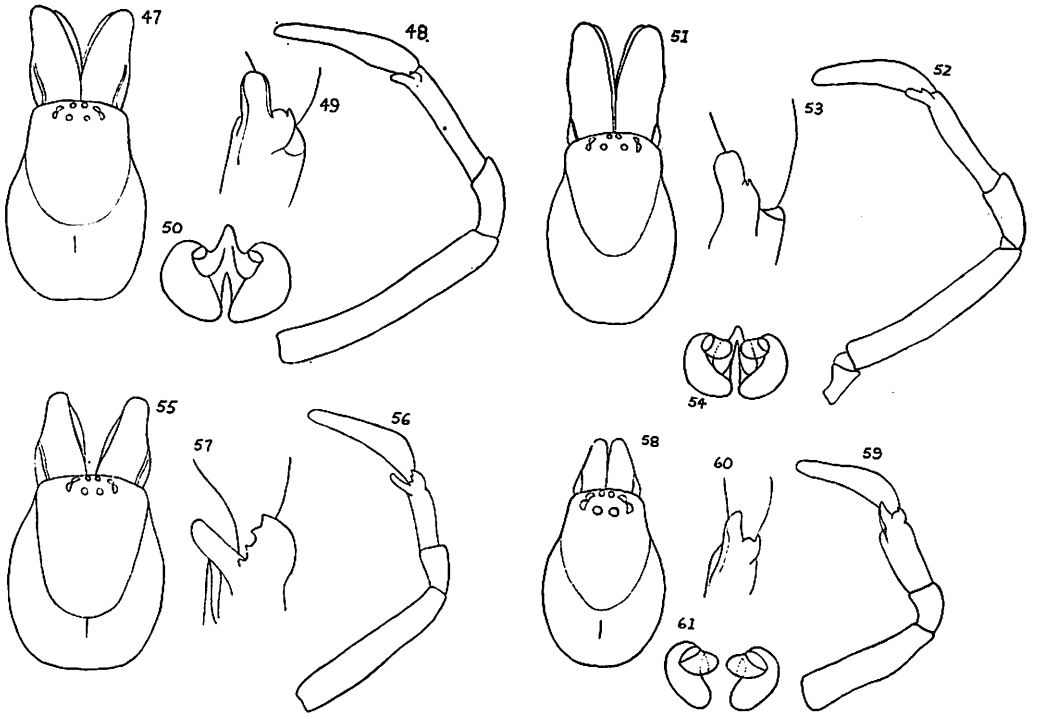
Rubrius falxiatus Hogg, 1909, Subantarct. Is. of N. Zeal. **1**: 170.
Gohia falcata: Dalmas, 1918, Ann. Soc. Ent. France **86**: 403.
Gohia falxiata: Forster, 1956, Rec. Dom. Mus. **2** (4): 175.

♂: Measurements in mm. Total length 6.41. Cephalothorax, length 3.08; width 2.64. Abdomen, length 3.24; width 1.99.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.08	1.32	3.08	2.91	1.41	11.80
2	2.64	1.15	2.64	2.21	1.32	9.96
3	2.20	0.96	1.84	1.99	0.92	7.91
4	2.64	1.11	2.64	2.34	1.41	10.14
Palp	1.99	0.52	1.32		1.15	4.98
Chelicera	1.84					

Color: Carapace reddish brown with dark shading. Legs, palp and chelicerae pale brown. The abdomen of a specimen from Bivouac is dark, almost black, with 2 pale spots on dorsal surface at 1/4 followed by 6 chevrons. A specimen from Ranui Cove has almost white abdomen with very little black shading.

Eyes: The eye group occupies slightly more than 1/2 the width of the head in that region. Ratio of AME. ALE. PME. PLE=5.7.6.6. The AME are separated from each other by 5/5 of from the ALE by 4/5 of the width of an AME. The lateral eyes are subcontiguous. The PME are separated from each other by 9/5 and from the PLE by 7/5 of the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 19 : 15 and longer than wide in the front in the ratio of 16 : 15. *Chelicerae.* Directed forward. Length equal to almost 3/5 the length of the cephalothorax. Promargin with 2 teeth of which the distal is large. Retromargin with 3 smaller teeth. Fang long and curved. The lateral condyle is small but there is a ridge extending down 1/3 of the length. *Sternum.* Scutiform, longer than wide in the ratio of 20.17, terminated sharply posteriorly between coxae IV which are separated by a distance slightly less than their width. *Legs.* Long and slender, clothed with fine hairs. Superior claws homogeneous, with 9–10 strong pectinations; inferior claw with 6 pectinations of which the anterior are long and curve down. *Spines.* Leg 1, femur, dorsal 1.1, patella 0, tibia, ventral 2.2.0, elsewhere 0, metatarsus, dorsal 0, ventral 2.2.0, prolateral 0.0.1, retrolateral 0.0.1, tarsus 0; leg 2, tibia, ventral 2.2, elsewhere 0, metatarsus, dorsal 0, ventral 2.2.0, prolateral 0.0.1, retrolateral 0.0,1, tarsus 0; leg 3, tibia, dorsal 0.0.0.1.0, ventral 1.0.2.0.2, prolateral 0.1.0.1.0, retrolateral 0, metatarsus, dorsal 1.0.1.0.1, ventral 0.1.0.2.1, prolateral 0.0.1.0.2, retrolateral 0.0.1.0.2, tarsus 0; leg 4, tibia, dorsal 1.0.1.0.0, ventral 1.0.1.0.1, prolateral 0.1.0.1.0, retrolateral 0.1.0.1.0, metatarsus, dorsal 1.1.1, ventral 0.1.2, prolateral 0.1.2, retrolateral 0.1.2, tarsus 0. There are also strong setae on the mid- and distodorsal and the distal prolateral surfaces of the femora and the distodorsal surface of the patella. Trichobothria are distributed as follows: Leg 1, tibia, 4 on proximal 1/2 of dorsal surface, metatarsus, 2 small median, 1 long distal, tarsus, 2 small median, 2 long distal; leg 2, as above, but 3 on tarsus, situated on distal 1/2; leg 3, as for leg 2; leg 4, tibia, single row of 8, 4th and 8th long, metatarsus, 3 distal, tarsus, 5 progressively longer distally. *Palp.* The palp is long and slender. Structure shown in figs. 48, 49, 64.



Figs. 47-61. *Gohia* spp. 47, *G. falxiata* (Hogg), cephalothorax and chelicerae of ♂; 48, same, retrolateral view of ♂ palp; 49, same, distal retrolateral portion of tibia of ♂ palp; 50, same, internal genitalia from below; 51, *G. clarki* n. sp., cephalothorax and chelicerae of ♂; 52, same, retrolateral view of ♂ palp; 53, same, distal retrolateral portion of tibia of ♂ palp; 54, same, internal genitalia from below; 55, *G. enderbyensis* n. sp., cephalothorax and chelicerae of ♂; 56, same, retrolateral view of ♂ palp; 57, same, distal retrolateral portion of the tibia of ♂ palp; 58, *G. wenhami* (Forster), cephalothorax and chelicerae of ♂; 59, same, retrolateral view of ♂ palp; 60, same, distal retrolateral surface of tibia of ♂ palp; 61, same, internal genitalia from below.

♀: Measurements in mm. Cephalothorax, length 3.24; width 2.64. Abdomen, length 3.96; width 2.64.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.28	0.88	1.84	2.03	0.96	7.99
2	2.43	0.88	1.99	1.84	1.11	8.25
3	2.21	0.88	1.55	1.76	0.96	7.36
4	2.43	0.96	1.99	2.28	1.09	8.75
Palp	1.32	0.52	0.88		0.96	3.68
Chelicera	1.69					

Cephalothorax yellow-brown with black shading. Legs pale brown with distinct dark blackish bands. Chelicerae reddish brown. Abdomen creamy white with an anteromedian dark band on dorsal surface and black shading on lateral margin extending back to 3 chevrons on posterior surface. General structure similar to ♂ but chelicerae although having a similar arrangement of teeth are much shorter, being little more than 1/2 the length of the cephalothorax. The internal genitalia are shown in fig. 50.

Records: AUCKLAND IS. Ranui Cove, on rata at night, 1. I. 1963, Johns; Ranui, 18. I. 1963, J. Moreland; Crozier Point, kelp on beach, 28. XII. 1962, Gressitt; Bivouac Hill, near rocky stream, 10. I. 1963, Gressitt; Ewing Island, 4. I. 1963, Gressitt.

Gohia clarki Forster, n. sp. Figs. 51–54, 63.

♂: Measurements in mm. Cephalothorax, length 2.72; width 2.28. Abdomen, length 2.87; width 1.88.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.64	1.11	2.64	2.51	1.32	10.22
2	2.43	1.01	2.20	2.20	1.04	8.88
3	1.91	0.88	1.44	1.76	1.04	7.03
4	2.49	0.88	1.92	2.03	1.11	8.43
Palp	1.76	0.48	1.11		0.96	4.31
Chelicera	1.63					

Color: Cephalothorax pale brown with slight black shading. Chelicerae uniform reddish brown. Legs pale brown with black bands. Abdomen heavily shaded with black. There are 2 pairs of white patches on anterodorsal surface followed behind by 5–6 pale chevrons. Ventral surface pale.

Eyes: The eye group occupies 1/2 the width of the head in that region. From above, the anterior row is straight and the posterior row slightly procurved. Ratio of AME. ALE. PME. PLE.=5.7.6.7. AME are separated from each other and from the ALE by 4/5 the diameter of an AME. Lateral eyes subcontiguous. The PME are separated from each other and from the PLE by 6/5 of the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 9.7 and longer than wide in the front in the ratio of 8.7. *Chelicerae*. Sternum, maxillae and labium as in *falxiata*. *Legs*. 1.2.4.3. Spines as in *falxiata* but with 3 pairs of spines on ventral surface of metatarsi of the 1st and 2nd pairs of legs. *Palp* (figs. 52, 53, 63). Cymbium long and slender. Embolus evenly curved, not sinuous. Tibial process with lateral flap not well developed and bearing 2 small teeth.

♀: Measurements in mm. Cephalothorax, length 2.64; width 1.76.

Leg	Femur	Patella	Tibia	Matatarsus	Tarsus	Total
1	1.92	0.88	1.68	1.55	0.96	6.99
2	1.76	0.75	1.36	1.51	0.92	6.30
3	1.58	0.71	1.18	1.43	0.88	5.78
4	2.03	0.88	1.68	1.68	0.88	7.15
Palp	1.11	0.44	0.67		0.88	3.10
Chelicerae	1.32					

Very similar in general structure to the ♂. The chelicerae are shorter and the anterior surface is swollen. The lateral boss, distinct but the ridge is absent. The teeth on the margin as in the ♂. Internal genitalia as in fig. 54.

Types: Holotype ♂, allotype ♀, Courrejolles Pen., on rock cliff, near Mollymawk colony, c. 230 m, Campbell I., 13. 11. 1963, Wise.

Records: CAMPBELL I. Courrejolles Point, 13. III. 1962, Clark; Courrejolles Pen., 200 m, from *Colobanthus* near Mollymawk nests, 14. XII. 1961, Gressitt; Mt. Lyall, 300 m, un-

der moss, 5. XII. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss on rocks, 30. XI. 1961, Gressitt; Beeman Camp, 9. XII. 1961, Gressitt.

Closely related to *falxiata* from which it is separated by the shorter cymbium of the ♂ palp, the reduction in size of the lateral flap of the tibial process and the evenly curved embolus.

Gohia enderbyensis Forster, n. sp. Figs. 55–57, 65.

♂: Measurements in mm. Cephalothorax, length 3.08; width 2.64. Abdomen, length 3.08; width 1.99.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.08	1.32	3.31	3.31	1.41	12.43
2	2.64	1.19	2.64	2.76	1.28	10.51
3	2.20	0.96	1.76	2.03	1.11	8.06
4	2.64	1.04	2.43	2.64	1.76	10.51
Palp	1.55	0.44	0.67		1.11	3.77
Chelicera	1.99					

Color: Carapace and chelicerae, dark brown without shading. Palps and legs uniform pale yellow-brown. Abdomen closely shaded with black with a few paler areas on dorsal surface which do not form a distinct pattern.

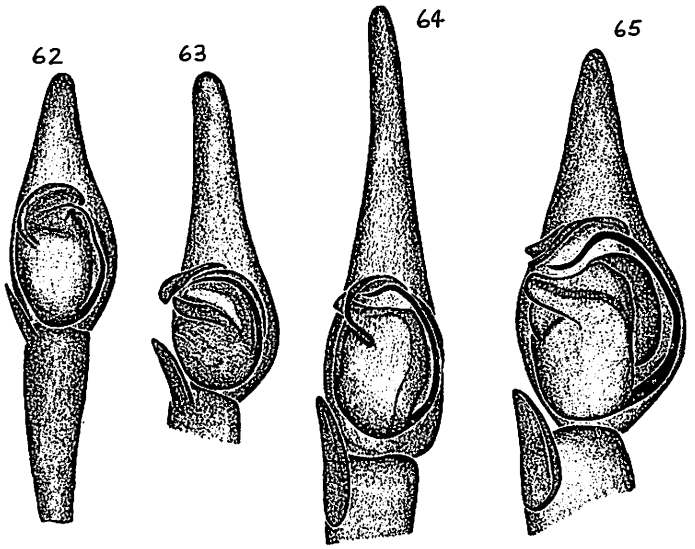
Carapace: Relatively wide (fig. 55) only slightly longer than wide. *Eyes.* The eye group occupies 1/2 the width of the head region. From above the anterior row is slightly recurved and the posterior row procurved. Ratio of AME. ALE. PME. PLE=4.8.6.7. The AME are separated from each other and from the ALE by a distance equal to the diameter of an AME. Lateral eyes subcontiguous. The PME are separated from each other and from the PLE by a distance equal to 7/4 the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 19.12 and longer than wide in the front in the ratio of 16 : 12. *Chelicerae*: There is a strong proximolateral ridge extending down almost 1/2 the length of the chelicerae. Fang strong, and almost as long as basal segment. There are 3 teeth on the retromargin and 2 on the promargin as in *falxiata.* Maxillae, labium as in *falxiata.* *Sternum.* Scutiform, longer than wide in ratio of 8 : 7, pointed posteriorly where it extends behind the 4th pair of coxae which are separated by a distance equal to 3/5 of their diameter. *Palp* (figs. 56, 57, 65). The tibial process possesses a large lateral flap with 3 teeth. Tibia short, not as long as cymbium. The embolus is sinuous distally and strong. *Legs.* 1.4. 2.3. The spination is similar to *clarki* but the spines are mostly shorter. *Abdomen.* Closely clothed with short, dark hairs, but with a few long, erect, black hairs on dorsal surface. Colulus large, triangular, clothed with numerous hairs.

♀: Not known.

Type: Holotype ♂, Auckland Is., Enderby I., under stones on northern cliffs, 31. XII. 1962, Johns, Canterbury Museum.

Records: A further ♂ specimen with same data as holotype.

This species is readily distinguished by the form of the palp, the tibial process and short tibia. The rather squat outline of the cephalothorax is also characteristic.



Figs. 62–65. *Gohia* spp. 62, *G. wenhami* (Forster), ventral view of ♂ palp; 63, *G. clarki* n. sp., ventral view of ♂ palp; 64, *G. falxiata* (Hogg), ventral view of ♂ palp; 65, *G. enderbyensis* n. sp., ventral view of ♂ palp.

Gohia wenhami (Forster) Figs. 58–61, 62.

Chiracanthium wenhami Forster, 1955, Rec. Dom. Mus. 2 (4): 181.

This species has been fully described previously (Forster, 1955) but at that time the relationship to *Gohia falxiata* was not recognised. The species is smaller than *falxiata*, *clarki* and *enderbyensis*. The short tibia of the ♂ palp is similar to that found in *enderbyensis* but is relatively stouter, while the tibial process is similar to *clarki*. The general spacing of the eyes is similar to the other species but the eyes themselves are relatively larger. Previously recorded from the Auckland Is., the present records extend the range to Campbell I.

Records: AUCKLAND IS. Crozier Point, 30.XII.1962, Gressitt. CAMPBELL I. Beeman Hill, 30–100 m, ex *Poa* roots and moss, 1–6. XII. 1961, Gressitt; Beeman Camp, 13. XII.1961, Gressitt; Beeman Camp, 2–50 m, ex *Chrysobactron*, 19. XII. 1961, Gressitt; St. Col-Lyall-Beeman, ex moss, 3, 5. XII. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss on rocks, 24, 26, 30. XII. 1961, Gressitt; St. Col Ridge, 200 m, ex moss on track, 24. XI. 1961, Gressitt; Courrejolles Pen., 200 m, 14. XII. 1961, Gressitt; Courrejolles Pen., mollymawk colony, ex moss, 14.XII.1961, Gressitt; Mt. Lyall, 200–400 m, ex moss, 3, 5, 12. XII. 1962, Gressitt; Filhol Peak, 213 m, ex lichens and moss, 9. II. 1963, Wise; Lookout Bay, 250 m, ex moss, 3. XII. 1961, Gressitt; Beeman Hill, 25 m, 21. XI. 1961, Gressitt; Moubray Hill, 200 m, ex moss, 12. XI. 1961, Gressitt.

Genus **Huara** Forster, n. gen.

Large agelenid spiders with the anterior row of eyes straight when viewed from in front.

Legs with a double row of spines on the ventral surfaces of tibiae and metatarsi, trichobothria on tibiae, metatarsi and tarsi and a scopula on the ventral surface of all tarsi. Spinnerets short, colulus well developed. Male with a free median apophysis.

Type species: *Gohia antarctica* Berland, 1931.

This genus includes 3 species, all from the Auckland Is. *H. antarctica* Berland, *H. sorenseni* Forster and *H. grossa* n. sp. The genus is related to *Myro* from which it is separated mainly by the straight anterior row of eyes when viewed from in front, whereas this row is strongly procurved in *Myro*. In the ♂ palp the well developed but free median apophysis is characteristic and is not present in this form in *Myro*. This character also separates the genus from *Gohia*. The presence of a thick covering of hairs on the ventral surface and distal portion of the tarsus is also lacking in both *Myro* and *Gohia*.

Huara antarctica (Berland) Figs. 69–71, 79–80.

Gohia antarctica Berland, 1931, Rec. Cant. Mus. 3 (6): 359.
Chiracanthium antarcticum: Forster, 1955, Rec. Dom. Mus. 2 (6): 177.

This species has been adequately described by the previous authors but figures of the ♂ palp and epigynum and internal genitalia have been included in the present paper for comparison (figs. 69–71, 79, 80). The species has been previously recorded from most of the islands in the Auckland group but re-examination of the material from Ocean I. and Ross I. previously identified as *H. antarctica* may show that these specimens are in fact *H. grossa* n. sp.

Records: AUCKLAND IS. Ranui Cove, under logs, 27.XII.1962, Johns; Bivouac Peak, 450 m, under stones, 6.I.1963, Johns; Bivouac, 15.I.1963, Gressitt; Bivouac, ex tussock, 16. I.1963, Gressitt; Bivouac, under rocks, 16.I.1963, Gressitt; Bivouac, ex *Pleurophyllum*, 17. I. 1963, Gressitt; Terror Cove, Port Ross, 10. I. 1963, Wise; Ewing I., 4–6. I. 1963, Gressitt.

Huara sorenseni (Forster) Figs. 72–76.

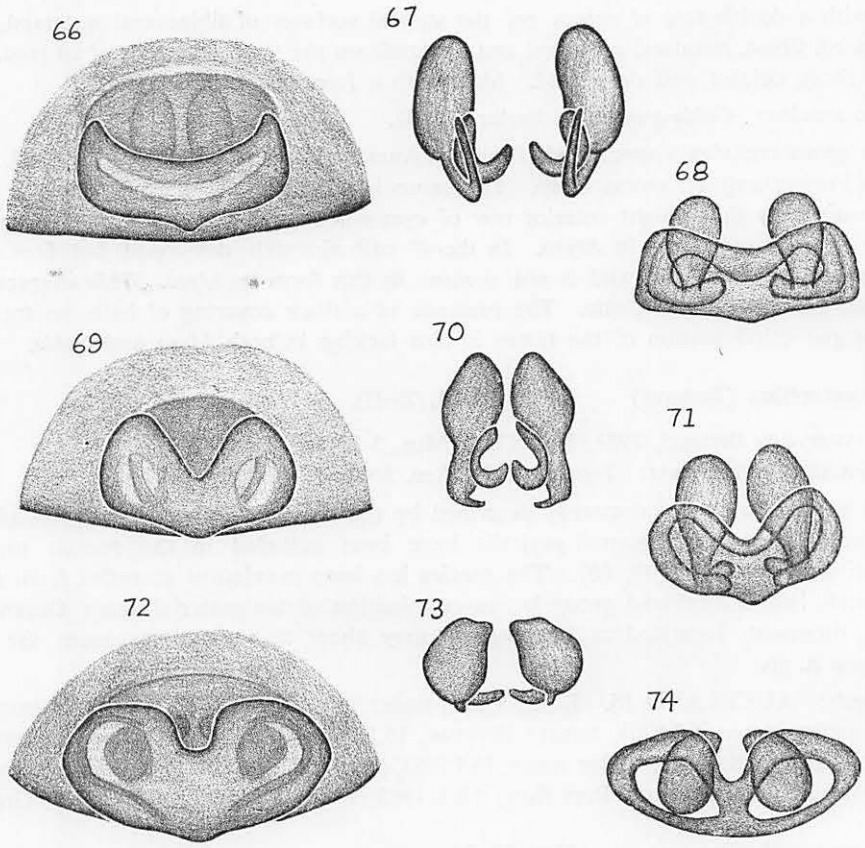
Chiracanthium sorenseni Forster, 1955, Rec. Dom. Mus. 2 (4): 179.

Records: AUCKLAND IS. Observation Point, 27.XI.1962, Gressitt; Crozier Point, under stones on beach, 28. XII. 1962, Wise; Terror Cove, Port Ross, 10. I. 1963, Wise; Deas Head, under rata logs, 18.I.1963, Johns; Tucker Point, under moss, 19.I.1963, Gressitt; Bivouac Hill, 400 m, near rocky stream, 10. I. 1963, Gressitt; Bivouac, 400 m, under rocks, 13. I. 1963, Gressitt; French I., from petrel burrows, 2. I. 1963, Gressitt; Ranui Cove, ex rata, 1. I. 1963, Gressitt.

Huara grossa Forster, n. sp. Figs. 66–68, 77–78.

♀: Measurements in mm. Cephalothorax, length 7.48; width 4.40. Abdomen, length 9.71; width 8.36.

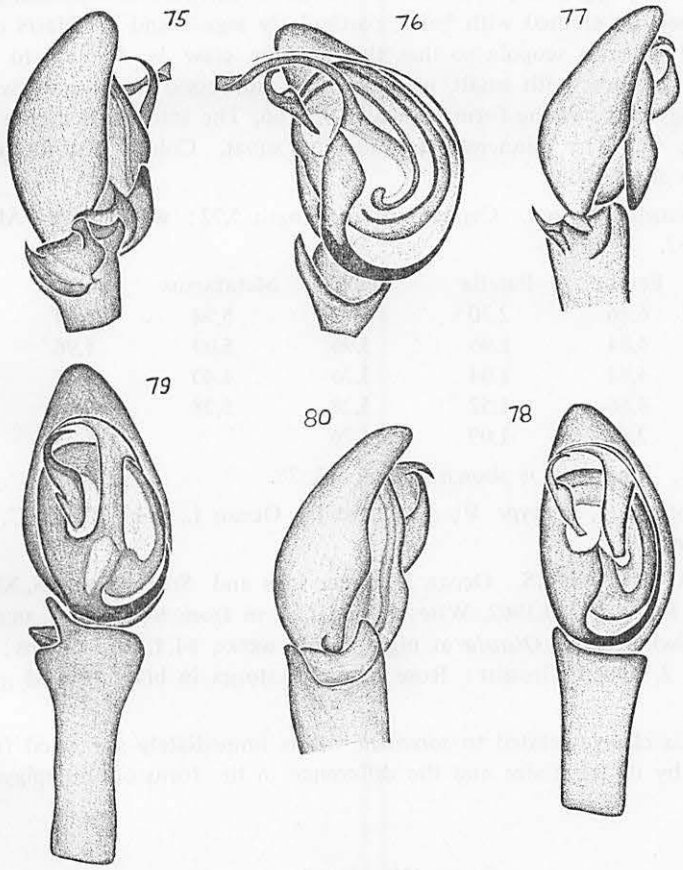
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	7.04	3.08	7.06	5.72	2.71	25.61
2	6.16	2.83	6.16	5.61	2.43	23.19
3	5.72	2.64	4.40	5.72	2.20	20.68
4	6.16	2.64	7.06	7.04	3.08	25.98
Palp	2.64	1.32	1.95		2.64	8.55



Figs. 66–74. *Huara* spp. 66, *H. grossa* n. sp., epigynum; 67, same, internal genitalia from above; 68, same, internal genitalia from below; 69, *H. antarctica* (Berland), epigynum; 70, same, internal genitalia from above; 71, same, internal genitalia from below; 72, *H. sorenseni* (Forster), epigynum; 73, same, internal genitalia from above; 74, same, internal genitalia from below.

Color: Cephalothorax deep reddish brown, eyes surrounded with black. Abdomen yellow-brown, heavily shaded with grey. There are a few pale marking on the anteromedian dorsal surface and rather indistinct rows of small pale patches along the lateral margins. Chelicerae dark brown, almost black. Legs, palp and sternum uniform reddish brown. *Carapace*. Head region no higher than thoracic region and not clearly separated from the thorax. Width of head region only 4/7 the maximum width of thorax. Lateral margins almost parallel. Thoracic region widest between the 2nd pair of legs. Fovea long and narrow, not deep. *Eyes*. Eye group relatively compact, taking up 5/8 the width of the head in that region. From above, the anterior row is straight and the posterior row is recurved. From in front the anterior row is slightly procurved and the posterior row strongly procurved. The eye group is placed on a low swelling which projects forward over the clypeus. Ratio of AME. ALE. PME. PLE=7.22.25.25. The AME are separated from each other by 5/7 and from the ALE by 10/7 of the diameter of an AME. The ALE and PME are separated from each other by 8/7 while the PME are separated from each other by

15/7 and from the PLE by 10/7 of the diameter of an AME. The median ocular quadrangle is wider behind than in front in the ratio of 65.19 and longer than wide in the front in the ratio of 54.19. *Chelicerae.* Stout, swollen on proximal anterior surface of basal segment and with a prominent lateral boss. There are 2 strong teeth on both pro- and retromargins and a thick scopula behind the promargin. There is a further scopula on the retrolateral surface but more proximal. *Labium.* Slightly longer than wide, matched proximally, lateral margins converging slightly anteriorly. Anterior margin incurved. *Maxillae.* Lateral margins relatively straight but diverging so that the distal width is the greater. Longer than this width in ratio of 11.7. There is a thick scopula on the inner distal margin with the apical hairs longer and forming a tuft. *Sternum.* Longer than wide in ratio of 8 : 7. Almost oval in outline, indented anteriorly. There appear to be sclerotic strips extending between the legs and back to the lorum of the pedicel. *Palp.* Spines, femur, dorsal 1.1.1, patella 0, tibia, dorsal, 2.0.0, tarsus dorsal 2.0.0, prolateral 2.2.2, retrolateral



Figs 75–80. *Huara* spp. 75, *H. sorenseni* (Forster), retrolateral view of ♂ palp; 76, same, ventral view of ♂ palp; 77, *H. grossa* n. sp., retrolateral view of ♂ palp; 78, same, ventral view of ♂ palp; 79, *H. antarctica* (Berland), ventral view of ♂ palp; 80, same retrolateral view of ♂ palp.

1.1.1.2 A single row of 5 trichobothria are present on the tibia. Claw with single row of 5 strong teeth. *Legs.* Spines distributed as follows: Leg 1, femur, dorsal 0.1.1.0, prolateral 0.0.0.2, patella 0, tibia, dorsal 0, ventral 2.1.2.2, prolateral 0.0.1.1; leg 2, femur, dorsal 2.2.10, patella 0, tibia, dorsal 0, ventral 2.2.2.0.1, prolateral 0.1.0.1.0, metatarsus, dorsal 0. 0.1, ventral 2.2.2, prolateral 0.1.1, retrolateral 0.0.1; leg 3, femur, dorsal 2.2.3, patella 0. tibia, dorsal 1.0.1, prolateral 0.1.1, retrolateral 0.1.1, ventral 2.1.2, metatarsus, dorsal 0.1.1. 1, prolateral 1.1.1, retrolateral 1.1.1, ventral 2.2.2; leg 4, femur, dorsal 1.1.3, patella 0, tibia, dorsal 0.1, prolateral 1.1, retrolateral 1.1, ventral 2.1.2, metatarsus, dorsal 1.1.2, prolateral 1.1.1, retrolateral 1.1.1, ventral 2.2.2, tarsus 0. Trichobothria present on tibiae, metatarsi, and tarsi of all legs and are distributed as follows: Leg 1, tibia 1.1.1, metatarsus 1.1.1.1.1.1.1.1, tarsus 1.1.1.1.1.1.1; leg 2, tibia 2.2.2.2.1, metatarsus 1.1.1.1.1.1.1.1.1, tarsus 1.1. 1.1.1.1.1.1; leg 3, tibia 2.2.2.1, metatarsus 1.1.1.1.1.1.1, tarsus 1.1.1.1.1.1.1.1; leg 4, tibia 2.2. 2.2.2, metatarsus 1.1.1.1.1.1.1, tarsus 1.1.1.1.1.1.1.1.1. Superior claws similar with 11 long teeth. Inferior claw small, apparently smooth. Distoventral surfaces of metatarsi and ventral surfaces of tarsi heavily clothed with hairs, particularly legs 3 and 4. Hairs on distal surface of tarsi seem to form a scopula so that the inferior claw is difficult to see. *Abdomen.* Ovoid, closely clothed with small, inconspicuous, adpressed hairs and fewer, long, erect hairs. The epigynum has the form shown in fig. 66. The internal genitalia are simple and is shown in fig. 67. The spinnerets are short and squat. Colulus distinct, triangular, closely clothed with short hairs.

♂: Measurements in mm. Cephalothorax, length 5.72; width 4.40. Abdomen, length 6.61; width 3.52.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	6.16	2.20	4.93	5.94	2.64	21.87
2	4.84	1.96	3.96	5.09	1.96	17.81
3	4.84	1.94	3.76	4.40	1.47	16.41
4	4.86	1.52	5.28	5.28	2.64	19.58
Palp	2.83	1.09	1.76		1.35	7.03

Similar to ♀. The palp is shown in figs. 77, 78.

Types: Holotype ♂, allotype ♀, Auckland Is., Ocean I., 3. 1. 1963, J. C. Yaldwyn, Dominion Museum.

Records: AUCKLAND IS. Ocean I., under logs and *Stilbocarpa*, 28. XII. 1962, Johns; Ocean I., Port Ross, 29.XII.1962, Wise; Ewing I., 1 m from high water, under log, 27. XII. 1962, Knox; Ewing I., on *Olearia* at night eating wetas, 14. I. 1963, Johns; French I., ex petrel burrows, 2. I. 1963, Gressitt; Rose I., under stones in black-backed gull colony, 8. I. 1963, Knox.

This species is closely related to *sorenseni*. It is immediately separated from both other known species by its large size and the difference in the form of the epigynum and the ♂ palp.

Genus **Hina** Forster, n. gen.

Carapace without distinct head region, lateral margins subparallel. Eyes subequal, in 2 rows, anterior row straight from above. Chelicerae short, lacking lateral condyles, a single tooth on promargin, 3 on retromargin. Legs 1.4.3.2. Trichobothria in 2 rows on tibiae,

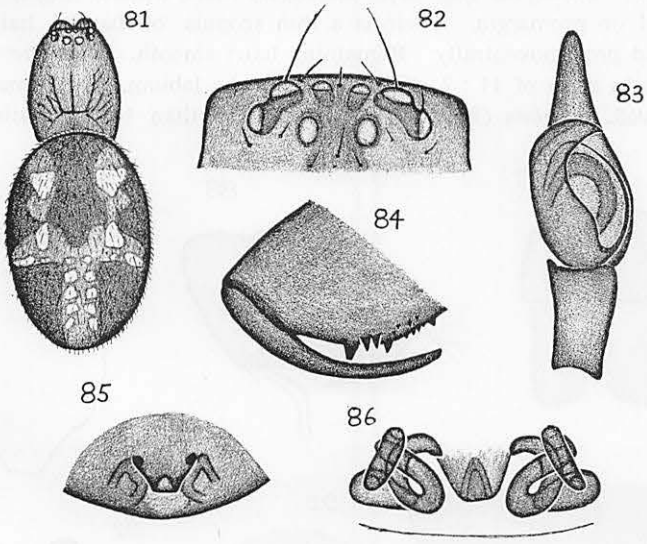
single row on metatarsi and tarsi. Scopulae lacking. Internal genitalia of ♀ convoluted.

Type species: *Ostearius delli* Forster 1955.

This genus is related to *Gohia*, *Huara* and *Myro*. It is separated from all of these genera by the number and arrangement of teeth of the chelicerae and the absence of lateral boss. The shape of the carapace is also characteristic and quite different in outline from these genera. The only known species *Hina delli* (Forster) has been recorded from the Auckland and Campbell Islands and the Antipodes.

Hina delli (Forster) Figs. 81–86.

Records: CAMPBELL I. Beeman Hill, 25 m, 21. XI. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss on rock, 4, 7, 9, 13. XII. 1961, Gressitt; Tucker Cove, ex lichens on *Dracophyllum*, 1. II. 1963, Rennell; above Tucker Cove, ex lichens on *Dracophyllum*, 28. II. 1963, Wise. AUCKLAND IS. Crozier Point, ex kelp on beach, 28.XII.1962, Gressitt; Ranui Cove, beating *Myrsine*, 29. XII. 1962, Johns; Ranui Cove, 2 m, ex light trap, 19. I. 1963, Gressitt; Laurie Harbor, Grey Duck Creek, 9. I. 1963, Wise; Ocean I., ex *Cassinia*, 28.XII. 1962, Johns; Rose I. ex *Carex*, 18. I. 1963, Johns.



Figs. 81–86. *Hina delli* (Forster). 81, dorsal surface of ♀; 82, eyes of ♀ from above; 83, ventral view of ♂ palp; 84, ♂ chelicerae; 85, epigynum; 86, internal genitalia ventral view.

Genus **Hahnia** Koch, 1841

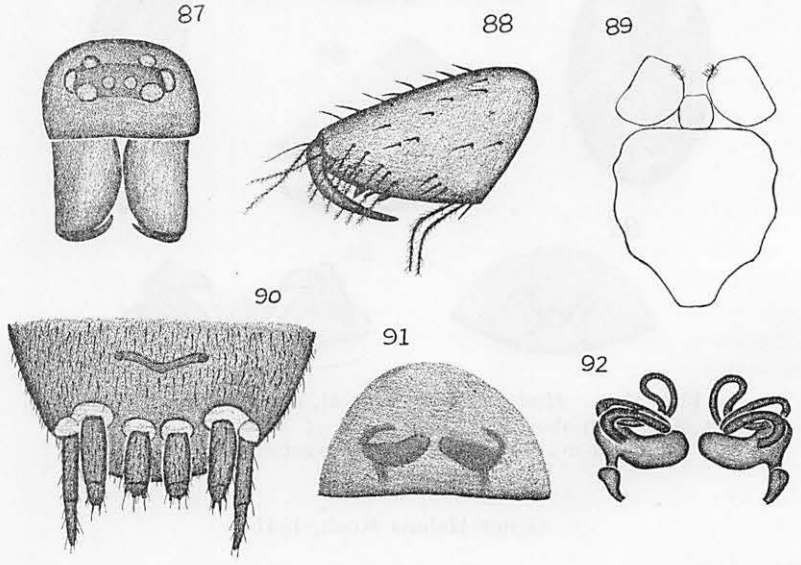
Hahnia hickmani Forster, n. sp. Figs. 87–92.

♀: Measurements in mm. Total length 1.32. Cephalothorax, length 0.61; width 0.57. Abdomen, length 1.17; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.51	0.19	0.36	0.31	0.37	1.74
2	0.54	0.18	0.45	0.36	0.37	1.90
3	0.49	0.18	0.32	0.33	0.31	1.63
4	0.58	0.25	0.45	0.45	0.39	2.12
Palp	0.25	0.09	0.16		0.24	0.74

Color: Cephalothorax pale, legs light brown. Base of abdomen yellow, but heavily shaded with blackish brown; 6 chevrons down the dorsal surface, the posterior 2 almost straight.

Eyes: The eye group is compact, occupies 3/4 of the head width in that region. When viewed from the front the AME is situated well behind the ALE so that the anterior row is strongly procurved while the posterior row is less strongly procurved (fig. 87). Ratio of AME. ALE. PME. PLE=3.8.6.8. The AME, ALE, and PLE are all contiguous, while the PME are separated from the PLE by a distance equal to 2/3 the diameter of an AME. The AME are separated from each other by 2/3 the diameter of an AME. The ALE are separated from each other by 8/3, and the PLE are separated from each other by 18/3 the diameter of an AME. The PME are separated from each other by 4/3 of this diameter of an AME. *Chelicerae* (fig. 88). Relatively short, without lateral boss. Two teeth on retromargin, 1 on promargin. There is a thin scopula of barbed hairs and 2 similar hairs distally, and proximoventrally. Remaining hairs smooth. *Maxillae* (fig. 89). Squat, longer than wide in ratio of 11 : 7, directed across the labium. Outer margins straight, inner margins curved. *Labium* (fig. 89). Wider at base than long in ratio of 3 : 2. *Ster-*



Figs. 87–92. *Hahnia hickmani* n. sp. 87, cephalothorax and chelicerae of ♀ from in front; 88, ♀ chelicerae; 89, sternum, maxillae and labium; 90, posteroventral surface of abdomen and showing spinnerets and posterior spiracle; 91, epigynum; 92. internal genitalia, ventral view.

num. Scutiform, wider than long in ratio of 27 : 23; broadly clavate behind between coxae IV, which are separated from each other by a distance equal to 1⅓ of their diameter. *Legs.* 4.2.1.3. Clothed with setose hairs, spines absent. Trichobothria distributed as follows: Legs 1 and 2, tibia 2.1.1, metatarsus 1.1, tarsus 1.1; leg 3, tibia 2.1, metatarsus 1.1, tarsus 1.1, superior claws similar, with 7 long teeth increasing in length distally. Inferior claw with 2 teeth near base. Tarsal organ present on all tarsi at 3/4 the length of each segment. *Palp.* Clothed with setose hairs. Tibia with 2 trichobothria. Claw small with a single tooth. Tarsal organ subdistal. *Abdomen.* Epigynum as in fig. 91, rather indistinct. Internal genitalia as in fig. 92. Six spinnerets in a straight row, the length of the outer pair are slightly more than 1/3 of the length of the abdomen. The ratio of length of the spinnerets from the outer pair is 15.12.7. The posterior spiracle opens from a distinct groove well separated from the spinnerets (fig. 90).

Types: Holotype ♀, Ranui Cove, Auckland I., ex rata leafmold, 3. I. 1963, Gressitt.

Record: AUCKLAND IS. Rose I., ex dead leaves of *Carex*, 8. I. 1963, Gressitt.

The species is named for Professor V. V. Hickman who described a species of this genus from the Crozets. The relationships of *H. hickmani* lie with the quite extensive New Zealand fauna which has not yet been described.

Family TOXOPIDAE Hickman

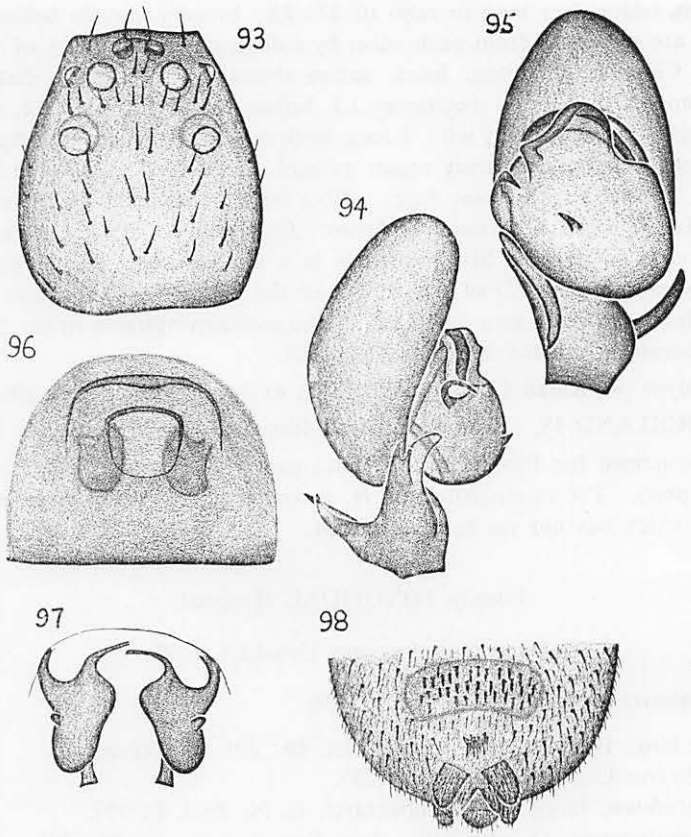
Genus **Laestrygones** Urquhart, 1893

Laestrygones albiceres Urquhart Figs. 93–98.

Lycosa proxima Urq., 1885, Trans. N. Zeal. Inst. **18**: 201 (preoccupied).
Laestrygones albiceres Urq., 1893, *Ibid.* **26**: 217.
Stiphidion minutissimum, Hogg: 1909, Subantarct. Is. N. Zeal. **1**: 157.
Stiphidiellum minutissimum: Dalmas, 1917, Ann. Soc. Ent. France **86**: 325.
Laestrygones urquharti Bryant, 1933, (for *Lycosa proxima* Urq. preoccupied) Rec. Cant. Mus. **4** (1): 7.
Laestrygones minutissimum (Hogg) Forster, 1955, Rec. Dom. Mus. **2** (4): 186.

This species was first recorded from the Subantarctic Is. by Hogg, who under the impression that the thickened plate on the ventral surface was a cribellum placed it in the cribellate genus *Stiphidion* Simon. In an earlier paper I (Forster, 1955) noted the true nature of this plate and transferred the species to *Laestrygones* Urquhart, a genus which the original author placed in the family Oxyopidae and subsequent authors (Bryant, 1933, Forster, 1955) placed in the little known family Perissoblemmidae. A recent revision of the New Zealand spiders of the family Toxopidae by me (in press) has shown clearly that *Laestrygones* falls into this family. Furthermore, an examination of specimens from many parts of New Zealand, the Chatham Is. and the present collections from the Auckland and Campbell Is. show that the spiders are all part of a single widespread species. The habits of this species differ from those of all other known New Zealand species of this family which are all nocturnal spiders living on the forest floor or among rocks and shingle in a few mountain regions. *L. albiceres* is found in shrubs and grass and is active during the daylight hours and is normally collected by sweeping.

The ♀ has been fully described previously (Forster 1955) except for the internal geni-



Figs. 93–98. *Laestrygones albiceres* (Urquhart). 93, cephalothorax of ♀; 94, retrolateral view of ♂ palp; 95, ventral view of ♂ palp; 96, epigynum; 97, internal genitalia, ventral view; 98, posteroventral surface of abdomen of ♀.

talia which are shown in fig. 97.

The ♂ is similar to the ♀ in most respects. The palp is shown in figs. 94–95.

Records: CAMPBELL I. Beeman, 30 m, ex sedge, 16. XII. 1961, Gressitt; Beeman, 20 m, ex *Poa litorosa*, 16. XII. 1961, Gressitt; Beeman Hill, ex *Poa* roots, 30–100 m, 16. XII. 1961, Gressitt; Beeman Hill, 2–50 m, ex peat, 21, 25. XI. 1961, Gressitt; Beeman, 30 m, sweeping sedge, 27. VII. 1962, Rennell; Beeman Hill, ex *Coprosma*, 2. XII. 1961, Gressitt; Beeman Camp, 2–50 m, ex *Coprosma*, 26–30. XI. 1961, Gressitt; Beeman Beach, ex *Poa*, moss turf and *Chrysobactron*, 15. XII. 1961, Gressitt; Tucker Cove, 1–50 m, ex *Colobanthus* and *Poa*, 20–25. XI.1961, Gressitt; Tucker Cove, 1–50 m, ex *Poa*, 1–5.XII.1961, Gressitt; Tucker Cove, 20 m, 5. XII. 1961, Gressitt; Tucker Cove, beaten from *Pittosporum*, 26. II. 1963, Wise; Tucker Cove, beating *Coprosma*, 9. IV. 1962, Rennell; Tucker Cove, ex grass, 1. XII. 1961, Gressitt; Moubray Hill, Davis Point, 200 m, ex *Poa* 12. XII. 1961, Gressitt; Lookout Beach, ex dead fern 16, 9. XII. 1961, Gressitt; Lookout Beach, under stones and kelp, 3. II. 1963, Wise; Lyall-Beeman Saddle, 70 m, ex *Poa* roots, 3, 12. XII. 1961, Gressitt; Shoal Point, sweeping

tussock, 29. VII. 1962, 21. X. 1962, 1. XII. 1962, Rennell; North-West Bay, ex tussock, 30. XII. 1962, Rennell; Perseverance Harbor, ex leafmold from base of *Chrysobactron*, 24. II. 1963, Wise. AUCKLAND IS. Crozier Point, 30. XII. 1962, Gressitt; Crozier Point, ex kelp on beach, 28. XII. 1962, Gressitt; Ranui Cove, ex leafmold rata forest, 3. I. 1963, Gressitt; West Coast slope, below Stony Peak, 650 m, ex *Danthonia*, 19. I. 1963, Gressitt; Ocean I., under logs and *Stilbocarpa*, 28. XII. 1962, Johns; Rose I., ex *Poa*, 8. I. 1963, Gressitt; French I., ex *Poa* leaves, 2. I. 1963, Gressitt.

Family AMAUROBIOIDIDAE

Genus **Amaurobioides** Cambridge, 1883

Amaurobioides maritima Cambridge

This intertidal spider has been previously recorded from South Africa, Australia, New Zealand and the Auckland and Campbell Is.

Records: CAMPBELL I. North West Bay, ex kelp on rocks, 29. XI. 1961, Gressitt; Davis Point, ex moss, 12. XII. 1961, Gressitt; Beeman Camp, under rocks on beach, 11. XII. 1961, Gressitt. AUCKLAND IS. Crozier Point, intertidal rocks, 28. XII. 1962, Johns; Ewing I., under rocks near kelp, 1. I. 1963, Gressitt.

Family LYCOSIDAE

Genus **Lycosa** Latreille, 1804

The presence of a lycosid spider in the Auckland Is. was noted by me in 1955, when 2♀♀ specimens in poor condition were examined from Auckland I. and Ocean I. A further specimen in good condition is now available and is described below:

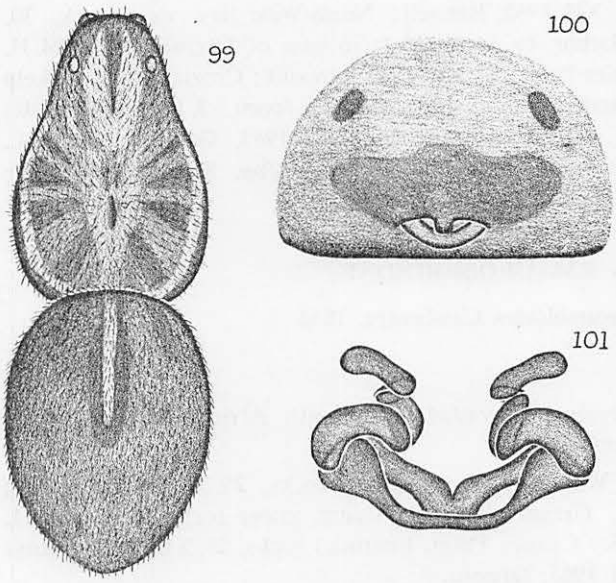
Lycosa subantarctica Forster, n. sp. Figs. 99–101.

♀: Measurement in mm. Cephalothorax, length 5.28; width 3.73. Abdomen, length 3.96; width 3.51.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.87	1.32	2.20	2.03	1.55	9.97
2	2.91	1.55	1.92	2.16	1.43	9.97
3	2.87	1.32	1.88	2.43	1.43	9.93
4	3.52	1.63	2.64	3.56	1.99	13.34
Palp	1.32	0.71	0.75		1.32	4.10

Color: Cephalothorax dark reddish brown with black shading as in fig. 99. Abdomen mottled black and brown, with a pale median longitudinal band running back from the anterior margin down 2/3 of the length of the dorsal surface.

Eyes: Ratio of AME. ALE. PME. PLE=6.8.8.13. AME separated from each other by 5/6 and from the ALE by 8/6 of the diameter of an AME. PME separated from each other by 7/6 and from the ALE by 8/6 of this diameter. PLE separated from each other by 54/6 and from the PME by 25/6 of the diameter of an AME. The clypeus is narrow, equal in width to the diameter of an AME. *Carapace*. Head relatively narrow, width equal to 5/8 the widest portion of the thoracic region. Fovea distinct. *Chelicerae*. Strong,



Figs. 99–101. *Lycosa subantarctica* n. sp. 99, dorsal surface of body of ♀; 100, epigynum; 101, internal genitalia, dorsal view.

with 2 stout teeth on each margin. *Maxillae.* Converging slightly over labium. Outer distal margin distended and rounded. Distal width greater than proximal width in ratio of 3.2. *Labium.* As wide as long. Anterior margin straight, provided with long black hairs. *Sternum.* Longer than wide in ratio of 19.15. Almost oval in outline, lateral margins evenly curved, terminated sharply behind between the 4th pair of coxae which are separated by 1/5 their width. *Abdomen.* Densely clothed with short hairs and fewer long, erect hairs. The epigynum is shown fig. 100 and the internal genitalia in fig. 101.

Type: Holotype ♀, Bivouac to Mt. Eden, 350 m, Auckland Is., 18. I. 1963, Gressitt, Dominion Museum.

Records: AUCKLAND IS., IV–V. 1944, E. G. Turbott; Ocean I., late April, 1944, Turbott, Auckland Museum.

This lycosid belongs to a group which is common in lowland country throughout New Zealand, and also which occurs on the Chatham Is. At present the nomenclature of these forms is confused, but the species described above seems quite distinct from the New Zealand forms examined. It is related to the widespread N. Z. species *Lycosa adumbrata* Urquhart and *L. ralphi* Simon from the Chatham Is.

Family THERIDIIDAE

Genus **Icona** Forster, 1955

Icona Forster, 1955, Rec. Dom. Mus. **2**: 189.—Levi & Lorna, 1962, Bull. Mus. Comp. Zool. **127** (1): 61.

This genus was established in 1955 for *I. alba* Forster, based on specimens from Enderby I. in the Auckland Group. Levi (1962) in his revision of the genera of the family Theridiidae retained the genus and pointed out that it was related to the widespread genus *Enoplognatha.* This relationship is further demonstrated with the description below of a 2nd species from Auckland Is. the ♂ of which possesses greatly enlarged chelicerae, a character usually found in *Enoplognatha.* With the description of further material from New Zealand it may be considered advisable to place *Icona* as a synonym of *Enoplognatha.*

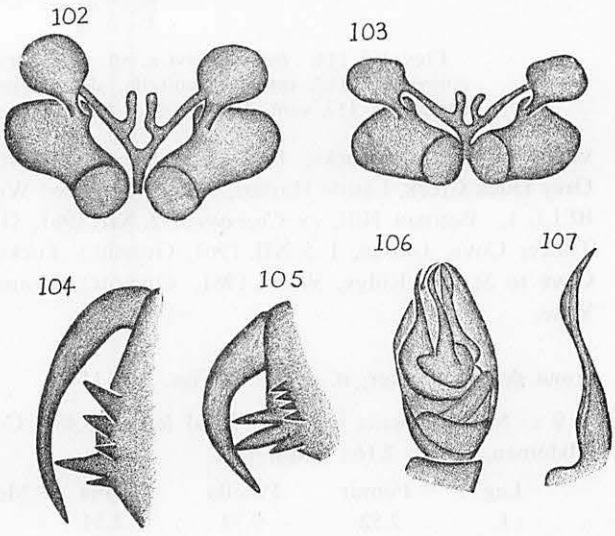
A spider described from the Crozets by Hickman (1939) under the name of *Drapetsica*

antarctica was subsequently transferred to *Ringina* by Tambs-Lyche (1954) who in the same paper described *Ringina crozetensis* also from the Crozets. This genus shares many characters with *Icona* including the unusual arrangement of the cheliceral teeth in the ♀. Unfortunately *R. antarctica* is known only from 1 immature ♀ and *R. crozetensis* from a damaged, and one-time dried, ♀ specimen. Both of these authors considered their species to be linyphiids, while *Icona* is undoubtedly a typical theridiid, but nevertheless subsequent examination may prove these spiders to be congeneric, and if this is so the distribution pattern for the genus would be very similar to that of *Myro*.

Icona alba Forster Figs. 102–107.

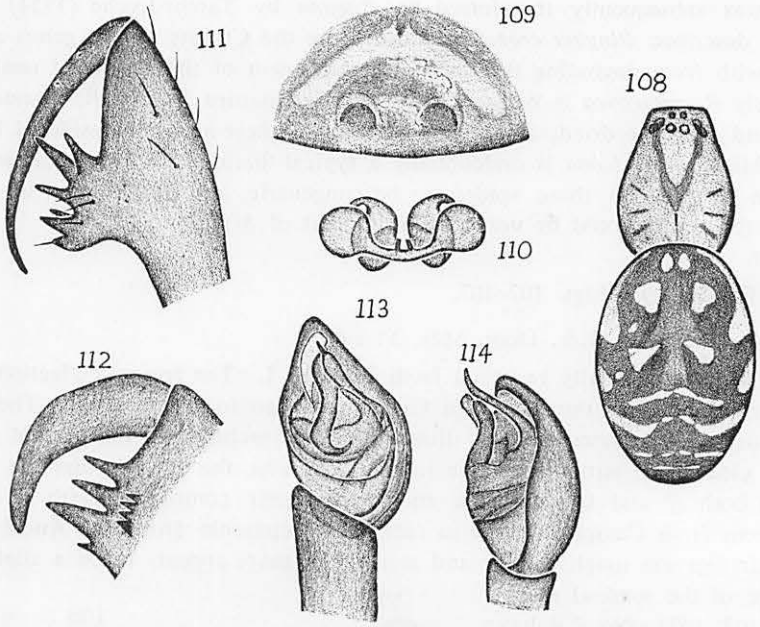
Icona alba Forster, 1955, Rec. Dom. Mus. **2**: 190.

This species was originally recorded from Enderby I. The present collections extend the range to other islands in the Auckland Group and also to Campbell I. The species has been fully described previously, but illustrations are included in the present paper which show more clearly the structure of the internal genitalia, the ♂ palp and the arrangement of teeth on both ♂ and ♀ chelicerae and also permit comparison with *T. drama* n. sp. The specimens from Campbell I. are in fact easily separable from the Auckland I. specimens. Their legs are much shorter and stouter and there appears to be a slight difference in the shape of the seminal receptacles (figs. 102, 103). No ♂♂ have yet been found on Campbell I.



Figs. 102–107. *Icona alba* Forster. 102 & 103, internal genitalia, ventral view (102, Auckland Is.; 103, Campbell Is.); 104, chelicera of ♂; 105, chelicera of ♀; 106, ventral view of ♂ palp; 107, embolus.

Records: AUCKLAND IS. Ranui Cove, beating leaves of *Myrsine divaricata*, 27. XII. 1962, Johns; Ranui, ex *Coprosma*, 29. XII. 1962, Gressitt; Ranui Cove, beating *Polystichum*, 4.I.1963, Johns; Ranui Cove, 4 m, ex Malaise trap, 4 m, 5–7. I. 1963, Gressitt & Wise; Ranui Cove, 2 m, ex light trap, 2 m, 7. I. 1963, Gressitt & Wise; same data, 18. I. 1963; Observation Point, ex *Poa*, 27. XII. 1962, Gressitt; Crozier Point, sweeping *Myrsine*, 28. XII. 1962, Wise; Crozier Point, ex kelp on beach, 28. XII. 1962, Gressitt; Crozier Point, 28. XII. 1962, Wise; Crozier Point, 30. XII. 1962, Gressitt; Ocean I., 29. XII. 1962, Gressitt; Ocean I., ex *Stilbocarpa*, 29. XII. 1962, Gressitt; Ocean I., beating *Histiopteris incisa*, 30. XII. 1962, Johns; Ewing I., from light trap, 5, 6. I. 1963, Gressitt; Ewing I., 4, 6. I. 1963, Gressitt; Enderby I., Port Ross, 18. I. 1963, Wise; Enderby I., Port Ross, under stones and logs, 18. I. 1963, Wise; French I., from petrel burrows, 2. I. 1963, Gressitt; Rose I., ex herbs, 8. I. 1963, Gressitt; Bivouac, 430 m, 10. I. 1963, Wise; Bivouac Hill, 450 m, near rocky stream, 10. I. 1963, Gressitt; Bi-



Figs. 108–114. *Icona drama* n. sp. 108, dorsal surface of body of ♀; 109, epigynum; 110, internal genitalia, dorsal view; 111, ♂ chelicera; 112, ♀ chelicera; 113, ventral view of ♂ palp; 114, retrolateral view of ♂ palp.

vouac Hill, ex wet rocks, 14. I. 1963, Gressitt; Bivouac, ex tussock, 16. I. 1963, Gressitt; Grey Duck Creek, Laurie Harbor, 9. I. 1963, Wise; Webling, Bay, 13. I. 1963, Wise. CAMPBELL I. Beeman Hill, ex *Coprosma*, 2. XII. 1961, Gressitt; Beeman Hill, 2. II. 1963, Wise; Tucker Cove, 1–50 m, 1–5. XII. 1961, Gressitt; Tucker Cove, 3. V. 1947, Sorensen; Tucker Cove to St. Col Ridge, 30. XI. 1961, Gressitt; Monument Harbor, ex tussock, 9. II. 1963, Wise.

Icona drama Forster, n. sp. Figs. 108–114.

♀: Measurements in mm. Total length 3.48. Cephalothorax, length 1.44; width 1.26. Abdomen, length 2.16; width 1.62.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.52	0.72	2.34	2.16	0.98	8.70
2	1.98	0.54	1.44	1.51	0.90	6.37
3	1.62	0.52	1.08	1.17	0.72	5.11
4	1.98	0.54	1.53	1.53	0.84	6.42
Palp	0.72	0.25	0.45			

Color: Carapace pale yellow with faint shading behind eyes. Abdomen greyish black with pale markings on dorsal surface as illustrated in fig. 108. Ventral surface of abdomen with a white sublateral line along each side behind level of epigynum. Sternum and legs brown.

Eyes: From above both rows appear straight. From in front the anterior row is straight

but the posterior row is procurved. Ratio of AME. ALE. PME. PLE = 4.7.7.7. AME separated from each other by 3/4 and from the ALE by 4/4 of the diameter of an AME. Lateral eyes contiguous. PME separated from each other by 5/4 and from the PLE by 6/4 of the diameter of an AME. Median ocular quadrangle wider behind than in front in ratio of 7 : 5 and longer than wide in front in the ratio of 6 : 5. Clypeus broad, equal to 16/4 of the diameter of an AME. *Carapace.* Low, head region not clearly separated from the thoracic region. Fovea distinct, longitudinal. *Chelicerae* (fig. 112). Retromargin with a row of 4 small, even, closely spaced, teeth; promargin with 4, of which the distal 3 are large and the proximal small. Fang short and straight. *Maxillae.* 2× as long as wide, lateral margins straight and parallel, converging over labium. *Labium.* Broad, wider than long in ratio of 3 : 2. *Sternum.* Almost triangular in outline with posterior apex bluntly pointed and extending back beyond coxae IV. *Legs.* Long and slender. Covered with short, sparsely serrate hairs. Spines absent. Trichobothria distributed as follows:– Legs 1–2, tibia 1.1.1.1, metatarsus 1 median; leg 3, tibia 1.2.1, metatarsus 1 median; leg 4, tibia 1.1.1.1.1.1, metatarsus 0. Tarsal comb lacking. Superior claws similar, with 8 teeth, inferior claw with 2 teeth. There are 2 or 3 serrate bristles at base of claws which appear to be weak spurious claws. Tarsal organ prominent and situated at 1/3 of length of the segment. *Palp.* Clothed with smooth hairs, spines absent. Tibia with 3 trichobothria arranged 2.1. Tarsal organ at 2/3 of length of tarsus. Tarsal claw well developed with a row of 11 small uniform teeth. *Abdomen.* Ovoid, longer than wide in ratio of 8 : 5. The epigynum is typical and is shown in fig. 109. Internal genitalia consists of 2 large atria leading into round seminal receptacles as in *I. alba* but with the appearance shown in fig. 110. Colulus distinct with 2 hairs.

♂: Measurements in mm. Total length 3.63. Cephalothorax, length 1.80; width 1.35. Abdomen, length 1.89; width 1.35.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	3.06	0.81	2.91	2.70	1.22	10.70
2	2.52	0.72	1.98	1.91	0.99	8.12
3	1.89	0.54	1.33	1.44	0.79	5.99
4	2.70	0.63	1.89	1.91	0.95	8.08
Palp	1.35	0.27	0.98		0.41	3.01

Many of the characters are the same as for ♀. Only the following need mention: Chelicerae divergent and greatly enlarged being almost 4/5 the length of the carapace. Six teeth are borne on a large swelling at about halfway (fig. 111). When compared with *T. alba* the 6 teeth would appear to consist of 3 promarginal and 3 retromarginal. Trichobothria present as follows: Leg 1, tibia 1.1, metatarsus 1; legs 2 and 3, tibia 1.1.1.1, tibia 1.1.1, metatarsus 0; leg 4, tibia 1.1.1, metatarsus 0. Structure of palp similar to *S. alba* and is shown in figs. 113, 114. There are 2 trichobothria on the tibia.

Types: Holotype ♂, allotype ♀, Bivouac Hill, Auckland Is., 450 m, near rocky stream, 17. I. 1963, Gressitt, Dominion Museum, Wellington.

Records: AUCKLAND IS. Bivouac, 420 m, 6. I. 1963, Wise; Bivouac Hill, 450 m, from wet rocks, 14. I. 1963, Gressitt; same data, 15. I. 1963.

Genus **Pholcomma** Thorell, 1869

In 1955 I described *Erigone antipodiana* from the Antipodes I. Dr. H. W. Levi subsequently pointed out that this species should be transferred to *Pholcomma*, a widespread genus of the family Theridiidae; this genus is in fact strongly represented in New Zealand by many undescribed species. The present collections include a single ♀ specimen which may eventually prove to be identical with *P. antipodiana* (Forster) which is known from a single ♂ but in the meantime is described below as new.

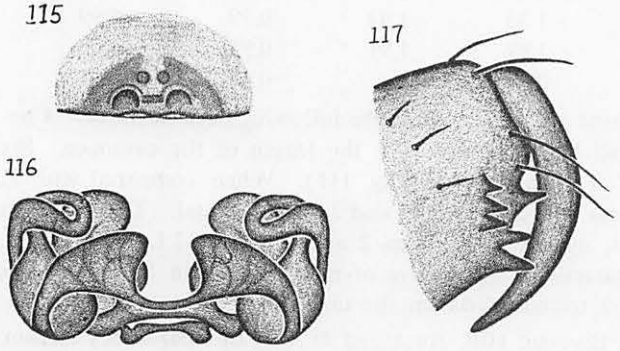
Pholcomma hickmani Forster, n. sp. Figs. 115–117.

♀: Measurements in mm. Total length 1.41. Cephalothorax, length 0.57; width 0.45. Abdomen, length 0.90; width 0.72.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.45	0.16	0.31	0.24	0.24	1.40
2	0.37	0.18	0.27	0.21	0.27	1.30
3	0.32	0.14	0.21	0.19	0.23	1.09
4	0.45	0.16	0.27	0.21	0.23	1.32
Palp	0.18	0.07	0.09		0.19	0.53

Color: Cephalothorax and legs pale uniform yellow-brown. Abdomen grey.

Eyes: Eyes large and occupying entire width of head. From in front the anterior row is straight and the posterior row precurved. Ratio of AME. ALE. PME. PLE=3.6.6.6. The AME are separated from each other and from the ALE by 2/3 of the diameter of an AME. The lateral eyes are contiguous. PME are separated from each other by 5/3 and from the PLE by 4/3 of the diameter of an AME. Median ocular quadrangle wider behind than in front in the ratio of 17.8 and longer than wide in the front in the ratio of 13.8. The clypeus is broad, the width being equal to 10/3 of the diameter of an AME. *Chelicera* (fig. 117). Promargin with 3 small teeth in a close line, contiguous at their base. Three teeth on the retromargin are larger and more widely spaced. *Maxillae*. Longer than wide in ratio of 9.5, curved in over the labium. *Labium*. Evenly rounded, almost 2× as wide as long. *Sternum*. Scutiform, as wide as long. Broadly truncate posteriorly between coxae IV which are separated from each other by a distance slightly more than 2× their width. *Legs*. 1.4.2.3. Clothed with sparsely serrate hairs, tarsal comb and spines lacking. Trichobothria distributed as follows: Legs 1 and 2, tibia 2.1, metatarsus 1; legs 3, tibia 1.1, metatarsus 0; leg 4, tibia 1.2, metatarsus 0. Tarsal organ present, at 1/3 the length of each segment. Superior claws similar. The 1st 2 pairs of which appear smooth, while the 2nd 2 pairs have 2 small teeth. Inferior claw of same length as superior



Figs. 115–117. *Pholcomma hickmani* n. sp. 115, epigynum; 116, internal genitalia, ventral view; 117, ♀ chelicera.

claws and smooth. *Palp.* A single trichobothrium present on mid dorsal surface of tibia. Tarsal organ situated at 2/3 the length of the tarsus. Claw long, straight and smooth. *Abdomen.* Ovoid, lightly clothed with short hairs. Colulus large, epigynum simple with 2 depressions, fig. 115. Internal genitalia as shown in fig. 116.

Type: Holotype ♀, Beeman Hill, Campbell I., ex moss, 2. III. 1963, Wise, Dominion Museum, Wellington.

Family SYMPHYTOGNATHIDAE Hickman 1931

Genus **Textricella** Hickman, 1845

The genus *Textricella* is abundantly represented in New Zealand and also occurs in Eastern Australia and New Guinea. I recorded *T. aucklandica* from the Auckland Is. in 1955 and a further species *T. wisei* n. sp. is described below from Campbell I. It is of interest to note that the 2 subantarctic species are not actually closely related to each other but belong to 2 distinct species groups, which also occur in N. Z. These 2 groups differ in the number of eyes present, as well as the form of the ♂ and ♀ genitalia. The New Zealand species are strictly forest dwellers and the occurrence of *T. campbellensis* in open tussock country is most interesting when looked at in relation to the conditions which possibly prevailed in the South I. of New Zealand during periods of maximum glaciation.

Textricella wisei Forster, n. sp. Figs. 118–121.

♂: Measurements in mm. Total length, 0.89. Cephalothorax, length 0.43; width 0.31. Abdomen, length 0.48; width 0.32.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.31	0.12	0.25	0.12	0.19	1.00
2	0.29	0.09	0.21	0.12	0.21	0.92
3	0.25	0.07	0.18	0.11	0.19	0.80
4	0.32	0.09	0.27	0.11	0.23	1.02
Palp	0.12	0.05	0.07		0.11	0.35

Color: Cephalothorax and appendages pale yellow-brown, without markings. Abdomen, yellow-brown but dorsal plate darker.

Eyes (fig. 118): Six eyes, AME lacking. Ratio of ALE. PME. PLE=3.2.3. Lateral eyes contiguous. ALE separated from each other by a distance equal to 10/3 the diameter of an ALE. PME separated from each other by 3/3 and from the PLE by 4/3 the diameter of an ALE. Width of clypeus equal to 8/3 the diameter of an ALE. *Chelicerae* (fig. 118): Without protuberances. Promargin with a median peg and a small tooth on the proximal and distal surfaces. Retromargin with a bifid proximal tooth and a single distal tooth. *Maxillae, labium* and *sternum* typical for the genus. *Legs.* 4.1.2.3. Without spines, clothed with smooth hairs. Trichobothria are present as follows: Legs 1 and 2, tibia 2.1, metatarsus 1; leg 3, tibia 2.1, metatarsus 0; leg 4, tibia 1.1.1.1, metatarsus 0. Superior claws with 8 minute teeth. Inferior smooth. Tarsal organ well developed and subproximal. *Palp* (fig. 119). Very similar in structure to *T. plebeia* Forster. *Abdomen.* Dorsal plate extending back 2/3 the length of the abdomen. Spinnerets typical. Colulus present.

♀: Measurements in mm. Total length 1.04. Cephalothorax, length 0.46; width 0.32.

Abdomen, length 0.72; width 0.48.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.33	0.12	0.28	0.12	0.25	0.10
2	0.33	0.11	0.25	0.12	0.23	0.04
3	0.29	0.11	0.18	0.11	0.23	0.92
4	0.36	0.11	0.32	0.16	0.27	1.22
Palp	0.11	0.05	0.05		0.07	0.30

Similar to ♂ in most characters. Abdomen creamy-white. There are 3 strong teeth on the promargin of the chelicera and 2 on the retromargin. Internal genitalia shown in fig. 120.

Types: Holotype ♂, allotype ♀, Beeman Hill, Campbell I., ex *Dracophyllum* leafmold, 2. III. 1963, Wise.

Records: CAMPBELL I. Tucker Cove, ex *Dracophyllum* leafmold, 1. II. 1963, Wise; Beeman Hill, ex moss, 2. III. 1963, Wise.

This species is most closely related to *T. plebeia* Forster from Codfish I., a small island off Stewart I., but may be separated from it by the form of the ♂ palp and ♀ genitalia.

Family ARGIOPIDAE

Genus **Araneus** Clerck, 1757

Araneus pustulosus Walck

This species, under the name *Araneus verrucosus* was recorded from both the Auckland and Campbell Is. by Hogg but subsequent collectors have failed to find it on Campbell I. It is common in New Zealand.

Records: AUCKLAND IS. Port Ross, Erebus Cove, in boatshed, 9. I. 1963, Wise; Port Ross, Terror Cove, 10. I. 1963, Wise; Ranui Cove, beating *Myrsine*, 27. XII. 1962, Johns; Ranui Cove, 4 m, ex Malaise Trap, 16–18. I. 1963, Gressitt & Wise; Ocean I., 3. I. 1963, Gressitt; Rose I., beating top branches of *Metrosideros*, 11. I. 1963, Johns; Enderby I., under *Metrosideros* bark, 31. XII. 1962, Johns.

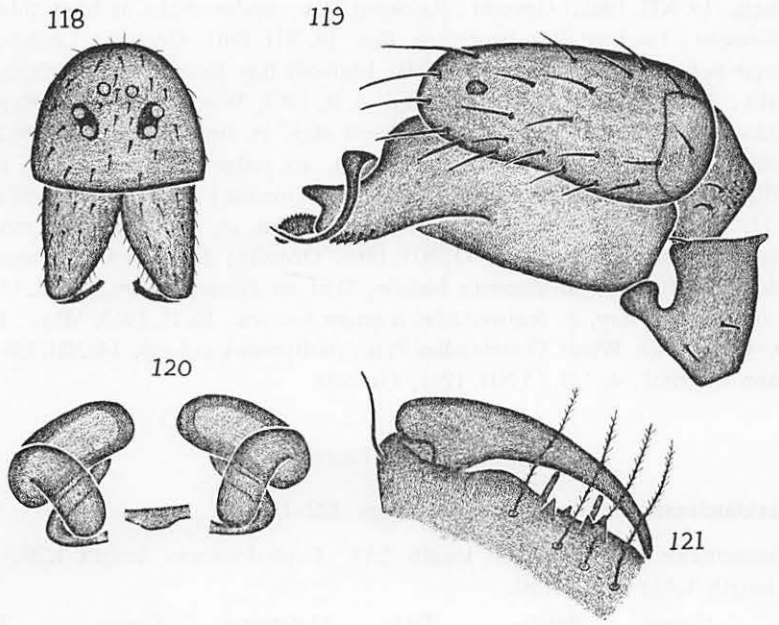
Family LINYPHIIDAE

Genus **Mynoglenes** Simon, 1905

Mynoglenes insolens Simon, 1905

Previously recorded from Chatham Is., Auckland Is., Campbell I., and Macquarie I., the range of the species is now extended to the Snares.

Records: AUCKLAND IS. Bivouac, 420 m, 7. I. 1963, Wise; Terror Cove, Port Ross, 10. I. 1963, Wise; Crozier Point, ex kelp on beach, 28. XII. 1962, Gressitt; Shore north of Lookout Point, under kelp, 31. XII. 1962, Wise; Ranui Cove, under logs in rata forest, 14. I. 1963, Wise; French I., 2. I. 1963, Gressitt; Ewing I., 4–6. I. 1963, Gressitt; Ewing I., rocks lying on soil 1 m above high water, 27. XII. 1962, Johns; Rose I., 8. I. 1963, Gressitt; Rose I., ex *Poa*, 8. I. 1963, Gressitt. CAMPBELL I. Perseverance Harbor, Lookout Bay, under *Stilbocarpa*, 3. II. 1963, Wise; Perseverance Harbor, 4 m, from shag resting place, on plants



Figs. 118–121. *Textricella wisei* n. sp. 118, cephalothorax and chelicerae from in front; 119, prolateral view of ♂ palp; 120, internal genitalia, ventral view; 121, ♂ chelicera.

growing on guano, 25. VII. 1962, Rennell; Perseverance Harbor, ex base of *Chrysobactron*, 24. II. 1963, Wise; Lookout Bay, ex *Chrysobactron*, 3. XII. 1961, Gressitt; Shoal Point, 7. II. 1963, Wise; Beeman Station, under timber on ground, 14. II. 1963, Wise; Beeman Cove, 3. III. 1962, Clark; Smoothwater Bay, ex leafmold under sedge, 16. II. 1963, Wise; Davis Point, ex moss, 12. XII. 1962, Gressitt; Courrejolles Pen., mollymawk Colony, 220 m, under stones, 12. II. 1963, Rennell. SNARES I. Near Station Point, under *Olearia* logs, 22–28. I. 1961, Mannering.

Mynoglenes marrineri Hogg, 1909 (See photo, p. 519)

This species has been recorded from the Auckland, Campbell and Antipodes Is. But it is apparently a rare species on the Auckland Is. and is not present in the present collections from this area.

Records: CAMPBELL I. Rocky Bay, ex *Anisotome*, 28. XI. 1961, Gressitt; Rocky Bay, penguin colony, under *Tillaea*, 18. II. 1963, Wise; Tucker Cove, 4. XII. 1961, Gressitt; Tucker Cove, 4 m, under boards, 15. XII. 1962, Rennell; Tucker Cove, beaten from *Pittosporum*, 26. II. 1963, Wise; Tucker Cove, 1 m, by shore, Rennell; Tucker Cove, 4. XII, 1961, Gressitt; Tucker Cove, 1–50 m, ex *Colobanthus* and *Poa*, 21–25. XI. 1961, Gressitt; Monument Harbor Beach, ex kelp, 17. XII. 1961, Gressitt; Monument Harbor, ex tussock, 9. II. 1963, Wise; Camp Cove, 2 m, under tussock, 20.XII.1961. Rennell; Shoal Point, 1.XII.1962. Rennell; Venus Bay, ex tussock, 2.II.1963, A. Wright; Venus Cove, 0–2 m, 2. II. 1963, Rennell; Lookout Bay beach, under stone and kelp, 3. II. 1953. Wise; Lookout Bay, ex kelp. 19. XII. 1961, Gressitt; Lookout Bay, ex *Hebe*, 19. XII. 1961, Gressitt; Lookout Bay, ex herbs on

boulder beach, 19. XII. 1961. Gressitt; Lookout Bay, under rocks at high tide level, 19. XII. 1961, Gressitt; Lookout Bay beach, ex *Poa*, 19. XII. 1961, Gressitt; Lookout Bay, 3 m, ex *Stilbocarpa polaris*, 30. XII. 1961, Rennell; Lookout Bay Beach, ex dead fern, 16, 19. XII. 1961, Gressitt; Middle Cove, Northwest Bay, 5. II. 1963, Wise; Northwest Bay, beach ex kelp on rocks, 29. XI. 1961, Gressitt; Northwest Bay, ex tussock, 30. XII. 1962, Rennell; Beeman Station, 8. II. 1963, Wise; Beeman Point, ex sedge leafmold, 28. II. 1963, Wise; Beeman Hill, 150 m, ex *Pleurophyllum*, 12. XII. 1961, Gressitt; Beeman Hill, 198 m, ex *Pleurophyllum*, 11. XII. 1961, Gressitt; Beeman Hill, 30–100 m, ex *Poa* roots and moss, 1–6.XII. 1961, Gressitt; Beeman Camp, 20 m, 11. XII. 1961, Gressitt; Beeman Camp area, Perseverance Harbor, 1958–1959; Lyall-Beeman Saddle, 70 m, ex *Pleurophyllum*, 3, 5, 8, 12. XII. 1961; Gressitt; Smoothwater Bay, ex leafmold from under tussock, 16. II. 1963, Wise; Courrejolles Pen., 240 m, 13. II. 1963, Wise; Courrejolles Pen., mollymawk colony, 14. XII. 1961, Gressitt; St. Col Ridge, on rock, 4, 7, 9, 13.XII. 1961, Gressitt.

Genus **Linyphia** Latreille, 1804

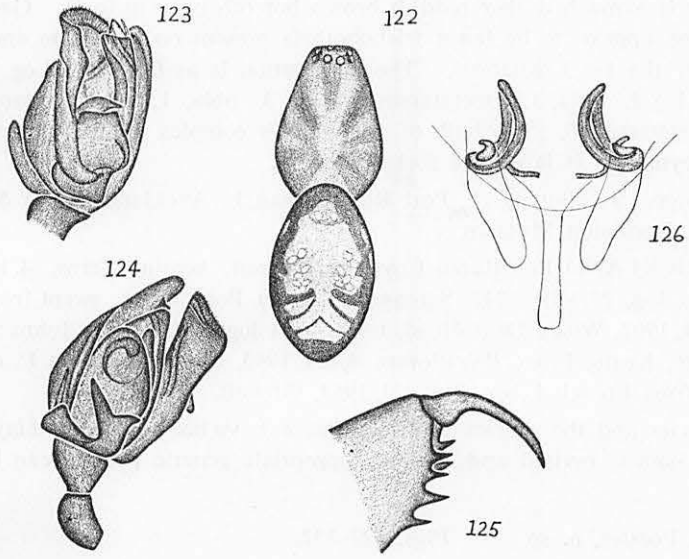
Linyphia aucklandensis Forster, n. sp. Figs. 122–126.

♀: Measurements in mm. Total length 2.54. Cephalothorax, length 1.26; width 0.99. Abdomen, length 1.44; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.58	0.36	1.36	1.35	1.04	5.69
2	1.62	0.41	1.53	1.33	0.99	5.88
3	1.26	0.36	0.99	0.99	0.66	4.26
4	1.64	0.29	1.31	1.26	0.81	5.31
Palp	0.54	0.18	0.36		0.54	1.62

Color: Cephalothorax pale yellow-brown with fairly uniform black shading. Abdomen mainly creamy white but with black markings on anterodorsal surface and lateral margins. The lateral markings extend to the central line posteriorly to form broken chevrons. Pale regions of dorsal surface are further broken with mottled white areas. Legs yellow-brown.

Eyes: From above the anterior row is slightly recurved and the posterior row slightly procurved. The AME are placed on a low mound which overhangs the clypeus. Ratio of AME. ALE. PME. PLE=3.5.5.4. AME separated from each other by 2/3 and from the ALE by 4/3 of the diameter of an AME. Lateral eyes contiguous. PME separated from each other and from the PLE by a distance equal to the diameter of an AME. Median ocular quadrangle wider behind, than in front, in the ratio of 11 : 8 and longer than wide in the front, in the ratio of 12 : 8. The width of the clypeus is equal to 11/3 of the diameter of an AME. *Carapace.* Low, widening evenly from the anterior margin to between legs 2 and 3 where the width is 11/14 the total length of the carapace. There is no fovea present. *Chelicerae.* There are 3 strong teeth on promargin and 2 on retromargin. *Maxillae.* Directed across the labium. Squat, as wide as long. Outer margins slightly curved. *Labium.* Broad, 2× as wide as long, anterior margin strongly rebordered. *Sternum.* Broadly scutiform, only slightly longer than wide. Anterior margin procurved. Posterior end, broadly obtuse, extending behind coxae IV, which are separated by a distance equal to their width. Lateral margins evenly curved and drawn out into small points between the coxae. *Legs.* Clothed with smooth hairs and stronger bristles on femora, patel-



Figs. 122–126. *Linyphia campbellensis* n. sp. 122, dorsal surface of ♀; 123, ventral view of ♂ palp; 124, retrolateral view of ♂ palp; 125, ♂ chelicera; 126, outline of epigynum and internal genitalia, ventral view.

lae and tibiae. The bristles are arranged as follows: Leg 1, femur, prolateral 1, patella, prolateral 1, distal, tibia, 4 proximo-ventral in a group, prolateral 1, retrolateral 1; leg 2, femur, dorsal 1.1, patella, 1 distodorsal, tibia, retrolateral 1.1, dorsal 1, metatarsus, 1 proximo-dorsal; leg 3, femur, dorsal 1, patella, 1 distodorsal, tibia, dorsal 1.1, retrolateral 1 distal; leg 4, patella, dorsal 1.1, tibia, dorsal 1.1, retrolateral 1 distal, metatarsus, dorsal 1 proximal. Trichobothria are present only on the tibiae. Leg 1, 1.1.1.1.2.1.1; leg 2 and 3, 1.1.1.1.1; leg 4, 1.1.2.1.1. Superior claws similar each with 12 short teeth. Superior claw with a single tooth. There are 3 or 4 serrate bristles forming false claws at the base of the claws. Tarsal organ distinct, and is subdistal in position. *Palp.* Bristles are present as follows: Patella, 1 distodorsal, tibia 1.1 distodorsal, 2 distal prolateral. Tarsus, 2.2 retrolateral, 1.1dorsal. Tibia with 2 trichobothria, claw long, slender and smooth. Tarsal organ subdistal. *Abdomen.* Ovoid, slightly less than 2× as long as wide. Shiny, clothed with short hairs. Epigynum with a long slender scape and 2 lateral projections. The internal genitalia are small and are shown in fig. 126. Prominent colulus present.

♂: Measurements in mm. Total length 2.81. Cephalothorax, length 1.26; width 0.99. Abdomen, length 1.62; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.72	0.36	1.71	1.53	1.11	6.43
2	1.62	0.36	1.54	1.41	0.99	5.92
3	1.26	0.31	0.99	0.99	0.71	4.26
4	1.56	0.28	1.35	1.26	0.81	5.06
Palp	0.45	0.14	0.12		0.37	

The carapace is a much darker reddish brown but otherwise as in ♀. General structure as in ♀. There appear to be fewer trichobothria present on the tibiae and a single trichobothrium on the 1st 3 metatarsi. The distribution is as follows: Leg 1, tibia, 1.1.1, metatarsus, 1; leg 2, tibia, 1.1, metatarsus, 1; leg 3, tibia, 1.1.1.1, metatarsus, 1; leg 4, tibia, 1.1.1.1, metatarsus, 0. The bulb of the palp is complex and is shown in figs. 123, 124. The paracymbium is large and forked distally.

Types: Holotype ♀, allotype ♂, Port Ross, Ocean I., Auckland Is., on *Stilbocarpa*, 29. XII. 1962, Wise, Dominion Museum.

Records: AUCKLAND IS. Ranui Cove, rata forest, beating ferns, 4. I. 1963, Johns; Port Ross, under log, 27. VIII. 1947, Sorensen; Crozier Point track, swept from *Polystichum vestitum*, 28. XII. 1962, Wise; Deas Head, under rata logs, 18. I. 1963, Johns; Ewing I., 4, 6.I.1963, Gressitt; Ewing I., ex *Polystichum*, 4, 6. I. 1963, Gressitt; Ocean I., ex *Stilbocarpa*, 29. XII. 1963, Wise; French I., ex *Poa*, 1. I. 1963, Gressitt.

Both this species and the species described below have been placed in *Linyphia* until the New Zealand fauna is revised and a more appropriate generic placing can be made.

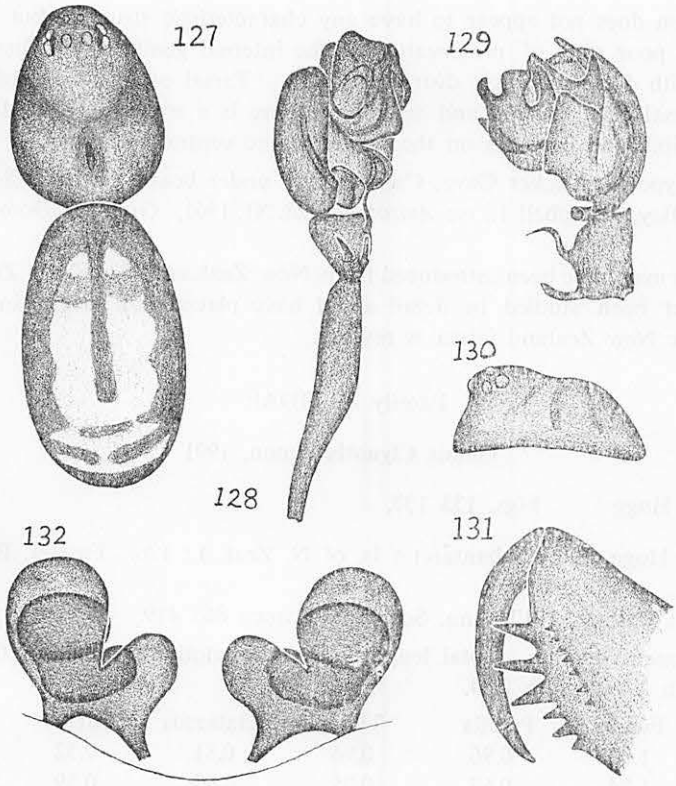
Linyphia setosa Forster, n. sp. Figs. 127–132.

♂: Measurements in mm. Total length 2.14. Cephalothorax, length 0.83; width 0.79. Abdomen, length 1.33; width 0.90.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.62	0.28	1.69	1.48	0.99	6.06
2		Missing				
3	1.17	0.28	0.93	0.99	0.81	4.18
4	1.44	0.28	1.26	1.17	0.83	4.98
Palp						

Color: Cephalothorax and appendages dark-brown. Abdomen blackish brown with a pale pattern on dorsal surface as shown in fig. 127.

Carapace: Almost circular in outline, high profile as in fig. 130. Fovea deep, prominent, sunken between swellings on lateral surfaces of thoracic region. *Eyes.* Compact, occupying 4/7 the width of the head. Ratio of AME. ALE. PME. PLE=3.4.4.4. From in front both rows are slightly recurved. From above both rows are strongly procurved. AME separated from each other and from the ALE by 2/3 of the diameter of an AME. Lateral eyes contiguous. PME separated from each other by 3/3 and from the PLE by 2/3 of the diameter of an AME. Median ocular quadrangle wider behind than in front in ratio of 11.8 and longer than wide in the front in the ratio of 10.8. *Chelicerae.* Length slightly more than 1/2 the length of carapace. A row of 6 teeth present on the retromargin of which the distal 3 are large and a row of 7 minute uniform sized teeth are present on the promargin. *Maxillae.* Margins straight, about 3× as long as wide, converging over labium. *Labium.* Margins evenly curved and rebordered, almost 3× as wide as long, and appears to be fused to the sternum. *Sternum.* Scutiform, as wide as long. Terminated broadly behind coxae IV. *Legs.* Long and slender. Clothed with short smooth hairs, spines and bristles absent. Trichobothria distributed as follows: Leg 1, metatarsus 1 at 3/4, tarsus 0; leg 3, 1.1 at 1/3 metatarsus 1 at 1/4; leg 4, tibia 1.1.1.1.1.1, metatarsus 0, tarsus 0. Tarsal organ subdistal. Superior claws similar, with 6–7 minute teeth. Inferior claws with



Figs. 127-132. *Linyphia setosa* n. sp. 127, dorsal surface of ♂; 128, retrolateral view of ♂ palp; 129, ventral view of ♂ palp; 130, carapace from the side; 131, ♀ chelicera; 132, internal genitalia, ventral view.

single tooth. *Palp.* The form of the palp is shown in figs. 128, 129. *Abdomen.* Rather elongate, longer than wide in ratio of 7 : 5. There is a sclerotic thickening on the anterior dorsal surface with well-defined stridulating ridges. The area beyond the epigastric furrow is thickened. Spinnerets short and stout, closely spaced. Colulus large.

♀: Measurements in mm. Cephalothorax, length 0.40; width 0.59. Abdomen length 1.26; width 0.41.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.62	0.25	1.71	1.44	1.08	6.10
2	1.44	0.31	1.26	1.19	0.82	5.02
3	1.16	0.29	0.93	1.03	0.68	4.09
4	1.16	0.31	1.08	1.04	0.72	4.31
Palp	0.54	0.25	0.29		0.46	1.54

The single specimen examined has been dried but the general characters including the relative size and placing of the eyes seems to be similar to the ♂. Trichobothria are distributed on the tibiae and metatarsi as follows: Legs 1 & 2, tibia, 1.1 distal, metatarsus, 1 at 3/4; leg 3, tibia 1.1 proximal, metatarsus, 1 proximal; leg 4, tibia, 1.1.1.1, metatarsus

0. The epigynum does not appear to have any characteristic structure but this may have been due to the poor state of preservation. The internal genitalia are shown in fig. 132. Tibia of palp with 4 trichobothria distributed 2.1.1. Tarsal organ at 3/4 of the length of the tarsus. Tarsal claw straight and smooth. There is a spine on the distal prolateral surface of the tibia and 2 spines on the tarsus, 1 mid-ventral and the other mid-prolateral.

Types: Holotype ♂, Tucker Cove, Campbell I., under boards, I. 1947, Sorensen. Allotype ♀, Rocky Bay, Campbell I., ex *Anisotome*, 28. XI. 1961, Gressitt, Dominion Museum, Wellington.

This species may have been introduced from New Zealand. The New Zealand linyphiids have not yet been studied in detail and I have placed this species in *Linyphia* until such time as the New Zealand fauna is revised.

Family ATTIDAE

Genus **Clynotis** Simon, 1901

Clynotis barresi Hogg Figs. 133–137.

Clynotis barresi Hogg, 1909, Subantarctic Is. of N. Zeal. **1**: 176.—Forster, Rec. Dom. Mus. **2** (4): 200.

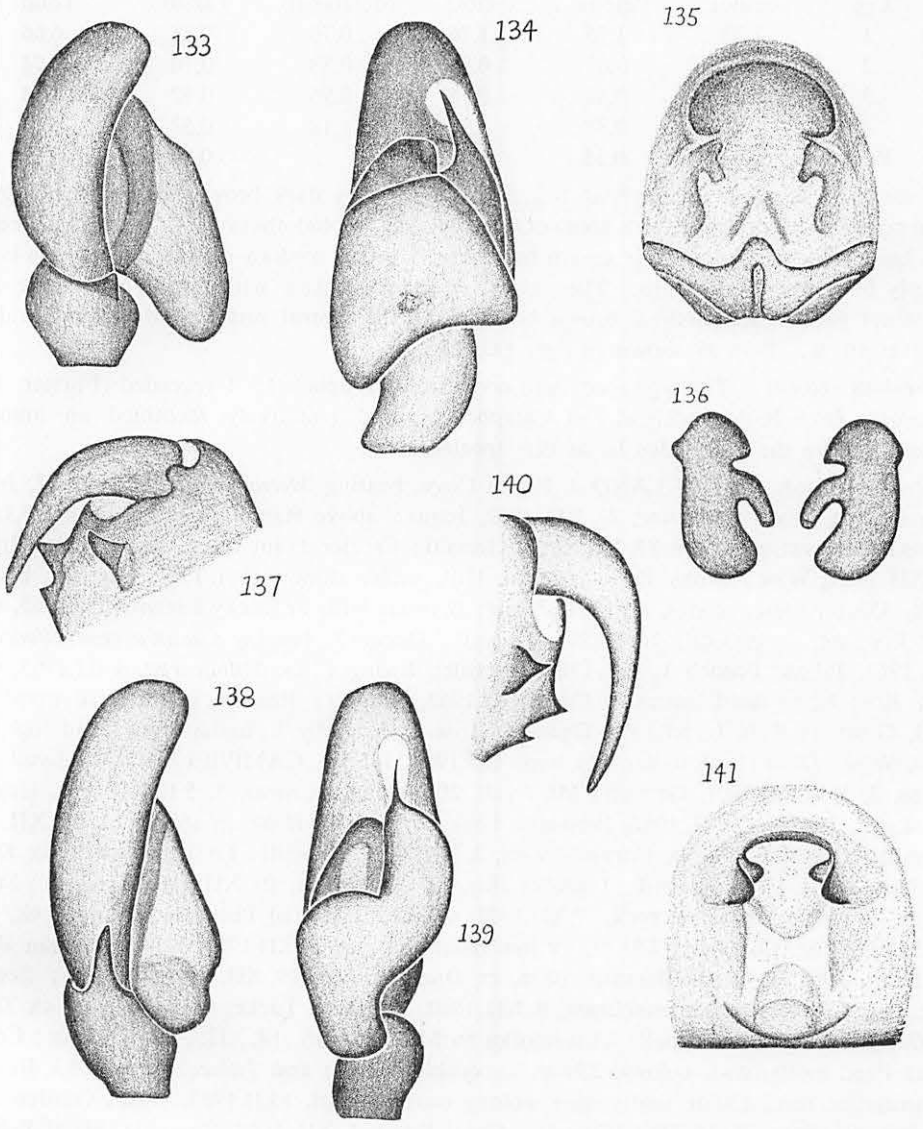
Clynotis barresi: Dalmas, 1917, Ann. Soc. Ent. France **86**: 419.

♀: Measurements in mm. Total length 7.12. Cephalothorax, length 2.64; width 1.56. Abdomen, length 4.40; width 2.84.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.32	0.96	0.96	0.81	0.52	4.57
2	1.24	0.67	0.75	0.69	0.39	3.74
3	1.12	0.52	0.52	0.77	0.48	3.41
4	1.56	0.67	0.88	0.96	0.52	4.59
Palp	0.76	0.27	0.31		0.67	2.01

Color: Appendages and cephalothorax yellow-brown. Area around eyes black and area enclosed by eyes paler than rest of cephalothorax. Abdomen cream mottled with white.

Eyes: Ratio of AME. ALE. PME. PLE = 22.15.3.15. The eyes in the anterior row are subcontiguous. The PME are separated from the ALE by 14/22, from the PLE by 15/22 and from each other by 77/22 of diameter of an AME. The PLE are separated from each other by a distance equal to 64/22 of the diameter of an AME. The quadrangle formed by lateral eyes is wider behind than in front in the ratio of 94.90 and wider in front than long in the ratio of 90 : 61. *Chelicerae.* Vertical, short and stout. Promargin with 2 strong teeth, retromargin with a single tooth which is broad at base (fig. 137). *Maxillae.* Distended distally where it is 2× the proximal width. *Labium.* Notched at base, widest at the base but evenly rounded anteriorly. *Sternum.* Scutiform, longer than wide in the ratio of 12 : 7. Terminating posteriorly with blunt point between coxae IV, which are separated by a distance equal to slightly less than 1/2 the width of a coxa. *Legs.* Few spines distributed as follows: Leg 1, tibia, ventral 2.2, 1p, metatarsus, 2.2, tarsus 0; leg, 2, tibiae, ventral 1r. 2, metatarsus, ventral 2.2; leg 3, tibia, distal 1p, metatarsus, distal ventral 2, distal prolateral 2, distal retrolateral 2; leg 4, tibia, ventral 1.1p, retrolateral 1 distal, metatarsus, ventral 2 distal, prolateral 2 distal, retrolateral 2 distal. *Ab-*



Figs. 133–141. *Clynotis* spp. 133, *C. barresi* Hogg, retrolateral view of ♂ palp; 134, same, ventral view of ♂ palp; 135, same, epigynum; 136, same, internal genitalia, ventral view; 137, same, ♂ chelicera; 138, *C. archeyi* (Berland), retrolateral view of ♂ palp; 139, same, ventral view of ♂ palp; 140, same, ♂ chelicera; 141, same, epigynum.

domen. Closely clothed with small, pale, and inconspicuous hairs and fewer long erect hairs. Epigynum as in fig. 135. Internal genitalia simple as illustrated in fig. 136.

♂: Measurements in mm. Total length 6.21. Cephalothorax, length 3.08; width 1.76. Abdomen, length 3.08; width 1.68.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	2.20	1.76	1.76	0.76	0.88	6.66
2	1.55	0.67	0.94	0.88	0.70	4.74
3	1.43	0.48	0.76	0.96	0.52	4.15
4	1.62	0.88	0.94	1.18	0.52	5.14
Palp	0.92	0.35	0.16		0.80	2.23

Color: ♂ is much darker than ♀. Appendages very dark brown, almost black. Apart from conspicuous orange-brown area enclosed by eyes, cephalothorax is also blackish brown. The base color of abdomen is cream but there is broad median dorsal band which is posteriorly broken into chevrons. The lateral margins flecked with brown and there are 3 indistinct parallel longitudinal brown bands down the ventral surface. Most structural features as in ♀. Palp as shown in figs. 133, 134.

Previous records: The type specimens come from Campbell I. I recorded (Forster, 1955) specimens from both Auckland and Campbell Is. and tentatively identified an immature specimen from the Antipodes Is. as this species.

Present records: AUCKLAND I. Ranui Cove, beating *Metrosideros*, 27.XII.1962, Johns; Ranui Cove, beating *Myrsine*, 27. XII. 1962, Johns; above Ranui Cove, on beach, 7.I.1963, Johns; Observation Point, 27. XII. 1962, Gressitt; Crozier Point track, swept from *Myrsine*, 28. XII. 1962, Wise; Stony Peak to Bleak Hill, under stones, 11. I. 1963, Gressitt; Bivouac Peak, 450 m, under stones, 6.I.1963, Johns; Bivouac Hill, nr. rocky stream, 10.I.1963, Gressitt; Bivouac, ex tussock, 16. I. 1963, Gressitt. Ocean I., beating *Cassinia veauvilliacea*, 28. XII. 1962, Johns; French I., 2. I. 1963, Gressitt; Ewing I., ex *Stilbocarpa*, 4–6.I.1963, Gressitt; Rose I., ex dead leaves of *Carex*, 8.I.1963, Gressitt; Rose I., under dead wood, 8. I. 1963, Gressitt; Rose I., 8.I.1963, Gressitt; Rose I., Enderby I., under stones and logs, 18.I. 1963, Wise; Deas Head, under rata logs, 18.I.1963, Johns. CAMPBELL I. Mt. Lyall, 200–400 m, 3, 5. 12.XII.1961, Gressitt; Mt. Lyall, 200–400 m, ex moss, 3, 5.12.XII.1961, Gressitt; Mt. Lyall, 250 m, 12. XI. 1962, Rennell; Lookout Bay, ex *Hebe* on shore, 16, 19. XII. 1961, Gressitt; Lookout Bay, ex *Chrysobactron*, 3. XII. 1961, Gressitt; Lookout Beach, ex *Dracophyllum*, 3. XII. 1961, Gressitt; Lookout Bay, ex *Coprosoma*, 19. XII. 1961, Gressitt; St. Col Ridge, 180 m, ex moss on rock, 7.XII.1961, Gressitt; St. Col Peak, 240 m, on rock, 23.II. 1963, Wise; St. Col Peak, 250 m, ex low plants on rock, 23.II.1963, Wise; Beeman Beach, on rocks, 1961, Rennell; Beeman, 10 m, ex *Dracophyllum*, 19. XII. 1961, Gressitt; Beeman-Tucker, ex *Pleurophyllum criniferum*, 8. XII. 1961, Gressitt; Tucker Cove, 0.3 m, ex *Dracophyllum*, 7. XII. 1962, Rennell; Courrejolles to Mt. Azimuth, 14. XII. 1961, Gressitt; Courrejolles Pen., mollymawk colony, 230 m, ex cushion plants and *Tillaea*, 12. II. 1963, Rennell; Courrejolles Pen., 230 m, mollymawk colony on rock cliff, 13.II.1963, Wise; Garden Cove, ex *Dracophyllum*, 25. XI. 1961, Gressitt; Shoal Point, 1. XII. 1962, Rennell; Shoal Point, 7. II.1963, Wise; Northwest Bay, ex tussock, 30. XII. 1962, Rennell; Venus Cove, 0.2 m, 2. II. 1963, Rennell; Mt. Dumas, 400 m, to summit, under stones, 6. II. 1963, Wise; Monument Harbor, 9. II. 1963, Wise.

The present collections although extensive do not resolve the problem raised by *Cosmophasis archeyi* Berland which was described from a ♂ and a ♀ specimen collected in the Auckland Is. This species is closely related to *C. barresi* and the palp and epigynum of the type specimens are shown in figs. 138–141. I have previously suggested (1955) that the specimens were actually collected from Bluff in the South I. of New Zealand in the same

way as *Rubrius rufus* which was also described by Berland in his paper. However with the recognition of speciation within the Auckland Islands as shown in *Gohia* it is possible that *C. archeyi* is in fact a rare species from the Auckland Is.

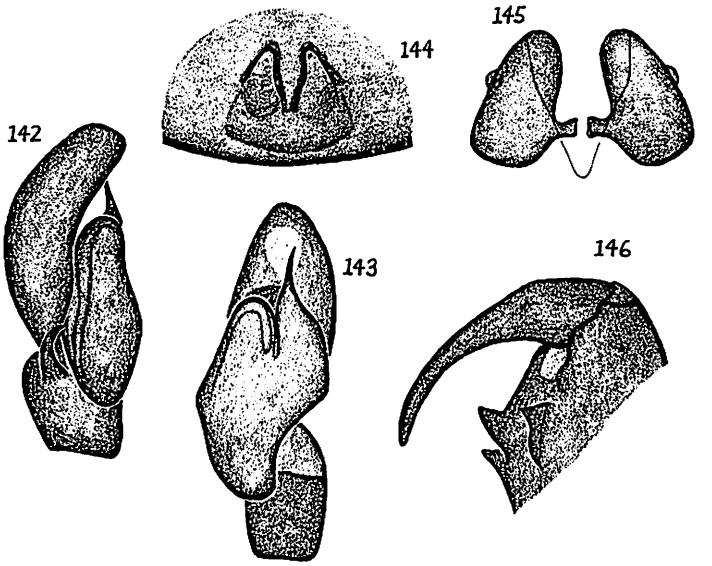
Clynotis knoxi Forster, n. sp. Figs. 142–146.

♂: Measurements in mm. Total length 4.96. Cephalothorax, length 2.25; width 1.62. Abdomen, length 2.88; width 1.71.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.80	0.83	1.62	0.99	0.63	5.97
2	1.26	0.81	0.92	0.72	0.54	4.35
3	1.08	0.57	0.64	0.75	0.45	3.49
4	1.35	0.63	0.90	0.90	0.47	4.25

Color: Lateral margins of the cephalothorax dark red-brown. The area enclosed by the eyes cream, with the central region behind the eyes pale brown. Abdomen cream, mottled, with a prominent longitudinal band down the median dorsal surface, terminating at 2/3 where it becomes wider. Legs pale yellow-brown but anterior pair dark brown.

Eyes: Ratio of AME. ALE. PME. PLE=21.11.4.12. AME are separated from each other by 2/21 and from the ALE by 5/21 of the diameter of an AME. PME separated from the ALE by 5/21 and from the PLE by 15/21 and from each other by 65/21 of the diameter of an AME. PLE separated from each other by a distance equal to 60/21 of the diameter of an AME. Ocular quadrangle formed by the lateral eyes, wider behind than in front in the ratio of 17 : 5 and wider behind than long in the ratio of 17 : 11. *Cara-*



Figs. 142–146. *Clynotis knoxi* n. sp. 142, retrolateral view of ♂ palp; 143, ventral view of ♂ palp; 144, epigynum; 145, internal genitalia, ventral view; 146, ♂ chelicera.

pace. Longer than wide in ratio of 4 : 3, closely clothed with adpressed white hairs and with fewer, erect, black hairs. *Chelicerae.* Stout, vertical, promargin with 2 strong teeth, retromargin with a single tooth expanded at base (fig. 146). *Maxillae.* Slightly divergent, outer margins swelling out distally where the width is greater than that at base in ratio of 5 : 3. Length equal to 2× the distal width. There is a thick scopula of apically expanded hairs on the inner distal surface. *Labium.* Longer than wide in the ratio of 5 : 4. Evenly rounded, anterior margin straight. *Sternum.* Longer than wide in ratio of 37 : 51. Anterior margin procurved, lateral margins evenly curved, without sharp lateral projections. Bluntly terminated posteriorly in front of coxa IV. *Legs.* 1.4.2.1. Anterior pair well developed; much longer than in ♀ but not as stout. Clothed with recumbent barbed setae and erect smooth setae. Spines. Leg 1, tibia, ventral, 0.2.2, metatarsus, ventral 0.2.2, tarsus 0; leg 2, tibia, ventral 0.1.1, metatarsus, ventral 0.2.2, tarsus 0; leg 3, femur, dorsal 1.1.2, tibia, ventral 0.0.2, prolateral 0.0.1, retrolateral 0.0.1, metatarsus, ventral 0.1.2, prolateral 0.0.1, retrolateral 0.0.1, dorsal 0.0,1; leg 4, femur dorsal 1.1.1, tibia, ventral 1.0.2, prolateral 0.0.1, retrolateral 0.0.1, metatarsus, ventral 0.1.2, prolateral 0.0.1, retrolateral 0.0.1, dorsal 0.0.1. Trichobothria are distributed as follows: Leg 1, tibia 1.1; leg 2, tibia 1.1, metatarsus 1, subdistal, tarsus 1.1; leg 3, tibia 1.1, metatarsus 1.1.1, tarsus 1; leg 4, tibia 1.1.1, metatarsus 1.1.1, tarsus 1.1. Superior claws similar each with a proximal row of 9 short teeth. Scopula thick, with spatulate hairs. *Palp.* As shown in figs. 142, 143. Tibia with a strong, sharply terminated, curved process. *Abdomen.* Thickly clothed with fine brown hairs and fewer erect black hairs. Spinnerets short, colulus well developed.

♀ : Measurements in mm. Total length 5.48. Cephalothorax, length 2.63; width 1.71. Abdomen, length 2.88; width 1.80.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.41	0.96	1.08	0.72	0.54	4.71
2	1.26	0.82	0.83	0.63	0.42	3.96
3	0.97	0.64	0.72	0.81	0.42	3.56
4	1.55	0.79	0.99	0.96	0.52	4.81
Palp	0.84	0.36	0.36		0.66	2.22

Similar to ♂ in general color but cephalothorax paler and anterior pair of legs not so heavily pigmented. Four or 5 imperfectly defined chevrons usually visible along posterior 1/2 of dorsal surface of abdomen. Chelicerae, maxillae, labium and sternum as in ♂. Number and disposition of spines and trichobothria on legs differ slightly from the ♂. *Spines*: Legs 1 & 2, tibia, ventral 0.2.2, metatarsus, ventral 2.2; leg 3 femur, dorsal 0.1.1, tibia, ventral 0.0.2, prolateral 0.0.1, retrolateral 0.0.1, metatarsus, ventral 0.0.2, dorsal 0.0.2, prolateral 0.0.1, retrolateral 0.0.1; leg 4, femur, dorsal 0.1.1.1, tibia, ventral 0.0.2, retrolateral 0.0.1, metatarsus, ventral 0.0.2, dorsal 0.0.2, prolateral 0.0.1, retrolateral 0.0.1. Trichobothria: Legs 1 & 2, tibia, 1.1, metatarsus, 1.1.1, tarsus, 1.1; leg 3, tibia, 1.1.1, metatarsus, 1.1.1, tarsus, 1.1; leg 4, tibia, 1.1.1, metatarsus, 1.1.1.1, tarsus, 1.1.1. *Palp.* Heavily clothed with hairs, spines absent, 2 trichobothria on tibia. Claw lacking. Epigynum as shown in fig. 144. Internal genitalia simple, as in fig. 145.

Types: Holotype ♂, allotype ♀, Snares Is., (6.5), Hoho Bay and East Coast, beating *Olearia*, 31. I. 1961, Mannering, Canterbury Museum.

Records: SNARES IS. South side of Hoho Bay, beating from *Senecio*, 31.I.1961, Mannering; SE promontory, beaten from *Hebe*, 31.I.1961, G. A. Knox; nr. Station Pt., beaten

from *Senecio*, 2. II. 1961, Knox; nr. Station Pt., beaten from *Carex*, 2. II. 1961, Knox; nr. Station Pt., beaten from *Polystichum vestitum*, 7.II.1961, Mannering.

Order OPILIONES

Harvestmen belonging to the genus *Neonuncia* (Suborder Laniatores), have been recorded previously from both Auckland and Campbell Is. The 2 species known from the Auckland Is., *N. enderbyi* (Hogg) and *N. eastoni* Forster are represented in the present collections but *N. campbelli* Forster, from Campbell I. has not been rediscovered. Extensive series of long-legged harvestmen of the suborder Palpatores have been collected for the first time from both areas and 4 species, 1 from Campbell I. and 3 from the Auckland Is. are described below. A further species from Snares is also described as this species is related to *P. rennelli* n. sp. from Campbell I. These species are all closely related to New Zealand forms, most of which are as yet undescribed. The taxonomy of this group of harvestmen is at present not very soundly based. A number of apparently polymorphic characters have not been recognised by earlier workers. The most obvious is the striking difference in the form of the chelicerae and the color and sclerotisation of the body between ♂♂ and ♀♀ of many species. In addition to sexual dimorphism there also appear to be present dimorphic ♂ forms in much the same way as I have demonstrated (Forster, 1954) for many New Zealand Laniatores. The Palpatores with 2 forms of ♂ seem to possess the body color pattern typical for the ♀ in the 1 form, while the carapace of the other form is usually heavily pigmented and sclerotised. Of the 4 species described below *P. mila* n. sp. is represented by 2 forms of ♂.

Suborder PALPATORES

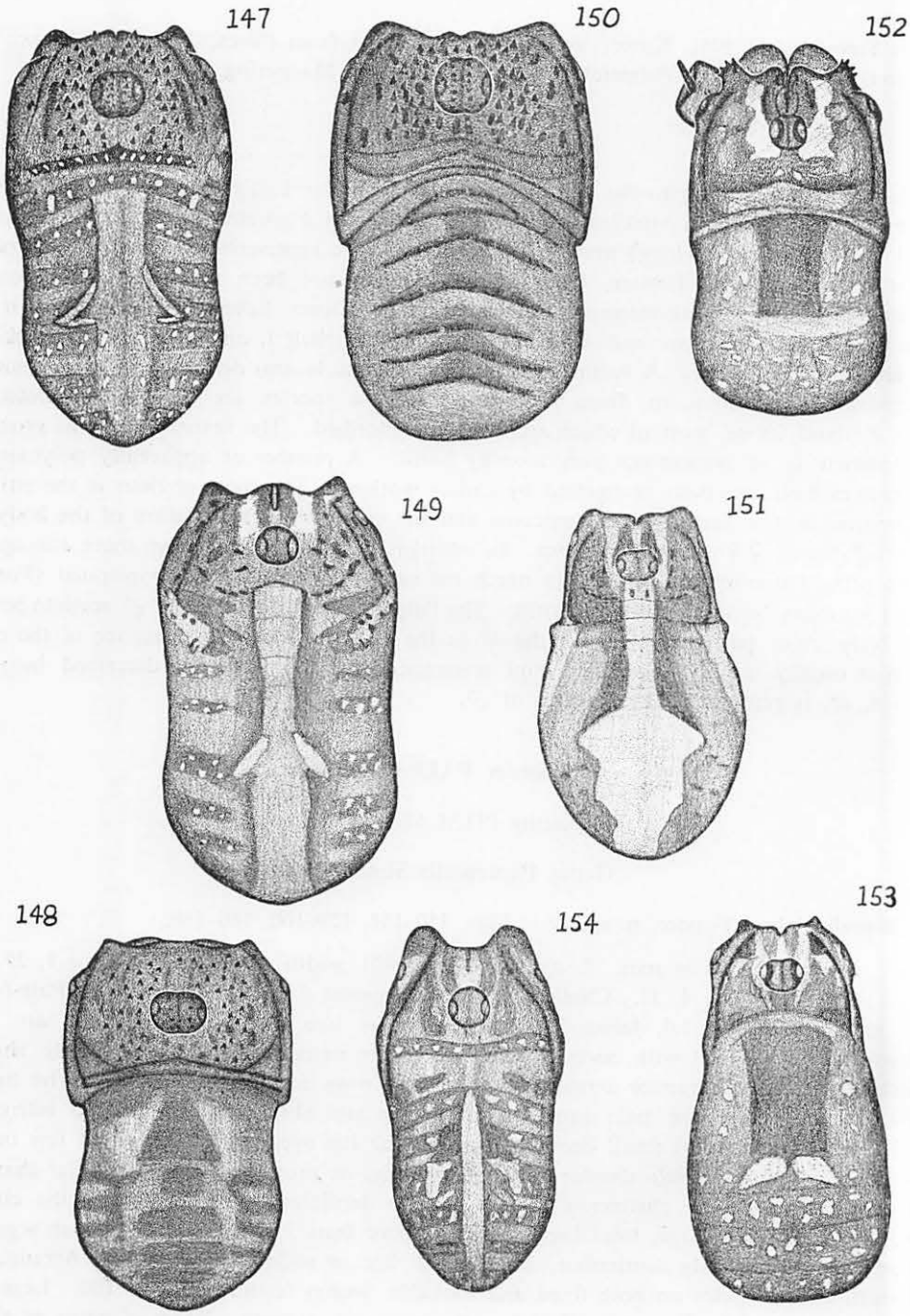
Family PHALANGIIDAE

Genus **Pantopsalis** Simon, 1879

Pantopsalis johnsi Forster, n. sp. Figs. 150–151, 159–160, 166–168.

♂: Measurements in mm. Length of body 4.40; width of body 3.16. Leg 1, 29; leg 2, 52; leg 3, 27; leg 4, 37. Chelicerae. Basal segment 6.1. Segment 2, 8.3. Palp-femur 1.8, patella 0.9, tibia 1.0, tarsus 2.2, total 5.0. The legs, body and chelicerae are dark brown, heavily shaded with sooty black. There are numerous small, irregularly shaped, black spots on the carapace arranged in segmental rows across the abdomen. The palp is also dark but there are pale areas on the patella and tibia. The carapace is sclerotised and there are numerous small denticles surrounding the eyemound, and with a few on the eyemound itself. *Pedipalp* slender without swellings or processes, slightly shorter than the basal segment of the chelicerae. There are no denticles on the femur and the claw is smooth. *Chelicerae* large, total length slightly more than 3× length of body, both segments strongly and uniformly denticulate, segments 2, 2× as wide as the basal. Arrangement of teeth and denticles on both fixed and movable fingers is shown in fig. 160. Legs long and slender, 2.4.1.3. Femur denticulate, other segments smooth. Form of penis as shown in figs. 166, 167.

♀: Measurements in mm. Length of body 4.48; width of body 3.52. Leg 1, 20; leg



Figs. 147–154. *Pantopsalis* spp. 147, *P. mila* n. sp., dorsal surface of body of ♂ (form); 148, same, dorsal surface of body of ♂ (typical); 149, same, dorsal surface of body of ♀; 150, *P. johnsi* n. sp., dorsal surface of body of ♂; 151, same, dorsal surface of body of ♀; 152, *P. distincta* n. sp., dorsal surface of body of ♂; 153, same, dorsal surface of body of ♀; 154, *P. snaresensis* n. sp., dorsal surface of body of ♂.

2, 35; leg 3, 21; leg 4, 25. *Chelicerae.* Basal segment 1.1. Segment 2, 2.1. Palp-femur 1.55, patella 1.04, tibia 0.96, tarsus 2.20, total 5.75. Pattern on dorsal surface of body is shown in fig. 151. Lateral and ventral surfaces mottled with white. Eyemound and surface immediately surrounding eyemound is reddish. Palp white with reddish shading. Legs dark brown with numerous patches. Dorsal surface of basal segment of chelicerae white and ventral surface brown. Proximal 1/2 of segment 2 brown. Distal 1/2 pale yellow. Scute not heavily sclerotised and is smooth. Chelicerae short and smooth. Total length less than length of body. *Legs.* 2.4.3.1. Relatively shorter than in ♂. Femora not denticulate. Palp slender, slightly longer than length of body. Prolateral surfaces of patellae and tibiae distended but not forming processes. Claw smooth. The receptaculum seminis of ovipositor is shown in fig. 168.

Types: Holotype ♂, allotype ♀, Deas Head, Auckland Is., under rata bark, 18. I. 1963, Johns, Canterbury Museum.

Records: AUCKLAND IS. Deas Head, under logs, 18.I.1963, Johns; Lindley Pt., under logs in rata forest, 18.I.1963, Johns; same locality, 30. XII. 1962, Johns; Lindley Pt., under rata bark, 30. XII. 1962, Johns.

Pantopsalis mila Forster, n. sp. Figs. 147–149, 155–156, 163–165.

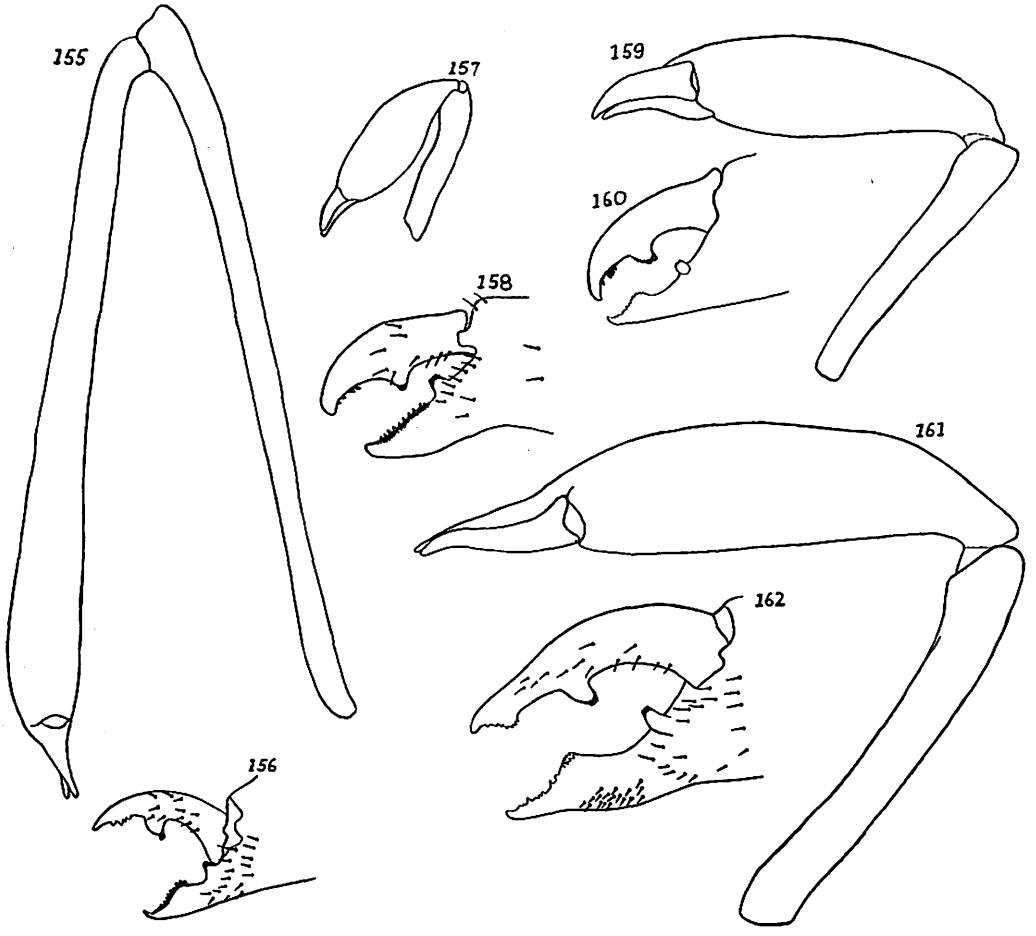
♂: Measurements in mm. Length of body 5.28; width of body 3.08. Leg 1, 29; leg 2, 53; leg 3, 31; leg 4, 37. Palp-femur 1.76, patella 0.88, tibia 0.88, tarsus 2.44, total 5.96. Chelicera. Basal segment 11.4. Segment 2, 13.2. The typical form is dark sooty black. There is a rather indistinct segmental pattern of darker shading on the abdomen as shown in fig. 148, and a few black patches on the carapace. The body of a secondary form is illustrated in fig. 147. In this form the legs and chelicerae are pale brown and the carapace is not as heavily sclerotised.

In both forms there are numerous small denticles on the carapace and also on the eyemound. Chelicerae relatively longer than in *johnsi*, equal in length to 4.5× length of body. Segment 2 is also more slender than *johnsi*. Both segments closely covered with strong denticles. Teeth and denticles on the fingers are shown in fig. 156. Palp smooth and slender, without processes. Claw smooth. Penis as in figs. 163, 164. Legs 2.4.3.1, long and slender, femora of all legs covered with small denticles.

♀ (immature): Measurements in mm. Length of body 4.41; width of body 3.08. Leg 1, 16; leg 2, 26; leg 3, 14; leg 4, 22. Palp-femur 1.32, patella 0.88, tibia 0.84, tarsus 1.56, total 4.60. Chelicera. Basal segment 0.88. Segment 2, 1.76. The color pattern of body shown in fig. 149. Pale central area flushed with pink. Body and eyemound without denticles. Chelicera smooth and short, total length much less than length of the body. Palp as in *johnsi* without denticles but with swellings on prolateral surfaces of patellae and tibiae. Receptaculum seminis of ovipositor illustrated in fig. 165.

Types: Holotype ♂, Terror Cove, Port Ross, Auckland Is., on rata trunk with cockroaches, 10. I. 1963, Wise. Allotype ♀, Terror Cove, Port Ross, on seashore cliff, 10. I. 1963, Wise, Dominion Museum, Wellington.

Records: AUCKLAND IS. Deas Head, under rata bark, 18.I.1963, Johns; Lindley Pt., under rocks in supralitoral, lying among fallen leaves of *Poa litorosa* and *Poa foliosa*, 18. I.1963, Johns. *P. johnsi* and *P. mila* are closely related and it is interesting to find them



Figs. 155–162. *Pantopsalis* spp. 155, *P. mila* n. sp., prolateral view of ♂ chelicera (denticles not drawn); 156, same, fingers of chelicera, ventral; 157, *P. snaresensis* n. sp., prolateral view of ♂ chelicera (denticles not drawn); 158, same, fingers of chelicera, ventral view; 159, *P. johnsi* n. sp. prolateral view of ♂ chelicera; 160, same, fingers of chelicera, ventral view; 161, *P. distincta* n. sp., prolateral view of ♂ chelicera; 162, same, fingers of chelicera, ventral view.

living together. Apart from genitalic characters, the 2 species are easily separated by the form of the chelicerae in the ♂ and the body pattern of the ♀.

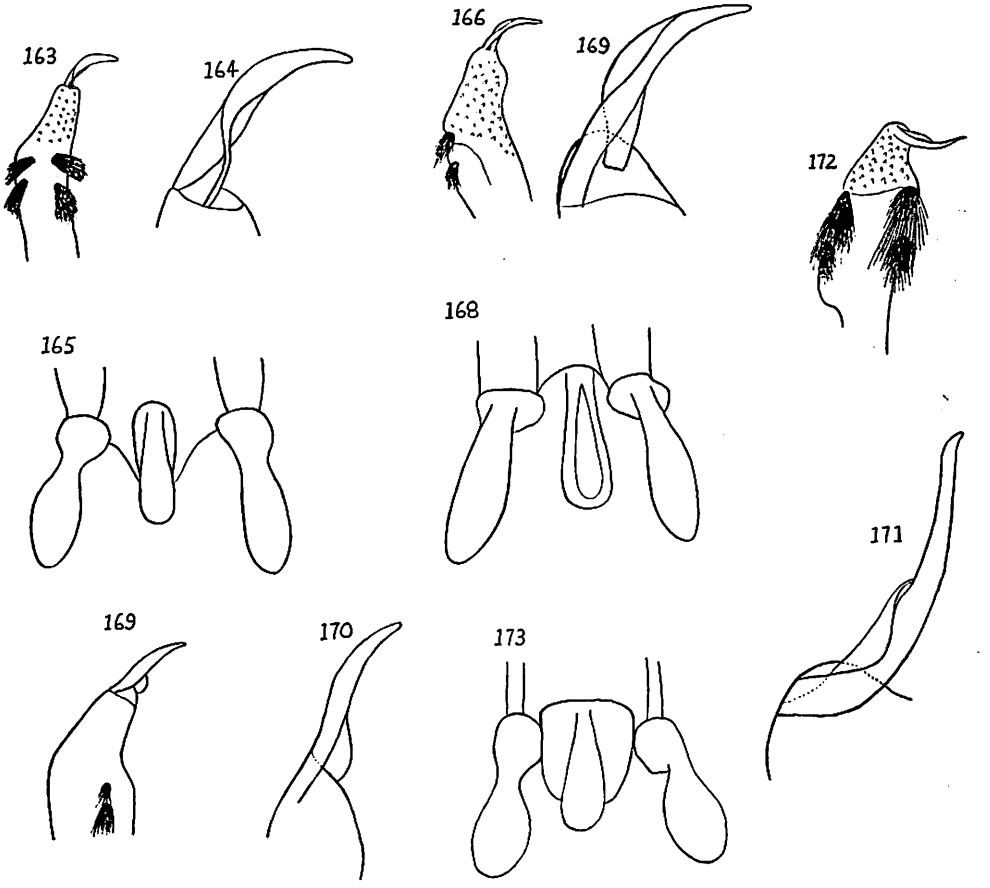
Pantopsalis distincta Forster, n. sp. Figs. 152–153, 161–162, 171–173.

♂: Measurements in mm. Length of body 4.84; width of body 3.21. Leg 1, 27; leg 2, 45; leg 3, 26; leg 4, 32. Palp-femur 2.64, patella 1.12, tibia 114, tarsus 3.76, total 8.66. Chelicera. Basal segment 7.04. Segment 2, 9.68.

Dorsal surface of body shown in fig. 152. Pale areas on each side of eyemound extending to anterior margin of carapace and the rectangular dark patch on anterior median surface of abdomen are distinctive. Chelicerae are a uniform reddish brown, palp are

white and legs dark brown with pale bands. The carapace is smooth apart from a group of denticles placed on a projection at each anterolateral margin (fig. 152). Eyemound is smooth. Chelicerae large, almost 3.5× as long as body, closely denticulate on both segments. Segment 2 is swollen, 2× as wide as basal segment. Processes and denticles on fingers shown in fig. 162. Legs long and slender, 2.4.1.3, all femora covered with denticles. Palp slender without processes but with a slight swelling on prodistal surface of patella and numerous denticles on femur. Penis as in figs. 171, 172.

♀: Measurements in mm. Length of body 5.28; width of body 3.52. Leg 1, 18; leg 2, 32; leg 3, 15; leg 4, 25. Palp-femur 1.56, patella 0.91, tibia 1.06, tarsus 2.03, total 5.56. Chelicera. Basal segment 1.11. Segment 2, 1.61. The color pattern of the abdomen is somewhat similar to the ♂ (fig. 153). The pale areas on each side of the eyemound



Figs. 163–173. *Pantopsalis* spp. 163, *P. mila* n. sp., penis; 164, same, distal portion of penis; 165, same, receptaculum seminis; 166, *P. johnsi* n. sp., penis; 167, same, distal portion of penis; 168, same, receptaculum seminis; 169, *P. snaresensis* n. sp., penis; 170, same, distal portion of penis; 171, *P. distincta* n. sp., penis; 172, same, distal portion of penis; 173, same, receptaculum seminis.

are pink whereas in the ♂ they are white. The dark rectangle on the abdomen is more pronounced and the paler areas on the abdomen are more numerous. Chelicerae small and smooth, less than 1/2 length of body. There is a well developed process on the prodistal surface of the patella of the palp. Claw smooth. Legs 2.4.1.3, smooth. Receptaculum seminis of ovipositor shown in fig. 173.

Types: Holotype ♂, allotype ♀, Lindley Pt., Auckland Is., under logs in rata forest, 18. I. 1963, Johns, Canterbury Museum.

Records: AUCKLAND IS. Deas Head, under rata logs, 18. I. 1963, Johns.

P. distincta is quite distinct from the 2 previously described species. The presence of a patella process in the ♀ should, under the present taxonomic situation, place the species in *Megalopsalis* Roewer, which is separated from *Pantopsalis* by only this character. However an unpublished study of the N. Z. species indicates that these processes are often secondary sexual characters present only in the ♀ (as in this species) and are also extraordinarily well developed in the earlier stages of development, but become progressively smaller as the animal passes through successive instars. There seems little virtue in placing these species in separate genera.

Pantopsalis snaresensis Forster, n. sp. Figs. 154, 157–158, 169–170.

♂: Measurements in mm. Length of body 4.24; width of body 2.64. Leg 1, 19; leg 2, 36; leg 3, 23; leg 4, 27. Palp-femur 1.43, patella 0.93, tibia 0.88, metatarsus 2.43, total 5.67. Chelicerae. Basal segment 1.91. Segment 2, 3.31. Color pattern of dorsal surface of body shown in fig. 154. The dark areas range from reddish to dark brown. Area in front of eyemound is pink. Eyemound is white. Proximal 1/2 of the pedipalp femur blackish brown but remainder of palp is pale. Legs reddish with paler bands. Chelicerae pale yellow but there is dark brown shading on the retrolateral surface of the basal segment. Body lightly sclerotised and without denticles. Eyemound also smooth. Pedipalp slender, almost 1.5× length of body. Pedipalp without processes, but distal prolateral surfaces of patella and tibia swollen. Chelicerae relatively short, slightly shorter than pedipalps. Segment 2 is distended and 2× as wide as basal segment. Basal segment provided with very few small scattered denticles, while segment 2 closely covered with denticles on dorsal surface and a few scattered denticles on the ventral surface, arrangement of teeth and denticles on fingers is shown in fig. 158. Legs 2.4.3.1, smooth, without denticles. Form of penis as shown in figs. 169–170.

Type: Holotype ♂, Snares Is., vicinity of Station Pt., 30. I. 1961, Mannering, Canterbury Museum.

Records: A number of immature specimens with the following data: SNARES IS. sweeping *Polystichum vestitum*, 7. II. 1961, Mannering; Snares I., Hoho Bay and East Coast, beating *Olearia*, 3. I. 1961, Mannering.

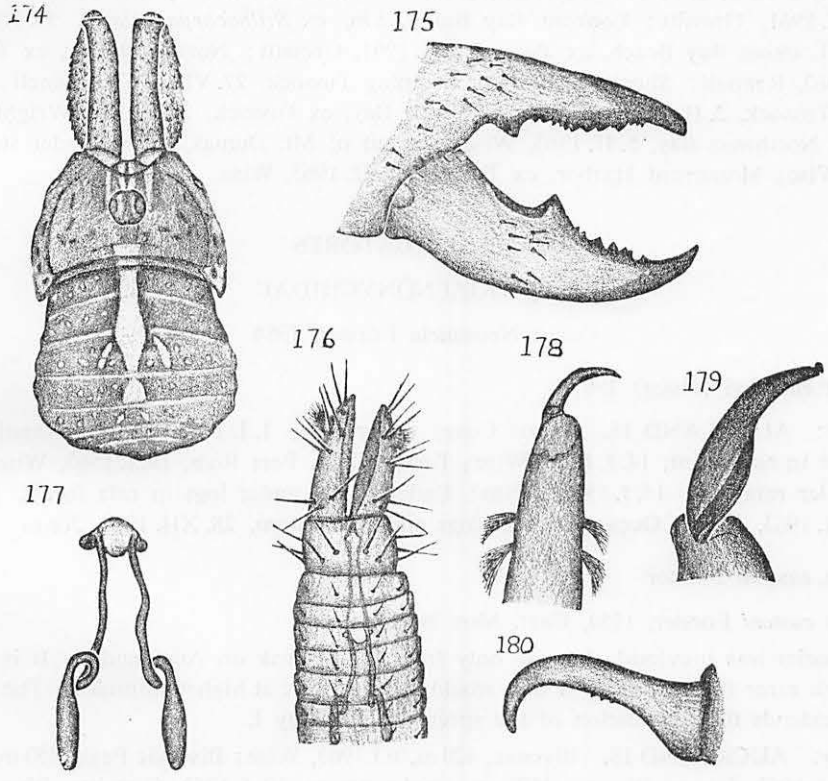
Pantopsalis rennelli Forster, n. sp. Figs. 174–180.

♂: Measurements in mm. Length of body 3.61; width of body 2.20. Leg 1, 17.6; leg 2, 29.1; leg 3, 16.8; leg 4, 22.0. Palp-femur 0.88, patella 0.65, tibia 0.65, tarsus 1.53, total 3.71. Chelicera. Basal segment 3.08. Segment 2, 3.52. Color pattern of dorsal surface of body shown in fig. 174. Median band, eyemound and area around eyemound flushed

with pink. Legs dark brown flecked with white. Chelicerae pale yellow with darker shading on the retrolateral surfaces of the basal segment. Palps pink with white patches.

Body and eyemound are smooth, without denticles, and lightly sclerotised. Femora of all legs with few minute denticles but otherwise legs smooth. Palp also smooth, without processes. Claw has 2–3 minute teeth (fig. 180). Chelicerae relatively slender, segment 2 slightly wider than basal segment. Both segments closely denticulate and their total length is equal to 2× the length of body. Teeth and denticles on inner surface of fingers shown in fig. 175. Penis is typical, as shown in figs. 178, 179.

♀: Measurements in mm. Length of body 6.62: width of body 3.52. Leg 1, 14; leg 2, 28; leg 3, 16; leg 4, 20. Palp-femur 1.32, patella 0.81, tibia 0.83, tarsus 1.98, total 4.94. Chelicera. Basal segment 1.12. Segment 2, 2.24. Color pattern on dorsal surface of body similar to ♂ but median band is broader and extends from anterior margin of carapace to posterior margin of abdomen. Legs brown mottled with white. Palp as in ♂ but the pink shading is less extensive. Chelicerae with reticulate white markings on dorsal surface. Body and eyemound smooth. Chelicerae only one half of the length of the body and smooth. Palps smooth, prolateral surfaces of patella and tibia swollen but



Figs. 174–180. *Pantopsalis rennelli* n. sp. 174, dorsal view of ♂; 175, fingers of ♂ chelicera; 176, ovipositor; 177, receptaculum seminis; 178, penis; 179, distal portion of penis; 180, claw of ♂ palp.

without an apophysis. Legs smooth. Ovipositor as in fig. 176. The receptaculum seminis is long and tubiform (fig. 177).

Types: Holotype ♂, allotype ♀, Venus Cove, Campbell I., ex tussock, 0–2 m, 2. II. 1963, Rennell, Dominion Museum, Wellington.

Records: CAMPBELL I. Beeman Hill, ex *Coprosma*, 2. XII. 1961, Gressitt; Beeman Camp, 2–50 m, ex *Chrysobactron*, 26–30. XI. 1961, Gressitt; Beeman Camp, 2–30 m, ex *Coprosma*, 26–30. XI. 1961, Gressitt; Beeman Camp, 30 m, 27.XI.1961, Gressitt; Beeman Camp, 25 m, 27. II. 1961, Gressitt; Beeman Camp, 250 m, ex *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; Beeman Camp, ex *Poa*, 13. XII. 1961, Gressitt; Beeman Station, under timber on ground, 14. II. 1963, Wise; Beeman, sweeping *Coprosma*, 27. VII. 1962, Rennell; same data 15. VIII. 1962; Beeman Hill, 30–100 m, ex *Poa* roots and moss, 1–6. XII. 1961, Gressitt; Beeman Hill, 2. II. 1963, Wise; Beeman Point, beaten from *Pittosporum*, 28. II. 1963, Wise; Beeman to Tucker Cove, ex *Pleurophyllum criniferum*, 8. XII. 1961, Gressitt; Tucker, ex *Poa* and sedge, 5. XII. 1961, Gressitt; Tucker Cove, 1–50 m, ex *Colobanthus* and *Poa*, 21–25. XI. 1961, Gressitt; Tucker Cove, ex *Dracophyllum* 25. XI. 1961, Gressitt; Tucker Cove, 1–50m, ex *Coprosma*, 1–5. XII. 1961, Gressitt; Tucker Cove, 1. II. 1963, Wise; Tucker Cove, beaten from *Pittosporum*, 26. II. 1963, Wise; Beeman Hill, 25 m, 21. XI. 1961, Gressitt; Lookout Bay Beach, 2–50 m, ex *Coprosma*, 3. XII. 1961, Gressitt; Lookout Bay Beach, ex dead fern, 16–19. XII. 1961, Gressitt; Lookout Bay Beach, 3 m, ex *Stilbocarpa polaris*, 30. XII. 1961, Rennell; Lookout Bay Beach, ex *Poa*, 19. XII. 1961, Gressitt; Northwest Bay, ex Tussock, 30. XII. 1962, Rennell; Shoal Pt., 0–10 m, sweeping Tussock, 27. VII. 1962, Rennell; Venus Cove, ex Tussock, 2. II. 1963, A. Wright; Venus Bay, ex Tussock, 2. II. 1963, Wright; Middle Cove, Northwest Bay, 5. II. 1963, Wise; summit of Mt. Dumas, 400 m, under stones, 6. II. 1963, Wise; Monument Harbor, ex Tussock, 9. II. 1963, Wise.

Suborder LANIATORES

Family TRIAENONYCHIDAE

Genus **Neonuncia** Forster, 1954

Neonuncia enderbyi (Hogg) 1909

Records: AUCKLAND IS. Ranui Cove, under logs, 1. I. 1963, Johns; Ranui Cove, under logs in rata forest, 14. I. 1963, Wise; Terror Cove, Port Ross, 10. I. 1963, Wise; Deas Head, under rata logs, 18. I. 1962, Johns; Enderby Is., under logs in rata forest, 31. XII. 1962, 19. I. 1963, Johns; Ocean I. under logs and *Stilbocarpa*, 28. XII. 1962, Johns.

Neonuncia eastoni Forster

Neonuncia eastoni Forster, 1954, Cant. Mus. Bull. 2: 129.

This species was previously known only from Stony Peak on Auckland I. It is apparently much rarer that *N. enderbyi* and would seem to live at higher altitudes. The present material extends the distribution of the species to Enderby I.

Records: AUCKLAND IS. Bivouac, 420 m, 6.I.1963, Wise; Bivouac Peak, 450 m, under stones, 6. I. 1963, Johns; Bivouac Hill, nr. rocky stream, 10. I. 1963, Gressitt; Bivouac, ex tussock, 16. I. 1963, Gressitt; Meggs Hill, Mt. Eden, 120–1150 m, 5. I. 1963, Wise; Enderby I., rata forest under logs, 17. I. 1963, Wise.

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Pacific Insects Monograph 7: 116-120 July 15, 1964

INSECTS OF CAMPBELL ISLAND. PSEUDOSCORPIONIDEA[1]

Von M. Beier

WIEN

Abstract: The collection of Pseudoscorpionidea represents only two species, and both are described as new: *Apatochernes antarcticus* n. sp. and *Systellochernes zonatus* n. gen. n. sp. The former belongs to a New Zealand genus. *Systellochernes* agrees with the Micronesian genus *Meiochernes* Beier in the reduction of the number of the tactile setae of the movable palpal finger. Both species are spotted with white on the carapace and on the abdominal tergites. That is very remarkable because this character is very rare in the Chernetini.

Die mir zur Bearbeitung übertragene kleine Pseudoscorpioniden-Ausbeute, welche die Herren Dr. J. L. Gressitt, K. P. Rennell und Wise vom Bernice P. Bishop Museum in Honolulu von ihrer Expedition auf die Campbell-Insel 1961/62 mitbrachten, enthielt nur zwei Arten, die sich allerdings als neu erwiesen. Im Hinblick auf den langen Aufenthalt und die sorgfältige Sammelweise der genannten Herren ist anzunehmen, daß dies der gesamte Artenbestand der immerhin schon sehr weit südlich gelegenen Insel ist. Sehr auffällig ist die weitgehende Ähnlichkeit dieser beiden Arten durch das Auftreten einer hellen Fleckung auf dem Carapax und einigen vorderen Abdominaltergiten, die umso bemerkenswerter ist, als sie bei Chernetiden nur außerordentlich selten vorkommt und hier bei zwei nicht näher miteinander verwandten Arten zweier verschiedener Gattungen in Erscheinung tritt. Es ist das wohl eine Parallele zum Auftreten bestimmter Färbungs- oder Zeichnungselemente bei den verschiedensten Insekten anderer Gegenden.

Apatochernes antarcticus Beier, n. sp. Fig. 1.

Allgemeinfärbung dunkelbraun, der Carapax in der Metazone beiderseits mit einer hellen Quermakel und in der Mitte der Mesozone diffus aufgehellt, die abdominalen Halbtergite des 2. bis 4.Segments mit hellen Fensterflecken, die sich am 3.Segment vom Vorderrand bis zum Hinterrand des Tergits erstrecken, am 2.Segment jedoch nur die hintere, am 4.die vordere Hälfte des Tergits einnehmen. Die Granulation des Integuments innerhalb aller dieser Makeln weitgehend reduziert, sonst überall sehr deutlich. Vestituralborsten durchweg kurz, die des Körpers und diejenigen auf der Medialseite der proximalen Palpenglieder deutlich gekeult, die übrigen gezähnt.—Carapax deutlich etwas länger als breit, in der Mesozone am breitesten, dicht körnig granuliert, mit undeutlichen Augenflecken; beide Querfurchen schmal, aber scharf eingeschnitten, die subbasale dem Hinterrand um 1/3 näher gelegen als der vorderen Furche; Hinterrand in der Mitte flach, aber deutlich kaudalwärts ausgebuchtet, mit 8 bis 10 Prämarginalborsten. Abdominaltergite mit Ausnahme des letz-

1. Results of field work supported by grants G-18800 and G-23720 from the National Science Foundation (U. S. Antarctic Research Program).

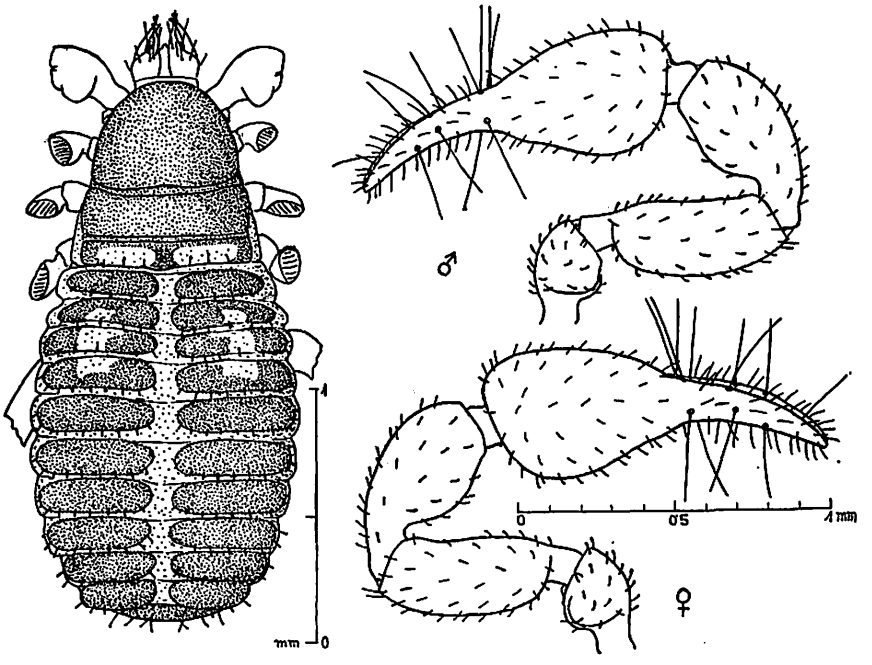

Fig. 1. *Apatochernes antarcticus* n. sp., Habitusbild ♂, Palpen von ♂ und ♀.

ten sehr breit geteilt, dicht körnig granuliert, nur das Endtergit fast glatt; die mittleren Halbtergite mit je 5 bis 7 Hinterrandborsten sowie 1 Medialrand- und 1 Seitenrandborste, ohne Discalborsten. Endtergit mit 6 Hinterrandborsten und einem Discalborstenpaar, diese Borsten durchweg gekeult und etwas verlängert; Tastborsten fehlen. Pleural- und Intersegmentalmembran sehr dicht und grob granuliert, die einzelnen Körner stumpf-kegelförmig, mit unregelmäßig sternförmigen Basen. Sternite mit Ausnahme des 11. breit geteilt, nahezu glatt, mit zahlreichen großen Sinnesporen, die vorderen Halbsternite medianwärts zugespitzt. Sternitborsten einfach. Chelicerenstamm mit 6, oft auch nur mit 5 Borsten, *B* und *SB* fein gezähnt, nicht gakeult. Flagellum mit 3 Borsten, die 1. kurz, die 3. einseitig gezähnt. Galea wenig geschlechtsdimorph, mit 5 Seitenästchen, das proximalste nahe der Mitte entspringend. Palpen einschließlich der Hand dicht, aber nicht sehr grob granuliert, die Borsten auf der Medialseite von Trochanter, Femur und Tibia relativ kurz und deutlich gekeult, sonst nur gezähnt. Trochanterhöcker rund. Femur abrupt gestielt, 2.7 bis 2.8mal, Tibia 2.1mal, Hand 1.6mal, Schere mit Stiel 2.8 bis 2.9mal, ohne Stiel 2.6 bis 2.7mal länger als breit. Hand mediodistal an der Fingerbasis mit flacher Erweiterung. Finger so lang wie die Hand ohne Stiel, je mit etwa 35 bis 38 Zähnen; Nebenzähne haben beide Finger in der Regel lateral 8 und medial 3; auch der feste Finger mit durchbohrter, aber etwas kürzerer Endklaue. Das Tasthaar *ist* gegenüber oder etwas proximal von *est* und etwas näher bei *it* als bei *isb* stehend, *it* von der Fingerspitze weiter entfernt als von *ist* und auch von *et* etwas abgerückt; *st* des beweglichen Fingers etwas näher bei *t* als bei *sb* inseriert. Tarsus der Hinterbeine auf der Dorsalkante proximal mit gekeulten, distal mit derb gezähnten Borsten, ohne Tastborste, nur subapikal mit einem Paar längerer, einfacher

die Borsten. Subterminalborste und Klauen einfach.—Körper L. ♂ 2.1–2.2 mm, ♀, 2.3–2.8 mm; Carapax L. 0.59–0.60 mm, B. 0.51–0.52 mm; Palpen: Femur L. 0.63–0.64 mm, B. 0.23–0.24 mm, Tibia L. 0.60–0.62 mm, B. 0.29–0.30 mm, Hand L. 0.64–0.65 mm, B. 0.40–0.41 mm, Finger L. 0.54–0.56 mm.

Typen: 1♂, 1♀, N. W. Bay, Campbell-Insel, im Gras, 30. XII. 1962, K. P. Rennell.

Paratypen: 10 ♂♂, 10 ♀♀, 3 Tritonymphen, 2 Deutonymphen, N. W. Bay, im Gras (Tussock), 30. XII. 1962, K. P. Rennell; 7♂♂, 1♀, 1 Tritonymphe, 1 Deutonymphe, Shoal Pt., 0–10 m, im Gras, 29. VII. 1962 & 5.I.1963, Rennell; 2♂♂, 2♀♀, Beeman Hill, 100–180 m, in Moos und auf *Pleurophyllum speciosum*, 2–16. XII. 1961, J. L. Gressitt; 1♀, Beeman, 5 m, auf *Dracophyllum*, 19. XII. 1961, Rennell; 1♀, Beeman Camp, 2–50 m, im Rispengras (*Poa*), 18–21. XII. 1961, Gressitt; 1♀, Lookout Bay, Beach, in totem Farnkraut, 16–19. XII. 1961, Gressitt; 5♂♂, 12♀♀, 9 Nymphen, Tucker Cove, *Dracophyllum* and *Pittosporum* leaf mould, 1 & 26. II. 1963, Wise; 3♀♀, 10 Nymphen, Perseverance Harbor, Lookout Bay, leaf mould under tussock and base of *Chrysobactron*, 3 & 24. II. 1963, Wise; 8♂♂, 3♀♀, zahlreiche Nymphen, Shoal Pt., Tussock, 7. II. 1963, Wise & Rennell; 1♀, Courrejolles Penin., 200 m, Grey-headed Mollymawk nest, 14. XII. 1961, Gressitt; 2 Deutonymphen, Smoothwater bay, Leaf mould, under Tussock, 16. II. 1963, Wise; 1♀, 2 Nymphen, Beeman Hill, Moss and nest of Sooty Albatross (*Phoebetria palpebrata*) with chick, 11.II. & 2.III.1963, Wise; 1 Deutonymphe, Northwest bay, 5 m, Middle cove, nest (*Megadyptes antipodes*) in *Dracophyllum* leaf mould, 5. II. 1963, Wise; 1♀, 1 Deutonymphe, Mt. Honey, 140 and 550 m, low plants on rock, 24. II. 1963, Wise; 1 Tritonymphe, Filhol Peak, summit, Tussock and Moss, 9. II. 1963, Wise; 13 ♂♂, 7 ♀♀, 4 Nymphen, Venus bay, Tussock, 2. II. 1963, Rennell & Wright; 2♀♀, Camp cove, ex Tussock, 6. II. 1963, Wise; 2♀♀, Monument Harbor, Tussock nr. beach, 9. II. 1963, Rennell (all in BISHOP).

Die Arten (4 neuseeländische) des Genus *Apatochernes* sind hinsichtlich ihrer Palpenform sehr unterschiedlich. Da sich jedoch Übergänge vom cheliferidenähnlichen Typus zum Chernetiden-Typus feststellen lassen, ist eine Aufspaltung der Gattung nicht möglich. *A. antarcticus* kommt dem *A. nestoris* m. aus Neu-Seeland in der Palpenform sehr nahe, unterscheidet sich jedoch von ihm sofort durch die charakteristische Fleckung, die kürzeren und schwächer gekeulten Vestituralborsten und das Vorhandensein von nur 5 oder 6 Borsten auf dem Chelicerenstamm.

Genus **Systellochernes** Beier, n. gen.

Carapax etwas länger als breit, dicht granuliert, ebenso wie einige der vorderen Abdominaltergite mit auffälliger heller Fleckung; beide Querfurchen schmal und tief, die subbasale dem Hinterrand genähert. Augenflecke fehlen. Abddominaltergite breit geteilt, granuliert, zum Teil mit Discalborsten. Endtergit mit Tastborsten. Alle Vestituralborsten, auch die der Palpen, dünn, gezähnt und zugespitzt, nicht gekeult. Pleural- und Intersegmentalmembran dicht und grob granuliert. Chelicerenstamm mit 5 Borsten, nur *B* gezähnt. Flagellum mit 3 Borsten. Palpen dicht körnig, die Hand flach granuliert. Femur abrupt gestielt. Scherenfinger nicht klaffend, mit Nebenzähnen; auch der feste Finger mit kurzer, durchbohrter Endklaue. Beweglicher Finger nur mit 3 Tasthaaren (*st* fehlt). Die Tasthaare *est* und *ist* des festen Fingers proximalwärts gerückt und einander gegenüber stehend, *it* ebenfalls ziemlich weit proximal nahe der Fingermitte inseriert, von *ist* etwas weiter entfernt als dieses von *isb*. Tarsus der Hinterbeine ohne Tastborste, nur subdistal mit einer

etwas verlängerten, gezähnten Borste. Subterminalborste und Klauen einfach.

Genustypus: *Systellochernes zonatus* Beier, n. sp.

Die neue, zu den *Chernetini* gehörige Gattung stimmt mit dem mikronesischen Genus *Meiochernes* m. in dem Besitz von nur 3 Tasthaaren auf dem beweglichen Scherenfinger überein, da auch hier *st* ausgefallen ist. Sie unterscheidet sich jedoch von *Meiochernes* sofort durch die dünnen, nicht gekeulten Vestituralborsten, die auch beim Männchen schmale subbasale Querfurche des Carapax und die Stellung des Tasthaares *ist* des fasten Scherenfingers, das sich in gleicher Höhe mit *est* und näher bei *isb* als bei *it* befindet.

Systellochernes zonatus Beier, n. sp. Fig. 2.

Hartteile kastanienbraun. Carapax beiderseits vor dem Hinterrand mit einer großen, hellen Makel, die sich lateralwärts rasch verschmälert. 2.Abdominaltergit laterokaudal, 3. bis auf einen schmalen, medialwärts verbreiterten, lateralwärts bisweilen aufgelösten dunklen Vorderrandstreifen weißlichgelb. Integument dicht und mäßig grob körnig granuliert, die Granulation in den hellen Makeln erloschen. Vestituralborsten dünn stiftförmig, spärlich gezähnt, aber nicht gekeult, spitzig, terminal kurz und meist ungleich gegabelt.—Carapax etwas länger als breit, dicht und gleichmäßig granuliert, ohne Augenflecke, in der Mesozone am breitesten; beide Querfurchen schmal und tief, die subbasale dem Hinterrand um 1/3 näher gelegen als der vorderen Furche, der Hinterrand mit 10 Prämarginalborsten. Abdominaltergite mit Ausnahme des letzten breit geteilt, einschließlich des Endtergits scharf körnig granuliert, die Granulation jedoch hier weniger dicht als auf dem Carapax;

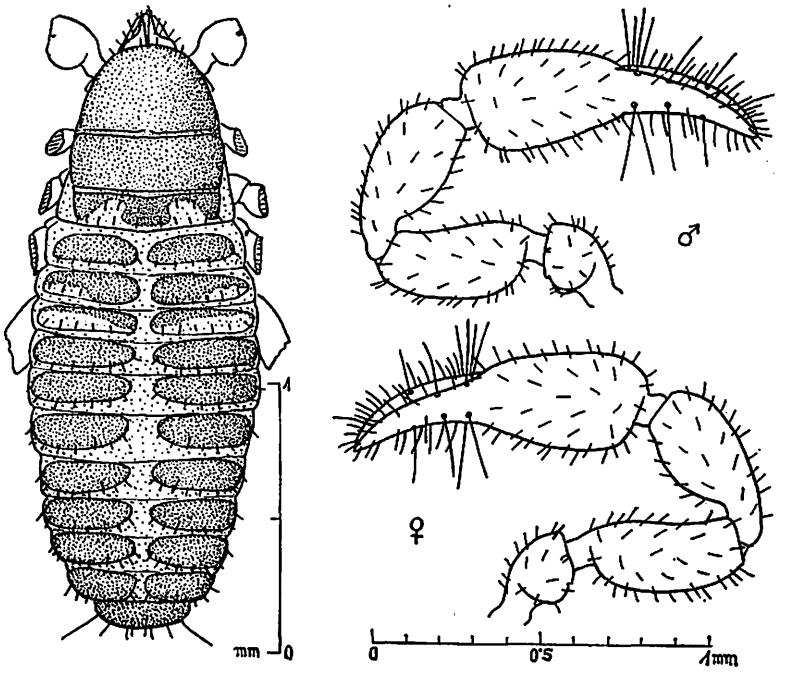

Fig. 2. *Systellocoernes zonatus* n. gen. n. sp., Habitusbild ♂, Palpen von ♂ und ♀.

die Halbtergite der mittleren Segmente mit je 7 bis 8 Hinterrandborsten sowie 1 Seitenrand- und 1 Medianrandborste; auf den Segmenten 6 bis 9 ist die 2. Hinterrandborste von der Mitt gezählt in subdiscale oder discale Stellung gerückt. Endtergit mit 4 Hinterrandborsten, 2 Discalborsten und einem Paar langer lateraler Tastborsten. Intersegmental- und Pleuralmembran dicht und grob raspelartig granuliert. Endsternit erloschen granuliert, mit einem Paar lateraler Tastborsten. Sternitborsten einfach. Chelicerenstamm mit 5 Borsten, nur *B* spärlich gezähnt. Galea bei beiden Geschlechtern mit 5 ziemlich kurzen Seitenästen in der distalen Hälfte. Palpen dicht und mäßig grob, die Hand flach granuliert, mit ziemlich langen, spärlich gezähnten Vestituralborsten. Trochanterhöcker rund. Femur abrupt gestielt, 2.3 bis 2.5mal, Tibia 2.2 bis 2.3mal, Hand 1.9mal, Schere mit Stiel 3.3mal, ohne Stiel 3 bis 3.1mal länger als breit. Finger beim Männchen so lang wie die Hand ohne Stiel, beim Weibchen etwas kürzer, der feste mit 28 bis 29, der bewegliche mit 30 Zähnen; Nebenzähne hat der feste Finger in der Regel lateral 6, medial 3, der bewegliche lateral 5, medial 2; die Nebenzähne sind verhältnismäßig groß; auch der feste Finger mit kurzer, duchbohrter Endklaue, an die sich ein reduzierter Giftapparat anschließt. Von den 8 Tasthaaren des festen Fingers stehen *est* und *ist* ziemlich weit proximal in gleicher Höhe, *ist* näher bei *isb* als bei *it*; der bewegliche Finger hat nur 3 Tasthaare, da *st* fehlt; alle Trichobothrien relativ kurz. Tarsus der Hinterbeine mit 2 langen Subapikalborsten und einer etwas verlängerten, fein gezähnten Borste am Ende des 2.Glieddrittels auf der Dorsalkante, aber ohne Tastborste.—Körper L. ♂ 1.8–2 mm, ♀ 2.2–2.5 mm; Carapax L. 0.65–0.67 mm, B. 0.56 mm; Palpen: Femur L. 0.50–0.52 mm, B. 0.21 mm, Tibia L. 0.50–0.52 mm, B. 0.22 mm, Hand L. 0.55–0.57 mm, B. 0.29–0.30 mm, Finger L. 0.44–0.46 mm.

Type 1♂ (DOMINION), Beeman Hill, 80 m, Campbell-Insel, aus *Coprosma*, 2. XII. 1961, J. L. Gressitt. Allotype 1♀, St. Col-Lyall Saddle, Campbell-Insel, aus Moos, 3–5. XII.1961, Gressitt (BISHOP).

Paratypen: 1♂, Mt. Lyall, 200–400 m, *Colobanthus*, 3–5.XII. 1961, Gressitt; 1♂, Tucker Camp area, unter Flechten auf *Dracophyllum*, 9. II. 1962, Rennell; 2♀♀, Tucker Cove, 1–8. XII. 1961, Gressitt; 1♂, 2♀♀, St. Col Ridge, 180–280 m, aus Moos auf Felsen, 9. XII. 1961, Gressitt; 1 Tritonymphe, Six-foot Lake, in verrottetem Seegras, 6.XII.1961, Gressitt; 1 Deutonymphe, 1 Protonymphe, Beeman Hill, 100–180 m, in Blattmulden von *Pleurophyllum*, 2–6. XII. 1961, Gressitt; 21♂♂, 19♀♀, 12 Nymphen, Tucker cove, Lichens and Moss on *Dracophyllum scoparium*, 1 & 28. II, 3. III. 1963, Wise; 2 Protonymphen, Rocky bay, S. coast below Mt. Dumas, ex *Dracophyllum longifolium* leaf mould and ex base of tussock, 18. II. 1963, Wise; 3♀♀, Smoothwater bay, Moss and Lichen on *Dracophyllum*, trunks, 16. II. 1963, Wise; 1♂, 1 Deutonymphe, Northwest bay, 5 m, Middle cove, Moss on *Dracophyllum*, 5. II. 1963, Wise; 2♂♂, 1♀, 2 Deutonymphen, Filhol Peak, 213 m, Lichens and Moss, 4. II. 1963, Wise; 4♂♂, 1♀, 1 Deutonymphe, Monument Harbor, nr. Beach, Lichen on shore rock, 9. II. 1963, Wise; 1♀, Mt. Honey, below summit, 550 m, Moss and Lichen on rock, 24. II. 1963, Wise (all in BISHOP).

Pacific Insects Monograph 7: 121-128 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
MESOSTIGMATA: LAELAPTIDAE[1,2]

By Preston E. Hunter

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Abstract: Three species—2 new—and 1 new subspecies of laelaptid mites representing 3 genera—1 new—are recorded from Campbell Island, one of the sub-Antarctic islands. The following species are listed: *Ayersacarus plumapilus*, n. sp., *A. gressitti*, n. sp., *Leptolaelaps reticulatus* Evans *campbellensis*, n. subsp. and *Androlaelaps* (= *Haemolaelaps*) *pachyptilae* (Zumpt and Till). Collections were made from soil samples, ground litter, and bird nests.

The material included in this study was collected from Campbell Island, from 1961–1963. Collections were made by Dr J. L. Gressitt, K. A. J. Wise, and K. Rennell of Bishop Museum. This paper records 3 species—2 new—and 1 new subspecies of laelaptid mites representing 3 genera, 1 of which is new. Primary types are deposited in the Dominion Museum Wellington, New Zealand, with series in Bishop Museum, Honolulu, Hawaii. Where specimens are available, paratypes will be deposited in the United States National Museum (USNM), Washington, D. C.; British Museum (Nat. Hist.) (BMNH), London; Australian National Insect Collection (ANIC), Canberra, Australia; and Dept. of Entomology, University of Georgia (UG), Athens, Georgia.

Genus **Ayersacarus** Hunter, n. gen.

Large, well sclerotized mites; dorsal plate covering dorsum or all but a narrow band laterally and posteriorly; leg I narrower than other legs; all tarsi with claws, laterodistal elements associated with claws II–IV; palpal tarsal seta 2-tined. ♀ with large metapodal plate, usually with a seta arising from plate; genito-ventral plate slightly expanded behind coxae IV, ending well short of anal plate; 2 pairs of setae arising from surface of genito-ventral plate; sternal plate longer than wide, bearing 3 pairs of setae; chelicera with a spine-like process arising from lateral surface of fixed digit. ♂ with holoventral plate; long posteriorly directed spermatodactyl process arising from mediolateral surface of fixed digit. Type species: *Ayersacarus plumapilus* Hunter, n. sp.

This genus is distinct in the ♀ by its large body size, large metapodal plate, usually bearing a seta, and 2 pairs of setae on the genito-ventral plate. In this last characteristic

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the genus resembles *Pseudopachylaelaps* Evans, but the large metapodal plate plus the metasternal setae arising from separate plates easily separates *Ayersacarus* from *Pseudopachylaelaps*. The long posteriorly directed spermatodactyl process arising from the lateral surface of the chelicera appears to be distinctive in the ♂.

Ayersacarus plumapilus Hunter, n. sp. Fig. 1.

The ♂ and ♀ of this species may be recognized by the following characteristics: dorsal setae fringed; peritremal plate strongly joined to parapodal plate; ventral body setae fringed. In the ♀ the posterior setae on the genito-ventral plate and the seta on the metapodal plate are fringed; in the ♂ some setae on the holoventral plate are fringed and a spoon-like seta arises from near the base of the spur on femur IV.

♀: Body broadly oval, 1128 μ long, 716 μ wide (all measurements for both sexes are the average of 10 specimens). *Dorsum.* Dorsal plate covering most of dorsum except for a strip at posterior and lateral margins of body; surface of plate marked by scale-like striae and by "granular" spots, which are more abundant along striation lines; 39 pairs of setae plus 3 or more accessory setae between J setae (see Costa, 1961, for setal notations); all dorsal setae fringed, setae up to 58 μ long. [The fringed setae appear to be split longitudinally, 1/2 having a row of fine cilia as a fringe along the inner margins, the other 1/2 of the seta without a fringe and forming a sheath around the basal part of the fringed 1/2 while terminally extending as a guard to the delicate fringe structure (fig. 1C). Apparently the setae can open and close as all conditions, from those with fringe completely

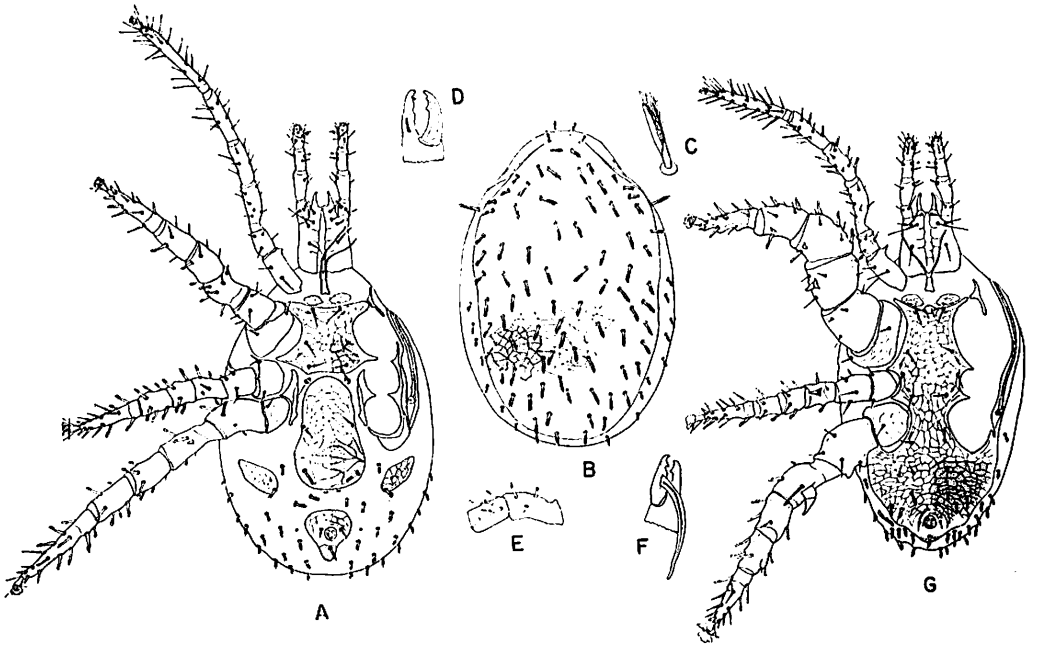

Fig. 1. *Ayersacarus plumapilus*, n. sp. A, ventrum of ♀; B, dorsum of ♀; C, dorsal plate seta; D, ♀ chelicera; E, dorsum of genu and femur IV, ♀; F, ♂ chelicera; G, ventrum of ♂.

exposed to those with fringe enclosed, were found on different specimens without any obvious pattern.] Humeral seta 77 μ long, fringed, arising from integument above coxa II. *Ventrum.* Presternal plates connected by semisclerotized integument. Sternal plate 225 μ long, 184 μ at narrowest width between coxae II; setae, pores, and striations as shown; granular spots on entire surface of plate but chiefly following striation lines. Metasternal seta and pore on small metasternal plate. Tritosternum consisting of a base and 2 feathery lacinae. Genito-ventral plate slightly widened behind coxae IV, anteriorly ending just short of sternal plate; 255 μ at widest point, 425 μ on midline from posterior of sternal plate to end of genito-ventral plate; striations as shown; surface of plate covered with granular spots, spots more concentrated along striae; 2 pairs of setae on plate, anterior pair simple, posterior pair fringed. Two small platelets in integument behind genito-ventral plate. Anal plate 184 μ long, 179 μ wide; shape of plate and striations as shown; posterior unpaired seta fringed, paired setae simple. Metapodal plate large, 189 μ long, 92 μ wide; surface covered by striations and granular spots; pore-like structure present; a fringed seta arises from margin of plate. Well developed endopodal plate median of coxa III and IV. Two parapodal plates: 1 partially encircling coxa IV posteriorly and extending forward to level of posterior 1/2 of coxa II; forward of this a small separate plate abuts against corner of sternal plate. Peritremal plate well developed; posteriorly strongly fused to parapodal plate; anteriorly joins dorsal plate above coxa I. Ventral body setae fringed, setae up to 28 μ long on opisthosoma. *Legs.* Legs I distinctly thinner than others, coxa with a spine on distal margin. Small boss-like structure on ventrum of femurs III and IV, that on IV longest. All legs, especially II–IV, with some lateral and dorsal setae ending in a weakly sclerotized, flattened or spoon-like process (see fig. 2E). Dorsum of femur IV with distal seta spoon-like and of about same length as other dorsal setae on that segment. All tarsi with well developed claws; distinct seta-like laterodistal elements associated with claws II–IV. Legs, including claws and coxae, measured as follows: I, 1146 μ; II, 871 μ; III, 854 μ; and IV, 1207 μ long. *Gnathosoma.* Relative lengths of setae as shown. Deutosternal groove with several rows of teeth, many teeth per row. Palpal genu with a blunt, slightly bifid seta arising from medial surface; tarsus with a 2 tined seta. Corniculi well sclerotized. Chelicera strongly chelate; fixed chela with a short anteriorly directed spine-like process arising from lateral surface near base of digit; movable digit with 2 teeth, fixed digit with small spine-like pilus dentilis and several small and 2 larger teeth.

♂: Body widened at level of coxae II; 974 μ long, 586 μ wide. *Dorsum.* Dorsal plate covering dorsum; surface of plate and setae as in ♀. *Ventrum.* Covered by a holoventral plate 735 μ long, 158 μ wide between coxae II and 442 μ at widest point behind coxae IV; 10 pairs of setae (anterior setae simple, 2–5 pairs of posterior setae fringed) in addition to the 3 anal setae; postanal seta fringed, paired anal setae simple; striations as shown; granular spots on plate generally restricted to area of striae. Peritremal plate strongly fused to holoventral plate lateral of coxae IV, anteriorly joins dorsal plate above coxa I. Two presternal plates connected by semisclerotized integument. Small parapodal plate adjacent to anterior corner of holoventral plate; posterior parapodal plate fused to holoventral plate posterolaterally of coxa IV. Ventral body setae short, fringed. *Legs.* Leg I slender; coxa with lateral spine near junction with trochanter; tarsus with slender, simple setae. Leg II thick (in the illustration this leg is drawn from a lateral view which makes it appear somewhat thicker than normal); blunt spur on ventrum of tibia and ge-

nu, a larger pointed spur on femur; ventrum of tarsus with 2 spur-like knobs. Leg III with strong spine on ventral surface of femur. Leg IV with heavy pointed spur on femur, tip of spur heavily sclerotized, a large spoon-like seta arising from near base of spur; trochanter with 2 boss-like processes ventrally, proximal one with seta arising from surface; boss-like process on tibia from which arises a small seta, similar process but without seta near middle of tarsus. Spoon-like setae present on all legs. Laterodistal elements associated with claws II–IV. Legs including claws and coxae measured as follows: I, 1090 μ; II, 851 μ; III, 741 μ; and IV, 1090 μ long. *Gnathosoma.* Position and relative lengths of setae as shown. Palpal genu setae as in ♀. Chelicera chelate; movable and fixed digits each with 1 large tooth; posteriorly directed spermatodactyl process, 145 μ long, originating from lateral surface of movable digit mid way between base and tip. Paratypes were used for illustration of some ♂ structures.

This species was described from a series of 40♀♀ and 22♂♂ from Campbell I. Additional specimens not used in the type series were included in the material. Specimens of both sexes of the type series were collected from grey-headed mollymawk nest, 14. XII. 1961 and 13.II.1963; penguin nest, 28. XI. 1961; chicken yard debris, 6–11. XII.1961; moss, 4–13.XII.1961; leaf mold, 5.II.1963; *Colobanthus* (Umbelliferae), 14.XII.1961; and Berlese of *Chrysobactron*, 24. II. 1963. Holotype ♀ (Dom. Mus.), Campbell I., ex grey-headed mollymawk nest, 14.XII.1961, J. L. Gressitt. Allotype ♂, Campbell I., ex Berlese of *Chrysobactron*, 24. II. 1963, K. A. J. Wise.

Paratypes: 10♂♀ (Bishop); 2♂♀ (USNM, BMNH, ANIC); 3♂♀ (UG); remaining paratypes and material in Bishop Museum.

Two protonymphs and 10 deutonymphs were included in the collection. These specimens were taken in conjunction with adults or from similar habitats. Both stages showed the fringed dorsal plate and ventral body setae of the adult. The chaetotaxy of the deutonymph is quite similar to that of the ♀, but the protonymph shows differences in having the dorsal plate divided and in some leg setae. The ventral plate chaetotaxy is typical of laelaptid and protonymphs and deutonymphs, the type of setae being similar to corresponding setae of the ♀.

Ayersacarus gressitti Hunter, n. sp. Fig. 2.

Both sexes of *gressitti* have fringed dorsal setae and the peritremal plate is not fused to the parapodal plate. The ♀ is distinct in not having a setae on the metapodal plate and in having simple setae on the genito-ventral plate. The ♂ has a simple seta arising from near the base of the spur on leg IV, and 2 pairs of fringed setae on the holoventral plate.

♀: Body elongate, 1143 μ long, 654 μ wide (measurements are the average of 6 specimens). *Dorsum.* Dorsal plate covering dorsum; surface of plate marked by striations; granular spots along striae; 40 pairs of dorsal plate setae; all dorsal plate setae fringed; anterior setae longest, median opisthosomal setae up to 62 μ long; 3 to 4 pairs of accessory setae between the J rows. Shorter fringed setae arise from lateral body integument; fringed humeral seta, which is about 2× as long as adjacent setae, arises from integument above coxa II. *Ventrum.* Sternal plate 241 μ long on midline, 167 μ at narrowest width between coxae II; 3 pairs of setae, 1st pair arising from extreme anterior margin of plate; 2 pairs of pores; surface of plate marked by striations with granular spots along striae. Two sclerotized spots in integument behind sternal plate. 2 small presternal plates. Meta-

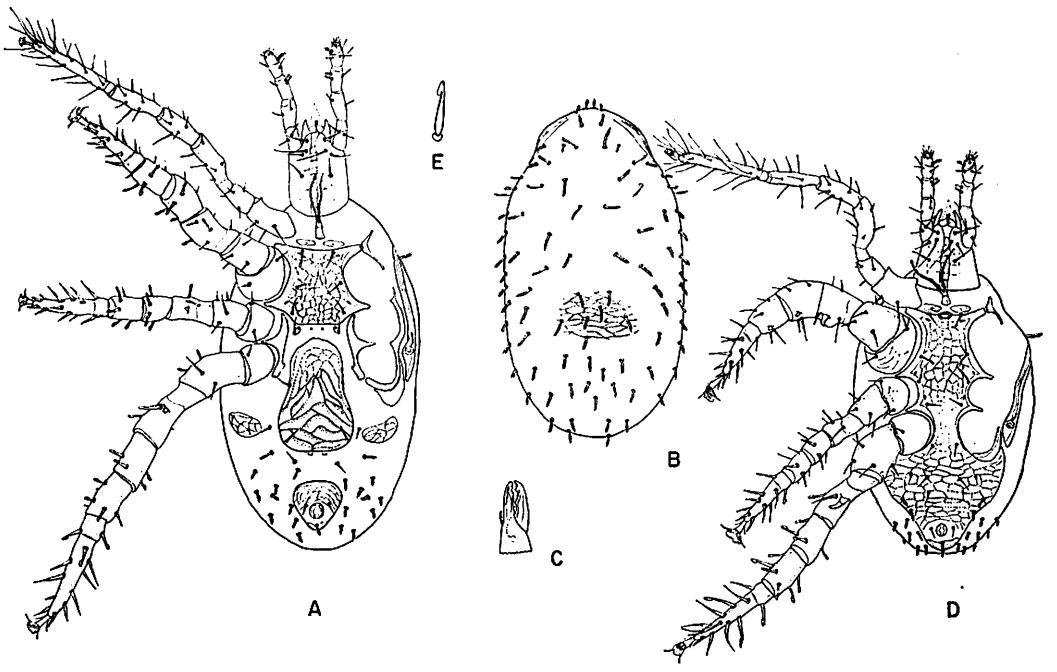

Fig. 2. *Ayersacarus gressitti*, n. sp. A, ventrum of ♀; B, dorsum of ♀; C, ♀ chelicera; D, ventrum of ♂; E, spoon-shaped leg seta.

sternal seta and pore on small metasternal plate. Strongly developed endopodal plate medial of coxae III and IV. Two parapodal plates: posterior one extending from behind coxa IV to area of coxa II, enlarged posterior of coxa IV; anterior plate small and abuts against sternal plate. Peritremal plate free in integument, extends anteriorly to join dorsal plate. Metapodal plate oval shaped, 123 μ long, 65 μ wide; striations on plate with granular spots along striae; plate without pore or seta. Genito-ventral plate drop-shaped, 400 μ long on midline from posterior margin of sternal plate, 239 μ wide, ending short of sternal plate anteriorly; striations as shown; some concentrations of granular spots on posterior 1/2 of plate in addition to those along striae; plate bears 2 pairs of simple setae. Two small platelets in integument just behind genito-ventral plate. Anal plate 184 μ long, 160 μ wide; with striations and granular spots; 1 pair of simple setae, unpaired seta fringed. Two pairs of simple ventral body setae—1 pair lateral and 1 pair immediately posterior to genito-ventral plate—remaining setae fringed; anterior pair of fringed setae longer than posterior setae (this anterior pair of setae are located on the metapodal plate in *A. plumapilus*). *Gnathosoma.* Deutosternal groove with 7 rows of teeth, up to 15 teeth per row; relative lengths of setae as shown; hypostome with a median seta-like projection, lateral of this a bulbous structure. Corniculi well sclerotized. Palpal genu with a rod-like seta and 1 seta slightly divided on medial surface. Chelicerae chelate, fixed digit with small spine-like pilus dentilis, and on lateral posterior 1/2 a strong spine-shaped anteriorly directed process; movable digit with 2 subterminal teeth. *Legs.* Leg I slender, coxa with lateral distal point; setae simple. Legs II–IV with some setae which end in a weakly sclerotized, flattened or spoon-like structure. Femur III and IV each with a ventral spur. Tarsus IV with some heavy spine-like setae. Dorsum of femur IV with distal seta of about same length as other setae of that segment. Seta-like lateral distal elements associated with

claws II–IV. Legs, including claws and coxae, measured as follows: I, 1145 μ; II, 870 μ; III, 845 μ; and IV, 1230 μ long.

♂: Known from a single specimen. Body slightly widened at level of leg II; 970 μ long, 580 μ wide. *Dorsum.* Dorsal plate covering dorsum; striations and chaetotaxy as in ♀; setae fringed, appear slightly more pointed than in ♀. *Ventrum.* Holoventral plate 760 μ long, 150 μ wide between coxae II, 410 μ wide behind coxae IV; striations becoming very faint between legs IV, elsewhere striations with granular spots along striae lines; plate bears 9 pairs of simple setae and 2 pairs of short, fringed setae in addition to a fringed postanal seta. Peritremal plate free in integument posteriorly, fused to dorsal plate anterodorsally. Small parapodal plate abuts against corner of holoventral plate between coxae I and II, a 2nd plate is fused to holoventral plate posterior to coxa IV. All setae arising from integument fringed. Two presternal plates between holoventral plate and tritosternum. *Gnathosoma.* As in ♀. Chelicera as in *A. plumapilus*. *Legs.* Leg I slender, spine-shaped process on distal margin of coxa; setae simple. Leg II with a ventral lateral spur on tibia, genu, and femur; spur on femur considerably the largest. Leg IV with 2 weakly developed boss-like structures on trochanter, a seta associated with proximal one; strong ventral spur on femur, tip of spur heavily sclerotized; a long simple seta arises from near base of spur; tarsus with heavy spine-like setae. All tarsi with claws; seta-like laterodistal elements associated with claws II–IV. Legs, including claws and coxae, measured as follows: I, 1060 μ; II, 840 μ; III, 780 μ; and IV, 1120 μ long.

Type series consisted of 25♀♀ and 1♂ all collected from Campbell I. Holotype ♀ (DOM. MUS.), Mt. Lyall, Berlese of low plants, 19. II. 1963, K. A. J. Wise. ♀ paratypes data: penguin nest, 28.XI.1961; *Colobanthus*, 12.XII.1961; *Puffinus griseus* (sooty shearwater) burrow, 12. II. 1963; leaf mold, 3. III. 1963; moss, 6. II. 1963; and *Dracophyllum*, 5. II. 1963. Paratypes were collected by Dr. Gressitt and K. A. J. Wise. Allotype ♂ (BISHOP), S of Courrejolles, ex *Puffinus griseus* burrow, 12. II. 1963, K. A. J. Wise. Fourteen paratypes (BISHOP); 12 paratypes (USNM, BMNH, ANIC, DOM. MUS., and UG).

Genus **Leptolaelaps** Berlese, 1918

Leptolaelaps reticulatus Evans **campbellensis** Hunter, n. subsp. Fig. 3.

The generic characteristics of *Leptolaelaps* Berlese were given by Evans (1957) in his revision of the genus. At that time he described *L. reticulatus* from New Zealand. Through the courtesy of Dr. G. O. Evans of British Museum (Nat. Hist.), London, an unmounted paratype of *L. reticulatus* was obtained for study. The subspecies described below appears identical to *reticulatus* except for the following: the new subspecies is much larger, the parapodal plates are not strongly enlarged behind coxae IV, and the striations of the genitoventral plate are slightly more undulating. In addition, the lateral sclerites of the genitoventral plate do not project beyond the margin of the plate, and the setae posterior to the dorsal plate do not arise from platelets; however, these last 2 characteristics may be variable in *reticulatus* as the paratype did not show the lateral sclerites projecting beyond the margin of the plate and the dorsal platelets were very much reduced if present.

The material included 3♂♂, 23♀♀ and 1 deutonymph. The ♂ of *reticulatus* has not been described and a description and illustration are given below. The ♀ is illustrated primarily to show the legs and gnathosoma which were not included in the original de-

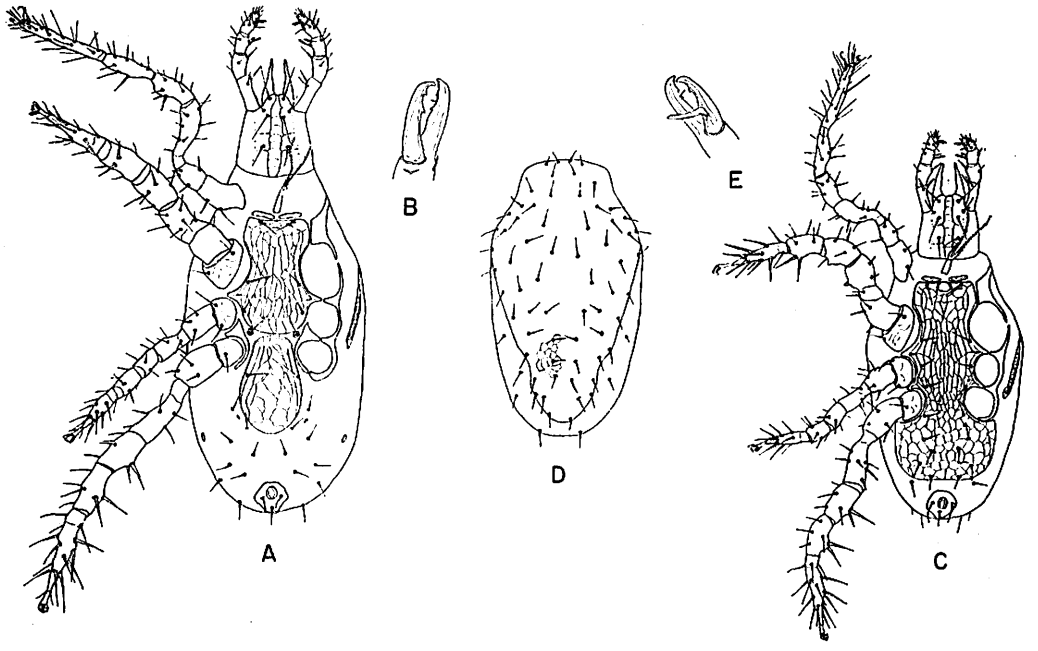

Fig. 3. *Leptolaelaps reticulatus* Evans *campbellensis*, n. subsp. A, ventrum of ♀; B, ♀ chelicera; C, ventrum of ♂; D, dorsum of ♂; E, ♂ chelicera.

scriptions of *reticulatus*.

♀: General characteristics of *reticulatus* except for differences pointed out above. Size (average of 7 specimens) as follows: body 768 μ long, 401 μ wide; dorsal plate 637 μ long, sternal plate 250 μ long, 120 μ at narrowest point between coxae II, genito-ventral plate 238 μ long, 143 μ at greatest width. Legs with ventral enlargement on tibia and genu (this is also true in the *reticulatus* paratype); tarsus I with a distinct S-shaped seta arising from the dorsal, distal surface; average measurements, including claws and coxae, as follows: I, 722 μ; II, 564 μ; III, 494 μ; and IV, 730 μ long.

♂: Body shape as in ♀, smaller, 560μ long, 295μ wide. *Dorsum.* Dorsal plate 530μ long covering proportionately more of dorsum than in ♀, slightly constricted near posterior end (no pronounced constriction seen in ♀♀). *Ventrum.* Presternal plates conspicuous. Sternal, genital and ventral plates fused into a single plate, 450 μ long, 105 μ wide at narrowest width between coxae II; truncate posteriorly, bearing 9 pairs of setae, striations as shown. Genital opening in anterior of sterno-genito-ventral plate. Anal plate separate; 50 μ long, 60 μ wide; bearing 3 relatively long setae. Parapodal plates not fused to sterno-genito-ventral; anterior parapodal plate located between coxae I and II, separate from posterior plate which surrounds coxae IV, III, and part of II. Peritremal plate narrow, not fused to parapodal, extends dorsally; peritreme short, ending anteriorly at level of coxa II. One pair of seta arise from integument between sterno-genito-ventral and anal plates. *Gnathosoma.* Relative lengths of setae as illustrated; palpal setae as shown. Movable digit of chelicerae with distinct spermatodactyl process; fixed digit bidentate, movable digit with 1 tooth. *Legs.* Tibia and genu enlarged ventrally on all legs, tarsus only slight-

ly enlarged; ventral setae long, spine-like. Femur and genu II with a short ventral spur.

The ♂♂ were collected by Dr. Gressitt from moss 30. XI. 1961 and 17. XII. 1961. ♀♀ were collected 26, 30. XI. 1961 and 2, 6. XII. 1961 by Dr. Gressitt ex *Poa* roots, moss and mollymawk nest, and by K. A. J. Wise, 2, 24. II. 1963 and 3. III. 1963 from Berlese of *Dracophyllum*, tussock leaf mold, and *Chrysobactron*. The ♂ slides are in the collection of Dominion Museum and Bishop Museum. Two ♀♀ specimens (USNM, BMNH), 1 specimen (ANIC), 3 specimens (UG); deutonymph and remaining ♀♀ (BISHOP, DOM. MUS.).

Previously only 1 species of *Leptolaelaps*, *L. macquariensis* (Womersley), has been recorded from the Antarctic Islands. This species was collected from Macquarie Island by the Australian Antarctic Expedition of 1911–14. *L. macquariensis* is easily separated from the above species by having the dorsal plate covering the dorsum, a greater number of dorsal plate setae, and body smaller in size.

Genus **Androlaelaps** (=**Haemolaelaps**) Berlese, 1903

Androlaelaps pachyptilae (Zumpt and Till)

The Campbell material included 25 ♀ specimens that appeared identical to *Androlaelaps pachytilae* (Zumpt and Till, 1956) (=*Haemolaelaps pachytilae* Zumpt and Till) which was originally collected from a dove petrel nest on Heard Island. Dr. Till has very kindly compared this mite with *pachyptilae* and found only minor differences between the two. The genus *Haemolaelaps* Berlese has recently been synonymized with *Androlaelaps* Berlese (Till, 1963) and *Androlaelaps pachyptilae* and other closely related species were placed in a "*zulu-glasgowi*" complex.

This species was collected from the following habitats on Campbell Island: nest and rookery of grey-headed mollymawk; nest of sooty albatross (*Phoebetria palpebrata*); Berlese of moss, Tussock leaf mold, and low plants; sooty shearwater (*Puffinus griseus*) burrow; dove prion (*Pachyptilae desolata*). Collections were made by Dr. J. L. Gressitt, XII. 1961; K. Rennell, XI. 1962; and K. A. J. Wise, II. 1963. Specimens will be deposited as follows: 2 specimens (USNM), 3 specimens (BMNH, UG); remaining specimens are in the Bishop Museum collection.

Acknowledgments: I would like to express my appreciation to the following persons for providing material and assistance during the course of this study: Mr. Carl Mitchell, Bishop Museum, for sending the Campbell I. material; Drs. G. O. Evans, British Museum, for the loan of a paratype of *L. reticulatus*, and W. M. Till, British Museum, for her comments and assistance with the *Androlaelaps* species.

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INSECTS OF CAMPBELL ISLAND
MESOSTIGMATA: HAEMOGAMASIDAE[1]

By Nixon Wilson

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Abstract: The family Haemogamasidae and species *Eulaelaps stabularis* (Koch) are recorded from the Australian region for the first time.

The following species of Acarina was found among a large and varied assortment of arthropods collected by Dr. J. L. Gressitt and field associates of the Bishop Museum during the summers of 1961–62 and 1962–63. Neither the species nor the family has been reported previously from the Sub-antarctic although both have a widespread distribution. In addition the opportunity is taken to list a record of this species from New Zealand, based on material in the Bishop Museum collection, in as much as it has not been reported from there.

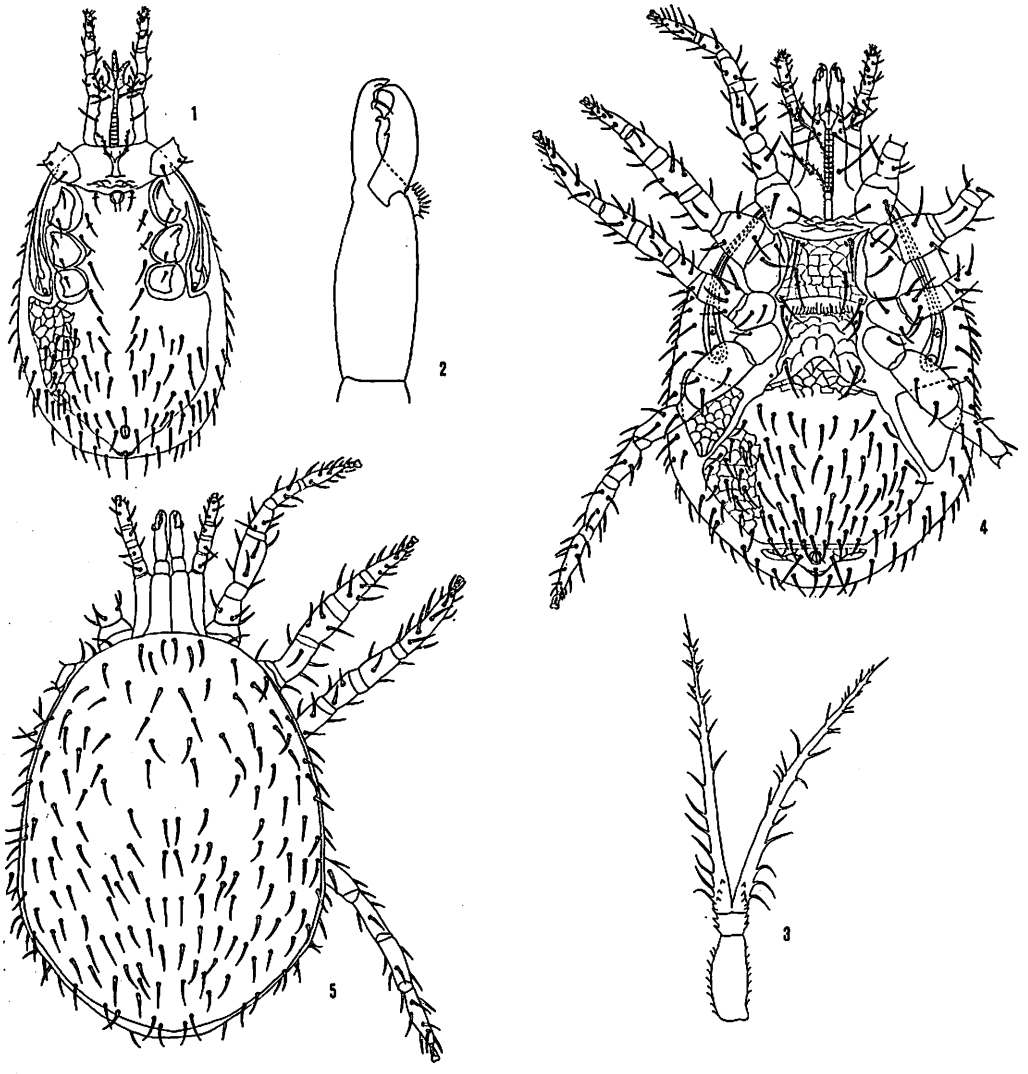
This species is considered parasitic upon vertebrates and has been recorded from a large number of mammalian hosts, most of which are rodents. There are only a few records from birds or bird nests. It is generally more common in the nest of the host than on the host itself and occasionally it has been reported as free living.

The following descriptions and figures are based on material from Campbell I. when it was available, otherwise they are taken from various sources in the literature.

Eulaelaps stabularis (Koch), 1836 Figs. 1–5.

Description: ♂—Idiosoma narrower than that of ♀ with similar dorsal chaetotaxy Holoventral shield large, expanded posterior to coxa IV, well sclerotized and ornamented, with about 100 setae. ♀—Large, well sclerotized and setose. Dorsal shield oval, 994–1026 μ long, 734–756 μ wide, with many setae which are more numerous on the posterior and lateral parts. Tritosternum with pilose lacinae and base. Sternal shield 113–118 μ long (at mid line), 180–188 μ wide (at level of 2nd setae), well sclerotized and ornamented. Sternal setae long, 1st pair extending over 2/3 length of sternal shield, 2nd pair extending past base of metasternal setae, 3rd pair extending to coxa IV. Genitoventral shield greatly expanded posterior to coxa IV, 529–540 μ wide, ornamented, with 70–75 setae exclusive of anterior pair, posterior margin straight to slightly concave, almost touching anterior margin of anal shield. Metapodal shields very large, triangular in shape, well sclerotized and ornamented. Anal shield much wider than long, 260–265 μ wide, 80–88 μ long, ornamented, anterior margin straight to slightly convex, adanal setae 81–90 μ long,

1. Field work supported by National Science Foundation grants (G-18800 and G-23720) from the U. S. Antarctic Research Program.



Figs. 1–5. *Eulaelaps stabularis* (Koch). 1, ♂ ventral view (modified after Strandtmann & Wharton, 1958); 2, ♀ chelicera; 3, ♀ tritosternum; 4, ♀ ventral view; 5, ♀ dorsal view.

extending well past postanal margin of anal shield. Peritreme extends slightly beyond posterior margin of coxa I, peritrematal shield well developed. Chelicerae chelate-dentate, a small non-inflated pilus dentilis present on fixed finger and a row of small setae at base of movable finger. Eleven rows of deutosternal teeth, 3–9 teeth per row (average 6.1). Legs I and IV longer than II and III. Tarsus I, 255–260 μ long, II, 175–190, III, 195–200 and IV, 280–305.

DISTRIBUTION: Africa, Asia, Europe, North America, Campbell I., New Zealand.

CAMPBELL ISLAND: 2♀♀, chicken yard debris, Berlese funnel, Beeman Camp, 2–50 m, 6–11. XII. 1961, J. L. Gressitt.

NEW ZEALAND: 2♀♀, *Eudyptula albosignata* nest, Port Levy, Canterbury Prov., 11. X. 1961, C. J. Mitchell.

Discussion: Only 2♀♀ of this species were found in a vial containing about 500 mites extracted with a Berlese funnel from chicken yard debris collected at the base camp on Campbell Island. The chickens and some of the litter had originated from New Zealand. The history of the material in which they were found and the fact that no additional specimens were collected in over 108 samples of mites from other localities on Campbell Island would seem to indicate these specimens were introduced from New Zealand. This mite previously has not been reported from New Zealand and these records are the first for it from the Australian region.

The 2♀♀ from Campbell Island differ in the following respects from a series of ♀♀ from North America. Their overall size is larger and most measurements are greater than in the North American specimens although this may be due to a greater degree of flattening in the specimens. The genitoventral shield is more setose and not as deeply incised behind coxa IV. The first pair of sternal setae average slightly longer. There are more rows of deutosternal teeth and a greater number of teeth per row in the Campbell I. specimens. These differences are considered to be within the normal range of variation for such a widely distributed species.

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Pacific Insects Monograph 7: 132–137 July 15, 1964

INSECTS OF CAMPBELL ISLAND. METASTIGMATA: IXODIDAE[1]

By Nixon Wilson

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Abstract: *Ixodes uriae* White and *I. pterodromae* Arthur are recorded from Campbell Island, the latter species for the first time.

The material reported here was collected largely by Bishop Museum staff members and field associates during the summers of 1961–62 and 1962–63. An additional five collections have been listed which are deposited in the Dominion Museum (DM). These were identified by Mr. L. J. Dumbleton.

The tick fauna of Campbell Island, as presently known, is restricted to two species belonging to the genus *Ixodes*. Both are confined to oceanic birds.

Key to Campbell Island species of Ixodes

All coxae unarmed ..... **uriae**
Some coxae armed ..... **pterodromae**

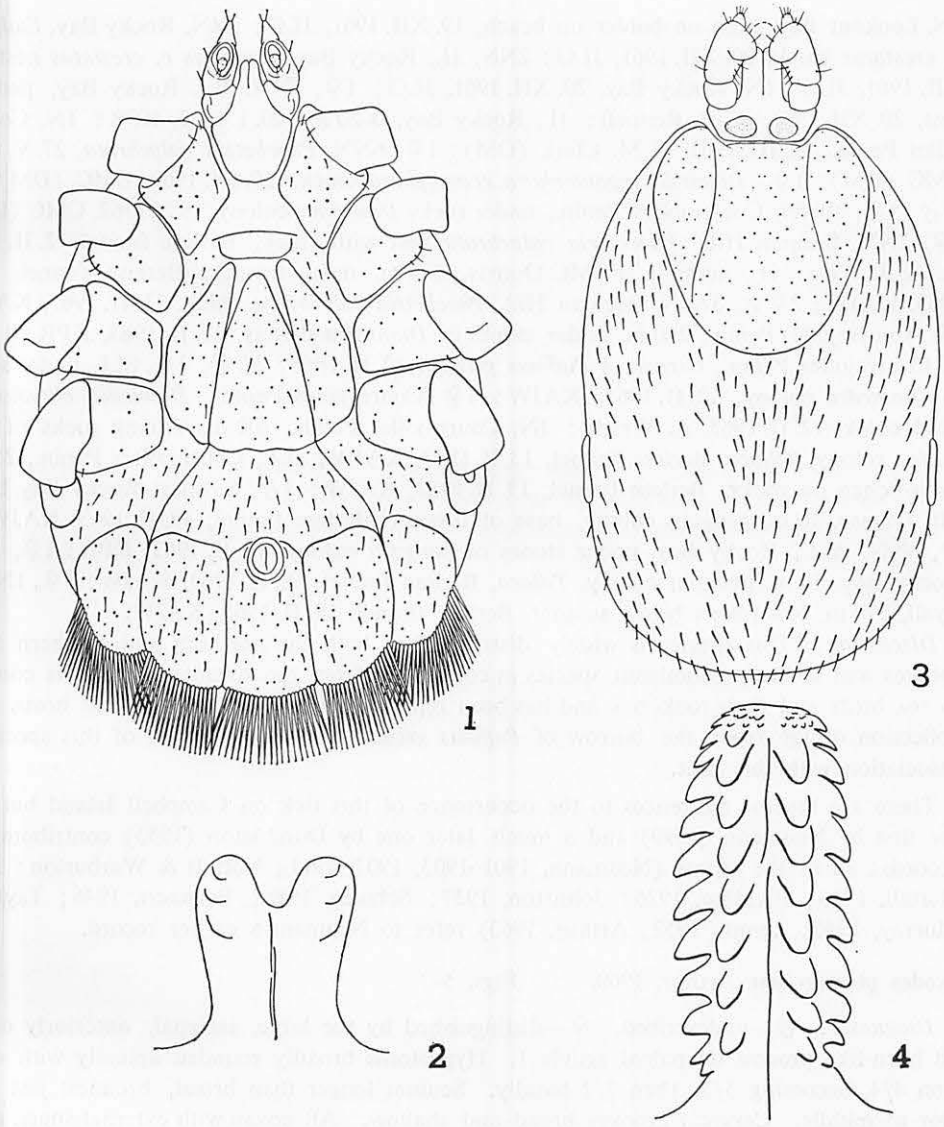
Ixodes uriae White, 1852. Figs. 1–4.

Diagnosis. ♂—a medium-sized tick easily recognized by the upturned, pointed palpi and the posterior fringe of 5 tufts of long hair. Hypostome rudimentary, notched and with dentition 1/1 faintly indicated. Ventrally an additional plate lies on each side of the median plate and the ephimeral plates do not enclose the spiracular plates. ♀—distinguished by the numerous hairs on the body and the widely separated, inwardly curved palpi. Hypostome broadly rounded apically with dentition 2/2. Scutum longer than broad, broadest anteriorly, with cervical grooves prominent. All coxae without spurs. Nymph and Larva—similar to ♀. Egg—oblate, yellow brown. Average (maximum-minimum) of 8, 605.3 μ (648–558) long, 443.3 μ (486–414) wide.

DISTRIBUTION: Bipolar. In the New Zealand subregion it has been recorded from New Zealand, The Snares, Antipodes I., Auckland I., Campbell I. and Macquarie I.

CAMPBELL ISLAND: 2NN, *Phoebetria palpebrata*, 1956, FD (DM); 13NN, 1L, Rocky Bay, *Eudyptes crestatus crestatus*, 28. XI. 1961, J. L. Gressitt; 5NN, 1L, Rocky Bay, *Eudyptes c. crestatus* nest, 28. XI. 1961, JLG; 1L, Mt. Azimuth, 350 m, moss-lichen, Berlese funnel, 30. XI. 1961, JLG; 1♀, Courrejolles Penin., 200 m, *Diomedea melanophris impavida* nest, 14.

1. Results of field work supported by grants G-18300 and G-23720 from the National Science Foundation (U. S. Antarctic Research Program).



Figs. 1-4. *Ixodes uriae* White. 1, ♂ ventral view; 2, ♂ hypostome; 3, ♀ dorsal view; 4, ♀ hypostome (after Cooley and Kohls, 1945).

XII. 1961, JLG; 1L, Courrejolles Penin., 225 m, *Diomedea chrysostoma* nest, 14. XII. 1961, JLG; 8♂♂, 2♀♀, 13NN, 10LL, eggs, Courrejolles Penin., 200 m, *Diomedea* rookery, 14. XII. 1961, JLG; 1♂, 1♀, 10NN, 1L, Courrejolles Penin., 200 m, *Diomedea* nests, 14. XII. 1961, JLG; 4♂♂, 1♀, Courrejolles Penin., 200 m, *Diomedea* nests, moss, 14. XII. 1961, JLG; 11♂♂, 5♀♀, 4NN, 12LL, eggs, Courrejolles Penin., 200 m, *Diomedea* nests, *Colobanthus*,14. XII. 1961, JLG; 4♂♂, 1♀, Courrejolles Penin., *Diomedea* rookery in moss, 14. XII. 1961, JLG; 1♂ 1L, Courrejolles Penin., 200 m, *Colobanthus*, 14. XII. 1961, JLG (2);

1N, Lookout Bay, herb on bolder on beach, 19. XII. 1961, JLG; 3NN, Rocky Bay, *Eudyptes c. crestatus* chick, 20. XII. 1961, JLG; 2NN, 1L, Rocky Bay, *Eudyptes c. crestatus* nest, 20. XII. 1961, JLG; 1N, Rocky Bay, 20. XII. 1961, JLG; 1♀, 2NN, 2LL Rocky Bay, penguin nest, 20. XII. 1961, K. P. Rennell; 1L, Rocky Bay, 0–20 m, 20. I. 1962, KPR; 1N, Courrejolles Penin., 12. III. 1962, C. M. Clark (DM); 1♀, 6NN, *Phoebetria palpebrata*, 27. V. 1962, CMC (DM); 1♀, *Diomedea epomophora epomophora* chick, 30. IX. 1962, CMC (DM); 15 ♂♂, 1♀, 10NN, Courrejolles Penin., under rocks *Diomedea* colony, 19.X.1962, CMC (DM); 1♀, 2NN, Beeman Hill, *Phoebetria palpebrata* nest with chick, Berlese funnel, 2. II. 1963, K. A. J. Wise; 1L, summit of Mt. Dumas, 503 m, moss tussock, Berlese funnel, 6. II. 1963, KAJW; 2♀♀, 32NN, Beeman Hill, *Phoebetria palpebrata* chick, 11. II. 1963, KAJW; 1♀, Courrejolles Penin., 220 m, under stones in *Diomedea* colony, 12. II. 1963, KPR; 1♀, S of Courrejolles Penin., burrow of *Puffinus griseus*, 12. II. 1963; 3♂♂, 1♀, 8LL, under stones in *Diomedea* colony, 12. II. 1963, KAJW; 1♀, Courrejolles Penin., *Diomedea chrysostoma* dead chick, 12. II. 1963, A. Wright; 1N, Courrejolles Penin, 200 m, among rocks of *Diomedea* colony, *Tillaea*, Berlese funnel, 13. II. 1963, KAJW; 8LL, Courrejolles Penin., 250 m, moss-lichen on rocks, Berlese funnel, 13. II. 1963, KAJW; 1♂, S. coast Rocky Bay below Mt. Dumas, 10 m, penguin colony, base of tussock, Berlese funnel, 18. II. 1963, KAJW; 1 ♂, 6NN, 5LL, Rocky Bay, under stones of penguin colony, 18. II. 1963, KPR; 1♀, 7NN, Rocky Bay, 10 m, penguin colony, *Tillaea*, Berlese funnel, 18. II. 1963, KAJW; 1♀, 1N, Mt. Lyall, 390 m, low plants below summit, Berlese funnel, 19. II. 1963, KAJW.

Discussion: This species is widely distributed in both the northern and southern hemispheres and is the predominant species in collections from the subantarctic. It is confined to sea birds and their rookeries and has been reported from about 45 different hosts. The collection of 1♂ from the burrow of *Puffinus griseus* is the first report of this species in association with this host.

There are several references to the occurrence of this tick on Campbell Island but only the first by Neumann (1899) and a much later one by Dumbleton (1953) contribute new records; all of the others (Neumann, 1901–1903, 1907, 1911; Nuttall & Warburton; 1911; Nuttall, 1916; Fielding, 1926; Johnston, 1937; Schulze, 1938; Bequaert, 1946; Taylor & Murray, 1946; Zumpt, 1952; Arthur, 1963) refer to Neumann's earlier record.

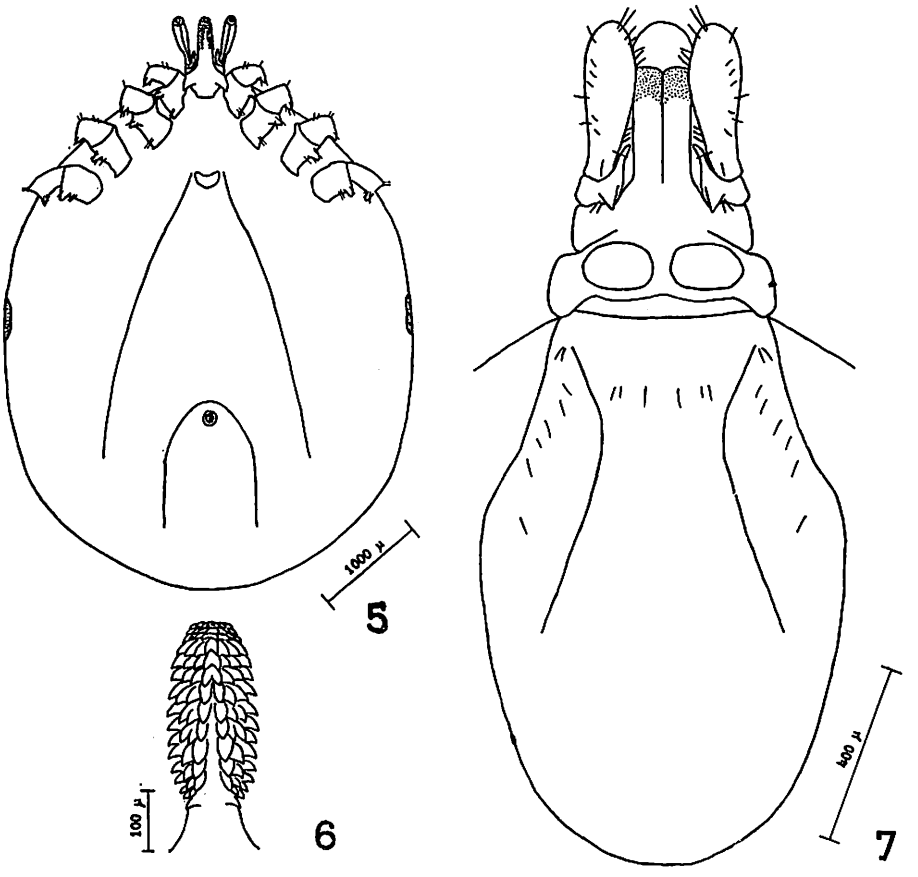
Ixodes pterodromae Arthur, 1960. Figs. 5–7.

Diagnosis: ♂—undescribed. ♀—distinguished by the large, internal, anteriorly directed horn-like process on palpal article 1. Hypostome broadly rounded apically with dentition 4/4, becoming 3/3, then 2/2 basally. Scutum longer than broad, broadest just anterior to middle. Cervical grooves broad and shallow. All coxae with external spurs, coxae I–III with internal spurs. Nymph—similar to ♀. Larva—undescribed.

DISTRIBUTION: Marion I., Australia, Tasmania, Campbell I., Macquarie I.

CAMPBELL ISLAND: 1L, Beeman, on foot of *Pachyptila desolata*, 27. II. 1962, K. P. Rennell; 4NN, Beeman, around beak and eyes of *Puffinus griseus*, 28. IV. 1962, KPR.

Discussion: This is the first record of this tick from Campbell Island and the first record from these hosts. It appears to be most closely associated with burrow nesting birds, however, there are records from *Diomedea exulans* and "penguin", two surface nesting species. Additional collecting is necessary before a true host relationship can be ascertained. The 1 larva listed here is provisionally placed under this species until additional mat-



Figs. 5–7. *Ixodes pterodromae* Arthur. 5, ♀ ventral view; 6, ♀ hypostome; 7, ♀ capitulum and scutum, dorsum.

erial can be obtained for comparison.

Scientific and common names of birds referred to in paper

Spheniscifórmes	
Eudyptes crestatus crestatus	Rockhopper penguin
Procellariiformes	
Diomedea chrysostoma	Grey-headed mollymawk
Diomedea epomophora epomophora	Southern royal albatross
Diomedea exulans	Wandering albatross
Diomedea melanophris impavida	Black-browed mollymawk
Pachyptila desolata	Antarctic prion
Phoebetria palpebrata	Light-mantled sooty albatross
Puffinus griseus	Sooty shearwater

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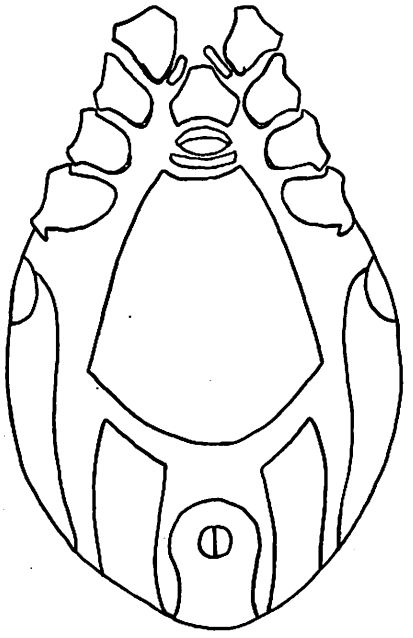
APPENDIX

The following information was obtained from the description of the ♂ of *Ixodes pterodromae* Arthur (after Roberts, 1964). The following diagnosis was obtained too late to insert in the original text. Insert on p. 25 after *Diagnosis*: ♂—scutum convex, smooth, lacking lateral carinae, cervical grooves short and shallow. Hypostome notched and with dentition 5/5–6/6. Coxae I–III with internal saliences, coxae II–IV with small external spurs, coxae I–IV with small anterior prominences. Ventrally there are 10 plates, the epimeral plates almost enclose the spiracular plates.



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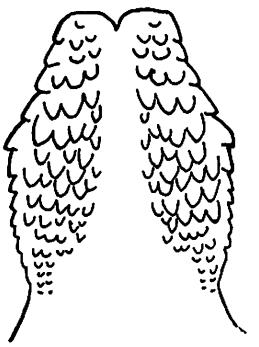

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Figs. 8-9. *Ixodes pterodromae* Arthur. 8, ♂ ventral view; 9, ♂ hypostome (after Roberts, 1964).

Pacific Insects Monograph 7: 138-147 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
CRYPTOSTIGMATA (Oribatei): OPPIIDAE[1]

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Abstract: Five new species belonging to the genera *Globoppia* and *Oppia* (sensu lat.) are described from collections made at Beeman Hill, Campbell Island. Three of the species, namely *Globoppia gressitti* n. sp., *Oppia diaphora* n. sp. and *Oppia disjuncta* n. sp., are similar in some morphological respects to South American species described recently by Hammer.

This paper is the first in a series devoted to descriptions of new and little known species of Oribatei from Campbell Island. The collections on which the descriptions are based were made by Dr. J. L. Gressitt of Bishop Museum, and I am indebted to him for making these available to me for study. Type material will be deposited in the Dominion Museum.

Genus **Globoppia** Hammer

This genus was described recently (Hammer 1962) from Chile. Characteristic features include the globular sensillus, the reduced notogastral seta *ta*, 6 pairs of genital setae, discidium strongly pointed and trochanter III with 1 or 2 short pointed projections on the outer face. Two new species of the genus are described below under the names *G. gressitti* and *G. campbellensis*.

Globoppia gressitti Wallwork, n. sp. Figs. 1–2.

MATERIAL EXAMINED: 2 adults.

Measurements: 642 μ × 385.2 μ and 631.3 μ × 374.5 μ.

Integument: Color of body red-brown; generally smooth with pale areas of weak chitinization on prodorsum and peripheral regions of notogaster.

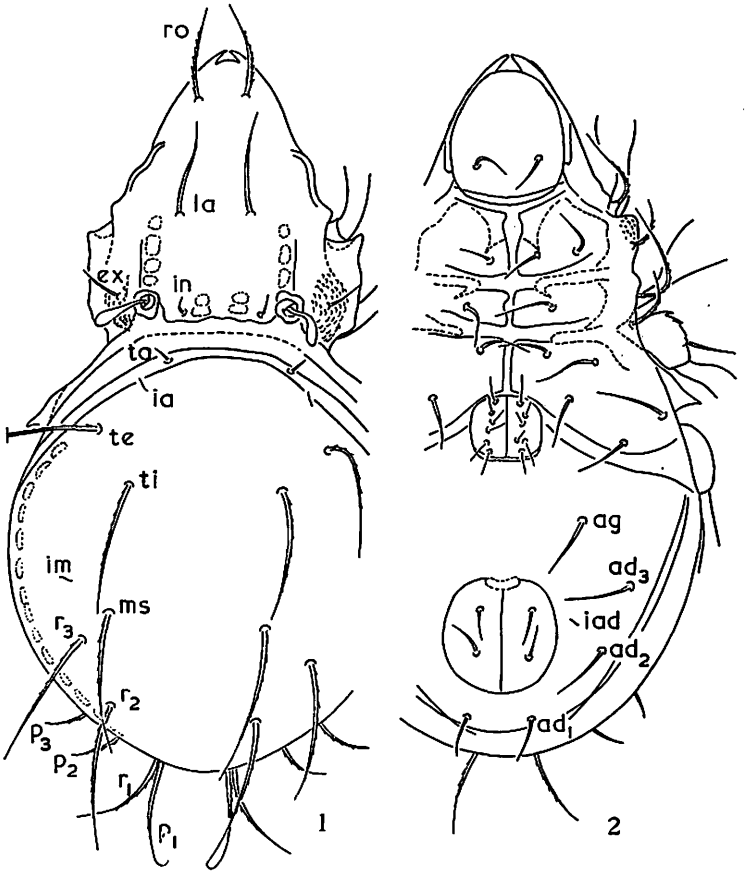
Prodorsum: Elongate, narrowing towards rostrum; rostrum trimucronate, with a pair of strongly incurved lateral points and a central rounded lobe. Rostral setae strongly developed, finely barbed, gently curved, about 2× as long as their mutual distance. Lamellar setae strongly developed, slightly longer than rostrals, roughened or finely barbed, tips flagelliform. Lamellae lacking. Interlamellar setae inserted on posterior region just median to each pseudostigma, very short, strongly curved. Each pseudostigma large, strongly chitinized, with opening directed dorso-laterally. Sensillus has a short stem and slightly ex-

1. Results of field work supported by a National Science Foundation grant (G-18800) from the U. S. Antarctic Research Program.

panded, elongate head. Exopseudostigmatic setae well developed, finely barbed, almost straight, spine-like, directed dorso-laterally. Integument covering exopseudostigmatic region strongly granular. Longitudinal row of pale areas present in front of each pseudostigma. Similar pale areas also present in interlamellar region.

Notogaster: Strongly convex, peripheral region with pale areas. Ten pairs of notogastral setae; setae *ta* very short, inserted on anterior margin, antero-median to fissure *ia*; remaining notogastral setae well developed, long and thickened, barbed, with fine, flagelliform tips; setae p_2 and p_3 rather shorter than the remainder.

Genito-anal region: Adanal setae (3 pairs) relatively long, finely barbed, with flagelliform tips; setae ad_2 and ad_3 rather longer than ad_1. Adanal fissure (*iad*) an elongate slit obliquely situated with respect to anal field. Each anal plate with 2 finely barbed setae. Aggenital setae (1 pair) long, flagelliform, finely barbed, located mid-distant between anal and genital fields. One specimen has aggenital seta duplicated on one side. Each genital



Figs. 1-2. *Globoppia gressitti* n. sp. 1, dorsal; 2, ventral. *ro*=rostral setae; *la*=lamellar setae; *ex*=exopseudostigmatic setae; *in*=interlamellar setae; *ta, te, ti, ms,* r_1, r_2, r_3, p_1, p_2, p_3 =notogastral setae; *ia, im*=notogastral fissures; *ag*=aggenital setae; ad_1, ad_2, ad_3=adanal setae; *iad*=adanal fissure.

plate has 6 setae; g_6 (anteriorly) and g_1 and g_2 (posteriorly) longer and more markedly flagelliform than the remainder.

Ventral region of podosoma: Coxisternal ridges I, II, sejugal and IV well developed, extending to mid-line to join an irregular sternal ridge. Ridges III lacking. Sternal ridge divides coxisternal fields into right and left halves; coxisternal ridges IV curve antero-medially to include anterior margin of genital field. Apodemes associated with ridges I, II and the sejugal are well developed. Coxisternal setae relatively long, flagelliform, barbed; formula: (3–1–3–3), distributed as shown in fig. 2.

Lateral region of podosoma: Tutorium well developed as a thickened ridge, curving antero-dorsally. Pedotectum I rather blunt, with conspicuous microsculpture of tubercles; coxisternal seta *1c* inserted on outer face of this pedotectum. Pedotectum II small and inconspicuous. Discidium strongly developed and produced into a sharp point.

Legs: All tarsi monodactyle. Tarsi III and IV relatively longer and more slender than tarsi I and II; tarsus: tibia length ratios as follows: I(1 : 1); II(1 : 1); III(1.4 : 1); IV (1.4 : 1). Trochanter III has a pair of points on the outer leading edge.

TYPE LOCALITY: Beeman Hill, Campbell Island, ex moss, XII. 1961, Gressitt.

Remarks: Similar in size and general morphology to *G. maior* Hammer. The two species differ principally in the length of interlamellar setae (shorter in *gressitti* than in *maior*), the length of notogastral setae r_1 (longer in *gressitti* than in *maior*), and possibly in the form of the rostrum (trimucronate in *gressitti*, apparently entire in *maior*).

Globoppia campbellensis Wallwork, n. sp. Figs. 3–4.

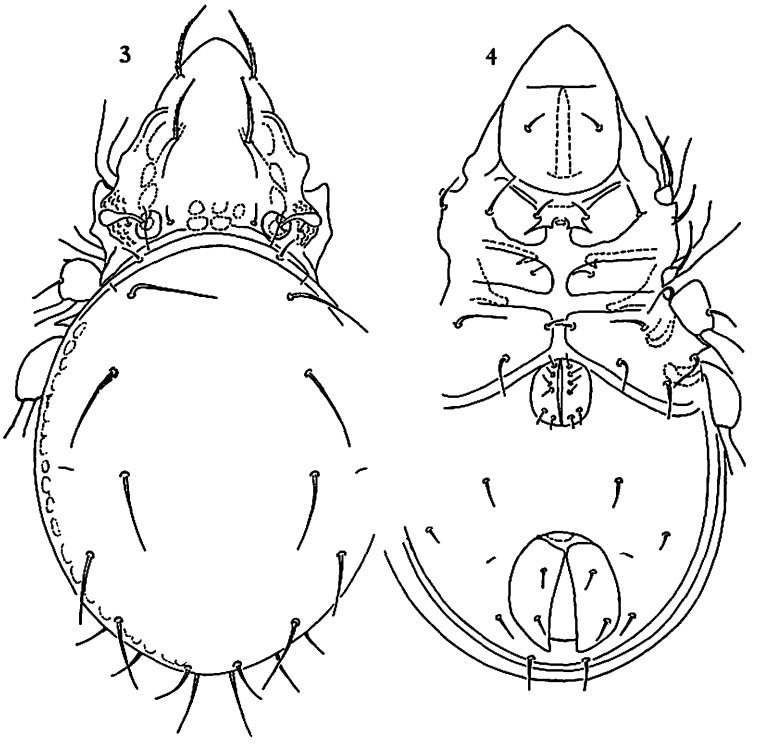
MATERIAL EXAMINED: 12 adults.

Measurements: 358.4 μ × 190.4 μ (Average).

Integument: Similar to that of *G. gressitti*, but rather more weakly pigmented.

Prodorsum: Rostrum entire, narrowing slightly anteriorly. Rostral setae inserted on lateral margins of rostrum, curved, barbed, almost as long as their mutual distance. Lamellar setae have same form as rostrals, but are slightly longer, inserted on apices of lamellae about mid-way along length of prodorsum. Lamellae distinct anteriorly; posteriorly they merge gradually into integument. Three pale areas arranged in a longitudinal row located in front of pseudostigma; other pale areas (4–5) in inter-pseudostigmatic region. Each pseudostigma strongly chitinized, with aperture directed antero-laterally. Sensillus short, with curved stem and smooth, spherical head. Exopseudostigmatic setae inserted on short tubercles, lateral to each pseudostigma; these setae are straight, apparently barbed. Integument covering exopseudostigmatic region strongly granular in appearance. Interlamellar seta relatively short, strongly upcurved, inserted just median to each pseudostigma.

Notogaster: Strongly convex, ovoid in shape, with peripheral ring of pale areas. Ten pairs of notogastral setae; setae *ta* inserted on anterior margin, shorter than remainder but relatively longer than corresponding setae in *G. gressitti*; other notogastral setae long, broadly curved, with fine, tapering tips, surface roughened or finely barbed; posterior setae rather shorter than anterior ones. Fissures *ia* and *im* visible in dorsal view as elongate slits. General features of dorsal surface are shown in fig. 3.



Figs. 3-4. *Globoppia campbellensis* n. sp. 3, dorsal; 4, ventral.

Genito-anal region: Three pairs of adanal setae; ad_3 (anteriorly) shorter than ad_2 which are shorter than ad_1. Adanal fissures are slits, obliquely situated with respect to anal field. Anal setae (2 pairs) as long as adanal setae ad_2, curved, surface roughened. Aggenital setae longer than anals and adanals, barbed, inserted mid-distant between genital and anal fields. Six pairs of smooth, straight genital setae.

Ventral region of podosoma: Arrangement of coxisternal ridges and associated apodemes as shown in fig. 4. Coxisternal ridges III lacking. Sternal ridge strongly developed. Coxisternal setae generally relatively long, finely barbed, particularly antiaxial setae; formula is (3–1–3–3); insertion pattern very similar to that of *G. gressitti*.

Lateral region of podosoma: Tutorium well developed, curved dorso-medially. Pedotectum I strongly developed, outer face bearing insertion of coxisternal seta *lc*. Discidium sharply pointed.

Legs: All tarsi monodactyle. Legs III and IV with elongate tarsi, as in *G. gressitti*. Trochanter III with a single short pointed projection on outer face.

TYPE LOCALITY: Beeman Hill, Campbell I., ex moss, XII. 1961, Gressitt.

Remarks: Differs from *G. gressitti* in several important respects. It is smaller in body size, has relatively shorter body setae, lamellae are present, rostrum is entire and trochanter III bears a single short pointed projection. An interesting feature of this species is the presence of lamellae. The South American species of this genus previously described

lack these structures and this absence was noted in the original diagnosis of the genus (Hammer 1962). The inclusion of *G. campbellensis* in this group necessitates a revision of the generic characteristics. A revision, on a much larger scale, of all of the genera in the family Oppiidae is badly needed; for the present it is proposed to place the species *G. campbellensis* in the genus *Globoppia*. Similarly the species described below are assigned tentatively to the genus *Oppia*, pending a revision of the family.

Genus **Oppia** C. L. Koch

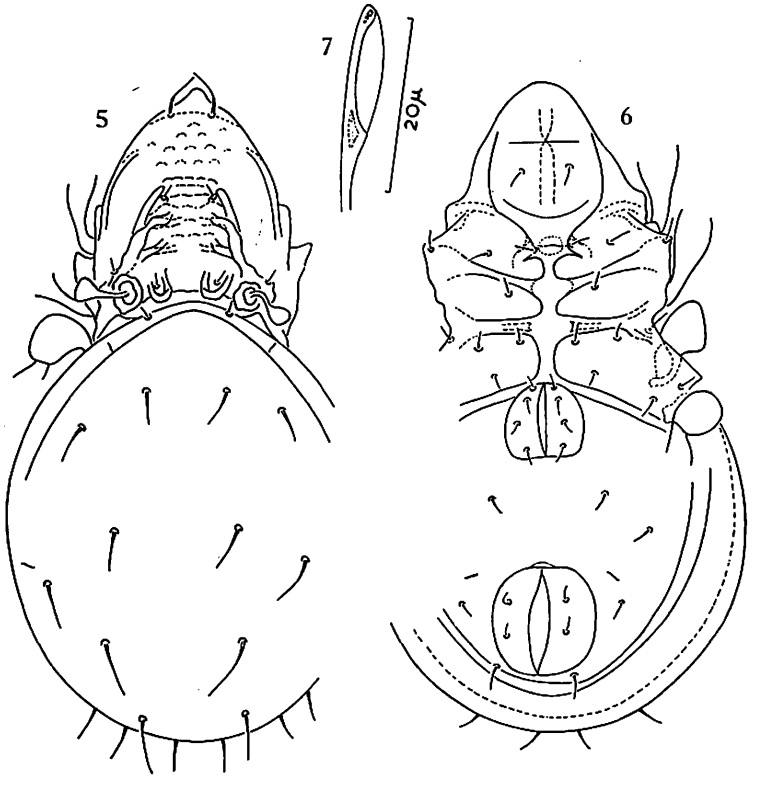
Oppia diaphora Wallwork, n. sp. Figs. 5–7.

MATERIAL EXAMINED: 3 adults.

Measurements: 201.6 μ × 112 μ.

Integument: Pale brown in color.

Prodorsum: Rostrum entire, terminally produced into a narrow lobe. Surface of prodorsum ridged or with granular microsculpture. Rostral setae inserted on faint rostral ridge, a short distance behind anterior margin of rostrum, curved, slightly shorter than



Figs. 5–7. *Oppia diaphora* n. sp. 5, dorsal; 6, ventral; 7, head of sensillus, viewed from the side.

their mutual distance. Lamellae are ill-defined, irregular ridges, originating in pseudostigmatic region, converging slightly, united apically by a translamella. Translamella occasionally poorly developed. Lamellar setae inserted on prominent rounded projections at junctions of lamellar apex with translamella or just posterior to this; setae fine and slender. A number of median transverse ridges develop from inner borders of lamellae and occupy interlamellar space, as shown in fig. 5; number and development of these ridges are variable. A pair of auriculate ridges well developed in inter-pseudostigmatic region; these are U-shaped, enclosing insertion of fine, short interlamellar seta. Pseudostigmata well developed and rounded, without prominent posterior lobe. Sensillus (fig. 7) with slender stem and flattened, membranous and expanded head. Exopseudostigmatic seta short, inserted on prominent rounded tubercle situated on a sub-lamellar extension of lamella lateral to each pseudostigma.

Notogaster: Ovoid, narrowing anteriorly. Antero-lateral margin produced into a pointed, tooth-like projection which opposes posterior wall of pseudostigma. Peripheral regions with pale areas. Ten pairs of notogastral setae; *ta* short, inserted on anterior margin; remainder moderately long, strongly curved away from surface of notogaster; r_1 and r_2 rather longer than remainder, with tapering tips. The position of fissure *im* is variable and may be antero-lateral or postero-lateral to seta r_3.

Genito-anal region: Adanal setae (3 pairs) short, curved, smooth; ad_1 posterior to anal field, rather longer than ad_2 and ad_3; ad_2 located lateral to anal field; ad_3 remote from anal field and located antero-laterally. Adanal fissure oblique and antero-lateral to anal field. Each anal plate with 2 short, smooth setae. One pair of aggenital setae, similar to anals and adanals, situated postero-lateral to genital field. Genital aperture trapezoidal in shape, each genital plate with 4 smooth, curved setae.

Ventral region of podosoma: Coxisternal ridges I, II, sejugal and IV well developed, extending to conspicuous sternal ridge; crescentic excavations at coxisternal/sternal ridge junctions similar to those described previously for *O. crozetensis* (see Wallwork 1963). Coxisternal ridges IV originate near insertion of leg IV, curving antero-medially to embrace anterior limit of genital field. Coxisternal ridges III lacking. Apodemes associated with ridges I, II and the sejugal, and the short curved apodemata III and IV are indicated by broken lines in fig. 6. Coxisternal setal formula: (3–1–3–3); setae are smooth and curved.

Lateral region of podosoma: Pedotectum I truncate; pedotectum II less conspicuous than pd. I. Discidium short, strongly chitinized, generally without sharp point.

Legs: All tarsi monodactyle. Chaetotaxy was not examined in detail in the present work.

TYPE LOCALITY: Beeman Hill, Campbell I., ex moss, XII. 1961, Gressitt.

Remarks: The ridged, granular character of the prodorsum and the possession of 4 pairs of genital setae are unusual features of the genus *Oppia* and serve to distinguish this species from the majority of species previously described. The closest similarity appears to lie with the South American species, *O. multicorrugata* Hammer 1962 which also possesses these unusual prodorsal and genital characteristics. The 2 species differ in the form of the lamellae, the development of auriculate inter-pseudostigmatic ridges (lacking in *multicorrugata*) and in the position and alignment of the adanal fissures.

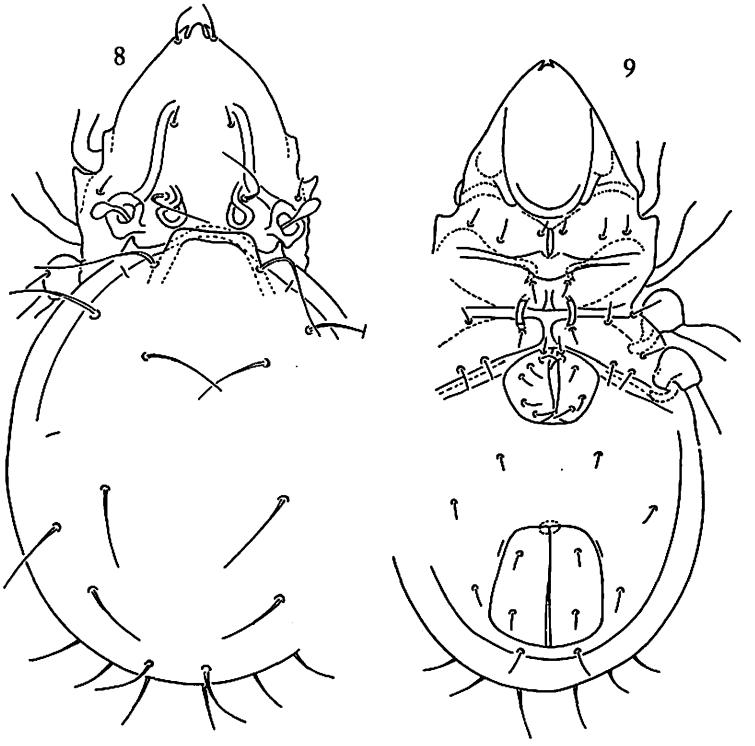
Oppia beemanensis Wallwork, n. sp. Figs. 8–9.

MATERIAL EXAMINED: 10 adults.

Measurements: Average length: 276.6 μ (range: 268.8 μ–280 μ); average width: 160.2 μ (range: 151.2 μ–168 μ).

Integument: Color of body pale brown.

Prodorsum: Rostrum trimucronate, lateral lobes slender, pointed, directed antero-medially; median lobe small, rounded. Rostral setae inserted at bases of lateral lobes, slender, curved, as long as or slightly longer than their mutual distance, extending in front of rostrum for a distance equal to 1/2 their length. Lamellae strongly developed, slightly S-shaped, extending forwards from pseudostigmata for a distance equal to 1/2 length of prodorsum, anterior extremity of each curving medially. Lamellar setae inserted median to each lamella and a short distance behind lamellar apex; setae fine and slender. Interlamellar region with a pair of strongly chitinized auricular ridges, resembling those of *O. nova* (Oudms.); antero-lateral to each of these is a depression containing insertion of interlamellar seta; this seta strongly developed, tapering to a fine point, strongly curved, finely barbed, approximately as long as mutual distance. Pseudostigma strongly chitinized, posterior rim with rounded lobe; sensillus with short stem and rounded head covered with granules. Exopseudostigmatic seta slender, inserted in usual position lateral to pseudostigma on each side.



Figs. 8-9. *Oppia beemanensis* n. sp. 8, dorsal; 9, ventral.

Notogaster: Anterior border weakly chitinized but overlaid with a strongly developed bi-angular ridge; each arm of this ridge extends back over notogaster for a very short distance. Antero-laterally, notogastral border produced into a pointed, tooth-like projection which interlocks with pseudostigmatic lobe. Setae comprise 10 pairs, well developed, apparently smooth with tapering tips; setae *ta* and *te* rather longer than remainder; p_3 and p_2 shorter than remainder; posterior setae strongly curved. Fissures *ia* and *im* indistinct, but their positions were noted (fig. 8).

Genito-anal region: Anal aperture slightly narrower anteriorly than posteriorly; 2 short, smooth setae on each anal plate. Adanal fissure is a slit lying close to, and parallel with, lateral rim of anal aperture. Adanal setae (3 pairs) and aggenital setae (1 pair) fine and smooth; posterior pair of adanal setae rather longer than remainder. Genital aperture trapezoidal in shape; each plate generally with 5 slender setae; fig. 9 shows unusual condition present in one specimen of 6 setae on one genital plate.

Ventral region of podosoma: Coxisternal ridges and apodemes developed as shown in fig. 9. Fields III and IV fused. Coxisternal ridges II weakly chitinized in sternal region; more posteriorly sternal ridge well developed. Coxisternal ridges IV broad, directed anteromedially, embracing anterior margin of genital field. Coxisternal setae smooth, antiaxial setae generally rather longer than paraxials; setae 3c and 4c are stiff, straight spines. Setal formula (3–1–3–3).

Lateral region of podosoma: Pedotectum I strongly developed, pointed. Pedotectum II inconspicuous, discidium short and blunt.

Legs: All tarsi monodactyle. Tibia and tarsus approximately equal in length on legs III and IV.

TYPE LOCALITY: Beeman Hill, Campbell I., ex moss, XII. 1961, Gressitt.

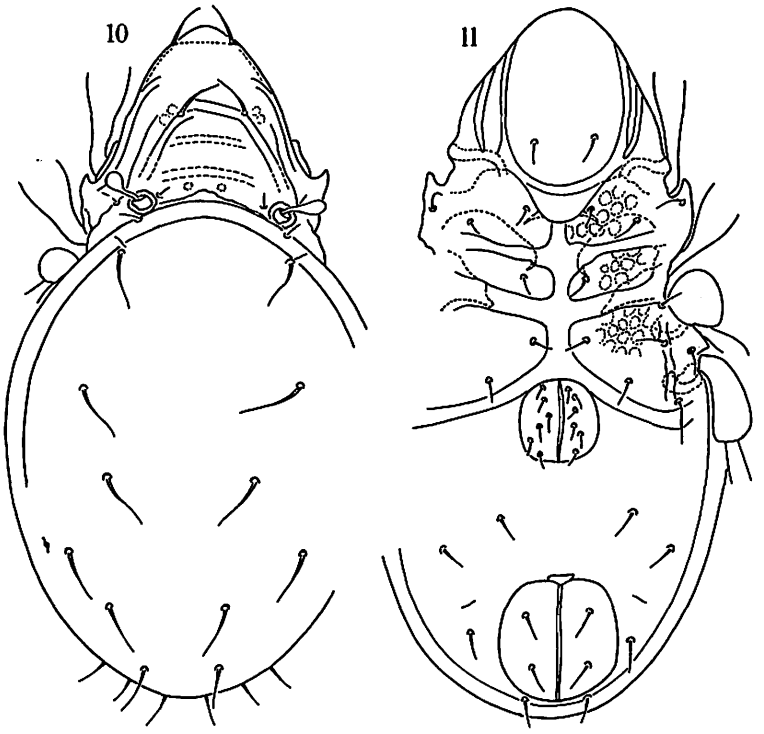
Remarks: The major diagnostic features include the trimucronate rostrum, sigmoid form of lamellae, well developed auriculate ridges on prodorsum, bi-angular form of anterior notogastral margin and the strong development of all notogastral setae. The arrangement of prodorsal and notogastral ridges is reminiscent of that present in the European species, *O. nova* (Oudms.), *O. neerlandica* (Oudms.), *O. falcata* (Paoli), and the species from Northern Canada, *O. fissurata* Hammer 1952. The Campbell I. form may be related to these species, but can be distinguished from them by the much stronger development of interlamellar and notogastral setae, and the form of the sensillus.

Oppia disjuncta Wallwork, n. sp. Figs. 10–13.

MATERIAL EXAMINED: 5 adults.

Measurements: Length of body: 224 μ; width: 123.2 μ.

Prodorsum: Anterior margin of rostrum rounded, entire. Rostral setae finely barbed, inserted on lateral margins of rostrum, slightly shorter than mutual distance, curved, slightly convergent, extending beyond rostrum for a distance equal to 1/2 their length. Tutoria strongly developed, curving dorso-mediad. Lamellae well chitinized for most of their lengths, rather indistinct posteriorly, convergent; translamella present, rather variable in form, usually appearing as an asymmetrically fractured ridge, as shown in fig. 10. Lamellar setae finely barbed, incurved, with fine flagelliform tips, rather shorter than their mutual distance. Integument in interlamellar region developed in a series of transverse ridges,



Figs. 10–11. *Oppia disjuncta* n. sp. 10, dorsal; 11, ventral.

the most conspicuous 2 are indicated by broken lines in fig. 10. Interlamellar setae very short and simple, inserted just median to each pseudostigma. Lateral ridge present outside lamellae; this originates postero-lateral to pseudostigmata and extends forwards to level of lamellar setae. Immediately lateral to each pseudostigma this ridge bears a rounded tubercle which carries insertion of fine, slender exopseudostigmatic seta. Sensillus clavate, globular head with granular microsculpture.

Notogaster: 10 pairs of setae; chaetotaxy shown in fig. 10. Setae generally moderately long, curved, flagelliform, with exception of setae *ta*, inserted on anterior margin, very much shorter than remainder; setae *te*, *ms*, r_3 and r_2 slightly longer than *ti*, r_1 and p_{1-3}. Fissure *im* indistinct in form and variable in position.

Genito-anal region: Details of this region very similar to those in *O. diaphora*; adanal setae slightly longer and with flagelliform tips. Fissure *iad* situated obliquely with respect to anal field. Aggenital setae (1 pair) located mid-distant between genital and anal fields, slender, with fine flagelliform tips. Genital aperture rectangular; each genital plate with 6 smooth, slender setae.

Ventral region of podosoma: Coxisternal and sternal ridges generally well developed, except for ridge III which is lacking; ridges IV surround anterior margin of genital aperture. Integument over coxisternal region weakly fenestrated or reticulate. Coxisternal setal formula (3–1–3–3); setae in fields I and II distributed in manner similar to that in *O. diaphora*

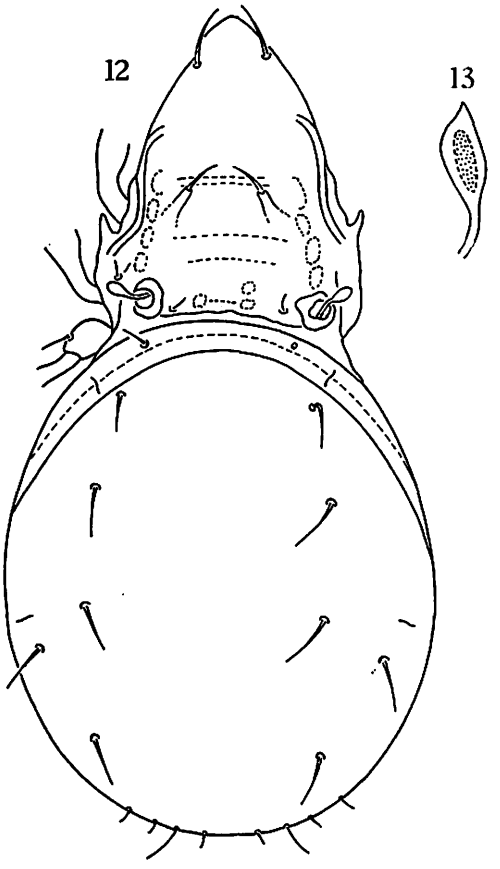
(c. f. figs. 11 and 6); insertion pattern on fields III/IV different in the 2 species. All coxisternal setae smooth, with flagelliform tips; setae 4c appreciably longer than remainder; seta 3c inserted on rounded tubercle on lateral region of podosoma.

Lateral region of podosoma: Pedotectum I well developed, with distinct point; pedotectum II also present. Discidium short, less conspicuous than in *O. diaphora*. Lateral margin of coxisternal fields III/IV bears a chitinized ridge which extends anteriorly to meet sejugal ridge.

All tarsi monodactyle. Tibia and tarsus approximately equal in length on legs III and IV.

TYPE LOCALITY: Beeman Hill, Campbell I., ex moss, XII. 1961, Gressitt.

Remarks: This species is distinguished by the disjunct form of the translamella, the coxisternal chaetotaxy and the presence of 6 pairs of genital setae. It resembles *O. ventrolaminata* Hammer 1962 in the character of the lamellae, but can be separated easily on the basis of the length of interlamellar setae (shorter in *O. disjuncta*), the notogastral chaetotaxy and the absence of prodorsal scales. The development of prodorsal ridges is variable in *O. disjuncta*; occasionally they are very weakly developed; several specimens are present in the collections which show an extreme reduction of prodorsal microsculpture. This extreme condition is shown in fig. 12. Intermediates between this condition and that described above are present, and the morphological evidence available does not warrant the creation of 2 separate species for these 2 forms. In most respects, particularly in the chaetotaxy, the 2 forms are identical.



Figs. 12–13. *Oppia disjuncta* n. sp., morphological variant. 12, dorsal; 13, head of sensillus.

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INSECTS OF CAMPBELL ISLAND. PROSTIGMATA: EUPODIDAE, PENTHALODIDAE, RHAGIDIIDAE, NANORCHESTIDAE, TYDEIDAE, EREYNETIDAE[1]

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Abstract: Eleven species of prostigmatic mites are recorded from Campbell Island. Represented by 3 or more specimens are: *Eupodes longisetatus* n. sp.; *Stereotydeus undulatus* n. sp.; *S. nudisetatus* n. sp.; *S. pulcher* n. sp.; *Penthaleus major* (Duges); *Rhagidia mildredae* n. sp.; *Microtrombidium karriensis* Womersley, and *Nanorchestes antarcticus* Strandtmann. Represented by unique specimens are *Rhagidia* sp.; *Lorryia* sp.; and *Ereynetes* sp. All were collected in terrestrial habitats such as moss, lichens, grasses, and leaf mold.

Some 200 slides of prostigmatic mites from Campbell I. were made available to me by Dr. J. L. Gressitt of Bishop Museum. I wish to thank Dr. Gressitt most sincerely for the opportunity to study and report upon this collection. Type specimens are housed in Dominion Museum.

Eupodes longisetatus Strandtmann, n. sp. Fig. 1.

♀. Length of body, measured from tip of epivertix, 400 μ with only slight variation in the 2♂♂ and 6♀♀ available for measurements. Slender, slightly more than 2× as long as wide, widest at the rather prominent shoulders. Legs I about 2× length of body. All leg and body setae closely and finely ciliated. No eyes apparent in mounted specimens. *Dorsal side* (fig. 1b): Propodosoma separated from hysterosoma by a distinct furrow; epivertix separated from propodosoma by a distinct furrow but fitting closely into anterior margin. Two finely ciliated setae from center of epivertex and about as long as epivertex. Four propodosomal setae subequal, 1/2 as long as width of propodosoma, arranged in an approximate rectangle. Sensillae very slender, sparsely covered with long cilia, originating at posterior margin, as long as propodosoma. Hysterosoma tapering slightly toward rounded posterior end, with 4 pairs widely spaced, long, closely ciliated setae, each more than 1/2 as long as width of body; posterior end with cluster of 8–12 smaller and finer, ciliated setae, the most posterior 4 may be terminal or even ventral, depending upon how the mite is mounted. Chelicerae slender, separate, more than 2× as long as wide; chela (fig. 1e) edentate, small (about 1/7 total length of chelicera) with dorsal, nude seta at base of fixed arm. *Ventral side* (fig. 1a): Coxae in 2 groups, poorly defined, not meet-

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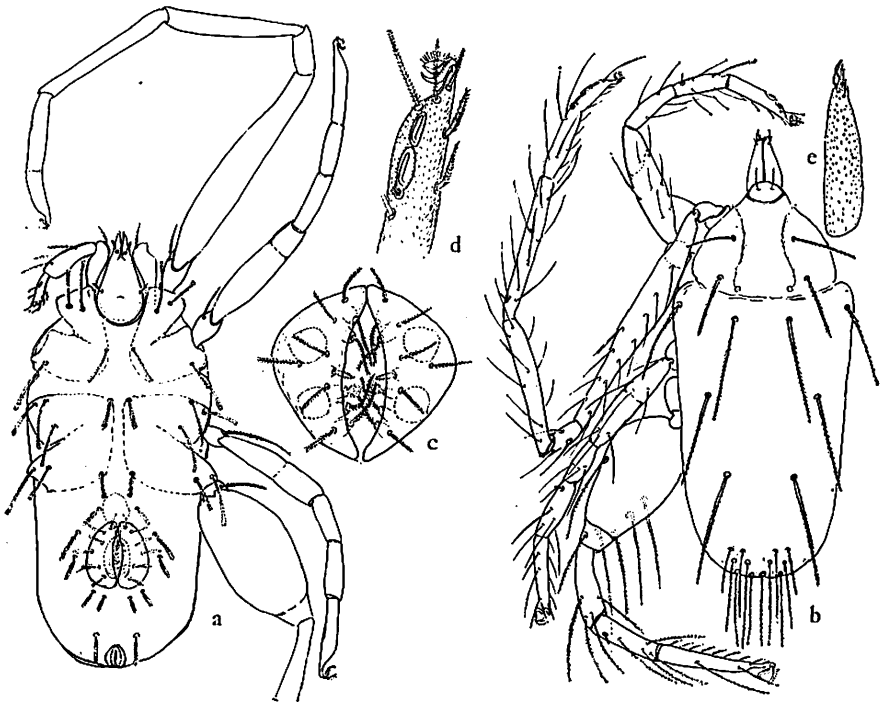

Fig. 1. *Eupodes longisetatus* n. sp. a, ventral view of ♂; b, dorsal view of ♂; c, ♀ genitalia; d, tarsus I of adult; e, chelicera.

ing medially, setal formula, 3–1–4–3. Rostrum narrowly cone-shaped, divided apically for about 1/4, with 2 subapical and 2 basal finely ciliated setae, plus 2 small, nude seta, difficult to find, on each apex. Genitalia in middle of ventral opisthosoma, roughly circular, covered by 2 reniform covers which each have 6 ciliated setae; bracketed by 5 pairs of setae. ♂ (fig. 1a) with a clear, rounded sac and a close cluster of some 7 pairs plumose setae not borne on apparent papillae. ♀ (fig. 1c) similar except internal setae more widely spaced, longer and more prominent; borne on obvious papillae and seemingly include shorter capitate and claviform setae. Excretory pore rounded, thick-lipped, ventral near apex, with a pair of plumose setae near anterior margin. Legs slender; leg I approximately 2× as long as body, legs II–IV approximately equal and shorter than body. All femora except III divided near apex (III divided near middle), the divisions apparently not movable. Tarsus I shows an apparent division in some specimens but not in others. Femur IV greatly enlarged. All tarsi with slender pretarsi bearing 2 basally ciliated claws and a slender, ciliated empodium. Tarsi I (fig. 1d) and II each with 2 rhagidiform organs, each in a separate field. On tarsus I, basal rhagidiform subtended by a stellate seta. A very small solenidion on dorsal base of each tibia. This does not preclude the presence of other solenidia as I found them exceedingly difficult to locate. Each trochanter with 1 seta (1–1–1–1). Leg chaetotaxy; abundant, long, slender, and very finely ciliated. The ciliations are shown only on leg IV and as I experienced difficulty in making them look right, I gave up the attempt to show ciliation on the other leg setae. Pedipalps: seg-

ments 2 & 3 approximately equal; terminal segment slender, more than 1/2 as long as 3, with 8 ciliated setae and a small, subbasal rhagidiform. Segments 2 & 3 with 2 & 3 setae respectively.

Holotype ♀ (Dominion), Beeman, St. Col Lyall, Campbell I., mixed moss, berlese funnelings, 3–5. XII. 1961, Gressitt.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1♂, 1♀, St. Col Ridge, 180–280 m, moss on rocks, 24, 26, 30. XI. 1961, Gressitt; 1♂, 1♀, Beeman Camp, 2–50 m, moss, lichen on trunk of *Drachophyllum*, 1–5. XII. 1961, Gressitt; 1♀, Beeman Hill, 100–180 m, yellow moss, 11–16. XII. 1961, Gressitt; 2♀♀, St. Col Lyall, Beeman, mixed moss, 3–5. XII. 1961, Gressitt; 1♀, Tucker Cove, 1–50 m, moss & lichen, berlese, 21–25. XI. 1961, Gressitt; 1♀, Lookout Bay Beach, *Drachophyllum* leaf mold, 16–19. XII. 1961, Gressitt; 1♀, 1961, Gressitt.

Remarks: Described from 7♀♀ and 2♂♂, all found in moss and lichens. There was only a slight variation in body size and length of setae. Although legs I are slender and very long, almost 2× as long as the body, the species is not *Linopodes* because of the long body setae, distinct suture between propodosoma and hysterosoma, and the greatly swollen 4th femora. It will key to *E. voxencollinus* Thor in Thor and Willmann's key (1941) and fits the description of that species tolerably well but *voxencollinus* is smaller (300–335 μ), has 7 pairs of paragenital setae, and leg I is only about 1/3 longer than the body. *Eupodes berlesei* Thor has a similar facies but it is much larger, 650 μ, and the 4th femora are less swollen. *Eupodes skiaaki* Thor also has very long legs I and is approximately the some size as our mite, 470–580 μ, but the dorsal setae are shorter and the body is wider. It is interesting that the 2 species that seem to resemble *longisetatus* closest are from Norway where climatic conditions are probably not too unlike those on Campbell I. The recently described *E. wisei* Womersley & Strandtmann (1963) differs in having shorter and finer dorsal setae and shorter legs.

Stereotydeus undulatus Strandtmann, n. sp. Fig. 2 a–b, 3 a–e.

♂. Average length 840 μ, varying from 775–940. Body elliptic, legs long and slender, legs I longer than body. Middle lobe of epivertex with scalloped or undulate margin, 4th palpal joint 1/2 as long as 3. Venter with numerous setae. Dorsum with indistinct longitudinal furrows, pubescent, with the pubescence in fairly regular polygons. *Dorsum* (fig. 2a): Epivertex distinct, trilobed, all 3 lobes pubescent, mid lobe with a distinctly scalloped margin, the lateral lobes less so. Propodosoma separated from hysterosoma by a distinct furrow; eyes large, frequently with pigment still present in mounted specimens. Lateral propodosomal setae inserted at middle of interior margin of eye. Sensillae on a line between the 2 posterior setae, only slightly longer than propodosomal setae. Dorsal and scapular setae subequal, not as long as propodosomal setae. Two weak, irregular, longitudinal furrows on hysterosoma. Entire dorsum covered with polygonal fields of pubescence which may be rounded tubercles between anterior propodosomal setae and base of epivertex. *Ventral side* (fig. 2b): Coxae in 2 groups separated by a shallow furrow. Coxal setae, 3–1–6–4, subequal, pectinate. A prominent pit between coxae III & IV. Genitalia in middle of opisthosoma, in a circular camerostome, each of the 2 covers with 6 setae, the 4th more lateral than the others, the whole surrounded by a cluster of 20–25 pairs of equal, pectinate setae. Excretory pore subterminal, round, thick-lipped, bracketed by 3

pairs of setae. ♂ genitalia with an internal sperm sac and a close cluster of plumose setae. ♀ genitalia with more widely spaced internal setae, each on a distinct papilla. A shallow, vaguely triangular depression each side of the genitalia. Ventral pubescence in indistinct polygons which merge into fine striations posteriorly. Rostrum (fig. 3d). The 2 apical halves divergent, each with 2 subapical, nude setae and 2 pairs plumose setae, 1 pair on margin, other mediobasal. Basal part of rostrum longer than the divided apical part. Chelicerae (fig. 3c) usual. Pedipalp (fig. 3a) with 0–2–3–7 pectinate setae + a dorsolateral rhagidiform on segment 4. Segment 2 not angular, longer than 3, 3 is 2× as long as 4, 4 obliquely pointed apically. Legs long and slender. Leg I longer than body, IV about same length as body, III & IV shorter. All femora completely divided at about apical 1/4. Tarsus I (fig. 3e) with 3 rhagidiform organs in 3 irregularly placed fields, a stellate seta at base of the basal. All tibiae and genua with a rather prominent, submedial dorsal solenidion. Tarsal claws ciliated basally, empodium straplike, ciliated, shorter than claws. Dorsoapical seta of tarsi II–IV broadened apically, brush-like.

Holotype ♂ (DOMINION), Tucker Cove, 4 m, Campbell I., tussock leaf mold, 3. III. 1963, K. A. J. Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 2♂♂, 1♀, Tucker Cove, 1–100 m, moss, 21. XI. 1961, Gressitt; 1♂, 1♀, Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt; 3♂♂ Tucker Cove, 4 m, tussock leaf mold, 3. III. 1963, Wise; 2♀♀, St. Col Ridge, 180–280 m, moss on

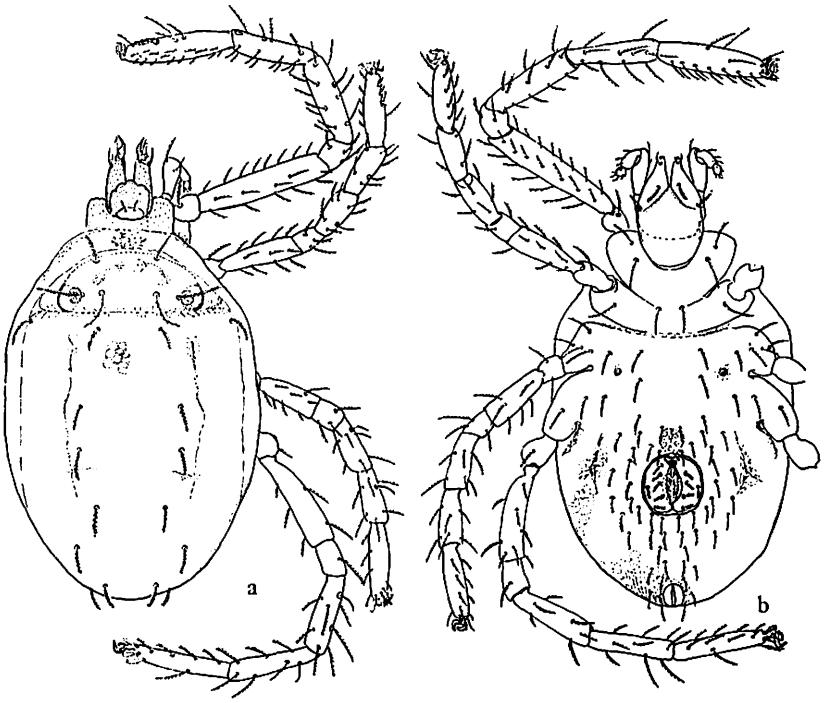

Fig. 2. *Stereotydeus undulatus* n. sp. a, dorsal view of ♂; b, ventral view of ♂.

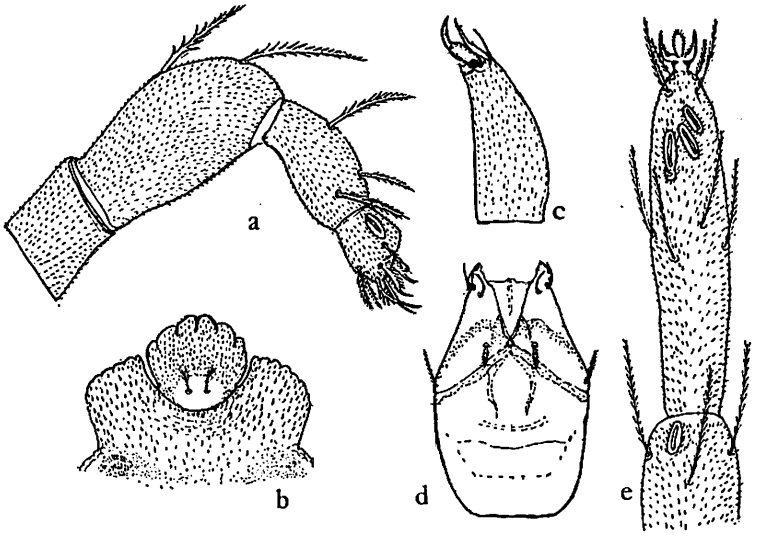

Fig. 3. *Stereotydeus undulatus* n. sp. a, lateral view of left pedipalp; b, dorsal view of epirostrum; c, chelicera; d, ventral view of rostrum; e, dorsal view of tarsus I and tip of tibia I.

rock, 4, 7, 9, 13. XII. 1961, Gressitt; 1♂, Beeman Camp, 2–50 m, chicken yard, 6–11. XII. 1961, Gressitt; 1♂, 1♀, Beeman Hill, moss, 2. II. 1963, Wise; 1♂, below summit, Mt. Lyall, 390 m, moss & lichen on rocks, 14. II. 1963, Wise; 1♂, 1♀, Campbell I., misc. berlese, 1961, Gressitt.

Remarks: Described from 10♂♂ and 5♀♀. May be distinguished from other species of the genus by the large number of ventral setae, and the distinctly scalloped margin of the epivertex. It is somewhat similar to the antarctic *S. villosus* (Trst.) but *villosus* has less prominent eyes, much more prominent horseshoe-shaped ridges on the propodosoma, is more heavily armored, and the epirostrum is smoothly margined.

Stereotydeus nudisetatus Strandtmann, n. sp. Fig. 4.

♀. Length, 410–480 μ, average 435. Coarsely hirsute dorsally with the pubescence in vague polygons; ventrally more finely pubescent, the pubescence in more distinct and regular polygons. Epirostrum in 3 large, triangular lobes, mid lobe long and pubescent, lateral lobes tuberculate, pointed. Femora divided at apical 1/4. Dorsal setae nude or nearly so; many leg setae nude. *Dorsal side* (fig. 4a): Shallow suture between propodosoma and hysterosoma. Posterior propodosomal seta at anterior margin of eye. Sensillae on or slightly posterior to a line between posterior margin of eyes, about as long as external propodosomal setae. Dorsal and scapular setae subequal, longer than ventral setae, nude or very nearly so. Hysterosoma with 2 faint, parallel lines laterally. Epirostrum and anterior portion of propodosoma tuberculate, rest of dorsum with coarse pubescence in more or less vague polygons. *Ventral side* (fig. 4b): Coxae in 2 groups separated by a shallow furrow. Coxae indistinct, not all coxal setae on coxae but assigning them by area the coxal seta formula is 3–1–4–3. Most lateral seta of coxa III nude, all others

pectinate. Circular genital camerastome bracketed by 5 pairs of lightly pectinate setae. Each genital cover with 6 plumed setae, 4th more lateral than others. Prominent pit between coxae III & IV on each side. Margins of body and margins of coxae tuberculate, venter otherwise with polygonal, pubescent fields. Excretory pore submarginal, ventral, surrounded by 3 pairs of setae, posterior pair nude. Rostrum closely pubescent, broadly cone-shaped, medially divided to about middle; 2 pairs of small, nude apical setae, 1 pair plumose marginal setae, and 1 pair internal plumose setae near base of medial division. All legs shorter than body; trochanter setal formula 1–1–1–1, all nude. All femora completely divided at about apical 1/4. Many dorsal setae of legs nude. Almost all ventral leg setae pectinate. Tarsal claws ciliated basally, empodium strap-like, ciliated, shorter than claws. All leg segments coarsely pubescent dorsally, more finely pubescent ventrally. Tarsi I & II each with 3 rhagidiforms in single file parallel to long axis of leg. On tarsus I (fig. 4d) each is in a separate field, on tarsus II the apical 2 are in a common field; all tibiae, and genua I–III with a single, dorsal solenidion. Pedipalp (fig. 4c) with segments strongly contracted basally; segment 2 about as long as 2 & 3 combined, angulated on outer margin, concave on inner face, with 2 setae; segment 3 shorter than 4, with 3 setae; segment 4, 1.5× as long as 3, with 7 apical setae and a basal rhagidiform. All palpal setae pectinate.

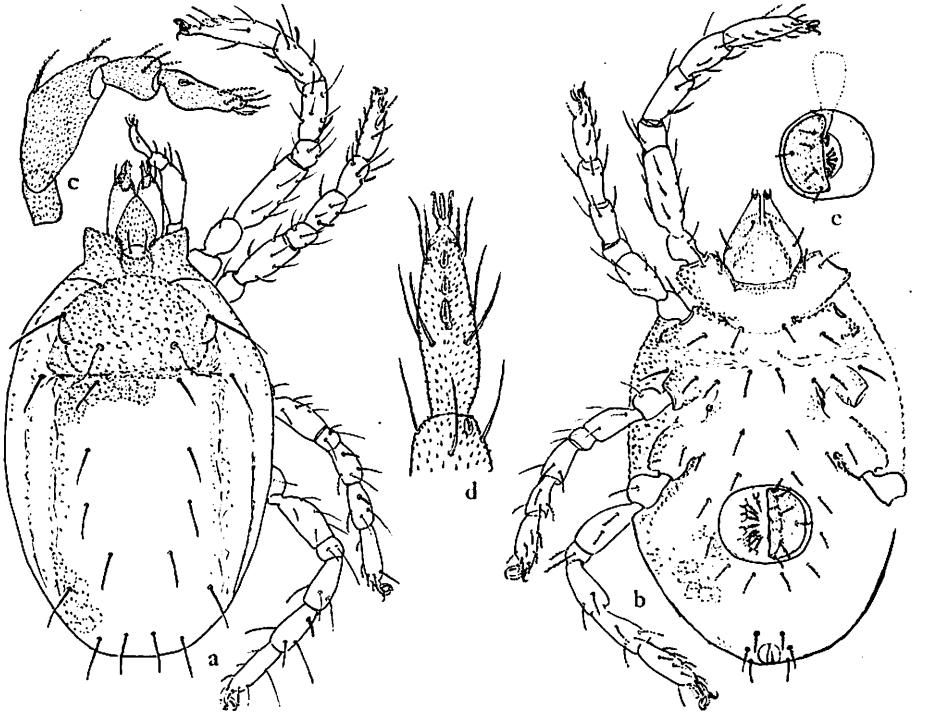

Fig. 4. *Stereotydeus nudisetatus* n. sp. a, dorsal view of ♀; b, ventral view of ♀ with right genital cover removed; c, lateral view of left pedipalp; d, dorsal view of tarsus I and tip of tibia I; e, ♂ genitalia.

Holotype ♀ (DOMINION), Mt. Lyall, 390 m, Campbell I., low plants below summit, berlese funnel, 19. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1♂, 1♀, Tucker Cove, 1–50 m, moss & lichen, berlese funnel, 25. XI. 1961, Gressitt; 1♂, 1♀, Shoal Point, tussock, 7. II. 1963, Wise; 1♂, Filhol Peak Summit, tussock & moss, 9. II. 1963, Wise; 1♂, 2♀♀, Mt. Lyall, 390 m, low plants below summit, 19. II. 1963, Wise; 1♀, Mt. Honey, 550 m, low plants below summit, 24. II. 1963, Wise.

Remarks: Described from 4♂♂ & 5 ♀♀. The combination of the long central lobe of the epivertex, distinctly triangular lateral lobes, nude dorsal setae, posterior dorsals as long as medial dorsals, angulate palpal segment 2 and long palpal segment 4 distinguish this species from others of the genus. It most closely resembles *S. areolatus* Womersley (1935) from S. Australia but *areolatus* is 100 μ shorter, has shorter dorsal setae, lateral lobes of epivertex not triangular, and palpal segment 2 is not angular. Also only 4 pairs of genital setae are shown for *areolatus* but this must be an error.

Stereotydeus pulcher Strandtmann, n. sp. Fig. 5

♀: Length 500 μ, varying from 455–540. Both dorsal and ventral surfaces with prominent, polygonal reticulations, sparsely and finely pubescent. Legs shorter than body; femora undivided. Segment 4 of palp 1/2 as long as 3. *Dorsum* (fig. 5a). Epirostrum trilobed, mid lobe a half circle, broader than lateral lobes, pubescent with faint reticulations; lateral lobes deeply pocked. Propodosoma and hysterosoma separated by a prominent suture that begins at eyes and extends posteriorly in a flat arc. Two prominent, slightly diverging furrows on hysterosoma connect with the propodosomal suture laterad of the sensillae, forming a prominent, modified "H" (or an "M", if the reader so prefers). Propodosomal setae equal, the posterior inserted near anterior margin of eye, the anterior nearer the eye than are the sensillae. Sensillae longer than dorsal setae, placed well back of a line drawn between the posterior margin of eyes. Dorsal setae subequal, delicate, finely pectinate. Scapular setae well forward, on or before a line through the bases of the sensillae. Entire dorsum prominently reticulated (except epivertex, which is smooth, and the mid lobe of epirostrum which is faintly reticulated basally and pubescent apically. *Venter* (fig. 5b): Coxae I & II separated from III & IV by a shallow furrow, setal formula 3–1–4–3. A small pit each side between coxae III and IV. Genital camerastome circular, usual, bracketed by 5 pairs of setae. Excretory pore usual, subterminal, surrounded by 3 pairs of setae. All ventral setae delicate, finely pectinate. Most of ventral surface prominently reticulated, margins of body and margins of coxae pocked. Ventral surfaces of coxae with fine pubescence forming striae. ♂ and ♀ genitalia distinguished by the usual differences. Rostrum with widely divergent apices, divided to about the middle, each half with readily apparent bars which are indicated by dotted lines on fig. 5b; with the usual 4 pairs of setae, – 2 small nude apicals, 2 pairs of pectinate basals. Pedipalp (fig, 5c). Diagnostic shape and size; segment 2 broad, strongly angulated on outer margin, equal to 1, 3 & 4 in length and surpassing them in volume. Segment 3 about 2/5 as long and 1/2 as wide as 2, with 3 setae; segment 4 slightly more than 1/2 as long as 3, obtusely angled apically, with 7 pectinate setae, and a small solenidion. Chelicerae usual, pubescent. Legs shorter than body, femora undivided, all segments noticeably constricted basally, setae delicate and finely pectinate. Tarsi I & II each with 3 rhagidiform organs, all

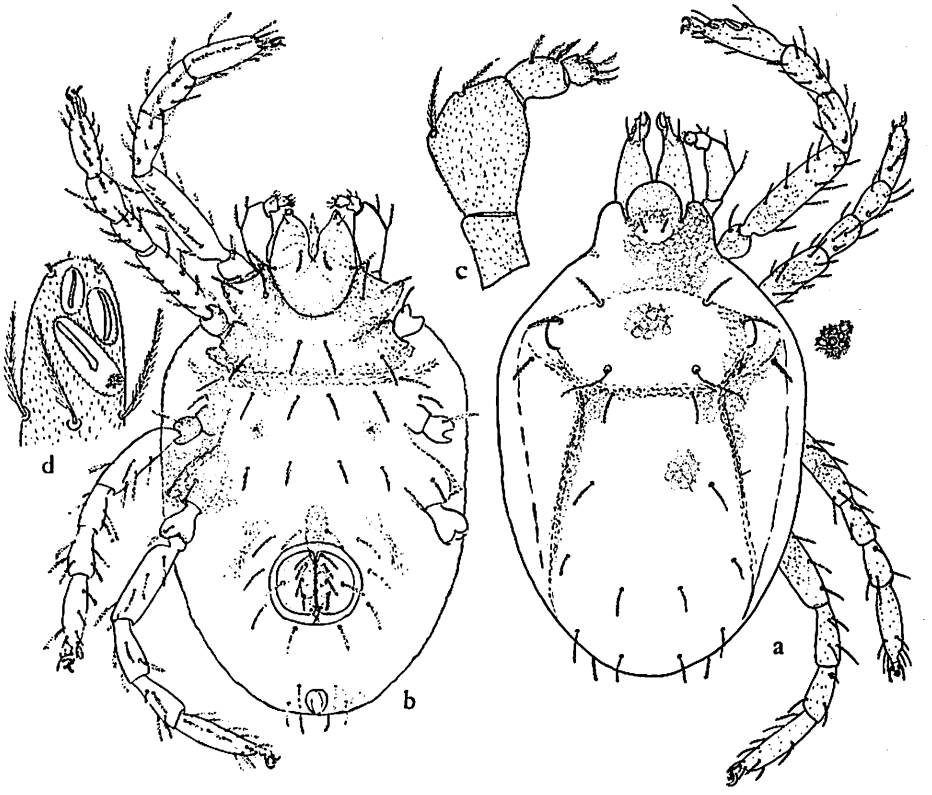

Fig. 5. *Stereotydeus pulcher* n. sp. a, dorsal view of ♂; b, ventral view of ♂; c, lateral view of left pedipalp; d, tip of tarsus I, dorsal view.

in separate fields, the apical 2 parallel to the long axis of leg, the basal longer and obliquely across the tarsus, subtended by a stellate seta on leg I (fig. 5d) and a nude seta on leg II. Tibiae I–IV, and genua I–III with a dorsal solenidion basally. Legs pubescent, faintly reticulate.

Nymph: Similar to adult but smaller, 350–390 μ and the internal genitalia not developed.

Holotype ♂ (DOMINION), below summit, Mt. Honey, 550 m, Campbell I., moss and lichens on rock, berlese fennel, 24. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 3 ♂♂, 1 ♀, St. Col Ridge, 180–280 m, moss on rocks, berlese funnel, 24, 26, 30. XI. 1961, Gressitt; 1♂, 1♀, Mt. Azimuth, 350 m, moss & lichen, 30. II. 1961, Gressitt; 2 nymphs, Beeman Hill, 100–180 m, yellow moss, 11–16. XII. 1961, Gressitt; 1, Beeman Camp, 2–50 m, moss, 12–17. XII. 1961, Gressitt; 1♀, 1 nymph, Campbell I., misc. berlese, 1961, Gressitt; 2♂♂, 2♀♀, Beeman Hill, 190 m, moss & lichen, 11. II. 1963, Wise; 1♂, below summit, Mt. Lyall, 390 m, moss & lichen on rock, 14. II. 1963, Wise; 1♂, Moubray Hill, low plants nr. summit, 16. II. 1963, Wise; 1♂, 1♀, St. Col Peak, 250 m, low plants on rocks, 23. II. 1963, Wise; 2♂♂, below summit, Mt. Honey, 550 m, moss & lichens on

rock, 24. II. 1963, Wise; 1♀, Tucker Cove, moss on *Dracophyllum scoparium*, 3. III. 1963, Wise.

Remarks: Described from 11♂♂, 7♀♀, and 4 nymphs. The combination of the large, angulated 2nd palpal segment, dorsal furrow pattern, setal pattern, prominent reticulations and undivided femora readily distinguish this species although there is a remote possibility that it is the same as *Stereotydeus occidentale* Womersley (1935 : 80). Womersley's illustration shows a similar epirostrum, setal pattern, and undivided femora. However *occidentale* is smaller, 420 μ, and the integument is said to be tuberculate. Unfortunately Womersley's description contains several obvious errors (3rd palpal segment with 2 hairs, pseudocapitulum with 2 setae) so that the possibility of other errors cannot be ignored. If Womersley's mite actually has no scapular setae, and if it is actually tuberculate rather than pocked, then the chance of synonymy is nil, but if these should prove to be errors in the descriptions, then synonymy is possible.

Penthaleus major (Duges) Figs. 6 & 7.

Tetranychus major Duges, 1834 (Ann. Sci. Nat. ser, 2 : 57). For further synonymy see Thor & Willmann (1941 : 80), & André (1953 : 279).

Average length of 5♀♀, 900 μ, varying from 890–1050. A plump mite with dorsal excretory pore and undivided body. All setae nude except ventral and apical tarsal setae which are pectinate or feathered. Dorsal podosomal setae stiff, moderately long, heavier than other setae. Sensillae slender, relatively short. Tarsus I (fig. 6d) with 3, tarsus II with 2 rhagidiform organs, the rhagidiforms of each tarsus in a common field. Tarsus I with a very short pretarsus (fig. 6e) tarsi II–IV (fig. 6c) without pretarsi. All claws ciliate basally, empodium narrow, straight, ciliated, about as long as claws. Rostrum (fig. 7a) of

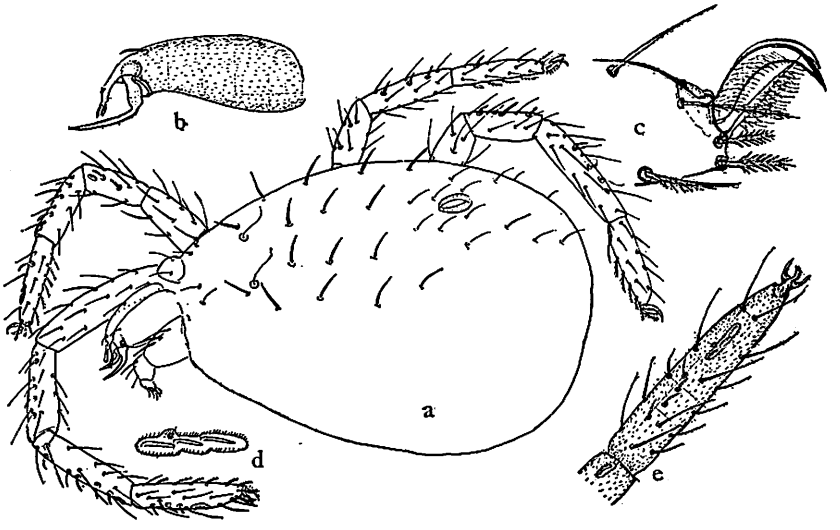

Fig. 6. *Penthaleus major* Duges. a, dorsolateral view of ♀ ; b, lateral view of chelicera ; c, tip of tarsus IV showing claws, empodium, and terminal setae; d, rhagidiform organs and stellate seta of tarsus I ; e, dorsal view of tarsus I and tip of tibia I.

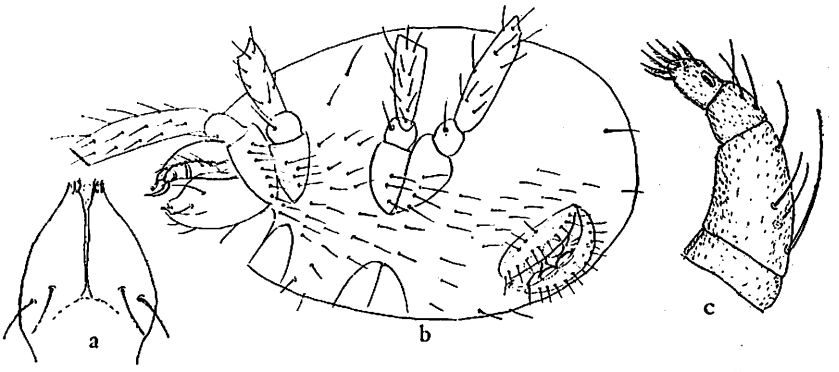

Fig. 7. *Penthaleus major* Duges. a, ventral view of rostrum; b, ventrolateral view of ♀; c, lateral view of right pedipalp.

a rather interesting shape, deeply divided, with 4 basal setae and 4 small apical setae. Ventral setae numerous. Coxal setae somewhat variable, the numbers shown, 7–4–3–4, was average for the 5 available specimens. Genitalia with 2 pairs of suckers and 12–16 setae on each genital cover. Pedipalps (fig. 7c) short, plump; apical segment as long as subapical, with 7 setae most of which are pectinate basally, and a dorsolateral rhagidiform near base. Segment 2 largest, with 4 nude setae; segment 3 (subapical) with 3 nude setae.

DISTRIBUTION: Cosmopolitan.

CAMPBELL I.: 5♀♀, Tucker Cove, 2 m, grass by stream, 22. XI. 1961, Gressitt; 1♀, nr. Tucker Cove, 5–100 m, 21, 22. XI. 1961.

Remarks: This serious pest of grasses, cereals, and other forage and garden crops has been reported from almost all crop-growing regions of the world. Its presence in the subantarctic is interesting in itself, but it seems especially so to note that it was on grass. Apparently it is a highly adaptable species provided that some of the higher plants, such as grasses, are present.

Rhagidia mildredae Strandtmann, n. sp. Figs. 8 & 9.

♀. Slightly more than 2× as long as wide. Legs I & IV longer than body. Eyes not apparent in mounted material. Average length, 1000 μ, varying from 790–1220. *Dorsal side* (fig. 8a): Epistome small, rounded, with 2 filamentose, ciliated setae longer than epistome and arising from approximately the middle (fig. 9f). Propodosoma with 2 pairs of setae, the inner pair from 1/2–2/3 as long as the outer, and near to and almost horizontal with the sensillae. Sensillae thread-like, finely ciliated, approximately as long as the outer setae. Dorsal hysterosoma with 8 or 9 pairs of setae, depending on whether the last pair is dorsal or ventral; the scapulars longest of the dorsal setae. *Ventral side* (fig. 8b): Coxae well defined, all somewhat triangular, in 2 groups, the anterior group touching midline, the posterior group separated by about the length of a genital seta. Coxal seta formula, 3–1–6–3, without variation in number or relative position and length. Genitalia in middle of opisthosoma, bracketed by 5 pairs of plumose setae. Genital covers each bearing 6 plumose setae shorter than the outer genital setae. ♂ with an internal sac and numerous internal, closely crowded, plumose setae. ♀ with 9–10 pairs more widely dis-

persed, internal plumose setae each of which is borne on a papilla. All ventral setae, especially the coxal, claviform. Excretory pore large and terminal. Rostrum (fig. 8c) with 8 subequal setae, the apical 4 nude. Anterior margin with 3–4 hyaline teeth on each side. Chelicera (fig. 9f) strongly swollen at base of fixed arm, outer seta of fixed arm 3–4× as long as the small inner seta. Tip of fixed arm with 3–4 small teeth apically (fig. 8d), no subapical teeth. Movable arm with a single row of very fine serrulations on inner margin; no teeth. Chelate portion slightly less than 1/2 total length of chelicera. Pedipalp with 4 segments, the 2 & 4 about equal, with 0–2–3–10 setae. Terminal segment (fig. 9e) cylindrical, rounded tip, almost 1/2 as long as wide, with 10 setae nearly as long as segment, and a small, submedian, dorsolateral solenidion. Legs long, relatively heavy for diameter of body. Femora I & II partially divided on ventral side, femora III & IV completely divided at approximately the middle. Legs I & IV longer than body, legs II & III shorter than body. Tarsal claws without accessory clawlets, empodium strap-like, ciliated, longer than claws. Tarsus I with 4 rhagidiform organs in separate, oblique fields (fig. 9 a, b). Not infrequently the apical or the basal rhagidiform will be almost at right

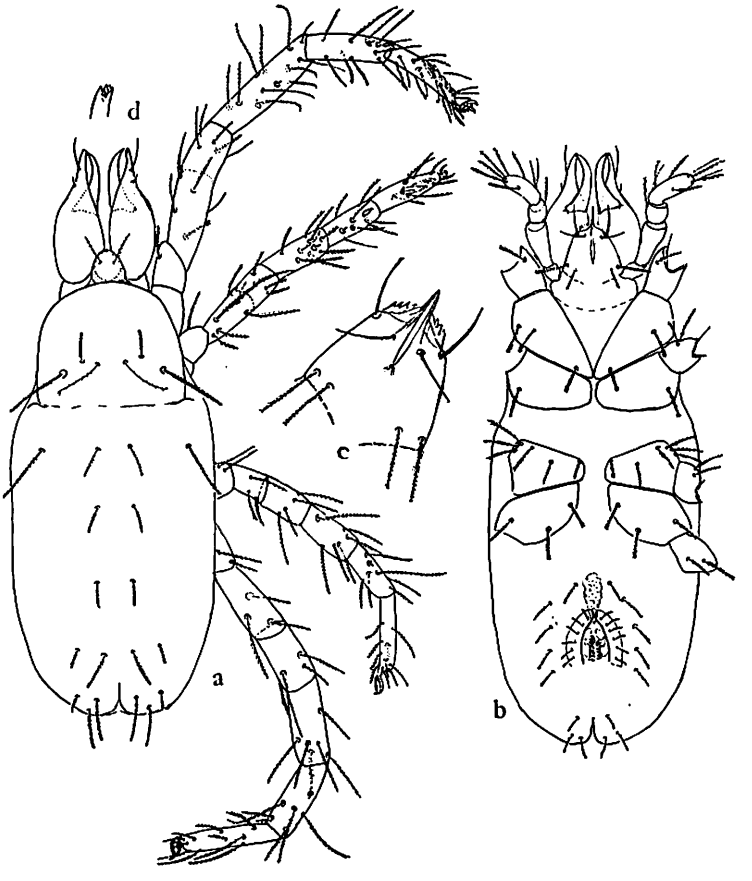

Fig. 8. *Rhagidia mildredae* n. sp. a, dorsal view of ♂; b, ventral view of ♂; c, ventral view of rostrum; d, enlarged tip of fixed arm of chela.

angles to the others. A stellate setae may be at base of the basal rhagidiform or at base of the subbasal rhagidiform. If it is at the base of the basal rhagidiform, then the solenidion of tibia I is near the apex of the tibia; if the stellate seta is subbasal, then the solenidion of tibia I is near the base of the tibia. Tibia I, in addition to the aforementioned solenidion has a dorsoapical rhagidiform. Genu I has a lateral, submedial solenidion. Tarsus II (fig. 9 c & d) has either 3 or 4 rhagidiforms in a common field parallel to the long axis of the tarsus and subtended by a small, erect seta. Tibia II has a dorsoapical sensory pit and a small solenidion dorsal and approximately medial, genus II has a small, ventral, subapical solenidion. Tibia III & IV and genu III each have a dorsal submedian solenidion. All leg setae finely ciliated. Base of claws finely ciliated.

Nymphs: Similar to adults except fewer genital setae, no internal genital setae and smaller body size.

Holotype ♀ (DOMINION), Beeman Hill, in *Dracophyllum longifolium* leaf mold, 2. III. 1963, Wise. Described from 8♂♂, 15♀♀, 4 nymphs.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1♂, 1♀, Mt. Lyall, 200–400 m, *Colobanthus*, berlese funnel, 3–5, 12.XII. 1961, Gressitt; 2♀♀, 1 nymph, Beeman Camp, 2–50 m, moss, 12–17. XII. 1961, Gressitt; 1♂, 2♀♀, Beeman Hill, *Dracophyllum longifolium* leaf mold, 2. III. 1963, Wise; 1♀, 1 nymph, Beeman Beach, on top rock, 19. XII. 1961, Rennell; 1♀, St. Col, Lyall, Beeman, mixed moss, 3–5. XII. 1961, Gressitt; 2♂♂, 2♀♀, St. Col Ridge, 180–280 m, moss, 4, 7, 9, 13. XII. 1961, Gressitt; 1♂, 2♀♀, 1 nymph, St. Col Ridge, 180–280 m, 24, 26, 30. XI.

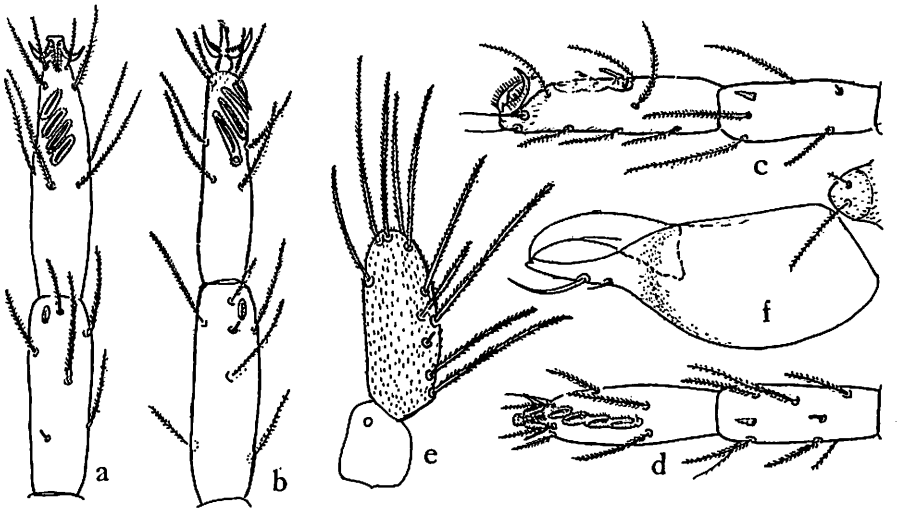

Fig. 9. *Rhagidia mildredae* n. sp. a, dorsal view of tarsus and tibia I showing the stellate seta between the 2 basal rhagidoforms and the solenidion near base of tibia; b, dorsal view of tarsus and tibia I showing the variation with stellate seta at base of basal rhagidiform and the solenidion near apex of tibia I; c, dorsolateral view of tarsus and tibia II showing a form with 3 rhagidial organs; d, dorsal view of tarsus and tibia II of a form with 4 rhagidial organs; e, lateral view of terminal two segments of right pedipalp; f, dorsolateral view of chelicera and dorsal view of epivertex.

1961, moss on rocks, Gressitt; 1♂, Smooth water Bay, leaf mold under tussock, berlese funnel, 16. II. 1963, Gressitt; 1 nymph, Filhol Peak summitt, tussock & moss, 9. II. 1963, Wise; 1♀, Filhol Peak, 213 m, lichens & moss, berlese funnel, 9. II. 1963, Wise; 2♀♀, Mt. Azimuth, 350 m, moss & lichen, 30. XI. 1961, Gressitt; 1♂, 1♀, Courrejolles Peninsula, 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 1♀, Lookout Bay Beach, high tide level, under rocks, 16–19. XII. 1961, Gressitt; 1♂, misc. berlese funnellings, 1961, Gressitt.

Remarks: Similar to *Rhagidia macquariensis* Womersley & Strandtmann (1963) in size and general appearance but *macquariensis* has a prominent, subapical tooth on the fixed arm of the chela, lacks solenidia on the leg segments, the terminal segment of the palp is shorter, and coxae I are less triangular. There is also a superficial resemblance to *R. gerlachei* Trst. but *gerlachei* has a trochanter setal formula of 1–2–2–2 and is a larger mite, from 1250–1550 μ. In Thor & Willmann's key (1941) *mildredae* runs to *megalochela* Tragardh from Tierra del Fuego. It is no doubt close to that species but the movable arm of the chelo is quite differently shaped. Most abundant in moss and lichen, if not entirely restricted thereto. Not only is there variation in size but considerable variation also is exhibited in the number and placement of solenidia and rhagidial organs. Some of these are indicatated in the figures and have been mentioned in the description. With only one exception, there was no consistency in the variations. The exception was on leg I; —if the stellate seta of tarsus I is between the 2 basal rhagidiforms then the solenidion of tibia I is basal; if the stellate seta is basal, then the solenidion of tibia I is apical. Sometimes tarsus II had 4 rhagidiforms and sometimes 3; also the solenidia of legs III and IV varied somewhat in position but I could establish no correlation with any of these variations to sex or to the position of the stellate seta of tarsus I. Body chaetotaxy was remarkably constant; the rostrum and epistome were constant; some variation occurred in the relative length of the chela and chelicera but again it did not correlate with other variations.

Named for Mildred, to fulfill a promise of long standing.

Rhagidia sp.

A unique ♀, Tucker Cove, 1–50 m, from moss and lichen, 21–25. XI. 1961, Gressitt. Length of body 512 μ. Legs usual in relative size and length; coxal seta formula 3–1–4–3; trochanter, 1–1–2–1. Genitalia with 5 setae on each cover, 9 internal setae on papillae, 5 pairs paragenital setae. First 3 pairs of dorsal setae 1/2 as long as scapulars and 1/2 as long as posterior 2 pairs of dorsals. Anterior propodosomal seta about 1/2 as long as the posterior propodosomal setae; sensillae filiform, longer than posterior propodosomal seta. Chelate portion of chelicera 1/3 total length of chelicera. Apparently only 1 chelicera seta. The condition of the specimen does not permit observation of rhagidiforms and solenidia.

The presence of only a single cheliceral seta when the normal number is 2 indicates that one may be missing accidentally. It is impossible to evaluate any character on a unique specimen and for that reason no name is given to this specimen.

Lorryia sp.

1♀, Courrejolles Peninsula, 200 m, *Colobanthus*, Gressitt. Length 363 μ; leg I 132 μ. Dorsum, large areas of delicate reticulations separated by smaller areas of striato-punctate lines.

Venter entirely striato-punctate. Resembles *Lorryia sigthori* Baker (1944) described from nymphs collected from moss and lichens on the western face of Popocatepetl in Mexico at an elevation of 2800 m. It is difficult to say from only 1 specimen, whether this is the adult of Baker's species or if it represents a new species.

Nanorchestes antarcticus Strandtmann

Nanorchestes antarcticus Strandtmann (in Womersley & Strandtmann, 1963).
?Nanorchestes amphibius, Womersley, 1937 (? not *N. amphibius* Topsent & Trouessart).

1♂ collected at Courrejolles Peninsula, 200 m, on *Colobanthus*, by Gressitt. 2♂♂, Tucker Cove, 1–50 m, Campbell I., moss, 21–25. XI. 1961, Gressitt.

Remarks: The assiduous collecting of Drs. J. L. Gressitt and K. A. J. Wise have demonstrated this very small mite to be common in the Antarctic proper and one of the most southern forms of terrestrial arthropods. Its presence in the subantarctic is to be expected and it is therefore quite likely that future collecting, with this mite as an objective, will reveal them in greater numbers. Womersley's paper (1937) on the Australian Antarctic Expedition of 1911–14 records a single specimen from the Macquarie Island of what he called *Nanorchestes amphibius* T. & T. It is probably *N. antarcticus*. The distinction between *N. antarcticus* and *N. amphibius* has been given in Womersley and Strandtmann (1963). Womersley's paper of 1937 does not indicate the diagnostic characters (cheliceral seta, solenidia, epirostrum) for separation and in view of the present recovery of *N. antarcticus* from Campbell I., I am assuming the specimen Womersley had is also this species.

Microtrombidium karriensis Womersley Figs. 10 & 11.

Microtrombidium karriensis Wom., 1934: 191.
Microtrombidium (*M.*) *tasmanicum* Wom., 1937: 88.

Redescribed from 37 specimens which ranged in size from 1120–1800 μ, averaging 1450 μ. Ovoid elliptic in shape, widest at shoulders. Propodosoma narrow, roundly angulate, the paired eyes marginal at lateral angles, about opposite the middle of crista. Legs shorter than body, tarsi I enlarged and ovoid. Body chaetotaxy dense, uniform, ciliated. *Ventral side* (fig. 10b): Rostrum (fig. 11c) bluntly cone-shaped, with 8–10 nude bristles subapically and some 15 pairs medially directed, ciliated setae ventrally and laterally. Genital opening between coxae IV, covered by 2 reniform covers, each bearing about 35 nude or nearly nude setae medially and about that many ciliated setae laterally (fig. 11d). Excretory opening (fig. 11d) circular, covered by 2 lips each bearing 12–15 ciliated setae. Coxae hirsute, each with 20–40 slender, ciliated setae which are not quite as long, more slender, and with smaller insertions than ventral body setae. *Dorsal side*: Propodosoma (fig. 10a) comes to a truncate apex where there are 10–12 anteriorly directed ciliated setae roughly in 2 rows. Eyes slightly elevated, projecting beyond margin of body and on a plate. Crista metopica has a circular sensory area (fig. 11 a–b) and 1 pair of long, filamentous, apparently nude sensillae originating off the inner posterior rim of the sensory area. Pedipalp tibia with a slender, spine-like seta near base of palp tarsus (fig. 11f). Accessory tibial claw about 1/2 as long as tibial claw, both smooth and sharply pointed. Inner side with a comb of 8–10 spine-like setae, followed by a loose cluster of 5–6 nude setae (fig. 11g); on outer side, tibia with 10–12 sparsely ciliated setae plus 2 nude setae apically, in addi-

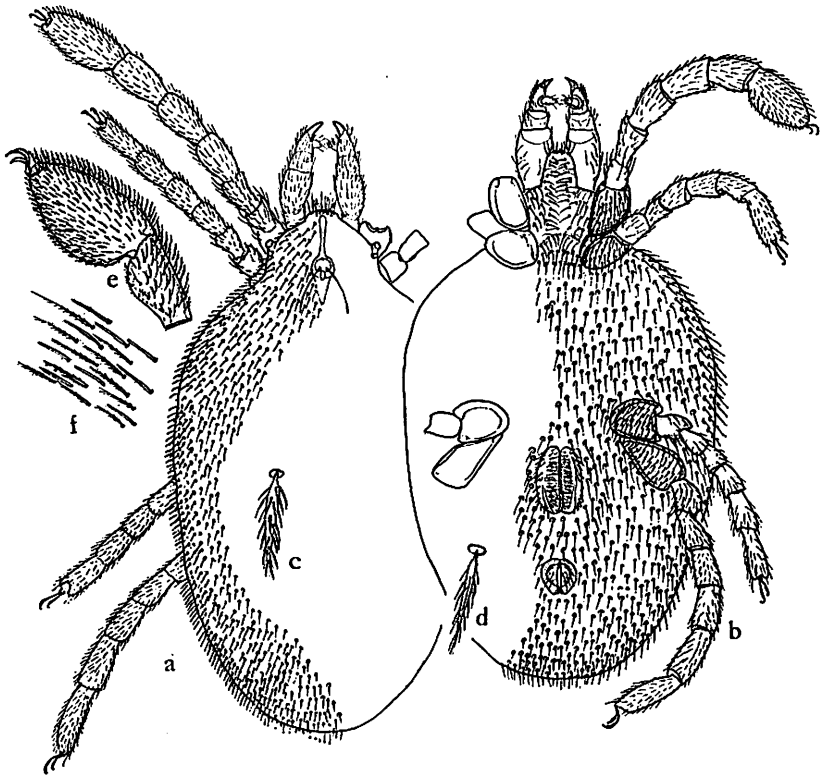

Fig. 10. *Microtrombidium karriensis* Womersley, adult. a, dorsal view; b, ventral view; c, dorsal seta enlarged; d, ventral seta enlarged; e, lateral view of tarsus and tibia I; f, enlarged view of portion of tarsus I showing intermingling of setae and solenidia.

tion to the spine-like seta (fig. 11f). Palp tarsus elongated, non-capitate, rather closely covered with ciliated setae among which is at least 1 nude solenidion. Rest of palpal segments closely covered dorsally with stiff, weakly ciliated setae, —ventrally setae are longer, not stiff, and fewer in number. Chelicera (fig. 11e) bears a strong chela, finely toothed on inner margin, —typical of the genus. Body chaetotaxy remarkably uniform. Dorsal setae a bit thicker, somewhat closer together and with smaller setal bases than ventral setae. All body setae ciliated, as shown in the enlargements (fig. 1 c & d). Femora of all legs divided in middle. Tarsi concave apically to receive the retracted claws. Claws 2, unequal, slightly widened in arch. No empodium. On basal segments the dorsal setae are finer, stiffer, more numerous and less ciliated than the ventral setae. Ventral setae more abundant and more densely ciliated on tarsi. All tarsi, and to a lesser extent the tibia with numerous solenidia interspersed among the ciliated setae. This is especially true of tarsus and tibia I (fig. 11e). Fig. 11f is an enlarged view of a section of tarsus I to show how the setae and solenidia are interspersed.

DISTRIBUTION: Campbell I., Tasmania, South Australia, West Australia.

CAMPBELL I.: 11, Mt. Lyall, 200-400 m, moss, 3, 5, 12. XII. 1961, Gressitt; 8, Cour-

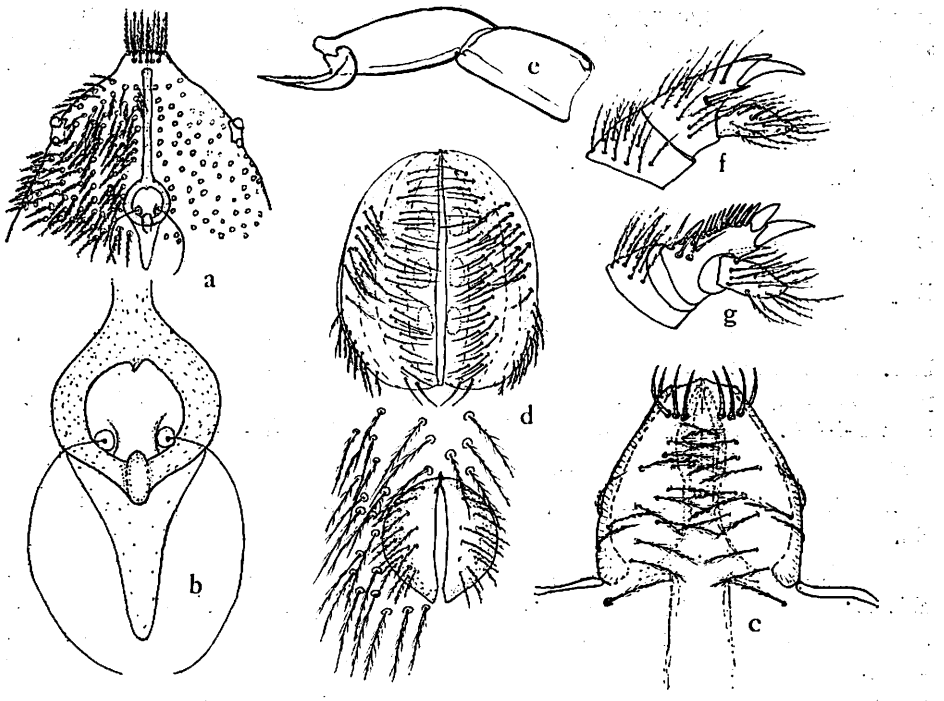

Fig. 11. *Microtrombidium karriensis* Womersley, adult. a, propodosoma with setae on right side removed; b, enlarged view of sensory area showing sensillae and post-metopical plate; c, ventral view of rostrum; d, genital and excretory pores and associated setae; e, lateral view of chelicera; f, lateral view of terminal 3 segments of right pedipalp; g, lateral view of terminal 3 segments of left pedipalp.

rejolles Peninsula, 200 m, Mollymawk rookery, moss, 14. XII. 1961, Gressitt; 1, Courrejolles Peninsula, 200 m, mollymawk rookery, 12. II. 1963, Rennell; 1, Monument Harbour, N. Bearch, rocky shore, 10. XII. 1961, Gressitt; 1, same data but beach boulders, moss, 17. XII. 1961, Gressitt: 1, same data but tussock, 9. II. 1963, Wise; 1, Perseverance Harbour, tussock roots, 11. XI. 1961, Wise; 3, Perseverance Harbour, Lookout Bay, leaf mold under tussock, 3. II. 1963, Wise; 1, same data but under *Stilbocarpa*; 4, Shoal Point, tussock, 7. II. 1963, Wise; 2, same data but Rennell; 1, below summit of Mt. Honey, 550 m, moss & lichen on rocks, 24. II. 1963, Wise; 1, Tucker Cove, tussock leaf mold, 3. III. 1963, Wise; 1, Rocky Bay, 10 m, penguin colony, 19. II. 1963, Wise.

Remarks: Womersley (1945: 308) stated, "Members of this genus are very difficicult to separate..." —a masterpiece of understatement! The 37 specimens before us exhibit considerable variation in size and considerable apparent variation in details of the crista, sensillae, and pedipalps. But careful study always dissolved the apparent variations and this, plus the absolute uniformity of the chaetotaxy, makes us feel confident that we are dealing with 1 species. Various ones of the specimens could be made to fit several of the species described by Womersley from Australia and New Guinea but since they are descriptions of unique, or of 2 or 3 specimens, it is impossible to evaluate the range of variation. I am of the opinion that they are probably synonyms of *karriensis* but hesitate

to relegate them to synonymy without seeing types or type locality material. André's descriptions of the species of Angola are sufficiently detailed to establish that our species does not apply to any of them. Clearly this species from Campbell I. has its affinities with Australian forms.

According to Womersley (1945) *Microtrombidium karriensis* and its synonym *M. (M.) tasmanicum* varies considerably in size and is widely distributed in South and Western Australia and Tasmania. The descriptions and illustrations contain nothing that would exclude the Campbell I. form.

Ereynetes sp.

Length approximately 365 μ. Propodosomal sensory area with weak, subcuticular, sclerotic bars. No propodosomal shield; eyes absent or not apparent on mounted specimens. Pedipalp apparently 3-segmented. Palp tarsus with an inflated seta basally (fig. 12b). Coxal setae 3–1–3–2. Trochantal setae 1–1–1–0; II & III ciliated, II nude.

DISTRIBUTION: Campbell I., ? Macquarie I.

CAMPBELL I.: 1, Lookout Bay, Beach, 16–19. XII. 1961, *Dracophyllum* leaf mold, Gressitt.

Remarks: This mite may be *Ereynetes macquariensis* Fain. The unique specimen available to me had the posterior ventral portion of the body badly torn and the legs were not in position for good observation. The other characters, as illustrated, seemed clear enough but I hesitate to say that the differences shown and enumerated below are true and constant; hence I prefer to leave the specimen unnamed until such time as more

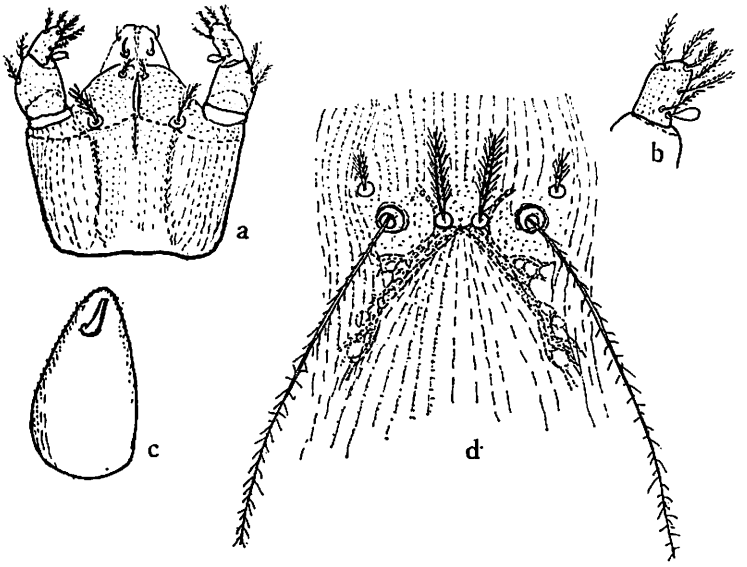

Fig. 12. *Ereynetes* sp. a, ventral view of gnathosoma; b, ventrolateral view of left palp tarsus; c, ventral view of chelicera (broken chela); d, propodosomal sensory area.

material is available. The unique specimen differs by having the sensillae much closer together, no podosomal shield, somewhat shorter dorsal setae, pedipalps apparently only 3-segmented, rostral setae differently arranged. The specimen is apparently a nymph and some of the above differences could be accounted for on that basis, but if the pedipalp is really only 3-segmented, then this is probably a different species.

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Pacific Insects Monograph 7: 166–169 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
PROSTIGMATA: BDELLIDAE[1]

By Warren T. Atyeo[2]

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Abstract: *Bdellodes* (*Hoploscirus*) *gressitti* from Campbell Island is described. A key to the identification of Campbell I. species of *Bdellodes* is given.

Bdellid species from Campbell I. and the Auckland Is. were described recently by Atyeo (1963) from material collected by the staff of the Dominion Museum, Wellington, New Zealand. The new species and the new records in the present paper are based on collections made by Dr. J. L. Gressitt (Bishop Museum, Honolulu).

Key to Campbell Island species of Bdellodes

1. Median propodosomal setae more than 8× length of posterior sensilla; tips of posterior sensilla in contact with adjacent median propodosomal setae; palpal genu shorter than telofemur 2
   Median propodosomal seta not more than 3× length of posterior sensilla; posterior sensilla slightly removed from and not in contact with median propodosomal setae; palpal genu longer than telofemur 3
2. Trichoboth on tibia IV inserted at 3/4 the length of segment; cheliceral setae separated by approximately 1/4 the cheliceral length ..... **Bdellodes (Hoploscirus) petila**
   Trichoboth on tibia IV inserted at 1/2 length of segment; cheliceral setae approximate ..... **B. (H.) gressitti**
3. Palpal genu with 8–10 setae ..... **B. (H.) flexuosa**
   Palpal genu with 4 setae ..... **B. (H.) multicia**

Bdellodes (Hoploscirus) petila Atyeo, 1963

This species was originally described from a single specimen collected at Homer Forks, Otago, New Zealand. Two additional specimens (♀♀) have been taken from Lookout Bay Beach, Campbell I., 16–19.XII.1961 by J. L. Gressitt, under a rock at high tide level. These specimens differ from the holotype in that they are almost 2× larger, have the internal humeral setae 3/4 the length of 1st interspace, have 2 setae on the lateral row of palpal tibiotarsus, and have 30 ventral setae on tarsi I–II. The numbers of setae mention-

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ed are greater than those given in the original description, but as there is a positive correlation between length and number of setae, these increases could be accounted for by intraspecific variation.

Bdellodes (Hoploscirus) flexuosa Atyeo, 1963

This species was collected on Campbell I. only at Perserverance Harbor and Tucker Cove.

Bdellodes (Hoploscirus) multicia Atyeo, 1963

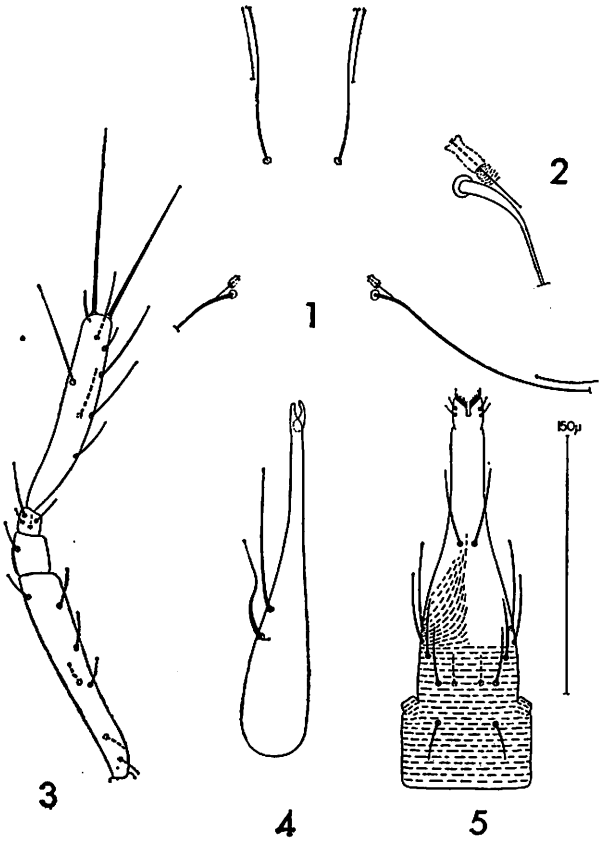
This species was described from material collected on the Auckland Is. Additional records show that *B. (H.) multicia* was discovered on Campbell I., Tucker Cove, Beeman Camp, St. Col Ridge, Courejolles Pen., Monument Harbor, and Mt. Puiseux, XII. 1961, by J. L. Gressitt.

Bdellodes (Hoploscirus) gressitti Atyeo, n. sp. Figs. 1–5.

The cheliceral setae of this n. sp. are arranged as in *B. (H.) norwegica* (Thor), and the palpal chaetotaxy is similar to *B. (H.) petila*. The latter species can be distinguished from *B. (H.) gressitti* by having the trichoboth on tibia IV inserted at 3/4 length rather than at 1/2 length.

♀: Length, including gnathosoma, approximately 1000 μ. *Gnathosoma* (figs. 1–5): Palpal basifemur with 3 setae on mesal surface; measurements: II, 125 μ; III, 24 μ; IV, 16 μ; V, 120 μ; *des*, 98 μ, *ves*, 85 μ. Chelicera nonstriated, 205 μ in length; movable digit flattened subapically; setae as figured; anterior seta, 119 μ, posterior seta, 137 μ from apices of chela. Gnathosomal base and hypostome striated to *vh* 6, remainder nonstriated; *vh* 6 nearer to *vh* 5 than to hypostomal tip. Dorsal hypostomal seta, 18 μ in length. *Dorsal idiosoma*: Striae with superimposed oscillatory pattern. Dorsal propodosoma without subcuticular thickenings; anterior sensilla, 115 μ in length, separated by 65 μ; posterior sensilla, 28 μ in length, separated by 115 μ; median propodosomal setae, 195 μ in length, nude (fig. 2). Hysterosomal setae nude; length of internal humeral seta, 83 μ, about 2/3 of 1st interspace; external humeral seta, 78 μ in length. *Ventral idiosoma*: Striae with superimposed oscillatory pattern in paragenital region. Each genital plate with 7 setae in linear arrangement, 2 pairs of paranal setae; 3 pairs of paragenital setae. *Legs*: Each claw with 4–6 lateral rays, row of minute rays not apparent; measurements; tibia I, 55 μ; tarsus I, 115 μ; pretarsus I, 29 μ; tibia II, 54 μ; tarsus II, 127 μ; tibia IV, 112 μ; tarsus IV, 186 μ; length of legs (excluding coxae and pretarsi): I, 410 μ; II, 405 μ; III, 480 μ; IV, 624 μ. Chaetotaxy: without supernumerary setae; coxae I–IV, 4, 3, 2 tactile setae; trochanters I–IV, 1 tactile seta each; basifemora I–IV, 13, 13, 10, 5 tactile setae; telofemora I–IV, 7 tactile setae each; genua I–IV, 6, 6, 5, 6 tactile setae and respectively, 8, 5, 3, 4 attenuate sensory setae; tibia I, 10 tactile setae, 3 attenuate sensory setae, 1 peg, trichoboth; tibia II, 10 tactile setae, 1 blunt and 1 attenuate sensory seta, trichoboth; tibia III, 10 tactile setae, 1 attenuate sensory seta distal; tibia IV, 11 tactile setae, trichoboth at 4/9 length; tarsus I, 18 pilose ventral setae arranged in 2 rows, 1 dorsal and 7 lateral setae, 2 attenuate and 2 long, attenuate sensory setae, 1 peg, *dt* 1, nude, *dt* 2, 3, branched; tarsus II, 2 attenuate and 1 long, attenuate sensory seta; tarsi III–IV, trichoboth.

♂. Similar to ♀, although slightly smaller; length, including gnathosoma, about 800 μ.



Figs. 1–5. *Bdellodes* (*Hoploscirus*) *gressitti* Atyeo, n. sp. 1, dorsal propodosomal shield; 2, posterior pseudostigma, enlarged; 3–5, ventral gnathosoma.

Holotype ♀ (DOMINION), Beeman Camp, 2–50 m, Campbell I., moss, 12–17.XII.1961, Gres-Gressitt. Allotype ♂, Courrejolles Peninsula, Campbell I., mollymawk nests, 14.XII.1961, sitt. Paratypes: 1♂, Beeman Hill, 100–180 m, yellow moss, 11–16.XII.1961; 1♂, Tucker Cove, 1–5 m, moss (Berlese), 21–25.XII.1961; 1♂, Beeman Beach, *Chrysobactron*, 11, 15.XII.1961; all Campbell, coll. Gressitt.

Location of types: The holotype is deposited in the Dominion Mus., Wellington; allotype and 1 paratype are deposited in the Bishop Museum, Honolulu and 2 paratypes are in my personal collection.

This new species is named after Dr. J. L. Gressitt, collector of the type series.

Acknowledgement: I wish to thank the University of Nebraska Research Council for funds to employ an artist to complete portions of the illustrations.

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INSECTS OF CAMPBELL ISLAND. CHILOPODA, DIPLOPODA (PRELIMINARY NOTE ON THE MYRIAPODA OF THE NEW ZEALAND SUBANTARCTIC ISLANDS)

By Peter M. Johns

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Abstract: One species of centipede and 2 of millipedes occur on Campbell I. The centipede is introduced and the millipedes (2 families) are new but will be described later. Two additional centipedes and 3 additional millipedes have been found in the Auckland Is., and 1 millipede of a different group in the Snares.

The first myriapods recorded from the New Zealand Subantarctic Islands are the centipedes *Cryptops megalopora* and *Haasiella insularis* of Haase (1887). The expedition sent to the islands by the Canterbury Branch of the New Zealand Institute in 1907 collected both centipedes and millipedes which were reported by Benham (1909) but these apparently remained unidentified and undescribed and are now presumed lost. Archey (1923) described a chilopod from the Auckland Is., but this must now be synonymised.

I have recently visited Auckland and Campbell Is. and material collected by members of Bishop Museum, Honolulu has been made available through the kindness of Dr. J. L. Gressitt. The material of the wartime Cape Expedition has also been examined.

CHILOPODA

Family HENICOPIDAE

Henicops maculatus Newport 1844

H. maculatus: Archey, 1937, Rec. Auck. Inst. Mus. **2** (2): 75, pl. 17, figs. 1–7.

This species must be regarded as introduced to Campbell I. as, like the *Schedotrigona* sp. noted below, it is found in the vicinity of Tucker Cove, the site of the farmhouse and first meteorological station.

Haasiella insularis (Haase)

Henicops insularis Haase, 1887, Abh. Zool. Anthropol.-Ethn. Mus. Dresden **5**: 36, pl. 3, fig. 41.

Haasiella insularis: Pocock, 1901, Ann. Mag. Nat. Hist. ser. 7, **8**: 449.

H. insularis: Archey, 1917, Trans. N. Z. Inst. **49**: 316.

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Wailamyctes munroi Archey, 1923, Rec. Cant. Mus. **2** (3): 115. **New Synonymy.**

W. munroi: Archey, 1937, Rec. Auck. Inst. Mus. **2** (2): 84.

Archey (1937) suspected, and my observations, confirm, that *Wailamyctes munroi* Archey is identical with *Haasiella insularis* (Haase). One specimen having the coxal pore formula 1.1.1.1. has been seen and it is without doubt a juvenile. All the legs are normal and there is no terminal tapering process described by Haase as the ♂ genitalia. Other juveniles having coxal pore formulae intermediate between 1.1.1.1. and the adult formula 3.3.3.3. described for *Wailamyctes munroi* have also been seen.

Anopsobius neozelanicus Silvestri

A. neozelanicus Silvestri, 1909, Rend. R. Acc. Lincei **18**: 322.
A. neozelanicus: Archey, 1937, Rec. Auck. Inst. Mus. **2** (2): 87, pl. 23, figs. 1–8.

A few adults of this species have been found at high levels and many juveniles are from the leafmold of the *Metrosideros lucida* forest of the Auckland Is. It is a common species in the leaf litter throughout New Zealand.

Family GEOPHILIDAE

A species of this family has been taken by me on the Auckland Is. Its habitat is unusual for a geophilid in the New Zealand area. It was taken under firmly cemented volcanic rocks in the upper littoral and supralittoral zones of the shore. The habitat of the mainland *Nesogeophilus xylophagus* is somewhat similar in that it is found under driftlogs in the supralittoral of sandy beaches.

DIPLOPODA

Family SPHAEROTRICHOPIDAE

Endemic sphaerotrichopid millipedes are found on both Auckland and Campbell Is. These were apparently collected in 1907 but have remained undescribed. The 3 species, 1 on Campbell I. and 2 on Auckland Is. belong to 2 genera. These species are to be described in a forthcoming paper in which all the genera in the New Zealand region will be considered.

Family METOPIDIOTRICHIDAE

Many specimens of a *Schedotrigona* n. sp. have been taken on Campbell Is. It is strongly suspected that this species has been introduced from New Zealand as the species has only been found in the close vicinity of Tucker Cove and the old meteorological station. This area has been occupied for 80 years, firstly as a sheep station and then for scientific purposes.

Family SIPHONOPHORIDAE

Siphonophora sp.

One juvenile is known from the Auckland Is.

Family near CRYPTODESMIDAE

I (1962) have already noted that a group of undescribed millipedes placed in or close

to the Cryptodesmidae is known from New Zealand and the Snares Is. to the south. So far this is the only myriapod recorded from the Snares Is. but it is likely that further members will be found.

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INSECTS OF CAMPBELL ISLAND.
SYMPHYLA

Par L. Juberthie-Jupeau

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Monsieur J. L. Gressitt, Professeur de Zoologie au Bishop Museum, Honolulu, m'a confié l'étude des Symphyles récoltés aux Iles Campbell, ce dont je le remercie. Ce matériel compte 31 individus appartenant à 2 espèces dont l'une est inédite.

Fam. SCOLOPENDRELLIDAE

Genre **Symphylella** Silvestri

Symphylella essigi Michelbacher

Beeman, 19. XII. 1961 : 1 1. à 11 pp.[1] ; Beeman Hill, 2–50 m, 21, 25. XI. 1961 : 1 ad. ♀ ; Perseverance Harbor, Lookout Bay, 3. II. 1963 : 2 ad. ♀♀ ; Tucker Cove, 4 m, 0–30 m, 0–100 m, 3. III. 1963 : 1 ad. ♀ ; Lyall–Beeman Saddle, 70 m, 3, 5, 8, 12. XII. 1961 : 1 ad. ♀, 1 1. à 10 pp. ; St. Col Ridge, 180–280 m, 4, 7, 9, 13.XII.1961 : 1 1. à 10 pp. ; Mont Honey, 500 m, 17. XII. 1961 : 1 ad. ♀; Misc, 1961 : 1 1. à 9 pp. Au total : 10 individus.

Les exemplaires examinés sont comparables aux paratypes de l'espèce, obligeamment prêtés par Michelbacher ; en particulier, les tergites présentent la même disposition des soies et les processus tergaux possèdent les mêmes dimensions et le même écartement ; les filières, les P.I. et les P.XII ont la même chaetotaxie. Cette espèce était connue à ce jour de Californie (environs de San Francisco).

Elle diffère nettement de *Symphylella tenella* Scheller des Iles Hawaii, de *S. cylindrica* Scheller, de *S. australiensis* Scheller, de *S. bornemisszai* Scheller, et de *S. tenuis* Scheller, décrites d'Australie. Elle est également très différente de *S. maorica* Adam et Burtel de Nouvelle-Zélande.

Fam. SCUTIGERELLIDAE

Genre **Hanseniella** Bagnall

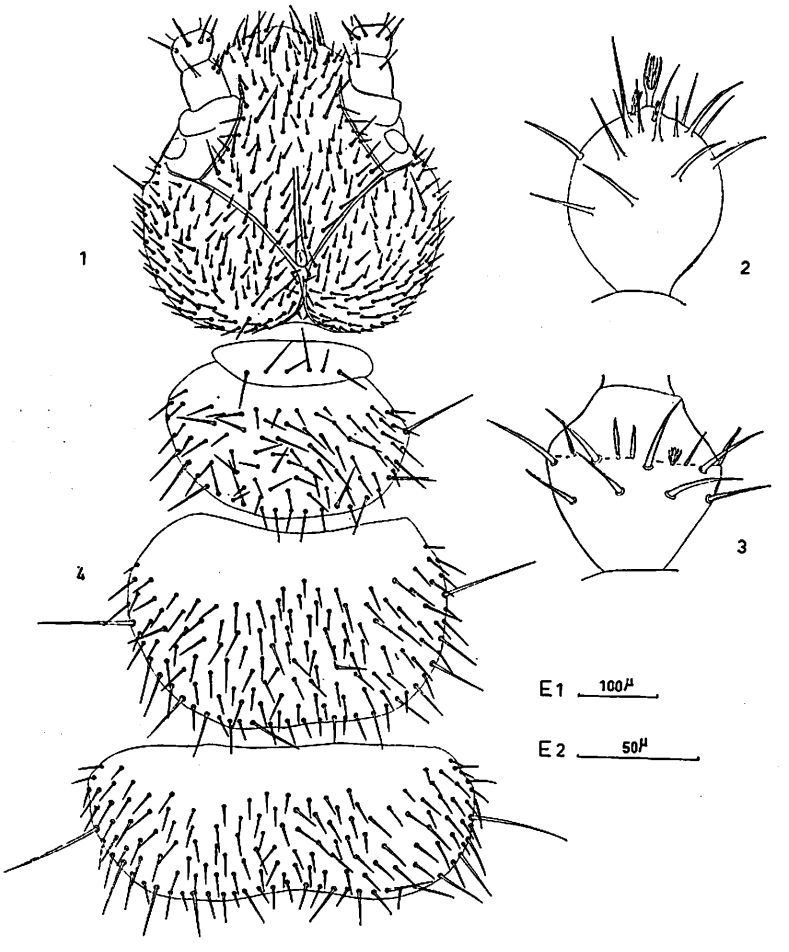
Hanseniella campbellensis Juberthie-Jupeau, n. sp.

Beeman Hill, 30–160 m, 6, 7. XII. 1961, Gressitt : 2 ad. (1♂, 1♀) ; Beeman, 19. XII. 1961 :

1. Abréviations : ad.=adulte (individu ayant 12 paires de pattes) ; 1. à ... pp.=larve à ... paires de pattes ; S ?=sexe indéterminé ; P. I, P. II, etc...=pattes de la 1re paire, pattes de la 2e paire, etc.

1 l. à 11 pp.; Tucker Cove, 4 m, 0–30 m, 0–100 m, 3. III. 1963 : 1 ad. ♂ ; Moubray Hill, 200 m, 12. XII. 1961, 1 ad. ♂ ; Mont Lyall, 200, 400 m, 3, 5. XII. 1961 : 1 ad. ♀, 2 l. à 8 pp. ; Mont Lyall, 500 m, 5. XII. 1961 : 1 ad. ♂ ; St. Col Ridge, 180–280 m, on rock, 7, 9, 13. XII. 1961 : 1 ad. S? ; St. Col Ridge, 180–280 m, moss on rock, 9. XII. 1961 : 1 l. à 7 pp ; Monument Harbor Beach, 9.II.1963 : 4 ad. (1♂, 3♀♀), 1 l. à 11 pp., 2 l. à 10 pp. ; Mont Dumas, 400 m to summit, 6.II.1963 : 1 ad. ♂ ; Misc, 1961 : 2 l. à 9 pp. Au total : 21 individus.

ADULTE. *Dimensions.* Longueur sans filières, ni antennes : 3.3 à 3.9 mm ; largeur maximum : 0.5 mm ; longueur des filières : 0.4 mm.



Figs. 1-4. *Hanseniella campbellensis.* 1, tête, face tergale ; 2, dernier article de l'antenne droite, face tergale ; 3, treizième article de l'antenne droite, face tergale ; 4, tergites I, II, III et IV. (Echelle des figures : 1 et 4=E1 ; 2 et 3=E2.)

Tête (fig. 1). Aussi longue que large, elle est ornée de soies nombreuses, sensiblement toutes de la même longueur, à l'exception de 3 soies nettement plus longues que les autres à la base de chaque antenne. L'apodème médio-tergal est bien marqué dans sa région postérieure ; il présente un renflement ovoïde en avant du départ des branches frontales ; celles-ci sont particulièrement nettes.

Antennes (figs. 2 & 3). Elles comptent un petit nombre d'articles, de 18 à 22. La deuxième couronne de soies commence face dorsale avec une soie au 4e ou au 5e article ; la troisième couronne apparaît vers le 16e article. Un petit organe en candélabre, constitué d'une branche centrale émoussée, entourée de 4 à 7 branches pointues, se rencontre face tergale et latéro-externe de tous les articles à partir du 3e. Au même niveau que cet organe en candélabre, c'est-à-dire un peu plus distalement que la première couronne de soies, se rencontrent, à partir du 6e article, des sensilles qui sont des épines cuticulaires ; l'une d'elles est émoussée, les autres sont pointues et mesurent 16 à 20 μ environ. L'article distal porte 3 organes en candélabre, dont un grand et deux petits.

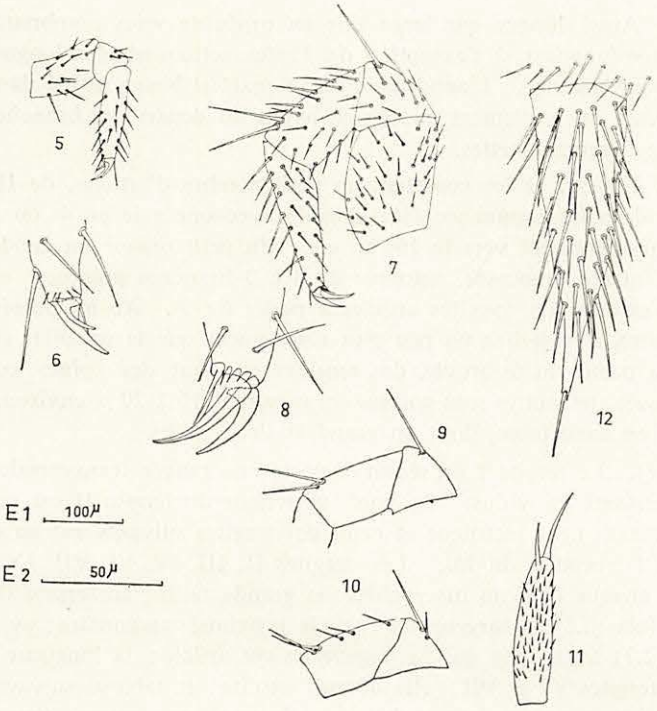
Tergites (fig. 4). Le tergite I est réduit et porte une rangée transversale de 6 soies, parfois plus chez certains individus. Le bord postérieur du tergite II est convexe, celui du tergite III est sensiblement rectiligne et celui des tergites suivants est au contraire légèrement concave à l'exception du 15_c. Les tergites II, III, IV, VI, VII, IX, X, XII, XIII et XIV portent de chaque côté un macrochète de grande taille ; au tergite II sa longueur atteint à peine 2 fois (1.7) la largeur de l'article proximal antennaire ; au tergite III, il est plus de 2 fois (2.3) aussi long que la largeur de cet article ; la longueur des macrochètes croît jusqu'aux tergites VI et VII ; elle décroît ensuite ; le tableau suivant indique, en valeurs relatives, la longueur des macrochètes de l'animal pris comme type ; la longueur de la soie latéro-postérieure la plus longue y est également portée.

	T.II	T.III	T.IV	T.VI	T.VII	T.IX	T.X	T.XII	T.XIII	T.XIV
Macrochète	3.1	3.6	4.1	4.4	4.4	4.2	4.2	4.2	4.1	3.8
Soie latéro-postérieure	1.6	2.1	2.1	2.4	2.2	2.6	2.6	2.3	2.8	2.2

Les macrochètes sont de plus en plus postérieurs de l'avant vers l'arrière du corps. Les soies marginales et sub-marginales situées entre les macrochètes sont de longueur inégale, de même que les soies de recouvrement.

Pattes. Les P. I (figs. 5 & 6) sont plus longues que la moitié des suivantes ; le tarse, 4 fois aussi long que sa largeur maximum est recouvert de soies toutes semblables et relativement nombreuses ; les deux griffes sont très inégales, la postérieure étant la plus courte.

Les P. XII (figs. 7 & 8) ont une pilosité très dense ; le tibia, environ aussi long que large, porte dans sa région distale un macrochète tergal dont la longueur est supérieure à celle de l'article ; le métatarse, 2 fois aussi long que large, porte également dans sa région distale 2 macrochètes tergaux nettement plus longs que la largeur maximum de l'article ; le tarse, 4 fois environ aussi long que large, porte des soies dont les plus longues sont situées face tergale ; les 2 griffes sont fortes et inégales. Le tibia et le métatarse des P. XI (fig. 9) et des P. X (fig. 10) portent également des macrochètes qui sont relativement un peu moins longs que ceux des P. XII, ceux de la P. X étant d'ailleurs un peu plus courts



Figs. 5-12. *Hanseniella campbellensis*. 5, P. I droite, face postérieure; 6, extrémité de la P. I, gauche, face postérieure; 7, P. XII droite, face antérieure; 8, extrémité de la P. XII gauche, face antérieure; 9, tibia et métatarse de la P.XI droite; 10, tibia et métatarse de la P.X droite; 11, style de la P.XI gauche; 12, filière droite, face tergale. (Echelle des figures: 5, 7, 9, 10 et 12=E1; 6, 8 et 11=E2.).

que ceux de la P. XI. La P. IX porte également des macrochètes mais qui sont très réduits par rapport aux précédents. A la P. VIII leur emplacement est occupé par des soies un peu plus longues que les autres.

Les styles (fig. 11), présents des P. III aux P. XII, sont très allongés; l'une des soies apicales est relativement longue; il n'y a pas de soies supplémentaires.

Filières (fig. 12). Effilées, environ 4 fois aussi longues que larges, elles sont recouvertes de soies nombreuses raides et très longues, dont les plus longues, situées vers l'extrémité distale, atteignent presque la largeur de l'appendice à la base; certaines soies distales sont également plus longues que la plus grande des soies apicales; l'aire terminale est sensiblement égale au 1/4 de la longueur de la filière.

Affinités. Cette espèce appartient au groupe d'*Hanseniella* présentant des macrochètes aux tergites II, III, IV, VI, VII, IX, X, XII, XIII et XIV; ce groupe comprend *H. agilis* Tiegs, *H. minor* Tiegs, et *H.* cf. *proxima*[2] Adam et Burtel, *H. proxima* ne possédant pas

2. Je remercie Monsieur le Professeur Condé qui m'a fait parvenir une partie du matériel déterminé par Adam et Burtel.

de macrochète au 14e tergite. *H. campbellensis* se différencie nettement de *H. agilis* et *H. minor* par les caractères des pattes et des filières. Cette espèce est également différente de l'individu rapproché de *H. proxima* par Adam et Burtel ; la chaetotaxie des pattes et des filières est en particulier très différente dans les deux cas.

Conclusions : Deux espèces de Symphyles ont été récoltées dans les Iles Campbell. L'une, *Symphylella essigi*, était connue à ce jour de Californie, l'autre, *Hanseniella campbellensis*, appartient à un genre extrêmement répandu dans l'hémisphère austral qui compte en particulier 14 espèces en Nouvelle-Zélande et 7 en Australie. Les affinités de la forme décrite ici et de quelques espèces de ces régions sont très nettes ; le nombre élevé d'espèces de ce genre, souvent très voisines, de Nouvelle-Zélande, d'Australie et des Iles Campbell porte à penser qu'il s'agit d'espèces endémiques.

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Pacific Insects Monograph 7: 178-207 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLLEMBOLA

By K. A. J. Wise

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Abstract: Seven genera, 10 species, and 2 subspecies of Collembola are recorded from Campbell Island for the first time. Four new species, *Colonavis litoralis*, *Cryptopygus campbellensis*, *Acanthomurus rivalis*, and *Longkingia salmoni*, are described. All recorded species are listed together with information on distribution and habitats. In a section on generic distribution strong affinity with the New Zealand fauna is recorded. Ecological aspects are discussed.

Collembola were first recorded on Campbell I. when Professor G. H. Carpenter (1909) described a new species (*Triacanthella alba*) from specimens collected by the Philosophical Institute of Canterbury (N. Z.) Expedition in 1907. Carpenter (1925) described a further species (*Lepidophorella australis*) collected by a Canterbury Museum field party in 1923. The first study of the Collembola of Auckland and Campbell Is. was made by Dr. J. T. Salmon from material collected by the Cape Expedition, which consisted of several coast-watching groups during World War II (1941–1945). Salmon (1949) recorded 22 genera, 33 species, and 1 subspecies, including 5 new genera, 23 new species and 1 new subspecies, from Campbell I. A little material, not yet studied, has been taken by various members of the permanent New Zealand meteorological station which was continued on Campbell I. after 1945.

This study is based on collections made by Dr. J. L. Gressitt, Bishop Museum; Mr. K. P. Rennell, N. Z. Meteorological Service; and me, between November 1961, and March 1963. A further 7 new generic records, 10 new specific records, 4 new species, and 2 new subspecific records are added to the Campbell I. list. Unfortunately, it has not been possible to process all the material to hand. Many collection tubes and a whole series of Berlese funnel samples remain to be sorted.

Identifications to date have been made from 576 microscope slide preparations of specimens from alcohol material sorted out of 139 original collection tubes. Up to 9 species have been recorded from a single collection.

Not all species previously recorded from Campbell I. have been recognised. All species, however, whether recorded previously or in this paper for the first time, are listed below. Descriptions and 'Remarks' refer to morphological and taxonomic characters. 'Specimens examined' are those in the present collections only. Numbers of specimens examined refer to numbers of microscope slides. An assessment of abundance and habitat, and whether endemic, indigenous, or introduced, is given for each species under the heading 'CAMPBELL I.' The distribution of genera is outlined in a separate section and in a section on ecology various aspects of the Campbell I. collembolan fauna are discussed.

Holotypes are deposited in the Dominion Museum, Wellington, New Zealand. Paratypes

are in Bishop Museum, but, series of Campbell I. species determined by me, including some paratype specimens, will be deposited in other institutions.

The systematic scheme adopted here is based on the classification of Salmon (1951, 1956, 1959) and the relevant systematic work by Salmon (1941, 1949).

Suborder ARTHROPLEONA

Family ONYCHIURIDAE

Subfamily TULLBERGINAE Bagnall, 1935

Genus **Tullbergia** Lubbock, 1876

KEY TO CAMPBELL I. SPECIES OF TULLBERGIA (from Salmon, 1949)

Body with lancet-like spines laterally on thorax II, III, and abdomen I, IV, and V ... . **scalpellata**
Body normal, without such spines ..... **subantarctica**

Tullbergia scalpellata Salmon

Tullbergia scalpellata Salm., 1949, Cape Exped. Ser. Bull. **4**: 17.

REMARKS: Not recognised in this collection.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1 specimen, described by Salmon (1949) from under tussock at Tucker Cove. Terrestrial. Endemic.

Tullbergia subantarctica Salmon

Tullbergia subantarctica Salm., 1949, Cape Exped. Ser. Bull. **4**: 18.

SPECIMENS EXAMINED: 4, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 2, same data but ex *Pleurophyllum criniferum* 1, Beeman Camp, 2–50 m, *Poa*, 18–21.XII.1961, Gressitt; 1, Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, Gressitt; 2, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 3, *ibid.*, under timber, 28. II. 1963, Wise; 1, *ibid.*, under stones, 28. II. 1963, Wise; 1, *ibid.*, beaten from *Pittosporum*, 26. II. 1963, Wise; 1, Lookout Bay, under *Stilbocarpa*, 3. II. 1963, Wise; 1, *ibid.*, beach, *Dracophyllum*, 16, 19. XII. 1961, Gressitt; 1, Smoothwater Bay, *Tillaea* on rock, 2. III. 1963, Wise; Mt. Lyall, 400 m, moss & lichen, 19. II. 1963, Rennell; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 1, *ibid.*, 230 m, mollymawk colony, moss & low plants, 12. II. 1963, Wise; 1, *ibid.*, 230 m, mollymawk colony, in cushion plant & *Tillaea*, 12. II. 1963, Rennell; 1, *ibid.*, moss & leaf-mold, 10.III.1962, Rennell; 3, Mt. Azimuth, 350 m, moss & lichen, 30. XI. 1961, Gressitt by Berlese funnel; 1, *ibid.*, south side, 250 m, under dead albatross chick, 12. II. 1963, Wise; 2, Mt. Azimuth—Courrejolles, under moss & turf, 12. II. 1963, Wise; 3, St. Col Ridge, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 1, Mt. Dumas, above 400 m, under stones, 6. II. 1963, Wise; 1, Monument Hbr., black-backed gull nest, 17. XII. 1961, Gressitt; 3, *ibid.*, top of beach, under stones amongst low plants, 9. II. 1963, Wise; 3, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I., New Zealand, Auckland I. (new record). One specimen, originally determined by J. T. Salmon (Dominion Mus., Wellington, N. Z., collection), was collected on Auckland I. (leaf-mold, Dec. 1944, E. G. Turbott).

CAMPBELL I.: Common and widely distributed. Mainly associated with low plant cover and surface debris including ground bird-nests. Terrestrial, beach to above 400 m. Indigenous by natural dispersal.

Subfamily ONYCHIURINAE Bagnall, 1935

Genus **Onychiurus** Gervais, 1841

Onychiurus subantarcticus Salmon

Onychiurus subantarcticus Salm., 1949, Cape Exped. Ser. Bull. **4**: 15.

REMARKS: Not recognised in this collection.

DISTRIBUTION: Campbell I.

CAMPBELL I.: A few recorded by Salmon (1949) under surface debris at Tucker Cove. Terrestrial. Endemic.

Family HYPOGASTRURIDAE Börner, 1913

Subfamily HYPOGASTRURINAE Börner, 1906

Genus **Xenylla** Tullberg, 1869

Xenylla novazealandia Salmon

Xenylla nova-zealandia Salm., 1941, Trans. Roy. Soc. N. Z. **70** (4): 287; 1949, Cape Exped. Ser. Bull. **4**: 5.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 2, *ibid.*, 2–50 m, moss & lichen on trunks of *Dracophyllum*, 1–5. XII. 1961, Gressitt; Northwest Bay, tussock, 30. XII. 1962, Rennell; 5, Rocky Bay, S. coast below Mt. Dumas, 10 m, penguin colony, under *Tillaea*, 18. II. 1963, Wise; 4, *ibid.*, on moss on shore rocks, 18. II. 1963, Wise; 2, Monument Hbr., top of beach, under lichen on rock, 9. II. 1963, Wise; 1, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: New Zealand, Campbell I., Auckland I.

CAMPBELL I.: Common and widely distributed. Particularly associated with moss and lichen. Terrestrial, below 50 m. Indigenous through natural dispersal.

Genus **Triacanthella** Schaeffer, 1897

KEY TO CAMPBELL I. SPECIES OF TRIACANTHELLA (adapted from Salmon, 1949)

Claw without inner teeth; a single clavate tenant hair to each foot..... **alba**
Claw with inner teeth; clavate tenant hairs absent ..... **sorenseni**

Triacanthella alba Carpenter

Triacanthella alba Carp., 1909, Subantarctic Islands of N. Z. **1**: 378.—Salmon, 1949, Cape

Exped. Ser. Bull. **4**: 5.

REMARKS: Not found in this collection.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Previously recorded by Carpenter (1909) from highwater mark at Venus Cove and by Salmon (1949) under stones in Tucker Cove. Probably marine supra-littoral. Endemic.

Triacanthella sorenseni Salmon

Triacanthella sorenseni Salm., 1949, Cape Exped. Ser. Bull. **4**: 7.

SPECIMENS EXAMINED: 1, Tucker Cove, under timber, 28. II. 1963, Wise; 1, *ibid.*, beach, under stones near high-water mark, 25. II. 1963, Wise; 1, Camp Cove, beach, under stones near high-water mark, 5. II. 1963, Rennell; 1, Venus Cove, beach, under stones near high-water mark, 2. II. 1963, Wise (type locality); 1, Smoothwater Bay, *Tillaea* on rock, 2. III. 1963, Wise; 3, Middle Bay, beach, under stones above high-water mark, 5. II. 1963, Wise; 1, *ibid.*, beach, in sand under kelp, 20. II. 1963, Wise; 2, Monument Hbr., top of beach, under stones, 9. II. 1963, Wise; 2, *ibid.*, on bank above beach, 9. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common on sea beaches and adjacent areas. Mainly supra-littoral. Endemic.

Genus **Hypogastrura** Bourlet, 1839

KEY TO CAMPBELL I. SPECIES OF HYPOGASTRURA (adapted from Salmon, 1949)

1. With a large exsertile sac at junction of antennal segments 3 & 4 ..... **armata**
   Without antennal sac 2
2. Body marked with large oval dark-colored spots ..... **morbillata**
   Body not so marked 3
3. Clavate tenant hairs 2.3.2., set obliquely across tibiotarsus ..... **obliqua**
   Clavate tenant hairs 3.3.3 ..... **pseudopurpurascens**

Hypogastrura armata (Nicolet)

Achorutes armatus Nic., 1841, Nouv. Mém. Soc. Helv. Sc. Nat. **6**: 57.
Podurhippus armatus: Salmon, 1949, Cape Exped. Ser. Bull. **4**: 10.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XI. 1961, Gressitt; 4, *ibid.*, 2–50 m, chicken yard debris, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, *ibid.*, 2–50 m, under old boards, 21–25. XI. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Dracophyllum scoparium*, 12–17. XII. 1961, Gressitt; 4, *ibid.*, under box-wood, 5. III. 1963, Wise; 1, Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, Gressitt; 6, Beeman beach, kelp, 16. XII. 1961, Gressitt; 1, Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 3, *ibid.*, on surface of pools, 25. II. 1963, Wise; 2, Lookout Bay, kelp on beach, 16, 19. XII. 1961, Gressitt; 3, *ibid.*, under *Stilbocarpa*, 3. II. 1963, Wise; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 2, St. Col Ridge, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Cosmopolitan, including New Zealand and Campbell I.

CAMPBELL I.: Common and apparently centered on Tucker and Beeman camps area associated with low plants and surface debris. In moss on St. Col Ridge at head of Tucker valley and elsewhere in ground bird-nests. Marine supra-littoral and terrestrial from beach to 200 m. Either indigenous by natural dispersal or introduced by man.

Hypogastrura pseudopurpurascens Womersley

Hypogastrura pseudopurpurascens Wom., 1928, Ann. Mag. Nat. Hist. ser. 10, **2**: 593.
Podurhippus pseudopurpurascens: Salmon, 1949, Cape Exped. Ser. Bull. **4**: 10.

REMARKS: Not discovered in this collection.

DISTRIBUTION: New Zealand, Campbell I.

CAMPBELL I.: Previously recorded by Salmon (1949) on freshwater pools, also taken under surface debris in Tucker Cove. Terrestrial. Presumably introduced by man.

Hypogastrura morbillata (Salmon)

Achorutes morbillatus Salm., 1941, Trans. Roy. Soc. N. Z. **70** (4): 292.
Podurhippus morbillatus: Salm., 1949, Cape Exped. Ser. Bull. **4**: 10.

REMARKS: Not found in this collection.

DISTRIBUTION: New Zealand, Campbell I.

CAMPBELL I.: Previously recorded by Salmon (1949) from lichen in Tucker Cove. Terrestrial. Presumably introduced by man.

Hypogastrura obliqua (Salmon)

Podurhippus obliquus Salm., 1949, Cape Exped. Ser. Bull. **4**: 10.

REMARKS: Not recognised in the present collection.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Recorded by Salmon (1949) from Tucker Cove on epiphytic lichens. Terrestrial. Endemic.

Subfamily BRACHYSTOMELLINAE Salmon, 1956

Genus **Subantarctica** Salmon, 1949

Subantarctica flava Salmon

Subantarctica flava Salm., 1949, Cape Exped. Ser. Bull. **4**: 13.

SPECIMENS EXAMINED: 2, Tucker Cove, beach, under stones near high-water mark, 25. II. 1963, Wise; 4, Venus Cove, beach, under stones near high-water mark, 2. II. 1963, Wise (type locality); 1, Davis Point, 1–3 m, shore rocks, 12. XII. 1961, Gressitt; 3, Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise; 1, Middle Bay, top of beach, at seepage & stream, under stones & driftwood, 5. II. 1963, Wise; 2, *ibid.*, beach, under stones above high-water mark, 5. II. 1963, Wise; 1, *ibid.*, under stones in grass just above beach, 5. II. 1963, Wise; 1, *ibid.*, under kelp, 20. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common on beaches but also occurs at ca. 220 m in a mollymawk colony suggesting local dispersal by sea-birds. Mainly marine supra-littoral. Endemic.

Genus **Colonavis** Salmon, 1949

A new species, described below, is placed in this genus as it differs from the original generic diagnosis only in the number of anal spines. *Colonavis* should consequently be described as with 4 or more anal spines.

Key to species of Colonavis

With 4 anal spines..... **grandis**
With 11 anal spines ..... **litoralis**

Colonavis grandis Salmon

Colonavis grandis Salm., 1949, Cape Exped. Ser. Bull. 4: 14.

Specimens examined: 4, Beeman Camp, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 5, *ibid.*, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 1, Camp Cove, northern spur Mt. Dumas, 80 m, swept from tussock, 6. II. 1963, Wise; 1, Shoal Point, 0–10 m, sweeping tussock, 29.VII.1962, Rennell; 1, *ibid.*, tussock near beach, 1. II. 1963, Rennell; 3, Mt. Lyall, 400 m, moss & lichen, 19. II. 1963, Rennell; 1, Courrejolles Pen., moss & leaf-mold, 10. III. 1962, Rennell; 5, *ibid.*, 220 m, mollymawk colony, under stones, 12. II. 1963, Wise (type locality); 1, Monument Hbr., top of beach, tussock, 9. II. 1963, Rennell; 1, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed. Associated with plant cover, and under stones. Terrestrial, from beach to 400 m. Endemic.

Colonavis litoralis Wise, n. sp. Figs. 1–9.

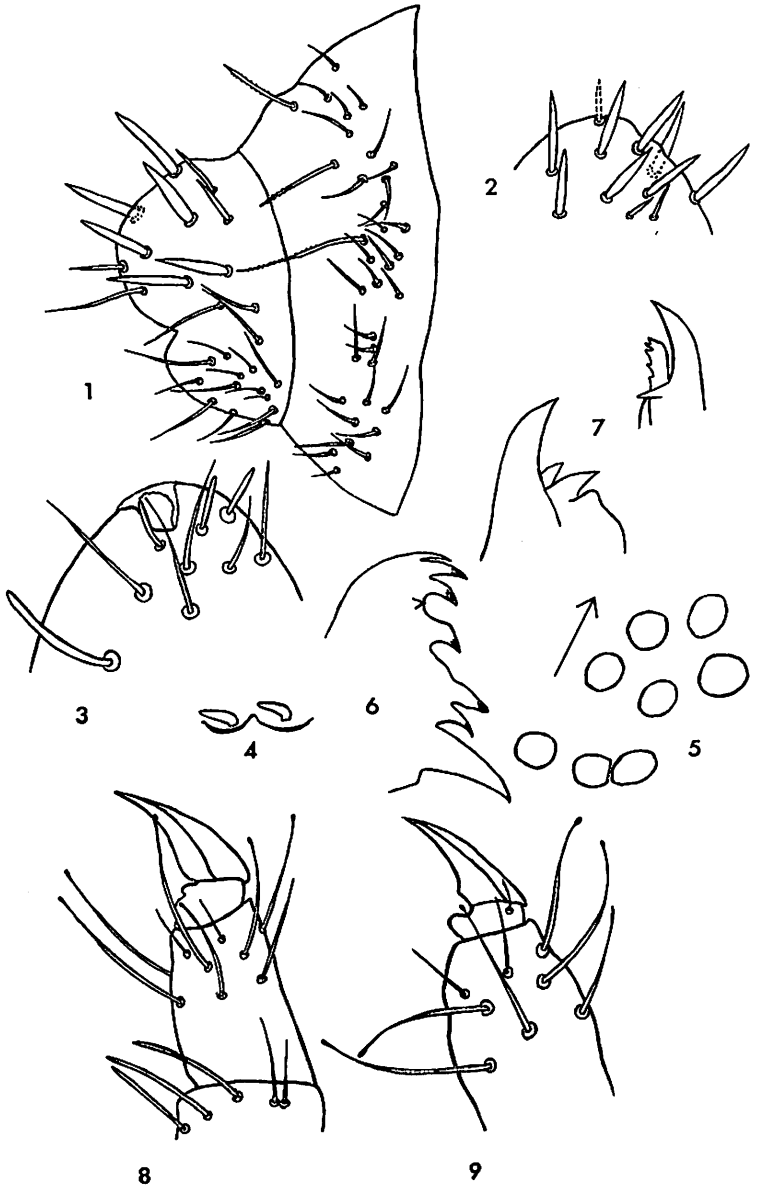
Color: Dark blue to black.

Clothing: Short straight and curved simple setae with several long, simple and serrate setae to each segment, with more on head and posterior segments. Thoracic segment III and abdomen I–V (fig. 1) each with a dorsal pair of long finely serrate spines. Abdomen VI (figs. 1, 2) dorsally with 11 stout minutely-serrate spines arranged as a pair of short spines anteriorly, 2 transverse rows of 4 long spines, and 1 shorter median posterior spine. *Body*: Length up to ca. 2 mm. Antenna almost as long as head. Antenna IV (fig. 3) with subapical exsertile knob and subapical straight sense rods. Sense organ of antenna III (fig. 4) consisting of 2 stout sense rods bent at right angles very close to base, exposed. Postantennal organ absent. Ocelli (fig. 5) 8 to eachside arranged as an anterior group of 5 and a posterior group of 3, subequal. Mandible (fig. 6) without molar area but with 7 apical teeth plus 1 small lateral tooth between apical 3 & 4. Maxilla (fig. 7) elongate with large subapical tooth, toothed lamella not reaching to apex. Cuticle coarsely granulate and tuberculate, abdomen with paratergal swellings. Tenaculum absent. *Legs* (figs. 8, 9): Claw without tooth or, if present, very small. Tibiotarsus with 10 clavate tenant hairs and 6 others. Base of claw with a slender seta present on each side, unguiculus absent. *Furcula*: Absent.

Specimens examined: Holotype, Lookout Bay, beach, under stones & kelp, 3. II. 1963, Wise; paratypes, 5, Lookout Bay, beach, under stones & kelp, 3. II. 1963, Wise; other specimens, 3, Smoothwater Bay, shore rocks, 2. III. 1963, Wise.

Remarks: This species is placed in the genus *Colonavis*, and not in *Friesea* Dalla Torre,

1895, on account of the absence of furcula and tenaculum, absence of papillae for the anal spines, and presence of serrate setae, as in *C. grandis*.



Figs. 1–9. *Colonavis litoralis* n. sp. 1, abdomen V, VI, dorsolateral view (×280); 2, abdomen VI, dorsal view (×280); 3, antenna IV, apex (×1000); 4, antenna III, subapical sense organs (×1500); 5, ocelli (×700); 6, mandible, apex (×1500); 7, maxillae (2 specimens), apices (×1500); 8, foot, right posterior (×400); 9, foot, right posterior (same specimen as 8) (×400). (All magnifications are comparative, not actual).

DISTRIBUTION: Campbell I.

CAMPBELL I.: Scarce, on 2 beaches under stones and kelp, and on shore rocks. Marine supra-littoral. Endemic.

Subfamily ANURIDINAE Salmon, 1956

Genus **Anurida** Laboulbene, 1865

Anurida granaria (Nicolet)

Anoura granaria Nic., 1847, Ann. Soc. Ent. France **5**: 387.
Anurida granaria: Salmon, 1949, Cape Exped. Ser. Bull. **4**: 15.

REMARKS: Not found in the present collection.

DISTRIBUTION: Cosmopolitan including Campbell I.

CAMPBELL I.: 3 specimens recorded by Salmon (1949) under surface debris in Tucker Cove. Terrestrial. Presumably introduced by man.

Subfamily NEANURINAE Börner, 1906

Genus **Neanura** MacGillivray, 1893

KEY TO CAMPBELL I. SPECIES OF NEANURA

All setae mounted on large bosses which have 7–8 non-tuberculate radiating lines... **radiata**
Setae mounted on granulate bosses ..... **hirtella schotti**

Neanura radiata Salmon

Neanura radiata Salm., 1941, Trans. Roy. Soc. N. Z. **70** (4): 308.

SPECIMENS EXAMINED: 4, Tucker Cove, under timber, 28. II. 1963, Wise.

DISTRIBUTION: New Zealand, Campbell I. (new record).

CAMPBELL I.: Few in Tucker Camp area under surface debris. Terrestrial, below 50 m. Introduced by man.

Neanura hirtella schotti (Womersley)

Achorutes hirtellus schötti Wom., 1935, Trans. R. Soc. Soc. Sth. Austral. **59**: 210.

SPECIMENS EXAMINED: 2, Tucker Cove, under stones, 28. II. 1963, Wise.

DISTRIBUTION: Australia, New Zealand, Campbell I. (new record).

CAMPBELL I.: 2 only, in Tucker Camp area under stones. Terrestrial, below 50 m. Introduced by man.

Family ISOTOMIDAE Schaeffer, 1896

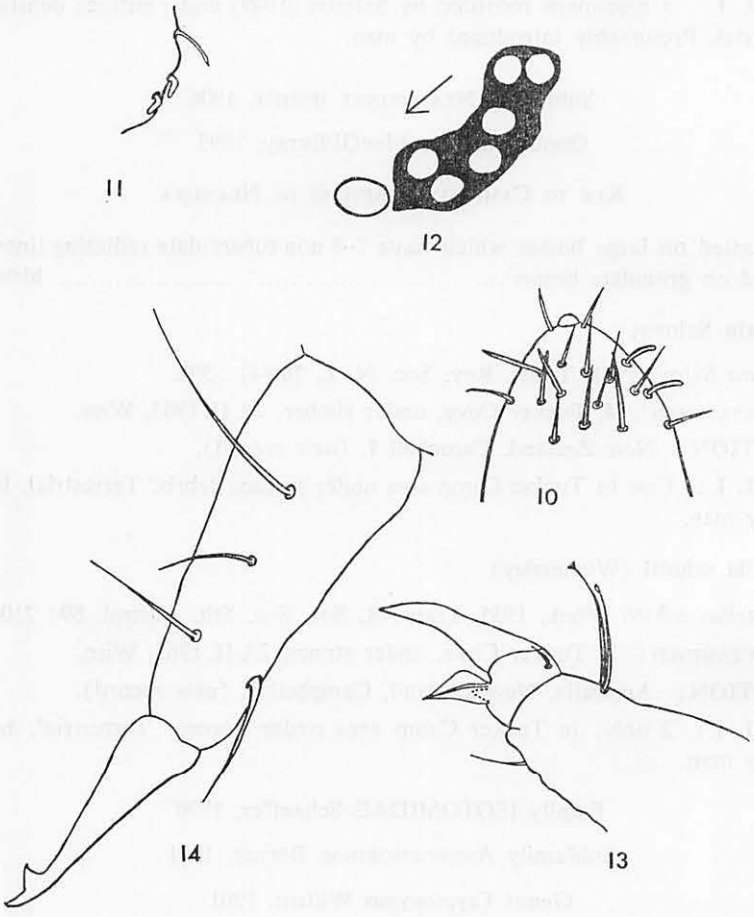
Subfamily ANUROPHORINAE Börner, 1901

Genus **Cryptopygus** Willem, 1901

Cryptopygus campbellensis Wise, n. sp. Figs. 10–14.

Color: Deep blue to black, paler ventrally.

Clothing: Well clothed with short to long simple setae. *Body*: Length up to ca. 1.5 mm. Antenna longer than head as 5 : 4, the 4 segments as 10 : 25 : 20 : 45. Antenna IV (fig. 10) with small apical sensory dome, clothing of medium length straight, stout, setae, and short slightly-curved sense rods. Antenna III (fig. 11) with 2 short, stout sense rods close together and a longer slightly-curved sense rod somewhat removed. Ocelli (fig. 12) 6 to each side, subequal. Postantennal organ (fig. 12) roundly oval, almost as wide as long, almost as big as 2 apical ocelli together. Rami of tenaculum each with 4 barbs. *Legs* (fig. 13): Claw without teeth, a medium length basal seta on each side. Unguiculus about 1/2 as long as claw, with strongly curved inner lamella reaching almost to apex and broad outer lamella reaching to apex. Clavate tenant hairs appear as 1.1.1 but possibly 1.2.2. On most specimens there appears to be 1 obviously clavate tenant hair and 1 simple tenant hair on mid and hind legs, but on holotype there are distinctly 2 clavate hairs on each hind leg, 1 widely clavate, the other narrowly clavate (fig. 13) and on each mid leg the



Figs. 10–14. *Cryptopygus campbellensis* n. sp. 10, antenna IV, apex (×700); 11, antenna III, subapical sense organs (×700); 12, ocelli and postantennal organ (×400); 13, foot, posterior (×700); 14, dens and mucro (×1000).

apparent simple hair seems to be slightly dilate as seen under oil immersion ×1500 magnification. *Furcula* (fig. 14): Ratio of manubrium: dens: mucro as 7 : 5 : 3. Dens with 3 ventral setae, 1 dorsal seta. Mucro narrow, elongate, with 2 teeth, apical tooth slightly longer and narrower than pre-apical.

SPECIMENS EXAMINED: Holotype, Rocky Bay, S. coast below Mt. Dumas, 10 m, penguin colony, under *Tillaea*, 18. II. 1963, Wise. Paratypes: 6, same data as holotype.

REMARKS: This species is very close to *C. antarcticus* Willem in having 6 ocelli and possibly clavate tenant hairs 1.2.2. It differs from that species in having a rounded post-antennal organ, a more elongate mucro and fewer setae on dens.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Few in one isolated coastal area under low plants. Terrestrial, 10 m. Endemic.

Subfamily PROISOTOMINAE Stach, 1947

Genus **Parafolsomia** Salmon, 1949

KEY TO CAMPBELL I. SPECIES OF PARAFOLSOMIA

Ocelli absent; mucro with 5 teeth ..... **litorea**
Five ocelli on each side, mucro with 2 teeth ..... **decemoculata**

Parafolsomia litorea Salmon

Parafolsomia litorea Salm., 1949, Cape Exped. Ser. Bull. 4: 21.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 4, *ibid.*, under timber on ground, 14. II. 1963, Wise; 3, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, *ibid.*, under stones, 28. II. 1963, Wise; 1, Lookout Bay, beach, *Dracophyllum*, 16, 19. XII. 1961, Gressitt; 1, Davis Point, 1–3 m, shore rocks, 12. XII. 1961, Gressitt; 1, Mt. Lyall, 200–400 m, moss, 3, 5, 12. XII. 1961, Gressitt; 2, Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise; 1, Mt. Azimuth, 300 m, sooty albatross nest, 30. XII. 1961, Gressitt; 3, *ibid.*, 350 m, moss & lichen, 30. XI. 1961, Gressitt by Berlese funnel; 2, St. Col Ridge, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 2, Mt. Azimuth–Courrejolles, under moss & turf, 12. II. 1963, Wise; 3, Middle Bay, under stones in grass just above beach, 5. II. 1963, Wise; 2, Mt. Dumas, NW slopes, 150 mm, in weevil pupal cells in soil 30 cm under *Bulbinella*, 20. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed, mainly occurring under low plant cover, stones and surface debris, also in soil. Found to a depth of 30 cm in fairly large numbers in and about pupal cells of large weevils. Terrestrial from beach to 350 m. Endemic.

Parafolsomia decemoculata Salmon

Parafolsomia decemoculata Salm., 1949, Cape Exped. Ser. Bull. 4: 20.

SPECIMENS EXAMINED: 2, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 2,

ibid., 2–50 m, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; 1, Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, Gressitt; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15.XII.1961, Gressitt; 1, Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, Davis Point, moss, 12. XII. 1961, Gressitt; 1, Smooth-water Bay, shore rocks, 2. III. 1963, Wise; 3, *ibid.*, *Tillaea* on rock, 2. III. 1963, Wise; 2, Mt. Lyall, 200–400 m, moss, 3, 5, 12. XII. 1961, Gressitt; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 3, *ibid.*, moss & leaf-mold, 10. III. 1962, Rennell; 2, Mt. Azimuth, 300 m, sooty albatross nest, 30. XII. 1961, Gressitt; 3, *ibid.*, 350 m, moss & lichen, 30. XI. 1961, Gressitt by Berlese funnel; 1, St. Col Ridge, 180–280 m, lichens on *Dracophyllum*, 4, 7, 9, 13.XII.1961, Gressitt; 2, Rocky Bay, S. coast below Mt. Dumas, on moss on shore rocks, 18. II. 1963, Wise; 3, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Auckland I., Campbell I. (new record).

CAMPBELL I.: Common and widely distributed under low plants and in ground bird-nests. Terrestrial, from shore to 350 m. Indigenous through natural dispersal.

Genus **Folsomia** Willem, 1902

Folsomia sp.

SPECIMENS EXAMINED: 3, Beeman Camp, under timber on ground, 14. II. 1963, Wise.

REMARKS: Of the 3 specimens of this species, 2 have been damaged when mounted although they can be recognised as being con-specific with the third. They belong to either a non-New Zealand or a new species but further specimens are required for proper determination.

DISTRIBUTION: Campbell I. (new record).

CAMPBELL I.: From Beeman Camp area under surface debris. Terrestrial below 50 m. Endemic or possibly introduced by man.

Genus **Proisotoma** Börner, 1901

KEY TO CAMPBELL I. SPECIES OF PROISOTOMA

Sense organ of antenna III with bases of rods and cuticular pockets in transverse line ..... **octojuga**

Sense organ of antenna III with bases of rods and cuticular pockets diagonal..... **xanthella**

Proisotoma octojuga Salmon

Proisotoma octojuga Salm., 1949, Cape Exped. Ser. Bull. 4: 33.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1 specimen from Beeman Camp area associated with low plants. Few previously recorded from Tucker Cove (Salmon, 1949). Terrestrial below 50 m. Endemic.

Proisotoma xanthella Salmon

Proisotoma xanthella Salm., 1949, Cape Exped. Ser. Bull. 4: 34.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, chicken yard debris, 6–11. XII. 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 1 specimen from Beeman Camp area under surface debris. Previously recorded from leaf-mold (Salmon, 1949). Terrestrial, below 50 m. Endemic.

Subfamily ISOTOMINAE Schaeffer, 1896

Genus **Acanthomurus** Womersley, 1934

Acanthomurus rivalis Wise, n. sp. Figs. 15–19.

Color: In alcohol, body (except Thorax I) deep violet to brown, paler ventrally, head, legs, and furcula ochreous, antenna I & II ochreous or pale violet, antenna III & IV deep violet to brown.

Clothing: Densely clothed with moderately long finely-ciliated setae with some longer setae on dorsum of body and head, up to 4 very long setae on dorsum of each body segment (not shown in fig. 15). Antennae densely clothed with short finely-ciliated setae. *Body*: Length up to 2 mm. Antenna over 1.5× length of head, the 4 segments related as 15 : 50 : 50 : 50. Ocelli not all seen but ocellar patch (fig. 16) as in *Acanthomurus alpinus* (Salmon, 1949). Postantennal organ (fig. 16) oval, smaller than large ocellus and double outlined. Abdomen III slightly longer than abdomen IV as 55 : 50. *Legs* (fig. 17): Claw without teeth, a slender seta at base. Unguiculus strongly curved with broad outer lamella and narrower inner lamella not reaching apex. Two slender plain setae to each foot. *Furcula* (figs. 18, 19): Ratio of manubrium : dens as 1 : 2. Dens with a single row of serrate spines, 3- or 4-pointed (fig. 18). Manubrium and dens with many fine, short, ciliated setae and 2 ventral rows of longer ciliated setae. A single stout ciliated seta, arising on apex of dens, stands out beside mucro. Mucro with 4 teeth, large apical, larger subapical, smaller central, and a still smaller exterior lateral tooth.

SPECIMENS EXAMINED: Holotype, Moubray Hill, SW slope, 50 m, under stones in stream, 2. III. 1963, Wise; paratypes, 2, Moubray Hill, SW slope, 50 m, under stones in stream, 2. III. 1963, Wise.

REMARKS: This species is separated from other species of *Acanthomurus* by the form of the dental spines, absence of teeth on claws, and/or size of the postantennal organ in relation to the ocelli.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Several under stones partially submerged in shallow streamlet above Perseverance Hbr. Semi-aquatic, 50 m. Endemic.

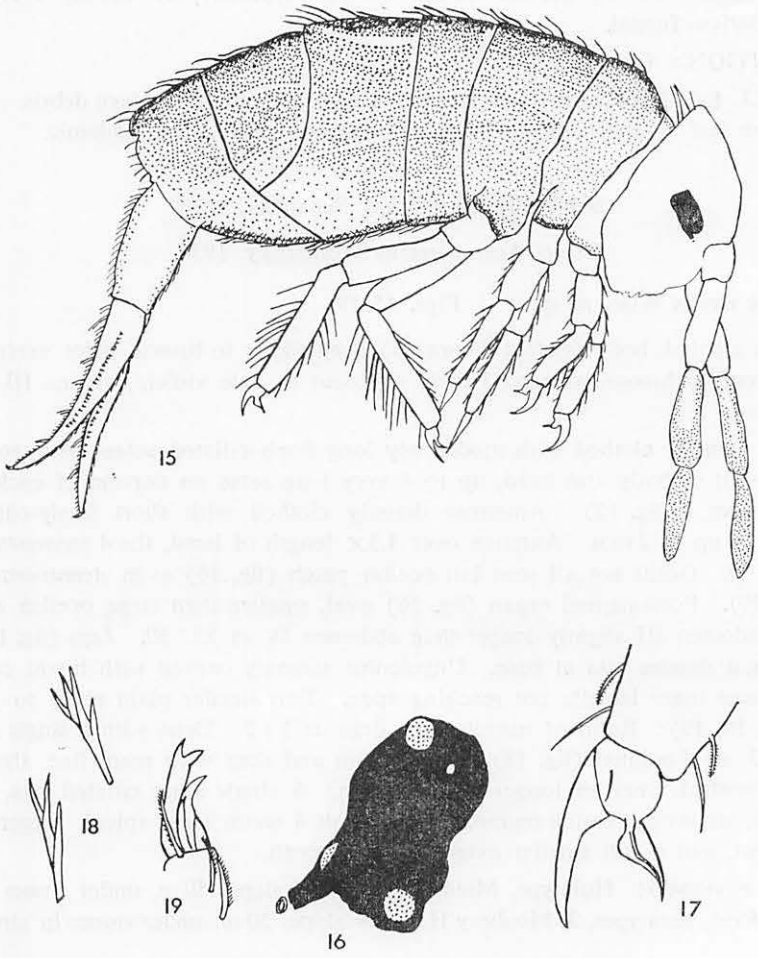
Genus **Proisotomurus** Womersley, 1934

Proisotomurus lapidosus Salmon

Proisotomurus lapidosus Salm., 1949, Cape Exped. Ser. Bull. 4: 25.

REMARKS: Not found in this collection.

DISTRIBUTION: Campbell I.



Figs. 15–19. *Acanthomurus rivalis* n. sp. 15, whole insect (×28); 16, ocellar patch and postantennal organ (×280); 17, foot, posterior (×400); 18, spines of dens (×1000); 19, mucro, ventro-lateral view (×700).

CAMPBELL I.: Several specimens recorded from under rocks, Monument Hbr. and under surface debris at Tucker Cove. Terrestrial. Endemic.

Genus **Sorensia** Salmon, 1949

Recorded by Paclt (1959) from South Africa but that record is not accepted here (see below, *S. subflava*).

Key to Campbell I. specimens of Sorensia

One ocellus to each side; empodium of foot short..... **subflava**
Two ocelli to each side; empodium of foot long..... **minuta**

Sorensia subflava Salmon

Sorensia subflava Salm., 1949, Cape Exped. Ser. Bull. 4: 22.

SPECIMENS EXAMINED: 2, Beeman Camp, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 1, Beeman Beach, 2–50 m, moss, turf, *Poa, Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, *ibid.*, on top of rock, 19. XII. 1961, Rennell; 2, Tucker Cove, under timber, 28. II. 1963, Wise; 2, *ibid.*, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, *ibid.*, under stones, 28. II. 1963, Wise; 2, Mt. Lyall, 200–400 m, moss, 3, 5, 12. XII. 1961, Gressitt; 1, Courrejolles Pen., 200 m, mollymawk nests, 14.XII.1961, Gressitt; 2, *ibid.*, moss & leaf-mold, 10.III.1962, Rennell; 1, St. Col Ridge, 180–280 m, on rock, 4, 7, 9.XII.1961, Gressitt; 1, *ibid.*, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 3, Mt. Dumas, above 400 m, under stones, 6. II. 1963, Wise; 1, *ibid.*, summit, 500 m, under stones, 6. II. 1963, Rennell; 1, Monument Hbr., top of beach, under stones among low plants, 9. II. 1963, Wise; 1, 1961, Gressitt by Berlese funnel.

REMARKS: Paclt (1959) synonymised both *Sorensia subflava* and *S. minuta* with *Isotoma finitima* Ščerbakov, 1899, in the genus *Sorensia*, but there seem to be no real grounds for this. In the original and later descriptions of *I. finitima* the postantennal organ is recorded as absent but this organ is well developed in *Sorensia*.

DISTRIBUTION: Campbell I., Auckland I.

CAMPBELL I.: Common and widely distributed under low plants and stones. Terrestrial from beach to 500 m. Indigenous by natural dispersal.

Sorensia minuta Salmon

Sorensia minuta Salm., 1949, Cape Exped. Ser. Bull. 4: 24.

REMARKS: Not recognised in this collection. This species, together with *S. subflava* (see above) was synonymised with *Isotoma finitima* Ščerbakov by Paclt (1955). However the type material has been examined and it is as described and figured by Salmon (1949) so the species is not here synonymised with either *I. finitima* or *S. subflava*.

DISTRIBUTION: Campbell I.

CAMPBELL I.: A few specimens from leaf-mold under tussock in Tucker Cove. Terrestrial. Endemic.

Genus **Papillomurus** Salmon, 1941

Papillomurus ochraceus Salmon

Papillomurus ochraceus Salm., 1949, Cape Exped. Ser. Bull. 4: 27.

Color: Although normally ochreous in color, a deep violet variant occurs fairly frequently. In a series of specimens examined the violet pigment extends from a narrow longitudinal strip, through intermediate stages, to cover the whole insect. All such specimens have the typical 4 teeth to the mucro.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 2, *ibid.*, 2–50 m, chicken yard debris, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, Beeman Hill, 2. II. 1963, Wise; 3, *ibid.*, 100–180 m, sooty albatross nest, 11–16. XII. 1961, Gressitt; 1, *ibid.*, under *Pleurophyllum speciosum*, 2.

II. 1963, Wise; 1, Beeman Beach, 2–50 m, moss, turf, *Poa, Bulbinella*, 11, 15. XII. 1961, Gressitt; 2, Beeman–Tucker, intertidal, under rocks, 8. XII. 1961, Gressitt; 1, Tucker Cove, under timber, 28. II. 1963, Wise; 3, *ibid.*, under stones, 28. II. 1963, Wise; 1, *ibid.*, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, Lookout Bay, beach, under rock at high-water mark, 16, 19. XII. 1961, Gressitt; 2, *ibid.*, under stones, 3. II. 1963, Wise; 1, Smoothwater Bay, *Tillaea* on rock, 2. III. 1963, Wise; 1, Lyall-Beeman Saddle, 70 m, *Pleurophyllum*, 3, 5, 8, 12. XII. 1961, Gressitt; 1, Mt. Lyall, 200–400 m, moss, 3, 5, 12. XII. 1961, Gressitt; 1, *ibid.*, SW slopes, 150 m, under stones, 19. II. 1963, Wise; 1, *ibid.*, 400 m, moss & lichen, 19. II. 1963, Rennell; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 1, *ibid.*, 230 m, mollymawk colony, moss & low plants, 12. II. 1963, Wise; 1, *ibid*, 230 m, mollymawk colony, in cushion plant & *Tillaea*, 12. II. 1963, Rennell; 3, *ibid.*, moss & leaf-mold, 10. III. 1962, Rennell; 1, 200 m, mollymawk nests, *Colobanthus*, 14. XII. 1961, Gressitt; 3, Mt. Azimuth, 350 m, moss & lichen, 30. XI. 1961, Gressitt; 2, *ibid.*, 300 m, sooty albatross nest, 30. XII. 1961, Gressitt; 1, *ibid.*, 360 m, under stones, 12. II. 1963, Wise; 1, *ibid.*, S. side, 250 m, under dead albatross chick, 12. II. 1963, Wise; 2, St. Col Ridge, 180–280 m, lichens on *Dracophyllum*, 4, 7, 9, 13.XII.1961, Gressitt; 1, *ibid.*, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 1, Middle Bay, under stones & wood in grass, 5. II. 1963, Wise; 1, Rocky Bay, S. coast below Mt. Dumas, 10 m, penguin colony, under *Tillaea*, 18. II. 1963, Wise; 1, Mt. Dumas, above 400 m, under stones, 6. II. 1963, Wise; 1, *ibid.*, northern spur, 310 m, on peat, 6.II.1963, Rennell; 6, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed under low plants, stones and surface debris, and in ground bird-nests. One marine littoral record, occasional supra-littoral, probably stray occurrences from terrestrial habitats. Mainly terrestrial to above 400 m. Endemic.

Genus **Tomocerura** Wahlgren, 1900

Tomocerura colonavia Salmon

Tomocerura colonavia Salm., 1949, Cape Exped. Ser. Bull. **4**: 31.

Body: Length up to 3.5 mm. Antenna 3× length of head, segments as 20 : 50 : 55 : 85.

Legs: Each posterior tibiotarsus with extremely long stout setae on proximal 1/3 reaching almost to distal end.

SPECIMENS EXAMINED: 1, Moubray Hill, SW slope, 50 m, under stones in stream, 2. III. 1963, Wise; 3, Mt. Lyall, SW slopes, 240 m, on stones in streamlet, 19. II. 1963, Wise; 1, Courrejolles Pen., 220–230 m, mollymawk colony, under stones, 12. II. 1963, Rennell (type locality); 1, Mt. Dumas, 460 m, under stones, 6. II. 1963, Rennell; 1, *ibid.*, 400 m, in moss on rocks, 6. II. 1963, Rennell.

REMARKS: All specimens seen and described by Salmon (1949) were immature. Morphological characters described above are from mature specimens.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Scarce in wet habitats, as on stones in streams, above 400 m, and probably in mollymawk colony where there is much seepage. Semi-aquatic from 50–460 m. Endemic.

Genus **Parisotoma** Bagnall, 1940

Key to Campbell I. species of Parisotoma

Six ocelli to each side; claw with lateral plate..... **picea**
Four ocelli to each side; claw without lateral plate..... **octooculata ovata**

Parisotoma picea Salmon

Parisotoma picea Salm., Cape Exped. Ser. Bull. **4**: 36.

Specimens examined: 1, Beeman-Tucker, intertidal, under rocks, 8. XII. 1961, Gressitt; 1, Tucker Cove, beach, intertidal, under rock, 7–8. XII. 1961, Gressitt (type locality); 3, *ibid.*, beach, under stones below high-water mark, 1. II. 1963, Wise; 2, *ibid.*, beach, under stones below high-water mark, 25. II. 1963, Wise; 2, Venus Cove, beach, on stone near low-water mark, 2. II. 1963, Wise; 3, *ibid.*, beach, under stones at high-water mark, 2. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common under stones, in intertidal zone in Perseverance Hbr. which is the main area of sheltered shore-line on the island. Marine littoral. Endemic.

Parisotoma octooculata (Willem)

Isotoma octo-oculata Will., 1902, IN Exped. Ant. Belge, pp. 1–19.
Parisotoma octo-oculata: Salmon, 1949, Cape Exped. Ser. Bull. **4**: 36, 39.

Parisotoma octooculata ovata Salmon

Parisotoma octo-oculata ovata Salm., 1949, Cape Exped. Ser. Bull. **4**: 39.

Specimens examined: 4, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 2, *ibid.*, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Coprosma* ?, 26–30. XI. 1961, Gressitt; 2, *ibid.*, 2–50 m, *Pleurophyllum criniferum*, 6–11.XII.1961, Gressitt; 1, Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, Gressitt; Beeman beach, kelp, 16.XII.1961, 1, *ibid.*, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; Tucker Cove, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, *ibid.*, under timber, 28. II. 1963, Wise; 2, *ibid.*, under stones, 28. II. 1963, Wise; Lookout Bay, beach, *Dracophyllum*, 16, 19. XII. 1961, Gressitt; 1, Moubray Hill, 200 m, moss, 12. XII. 1961, Gressitt; Smooth-water Bay, *Tillaea* on rock, 2. III. 1963, Wise; 1, Mt. Lyall, 400 m, moss & lichen, 19. II. 1963, Rennell; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt; 10, *ibid.*, moss & leaf-mold, 10.III.1962, Rennell; 2, *ibid.*, 230 m, mollymawk colony, in cushion plant & *Tillaea*, 12. II. 1963, Rennell; 3, Mt. Azimuth, 350 m, moss & lichen, 30. XI. 1961, Gressitt; 2, *ibid*, 300 m, sooty albatross nest, 30. XII. 1961, Gressitt; 4, St. Col Ridge, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 1, *ibid.*, 180–280 m, lichens on *Dracophyllum*, 4, 7, 9, 13. XII. 1961, Gressitt; 2, Rocky Bay, penguin nest, 28. XI. 1961, Gressitt.

DISTRIBUTION: Campbell I., Auckland Is.

CAMPBELL I.: Common and widely distributed in vegetation and ground bird-nests, under stones and surface debris. Terrestrial, from beach to 400 m. Indigenous by natural dispersal.

Family TOMOCERIDAE Schaeffer, 1896

Subfamily LEPIDOPHORELLINAE Börner, 1906

Genus **Lepidophorella** Schaeffer, 1897

KEY TO CAMPBELL I. SPECIES OF LEPIDOPHORELLA

1. Claw with 2 or 4 inner teeth on mid and posterior feet 2
   Claw with 3 inner teeth on mid and posterior feet 3
2. Claw with 2 inner teeth on mid and posterior feet ..... **australis**
   Claw with 4 inner teeth on mid and posterior feet ..... **brachycephala**
3. Claw with 3 equal inner teeth on feet; color cream to black ..... **communis**
   Claw with 2 large and 1 small apical inner teeth; color black, usually with paler diagonal lateral stripes on thorax II ..... **nigra**

Lepidophorella australis Carpenter

Lepidophorella australis Carp., 1925, Mem. Proc. Manchester Litt. & Phil. Soc. **69**: 97.

Legs: The holotype and other Campbell I. specimens have a suggestion of a 3rd inner tooth on fore claws. There is a slit visible though normally the tooth lies flush with the inner surface of the claw. In some mounts where the claw is more or less squashed, the tooth opens out giving the appearance of 3 inner teeth as in *L. nigra* or *L. communis*. All feet have a single tooth on outer membrane of unguiculus, the tooth being most prominent on the fore feet.

SPECIMENS EXAMINED: 1, Beeman Camp, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; 1, *ibid.*, under box-wood, 5. III. 1963, Wise; 6, *ibid.*, 50 m, tin can trap in *Dracophyllum* scrub, 6–11. XII. 1961, Gressitt; 4, *ibid.*, 50 m, 12–17. XII. 1961, Gressitt; 1, *ibid.*, tin trap in *Dracophyllum*, 12. XII. 1961, Gressitt; 2, *ibid.*, 50 m, tin can traps, 12–17. XII. 1961, Gressitt; 2, *ibid.*, under timber on ground, 14. II. 1963, Wise; 2, Beeman Hill, 30–100 m, *Poa* roots & moss, 6. XII. 1961, Gressitt; 2, Tucker Cove, under timber, 28. II. 1963, Wise; 2, *ibid.*, 2–50 m, moss, 21–25. XI. 1961, Gressitt; 1, *ibid.*, under debris, 1.II.1963, Wise; 1, *ibid.*, in peat bank, 25. II. 1963, Wise; 1, *ibid.*, on surface of pools, 25. II. 1963, Wise; 2, *ibid.*, beaten ex *Pittosporum*, 26. II. 1963, Wise; 1, *ibid.*, 2 m, peat bank, 1. II. 1963, Rennell; 1, *ibid.*, under boards, 1. II. 1963, Rennell; 1, *ibid.*, 0–30 m, *Dracophyllum*, 7. VIII. 1962, Rennell; 1, *ibid.*, 4 m, *Coprosma*, 6. VIII. 1962, Rennell; Lookout Bay, swept beside stream, 3. II. 1963, Wise; 1, Camp Cave, northern spur Mt. Dumas, 80 m, swept from tussock, 6. II. 1963, Rennell; 2, Venus Cove, 0–2 m, tussock, 2. II. 1963, Rennell; 1, Shoal Point, 0–10 m, 7. II. 1963, Rennell; 1, *ibid.*, 0–10 m, sweeping tussock, 29. VII. 1962, Rennell; 1, 1961, Gressitt by Berlese funnel.

REMARKS: The above described characters of the feet have not previously been recorded. The characters of the fore feet should not be considered for the separation of this species from *L. nigra* or *L. communis*.

DISTRIBUTION: Campbell I., New Zealand.

CAMPBELL I.: Common about shores of Perseverance Hbr. In vegetation, under low plants and surface debris. Terrestrial, below 100 m. Indigenous or introduced by man. This species was first collected on Campbell I. in 1923. The fact that it was described from Campbell I. specimens does not preclude the possibility that it may have been in-

troduced by man from New Zealand.

Lepidophorella communis Salmon

Lepidophorella communis Salm., 1937, Trans. Roy. Soc. N. Z. **67**: 353.

SPECIMENS EXAMINED: 2, Beeman Camp, tin trap in *Dracophyllum*, 12. XII. 1961, Gressitt; 3, *ibid.*, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, moss & lichen on *Dracophyllum* trunks, 1–5.XII.1961, Gressitt; 2, *ibid.*, under box-wood, 5. III. 1963, Wise; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Lookout Bay, under *Stilbocarpa*, 3. II. 1963, Wise.

DISTRIBUTION: New Zealand, Campbell I. (new record).

CAMPBELL I.: Few specimens in Beeman Camp area extending to Lookout Bay. In vegetation and under surface debris. Terrestrial, below 50 m. Introduced by man.

Lepidophorella nigra Salmon

Lepidophorella nigra Salm., 1943, Trans. Roy. Soc. N. Z. **72**: 383.

SPECIMENS EXAMINED: 1, Beeman Camp, 50 m, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; 1, *ibid.*, under timber on ground, 14. II. 1963, Wise; 2, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 3, Tucker Cove, under timber, 28. II. 1963, Wise; 1, *ibid.*, 2 m, peat bank, 1. II. 1963, Rennell; 2, Shoal Point, 0–10 m, 7. II. 1963, Rennell; 1, *ibid.* decaying bottom of tussock, 7. II. 1963, Rennell.

DISTRIBUTION: New Zealand, Campbell I. (new record).

CAMPBELL I.: Few specimens in Tucker and Beeman Camps area and on opposite shore of Perseverance Hbr. at Shoal Point, amongst low plants and under surface debris. Three specimens, originally determined by J. T. Salmon, but previously unrecorded (2 in Dominion Mus., Wellington; 1 in Canterbury Mus., Christchurch) were collected at Monument Hbr., Campbell I. (beneath rocks back of beach, 15. XI. 1945, J. H. Sorenson). These are the only *Lepidophorella* specimens recorded outside the Perseverance Hbr. area. Terrestrial, below 50 m. Indigenous or introduced by man.

Lepidophorella brachycephala (Moniez)

Drepanura brachycephala Mon., 1894, Rev. Biol. Nord. France, 6.

SPECIMENS EXAMINED: 1, Camp Cove, northern spur Mt. Dumas, 80 m, swept from tussock, 6. II. 1963, Wise; 1, Shoal Point, tussock near beach, 1. II. 1963, Rennell.

DISTRIBUTION: New Zealand, Campbell I. (new record).

CAMPBELL I.: 2 specimens only from widely separated points on opposite shores of Perseverance Hbr., in tussock. Terrestrial, below 80 m. Probably introduced by man, although not taken in the actual camp area.

Subfamily TOMOCERINAE

Genus **Tomocerus** Nicolet, 1842

Tomocerus setoserratus Salmon

Tomocerus setoserratus Salm., 1941, Trans. Roy. Soc. N. Z. **70** (4): 347.

SPECIMENS EXAMINED: 1, Tucker Cove, under timber, 28. II. 1963, Wise.

DISTRIBUTION: New Zealand, Campbell I. (new record).

CAMPBELL I.: 2 specimens only in Tucker camp area, under surface debris. Terrestrial, below 50 m. Introduced by man.

Family ENTOMOBRYIDAE Schaeffer, 1896

Subfamily ENTOMOBRYINAE

Genus **Entomobrya** Rondani

Entomobrya nivalis (Linnaeus)

Podura nivalis L., 1758, Systema Naturae, ed. 10: 608.
Entomobrya nivalis: Salmon, 1941, Trans. Roy. Soc. N. Z. **70** (4): 361.
Mydonius exfoliatus: Salmon, 1949, Cape Exped. Ser. Bull. **4**: 40.

SPECIMENS EXAMINED: 2, Beeman Camp, 2–50 m, chicken yard debris, 6–11. XII. 1961, Gressitt; 4, *ibid.*, under box-wood, 5. III. 1963, Wise; Beeman Hill, 2–50 m, old *Dracophyllum* trunk, 21–25. XI. 1961, Gressitt; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Tucker Cove, 1–50 m., old camp, under boards, 6–11. XII. 1961, Gressitt; 1, *ibid.*, 1–50 m, *Dracophyllum*, 21–25. XI. 1961, Gressitt; 1, *ibid.*, 2 m, 22. XI. 1961, Gressitt; 1, *ibid.*, under debris, 1.II.1963, Wise; 1, *ibid.*, old camp, under timber, 1.II.1963, Wise; 1, *ibid.*, under timber, 28. II. 1963, Wise; 1, Lookout Bay, swept beside stream, 3. II. 1963, Wise; 2, *ibid.*, beach, under stones & kelp, 3. II. 1963, Wise; 2, *ibid.*, under *Stilbocarpa*, 3. II. 1963, Wise; 2, Mt. Azimuth, 350 m, moss-lichen, 30. XI. 1961, Gressitt by Berlese funnel; 1, Mt. Azimuth—Courrejolles, under moss & turf, 12. II. 1963, Wise; 1, Venus Cove, 0–2 m, tussock, 2. II. 1963, Rennell; 1, *ibid.*, tussock, 2. II. 1963, A. Wright; 1, Shoal Point, 0–10 m, sweeping tussock, 29. VII. 1962, Rennell; 1, Shoal Point, tussock, 1. XII. 1962, Rennell.

REMARKS: The present Campbell I. specimens are conspecific with specimens recorded as *Mydonius exfoliatus* by Salmon (1949) but not with New Zealand specimens of *Entomobrya exfoliata* Salmon, 1943. Both Campbell I. series appear to be conspecific with the species known as *E. nivalis* in New Zealand (Salmon, 1941) although the color pattern is more extensive. There are some constant differences in color pattern from *E. nivalis* as restricted by South (1961), but until such time as South's methods and results are applied to the genus *Entomobrya* in New Zealand, it seems best to retain the New Zealand—Campbell I. species under this name.

DISTRIBUTION: Cosmopolitan (see South, 1961) including New Zealand and Campbell I. (new record).

CAMPBELL I.: Common in Tucker and Beeman Camps area mainly under surface debris. Associated with plant cover in other areas, occurring in tussock at Venus Cove and Shoal Pt. on the S. side of Perseverance Hbr., and in moss, lichen, and turf on Mt. Azimuth. Terrestrial from beach to 350 m. Indigenous or possibly introduced by man as common in the camps area but scarce elsewhere.

Genus **Parasinella** Bonet, 1934

Parasinella castanea Salmon

Parasinella castanea Salm., 1949, Cape Exped. Ser. Bull. **4**: 41.

SPECIMENS EXAMINED: 2, Rocky Bay, S. coast below Mt. Dumas, 10 m, penguin colony, under *Tillaea*, 18. II. 1963, Wise (type locality).

DISTRIBUTION: Campbell I.

CAMPBELL I.: Few specimens, apparently confined to one isolated area on the S. coast. Under low plant cover. Previously recorded under stones in same locality and in leaf-mold (Salmon, 1949). Terrestrial, 10 m. Endemic.

Genus **Lepidiaphanus** Salmon, 1949

Lepidaphanus eudyptidus Salmon

Lepidiaphanus eudyptidus Salm., 1949, Cape Exped. Ser. Bull. **4**: 42.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; 1, Beeman Hill, 30–100 m, *Poa* roots & moss, 6.XII.1961, Gressitt; 1, *ibid.*, under *Pleurophyllum speciosum*, 2.II.1963, Wise; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, *ibid.*, 5 m, *Dracophyllum*, 19. XII. 1961, Rennell; 1, Tucker Cove, under stones, 28. II. 1963, Wise; 1, *ibid.*, 1–50 m, weed & grass turf, 6–11. XII. 1961, Gressitt by Berlese funnel; 1, Lookout Bay, beach, *Dracophyllum*, 16, 19. XII. 1961, Gressitt; 1, *ibid.*, under stones, 3. II. 1961, Wise; 1, Courrejolles Pen., 220–230 m, mollymawk colony, under stones, 12. II. 1963, Rennell; 1, Mt. Azimuth—Courrejolles, under moss & turf, 12. II. 1963, Wise; 1, Middle Bay, under stones & wood in grass, 5. II. 1963, Wise; 1, Rocky Bay, S. coast below Mt. Dumas, 10 m, penguin colony, under *Tillaea*, 18. II. 1963, Wise (type locality).

DISTRIBUTION: Campbell I.

CAMPBELL I.: Not common in any one locality but widely distributed. Mainly associated with low plant cover, occasionally under stones. Terrestrial, from beach to 220 m. Endemic.

Genus **Lepidocyrtus** Bourlet, 1839

Lepidocyrtus cyaneus cinereus Folsom

Lepidocyrtus cyaneus cinereus Fols., 1924, Amer. Mus. Novit. **108**: 9.

SPECIMENS EXAMINED: 1, Beeman Camp, under box-wood, 5. III. 1963, Wise; 1, Beeman Hill, 2–50 m, old *Dracophyllum* trunk, 21–25. XI. 1961, Gressitt; 1, Tucker Cove, 22. XI. 1961, Gressitt; 1, *ibid.*, under timber, 28. II. 1963, Wise.

DISTRIBUTION: North America, New Zealand, Campbell I. (new record).

CAMPBELL I.: 4 specimens only taken under surface debris in Tucker and Beeman Camps area. Terrestrial, below 50 m. Introduced by man.

Genus **Lepidobrya** Womersley, 1937

KEY TO CAMPBELL I. SPECIES OF LEPIDOBRYA

1. Color mainly blue or violet 2
   Color deep ochreous with wine-colored edging to thoracic terga and posterior seg-

mental margins ..... **thalassarchia**
2. Color pale ochreous with wide segmental bands of pale blue..... **mawsoni**
Color mainly violet..... **violacea**

Lepidobrya mawsoni (Tillyard)

Entomobrya mawsoni Tilly., 1920, Sci. Rep. Australas. Ant. Exped., 1911–14, (C) 5(8): 11.
Lepidobrya mawsoni: Salmon, 1949, Cape Exped. Ser. Bull. 4: 43.

REMARKS: Not in present collection. The 1 specimen known from Campbell I. is as described by Salmon (1949) and belongs to the genus *Lepidobrya*.

DISTRIBUTION: Macquarie I., Campbell I.

CAMPBELL I.; 1 specimen recorded by Salmon (1949) under firewood (presumably Tucker Camp area). Possibly indigenous but probably introduced.

Lepidobrya thalassarchia Salmon

Lepidobrya thalassarchia Salm., 1949, Cape Exped. Ser. Bull. 4: 44.

SPECIMENS EXAMINED: 1, Beeman Hill, under *Pleurophyllum speciosum*, 2. II. 1963, Wise; 1, Tucker Cove, under timber, 28. II. 1963, Wise; 1, Shoal Point, 0–10 m, 7. II. 1963, Rennell; 1, Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise (type locality); 1, Northwest Bay, tussock, 30. XII. 1962, Rennell; 2, Middle Bay, under stones & wood in grass, 5. II. 1963, Wise; 1, Monument Hbr., top of beach, tussock, 9. II. 1963, Rennell; 1, (SW), vegetation & under boards, 28–29. XI. 1961, Gressitt; 1, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Not common in any one area but widely distributed. Associated with low plant cover and surface debris. Terrestrial, beach to 220 m. Endemic.

Lepidobrya violacea Salmon

Lepidobrya violacea Salm., 1949, Cape Exped. Ser. Bull. 4: 46.

SPECIMENS EXAMINED: 1, Beeman Camp, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Tucker Cove, under timber, 28. II. 1963, Wise (type locality); 1, *ibid.*, on surface of pools, 25. II. 1963, Wise (type locality); 2, *ibid.*, under stones, 28.II.1963 (type locality); 1, Lookout Bay, swept beside stream, 3. II. 1963, Wise; 1, Camp Cove, N. spur Mt. Dumas, 80 m, swept from tussock, 6. II. 1963, Wise; 1, Lyall–Beeman Saddle, 70 m, *Pleurophyllum*, 3, 5, 8, 12. XII. 1961, Gressitt; 1, Mt. Lyall, 200–400 m, moss, 3, 5, 12.XII.1961, Gressitt; 1, *ibid.*, 150 m, SW slopes, under stones, 19. II. 1963, Wise; 1, Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise; 1, Mt. Azimuth, under stones, 12. II. 1963, Wise; 2, St. Col Ridge, 180–280 m, lichens on *Dracophyllum*, 4, 7, 9, 13. XII. 1961, Gressitt; 1, Rocky Bay, penguin nest, 28. XI. 1961, Gressitt.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed. Associated with low plant cover and surface debris. Terrestrial, beach to 360 m. Endemic.

Suborder SYMPHYPLEONA

Family SMINTHURIDAE Lubbock, 1870

Not all the Campbell I. species of this family have been fully worked out. There appear to be 3 species in addition to the 4 recorded below. More specimens are required before they can be finally determined.

Subfamily SMINTHURIDINAE Börner, 1906

Tribe *Katiannini* Börner

Genus **Sminthurinus** Börner, 1901

Sminthurinus discordipes Salmon

Sminthurinus discordipes Salm., 1949, Cape Exped. Ser. Bull. 4: 49.

SPECIMENS EXAMINED: 2, Beeman Camp, 2–50 m, moss & lichen on trunks of *Dracophyllum*, 1–5. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Poa*, 18–21. XII. 1961, Gressitt; 3, *ibid.*, 2–50 m, *Pleurophyllum criniferum*, 6–11. XII. 1961, Gressitt; 4, Courrejolles, moss & leaf-mold, 10. III. 1962, Rennell; 1, Mt. Azimuth, 350 m, moss & lichen, 30. XI. 1961, Gressitt by Berlese funnel; 1, St. Col Ridge, 180–280 m, moss on rock, 24. XI. 1961, Gressitt by Berlese funnel; 1, 1961, Gressitt by Berlese funnel.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Widely distributed but not common in any one place. In vegetation and under low plant cover mainly in damp areas. Terrestrial, above beach to 350 m. Endemic.

Genus **Pseudokatianna** Salmon, 1949

KEY TO CAMPBELL I. SPECIES OF PSEUDOKATIANNA

Antenna IV not divided; posterior foot with 5 clavate hairs ..... **campbellensis**
Antenna IV subdivided; posterior foot with 3 clavate hairs..... ..... **triclavata**

Pseudokatianna campbellensis Salmon

Pseudokatianna campbellensis Salm., 1949, Cape Exped. Ser. Bull. 4: 52.

SPECIMENS EXAMINED: 1, Smoothwater Bay, *Tillaea* on rock, 2. III. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Few at one isolated area under low plants but previously recorded at Tucker Cove under surface debris (Salmon, 1949). Terrestrial below 50 m. Endemic.

Pseudokatianna triclavata Salmon

Pseudokatianna triclavata Salm., 1949, Cape Exped. Ser. Bull. 4: 53.

SPECIMENS EXAMINED: 1, Moubray Hill, SW slope, 50 m, under stones in stream, 2. III. 1963, Wise; 3, Smoothwater Bay, shore rocks by stream, 2. III. 1963, Wise; 2, Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise (type locality); 1, *ibid.*, 220–230 m, mollymawk colony, under stones, 12. II. 1963, Rennell; 3, Northwest Bay, kelp

on rock, 29. XI. 1961, Gressitt; 1, *ibid.*, tussock, 30. XII. 1962, Rennell; 8, Middle Bay, top of beach, at seepage & stream, under stones & driftwood, 5. II. 1963, Wise; 1, *ibid.*, beach, under stones above high-water mark, 5. II. 1963, Wise; 2, Rocky Bay, S. coast below Mt. Dumas, top of boulder beach, on seepage pools, 18. II. 1963, Wise.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed. Although occurring mainly about seashore at top of supra-littoral it is considered to be associated more with freshwater seepage and streams. The occurrence at 220 m in a mollymawk colony, where the species was common on seepage and rivulets, suggests local dispersal by seabirds. Semi-aquatic. Endemic.

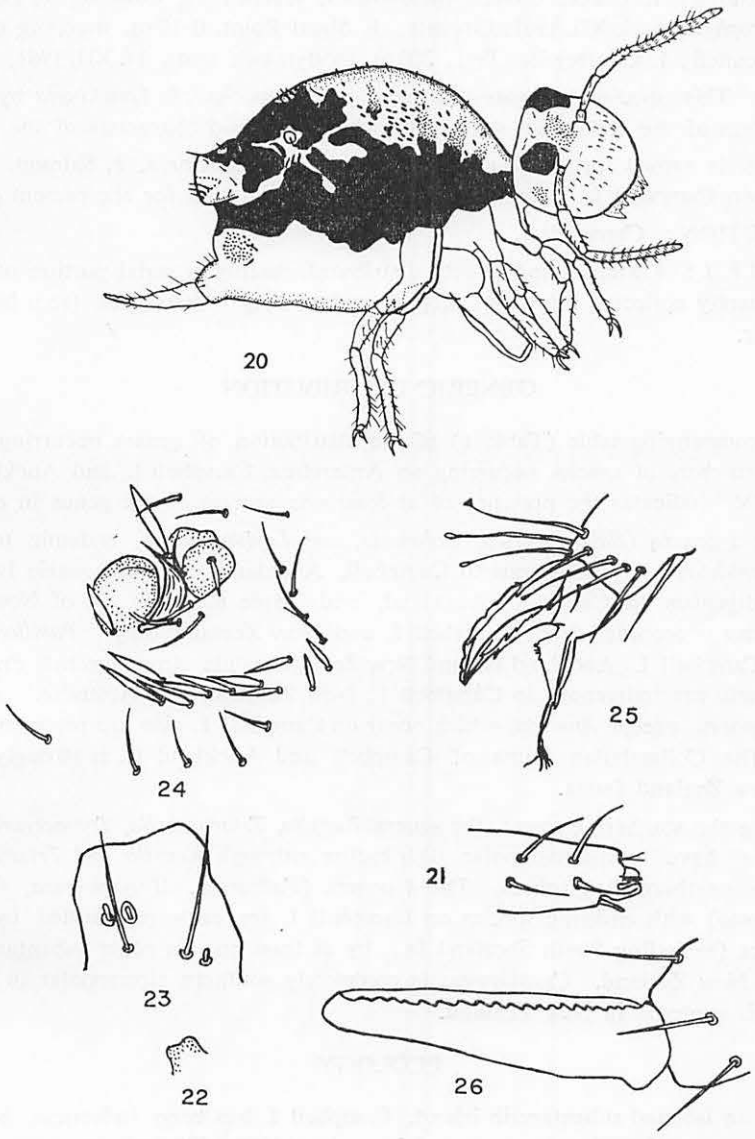
Genus **Longkingia** Salmon, 1946

Longkingia salmoni Wise, n. sp. Figs. 20–26.

Color: In alcohol, body dark green, colorless dorsal patch and ventrally. Pigment in a wide lateral band on each side spreading in transverse bands dorsally in thoracic region, a pigmented dorsal patch posteriorly. Head more or less pigmented with dark patch between antennal bases, and colorless or white patch from between black ocellar patches to hind margin of head. Antenna and legs pale orange, furcula colorless to pale orange.

Clothing: Occasional short plain setae on body, most numerous postero-dorsally and on head, antennae, legs, and furcula. Numerous stout, erect, straight, dagger-like spines on antero-dorsal portion of body. Length up to ca. 1.2 mm. Antennae 2× as long as head, the 4 segments as 10 : 20 : 30 : 60. Antenna IV (fig. 21) annulated with 2 apical sensory processes, 1 finger-like, 1 rounded, and several apical short, straight, sense rods. Antenna III with small peg-like organ (fig. 22) at 1/3, and subapical sense organs (fig. 23) consisting of a pair of short exposed sense rods and a 3rd similar rod somewhat removed to one side and below with 1 seta beside it. Eight ocelli, 5 large outer peripheral, 2 small inner, and 1 very small central. Dorso-lateral sensory abdominal protuberances present, each (fig. 24) consisting of 2 rounded swellings, the anterior being smaller and bearing a short, stout, seta. Between the swellings a large straight spine-like seta dorsally, a single stout seta below it, a stout seta ventrally, with 2 further setae below it, and posteriorly a very large, wide, curved seta. A single large straight spine-like seta posteriorly on posterior swelling and 2 rows of 6 similar setae below protuberance. *Legs* (fig. 25): Claw with a single inner tooth just beyond center, 2 pairs of outer teeth, 1 at 1/3, 1 at 2/3, a strong tunica with prominently serrate edges. Unguiculus lanceolate, inner lamella much broader than outer, the inner angulated with 4 small teeth beyond angle, the subapical bristle very stout basally and dividing into a number of intertwining strands which overreach end of claw. There appear to be 8 clavate tenant hairs on mid and posterior legs. *Furcula* (fig. 26): Dens to mucro as 11 : 4. Mucro plump, rounded apically, inner lamella serrate.

SPECIMENS EXAMINED: Holotype, Camp Cove, N. spur Mt. Dumas, 80 m, swept from tussock, 6.II.1963, Wise; paratypes: 1, Beeman, *Coprosma*, 15.VIII.1962, Rennell; 1, Beeman Beach, 2–50 m, moss, turf, *Poa*, *Bulbinella*, 11, 15. XII. 1961, Gressitt; 1, Beeman, 20 & 80 m, sweeping *Coprosma*, 27. VII. 1962, Rennell; 1, Tucker Cove, beaten ex *Pittosporum*, 26. II. 1963, Wise; 2, Camp Cove, northern spur Mt. Dumas, 80 m, swept from tussock, 6.II.1963, Rennell; 1, Beeman—Lyall, *Pleurophyllum speciosum*, 10. II. 1962, Rennell; 1, St. Col Ridge,



Figs. 20–26. *Longkingia salmoni* n. sp. 20, whole insect (×28); 21, antenna IV, apex (×700); 22, antenna III, basal peg-like organ (×700); 23, antenna III, subapical sense organs (×700); 24, sensory protuberance of body, end view (×200); 25, foot, middle (×400); 26, mucro and apex of dens (×600).

180–280 m, lichens on *Dracophyllum*, 4, 7, 9, 13. XII. 1961, Gressitt; 1, Monument Hbr., top of beach, tussock, 9. II. 1963, Rennell. Other specimens: 1, Beeman Camp, 2–50 m, *Dracophyllum scoparium*, 12–17. XII. 1961, Gressitt; 1, *ibid.*, 2–50 m, *Poa* roots, 6–11. XII. 1961, Gressitt; 2, Beeman, *Coprosma*, 15. VIII. 1962, Rennell; 1, *ibid.*, 30 m, sweeping sedge, 27.

VII. 1962, Rennell; 1, Tucker Cove, *Dracophyllum*, 4. XII. 1961, Gressitt; 2, Lookout Bay, beach, *Dracophyllum*, 3. XII. 1961, Gressitt; 1, Shoal Point, 0–10 m, sweeping tussock, 29. VII. 1962, Rennell; 1, Courrejolles Pen., 200 m, mollymawk nests, 14. XII. 1961, Gressitt.

REMARKS: This species is separated from other species of *Longkingia* by color and markings, form of the abdominal sensory protuberances, and characters of the feet.

The species is named for the founder of the genus, Professor J. T. Salmon, whose previous work on Campbell I. Collembola laid a solid foundation for the present study.

DISTRIBUTION: Campbell I.

CAMPBELL I.: Common and widely distributed, mainly in aerial portion of vegetation and consequently collected most by sweeping and beating. Terrestrial, from beach to 200 m. Endemic.

GENERIC DISTRIBUTION

In the accompanying table (Table 1) of the distribution of genera occurring on Campbell I., the numbers of species occurring on Antarctica, Campbell I., and Auckland Is. are given. A "×" indicates the presence of at least one species of the genus in other areas.

There are 3 genera (*Subantarctica*, *Colonavis*, and *Lepidiaphanus*) endemic to Campbell I. Only *Lepidobrya* is indigenous to Campbell, Auckland, and Macquarie Is.; and *Sorensia* is indigenous to Campbell, Auckland, and Three Kings Is. (N of New Zealand). *Pseudokatianna* is recorded from Campbell I. and New Zealand only. *Papillomurus* is restricted to Campbell I., Auckland Is., and New Zealand, while *Acanthomurus*, *Proisotomurus*, and *Longkingia* are indigenous to Campbell I., New Zealand, and Australia. All the cosmopolitan genera, except *Anurida*, which occur on Campbell I. also are represented in New Zealand. The Collembolan fauna of Campbell and Auckland Is. is strongly associated with the New Zealand fauna.

Concerning the southern element, the genera *Xenylla*, *Triacanthella*, *Tomocerura*, and *Lepidophorella*, all have semi-circumpolar distribution although *Xenylla* and *Triacanthella* also occur in the northern hemisphere. The 4 genera (*Tullbergia*, *Hypogastrura*, *Cryptopygus*, and *Parisotoma*) with endemic species on Campbell I. are each represented by 1 species in Antarctica (including South Shetland Is.), by at least one on other subantarctic islands and also in New Zealand. *Cryptopygus* is completely southern circumpolar in distribution although it is centered in New Zealand.

ECOLOGY

Although an isolated subantarctic island, Campbell I. has been influenced by man for over a century—parties of sealers operated from about 1810–1830; whalers were later active ashore in Windlass Bay (E of Middle Bay) and Northeast Hbr.; sheep were introduced about 1890 and a sheep run was actively operated during 1896–1931; a few scientific expeditions were established for short periods; and a meteorological station has been occupied, firstly as a coastwatching unit during World War II, continuously since 1941. The farmhouse and coastwatching camp were located in Tucker Cove and the present meteorogical station is situated on the point below Beeman Hill. Shepherds and their stores were replaced every one or two years and, likewise, present camp personnel every year. In considering the possibility or probability of Collembola being introduced to Campbell I., it must be

Table 1. Distribution of genera of Collembola occurring on Campbell Island.

	Antarctica	Campbell I.	Auckland Is.	Other Subantarctic Islands	New Zealand	Elsewhere
Tullbergia	1*	2	1	×**	×	Cosmopolitan
Onychiurus		1			×	Cosmopolitan
Xenylla		1	1	×	×	Cosmopolitan
Triacanthella		2	1	×	×	Tierra del Fuego, Malta, Italy
Hypogastrura	1	4	1	×	×	Cosmopolitan
Subantarctica		1				
Colonavis		2				
Anurida		1		×		Cosmopolitan
Neanura		2			×	Cosmopolitan
Cryptopygus	1	1		4	8	Australia, 2 South Africa, 1
Parafolsomia		2	2		×	Cosmopolitan
Folsomia		1			×	Cosmopolitan
Proisotoma		2		×	×	Cosmopolitan
Acanthomurus		1			×	Australia
Proisotomurus		1			×	Australia
Sorensia		2	1			Three Kings Is.
Papillomurus		1	2		×	
Tomocerura		1		×		Australia, Patagonia
Parisotoma	1	2	2	×		Cosmopolitan, Patagonia
Lepidophorella		4			×	Australia, Chile
Tomocerus		1			×	Cosmopolitan
Entomobrya		1			×	Cosmopolitan
Parasinella		1			×	Cosmopolitan ?
Lepidiaphanus		1				
Lepidocyrtus		1			×	Cosmopolitan
Lepidobrya		3	1	×		
Sminthurinus		1		×	×	Cosmopolitan ?
Pseudokatianna		2			×	
Longkingia		1			×	Australia

* Number of species for genus.

** One or more species of genus present.

remembered that all food and general supplies of all kinds—building materials, and fence posts—were supplied directly by ships from New Zealand. At least in later years, boxes of vegetable plants in soil have been taken to the island, and the vegetables planted in outside plots.

Many of the species recorded above appear to be centered in the Tucker and Beeman camps area, but this to some extent is influenced by less frequent collecting elsewhere. Each species has been recorded as 'endemic' when it is known only from Campbell I.; 'indigenous by natural dispersal' when it is non-endemic and is widely spread on the island or occurs in isolated areas away from the camps area; and as 'introduced by man' when it is non-endemic and has only been collected in the Tucker and/or Beeman Camps area. However, owing to the long period of human and sheep habitation, the last two categories cannot be properly defined or separated. Some of the species classed, at present, as 'endemic' are only known from a few specimens in the camps area. If any of these should in

Table 2. Species of Collembola endemic to Campbell Island, related to ecological areas.

	Terrestrial				Semi-aquatic		Supra-littoral	Littoral	Elsewhere
	Wide-spread	Above 300 m	Camps area	Isolated	Below 300 m	Above 300 m			
Tullbergia scalpellata			×						
Onychiurus subantarcticus			×						
Triacanthella alba							×		
Tr. sorenseni							×		
Hypogastrura obliqua			×						
Subantarctica flava							×		220 m Molly-mawk colony
Colonavis grandis	×	×	×						
C. litoralis							×		
Cryptopygus campbellensis				×					
Paràfolsomia litorea	×	×	×						
Folsomia sp.			×						
Proisotoma octojuga			×						
P. xanthella			×						
Acanthomurus rivalis					×				
Sorensia minuta			×						
Proisotomurus lapidosus			×	×					
Papillomurus ochraceus	×	×	×				×	×	
Tomocerura colonavia					×	×			
Parisotoma picea								×	
Parasinella castanea				×					
Lepidiaphanus eudyptidus	×		×						
Lepidobrya thalassarchia	×		×						
L. violacea	×	×	×						
Sminthurinus discordipes	×	×	×						
Pseudokatianna triclavata					×				220 m Molly-mawk colony
Ps. campbellensis			×	×					
Longkingia salmoni	×		×						

Table 3. Species of Collembola indigenous or introduced to Campbell Island, related to ecoloical areas on Campbell Island and distribution elsewhere.

	Campbell Island			Auckland Island	New Zealand	Elsewhere	Suggested status on Campbell I.
	Below 300 m	Above 300 m	Camps area (below100 m)				
Tullbergia subantarctica	×	×	×	×	×		Indig.*
Xenylla novazealandia	×		×	×	×		Indig.
Hypogastrura armata	×		×		×	Cosmopolitan	Indig. or Intro.**
Hy. pseudopurpurascens			×		×		Intro.
Hy. morbillata			×		×		Intro.
Anurida granaria			×			Cosmopolitan	Intro.
Neanura radiata			×		×		Intro.
Ne. hirtella schotti			×		×	Australia	Intro.
Parafolsomia decemoculata	×	×	×	×			Indig.
Sorensia subflava	×	×	×	×			Indig.
Parisotoma octooculata ovata	×	×	×	×			Indig.
Lepidophorella australis	×		×		×		Indig. or Intro.
L. communis	×		×		×		Intro.
L. nigra	×		×		×		Indig. or Intro.
L. brachycephala	×				×		Intro.
Tomocerus setoserratus			×		×		Intro.
Entomobrya nivalis	×	×	×		×	Cosmopolitan	Indig. or Intro.
Lepidocyrtus cyaneus cinereus			×		×	North America	Intro.
Lepidobrya mawsoni			×			Macquarie I.	Possibly Indig., Probably Intro.

* Indigenous. ** Introduced.

the future be discovered in New Zealand or elsewhere, they may be found to have been introduced into Campbell I. Such species are *Tullbergia scalpellata*, *Onychiurus subantarcticus*, *Folsomia* sp., *Proisotoma octojuga*, *P. xanthella*, and *Sorensia minuta*.

Of the species endemic to Campbell I. (Table 2), each species is indicated for ecological areas in which it has been recorded. Of the indigenous or introduced species (Table 3), each is indicated for important ecological areas on Campbell I., and for distribution elsewhere.

It is generally recognised that the present topography of Campbell I. is largely due to glaciation (Marshall, 1909; Oliver, 1950). Most of the hill-tops are isolated and most are ringed by rock bluffs (remains of lava flows) at about the 300 m level. My field observations of other insects (apterous terrestrial Plecoptera) suggest that faunas have been isolated on the present hill-tops above those bluffs. Whether these are relict faunas, being survivors after the last glaciation from previously more widespread faunas, or whether they represent the earliest colonisers of the first land appearing as glaciation receded, is an interesting question. None of the present-day Collembolan species are restricted to the hill-tops, but some which could have spread from hill-tops post-glacially are *Colonavis grandis*, *Parafolsomia litorea*, *Papillomurus ochraceus*, *Lepidobrya violacea*, *Sminthurinus discordipes*, *Tullbergia subantarctica*, *Parafolsomia decemoculata*, *Sorensia subflava*, and *Parisotoma octooculata ovata*; and of these the last four are common to Auckland I.

Species represented in the present collections are associated with ecological habitats as follows:

Vegetation, low plant cover, surface debris, stones: Most species are associated with various types of cover. They often occur indiscriminately in several or all of these. Tussock covers much of the island but few, if any, species are restricted to it. Several species occur in mosses and lichens on rocks and in epiphytic mosses and lichens on *Dracophyllum*. The low plant *Tillaea*, where it grows on shore rocks, often provides cover for large populations of insects, particularly Collembola. Species in this category are: *Tullbergia subantarctica*, *Hypogastrura armata*, *Colonavis grandis*, *Neanura radiata*, *Neanura hirtella schotti*, *Cryptopygus campbellensis*, *Parafolsomia litorea*, *P. decemoculata*, *Folsomia* sp., *Proisotoma octojuga*, *P. xanthella*, *Sorensia subflava*, *Papillomurus ochraceus*, *Parisotoma octooculata ovata*, *Lepidophorella australis*, *L. communis*, *L. nigra*, *L. brachycephala*, *Tomocerus setoserratus*, *Entomobrya nivalis*, *Parasinella castanea*, *Lepidiaphanus eudyptidus*, *Lepidocyrtus cyaneus cinereus*, *Lepidobrya thalassarchia*, *L. violacea*.

Streams and seepage: *Acanthomurus rivalis*, *Tomocerura colonavia*, *Pseudokatianna triclavata*.

Beaches and shore rocks: *Triacanthella sorenseni*, *Subantarctica flava*, *Colonavis litoralis*.

Intertidal: *Parisotoma picea*.

Acknowledgements: I wish to thank Dr. J. L. Gressitt, L. A. Bishop Distinguished Chair of Zoology, B. P. Bishop Museum, for the opportunity to study several Campbell I. collections; and to acknowledge the advice and assistance kindly given by Prof. J. T. Salmon, Victoria University, Wellington, N. Z., who introduced me to the study of Collembola.

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INSECTS OF CAMPBELL ISLAND. PLECOPTERA[1]

By Joachim Illies

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Abstract: Campbell I. is inhabited by 3 species of stoneflies. They belong to 2 genera which are endemic in New Zealand and its subantarctic islands. The fully winged *Aucklandobius complementarius* End., is known from Auckland and Campbell Is. The 2 other species belong to the completely apterous genus *Apteryoperla* Wisl. and are endemics of Campbell. *Apteryoperla campbelli* Ills. is terrestrial in the larval stage and lives on the slopes of mountains (above 300 m), where both stages are encountered under stone. The ♀ of this species, hitherto unknown, is described. The 3rd species, *Apteryoperla longicauda* Ills., has aquatic larvae, which live in several streams of the island. The adults of this species are unknown. For the explanation of the existence of these Plecoptera on the Island it is necessary to assume a former land connection between Campbell (as well as Auckland) and the mainland of New Zealand. Since the breakdown of this land bridge the recent cool and wet climate must have been continuous on the island.

The only stonefly hitherto known from subantarctic islands was the endemic *Aucklandobius complementarius* End., taken in 1874 on the Lord Auckland Group by Krone on his German Scientific Expedition and described by Enderlein 1909. No members of the order Plecoptera have been recorded from Campbell. I. before the material of the New Zealand "Cape Expedition" (a 1941–1945 Wartime operation, which established watching-stations on the islands, instructing personnel to collect insects in their spare time) together with some further material became available for study. This study (Illies, 1963b), stated the existence of three species of Plecoptera on the island.

Some additional material, which had been collected by Dr. J. L. Gressitt in 1961, was handed over to me for study. It gives more information about the Campbell I. species and includes the first fully mature adult of the terrestrial, apterous *Apteryoperla campbelli* Ills. So it is necessary to include more morphological details of this species, which was hitherto known only as larva and immature adult.

During February and March 1963, Mr. K. P. Rennell and Mr. K. A. J. Wise of Bishop Museum collected an abundant material of more than 300 larval specimens of Plecoptera from streams as well as from terrestrial biota. Wise, who systematically searched for stoneflies on various biotopes, has written a special report which is cited in this paper. These special activities have brought us to a rather detailed knowledge of the stonefly-fauna of the island and even of the distribution and the preferred localities of its species.

According to all this material, it becomes evident that the plecopteran fauna of Campbell I. consists of 3 species: 1) *Aucklandobius complementarius* End. is the only fully

1. Results of field work supported by National Science Foundation grant G-23720 from the U. S. Antarctic Research Program.

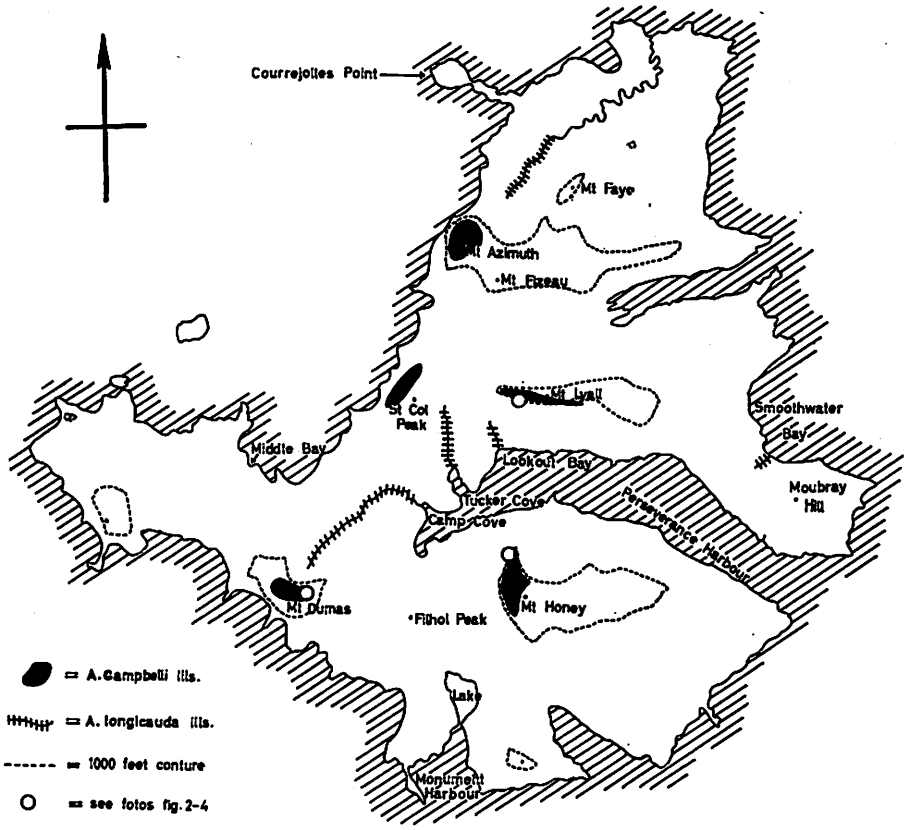


Fig. 1. Map of Campbell I. with distribution of the 2 species of *Apteryoperla* Wisl. The circles (see also figs. 2-4) indicate position of the lowest collection of *A. campbelli* Ills.

winged form of normal aquatic larval life; 2) *Apteryoperla campbelli* Ills. has terrestrial larvae and both stages are found under stones on the slopes of high mountains; 3) *Apteryoperla longicauda* Ills. inhabits some streams in the larval stage; adults are unknown but must be expected to live on the banks of these streams.

The 3 species, which are known to occur on Campbell I. are listed below. All Campbell I. records known to science are added.

1. **Aucklandobius complementarius** Enderlein

RECORDS: 2♂♂, Cape Expedition, ("Campbell Island"), 1943, J. H. Sorensen, (Dominion Mus.).

DISTRIBUTION: Known from Campbell and Auckland Is. only. Five more species of the genus (formerly included in *Nesoperla* Tlly.) are known from New Zealand.

Ecology: Fully winged species presumed to be active on the wing. Larvae live in streams, adults (on Auckland) have been taken under stones on the banks of streams. The species seems to be very rare on the island.

Remarks: The numerous material of nymphs out of streams, which has been collected by Wise and Rennell in 1963, includes no specimen of this species. This is all the more astonishing as a month earlier Wise found several larvae with wingcases in the Auckland Is. which certainly belong to this species.

Unfortunately it is not known at what part of the island Mr. Sorensen in 1943 found the 2 adults, which are the only known representatives of *Aucklandobius complementarius* End. on Campbell I. It must be supposed that the existence of the species on Campbell I. is restricted to an area which has not been examined by recent expeditions. But this idea is not satisfactory when dealing with a fully winged species whose chances of dispersal on the island are great. On Auckland Is. larvae have been found in several streams near sea level. Therefore it is difficult to understand, why collectors on Campbell I. did not succeed in finding them.

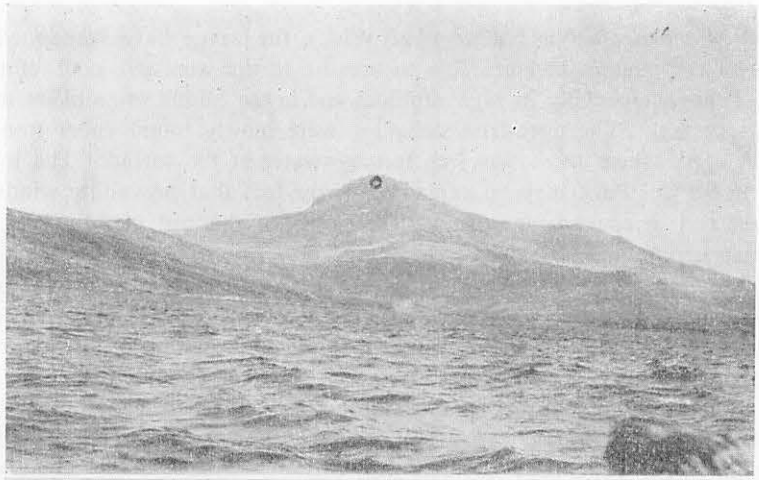
2. **Apteryoperla campbelli** Illies

RECORDS: 1♂, Cape Expedition, ("Campbell Island"), 1941, E. W. Mitchell & R. F. Wilson (Dominion Mus.); 5 larvae, Mt. Azimuth, under stones nr. summit, 17. I. 1961, P. M. Jones, (Canterbury Mus.); 1♀, 16 larvae, Mt. Lyall, 200–400 m, under rock, 3, 5, 12. XII. 1961, J. L. Gressitt (BISHOP); 11 larvae, Mt. Lyall, 200–400 m, under stones, 5.XII.1961, Gressitt, (BISHOP); 13 larvae, Mt. Dumas, above 400 m, under stones, 6. II. 1963, K. A. J. Wise; 1 larva, *ibid.*, 460 m, under stone in moist area, 6.II.1963, K. P. Rennell; 3 larvae, Summit Mt. Dumas, 315 m, 6. II. 1963, Wise; 12 larvae, N. side Mt. Azimuth, 480 m, under stones, 12. II. 1963, Wise; 1 larva, N. ridge Mt. Azimuth, 440 m, under stone, 12. II. 1963, Rennell; 16 larvae, SW slopes Mt. Lyall, 280–375 m, under stones, 19. II. 1963, Wise; 14 larvae, SW slopes Mt. Lyall, 310–390 m, 19. II. 1963, Rennell; 4 larvae, W. slopes St. Col Peak, ca. 180 m, under stones, 23. II. 1963, Wise; 31 larvae, N. slope Mt. Honey, ca. 310–326 m, gap in bluffs, 24.II.1963, Wise; 15 larvae, *ibid.*, 415–480 m, 24.II.1963, Wise (BISHOP); all Campbell I.

DISTRIBUTION: Endemic species for Campbell I. Distribution shown by map (fig. 1). High elevations about 300 m are inhabited on several places, especially Mt. Dumas, Mt. Lyall and Mt. Honey (see photos in fig. 2–4). The respective part of the report of K. A. J. Wise, who so successfully collected this species, is as follows: "Terrestrial stoneflies were systematically searched for when climbing or moving about high areas. On the hills surrounding Perseverance Harbor a hard rock stratum outcrops as a series of bluffs 30–60 m in height reaching to approximately 305 m. Stoneflies were not found below these bluffs but were taken between and or above them at ca. 310 m on Mt. Honey, ca. 400 m on Mt. Dumas, and ca. 280 m on Mt. Lyall, on slopes above Perseverance Harbor. Stoneflies did not occur on hills not reaching above 305 m, Mt. Filhol 287 m, Beeman Hill 198 m, Moubray Hill 249 m, except for St. Col Peak 300 m, where they were found on the western slopes at only ca. 180 m."

During a trip made from Tucker Cove over Mt. Azimuth and along the western cliff-tops to Courrejolles Point, at the NW end of the island, terrestrial stoneflies were only found between 440 and 480 m above bluffs on the N. slopes of Mt. Azimuth.

Ecology: The species is completely apterous. Adults as well as larvae show morphological adaptations to semi-terrestrial life (shortening of cerci, reduction of gill tufts, see fig. 5c). Similar to the respective species of the genus on Auckland (*A. turbotti* Ills.) and on



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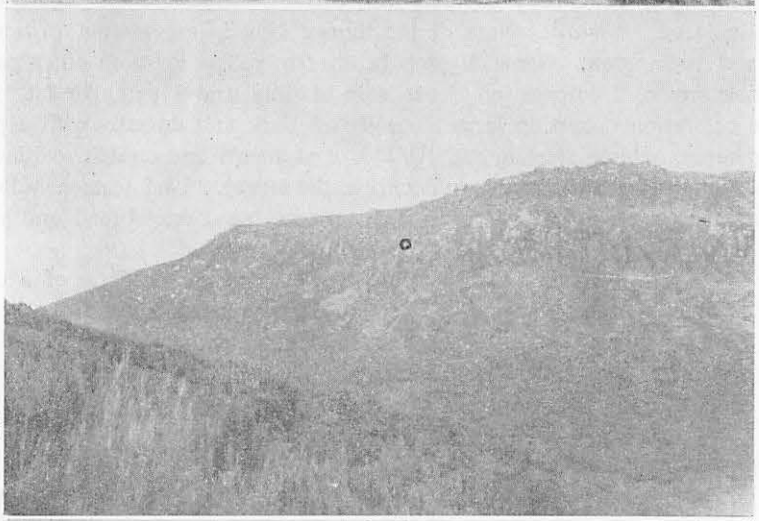

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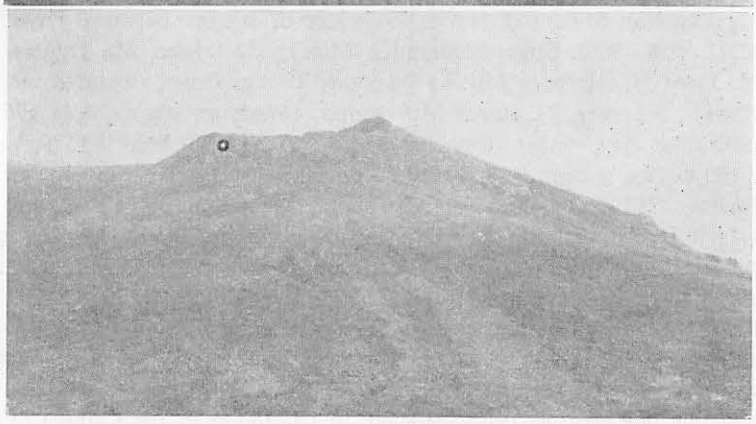

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Figs. 2–4. 2, Mt. Dumas (503 m) from NE. Small circle (see map fig. 1) indicates the lowest collection of *A. campbelli* Ills.; 3, Mt. Lyall (412 m) from S. Circle indicates lowest point of collection of *A. campbelli* Ills.; 4, Mt. Honey (568 m) from W. Circle indicates the lowest collection of *A. campbelli* Ills. Photo: K. A. J. Wise.

New Zealand (*A. monticola* Wisl., *A. angularis* Wisl.), the larvae have abandoned the aquatic environment of the streams and are able to breathe in the wet and cool climate of the subantarctic steppes, especially in high altitudes and in the humid atmosphere under stones.

Mr. Wise reports: "The terrestrial stoneflies were mostly found under stones on small bare areas of earth where there was free seepage water at the surface. The lower altitude occurrence on St. Col Peak may be explained by the fact that prevailing winds blow from the southwest and in consequence the western slopes of this hill may be kept more cold and wet than surrounding areas."

Additional description: Of this species only 1 adult was known, when the original description was made (Illies 1963 b). As this adult was a ♂ and not fully mature, nothing is known about the genitalia of the ♀ and about the color pattern of the mature adult. In the material collected by Dr. Gressitt a mature ♀ was found and it is possible therefore, to give the hitherto lacking details of the morphology of the species.

♀. 17 mm in length. Rather broad and stout (see fig. 6a) and brown to black in general coloration. Body completely covered with bristles. *Antenna*: 40 segments, somewhat longer than in larva. *Thorax*: Nota of the thorax broad, mesonotum distinctly broader than pro- and metanotum. Some lighter brown to yellow spots in outer parts of nota. *Legs* also dark brown, 2 patches on front side of tibia and 1 patch in 1st 1/3 of femur light. (Same coloration occurs in larva). *Abdomen* dark and dorsally with a pair of lateral yellow patches, which start in the 1st 1/3 of segments and stretch to hind margin in form of divergent stripes (same pattern occurs in the larva). Last segment yellow to brown in front, darkened in distal 1/2. Cerci of 13 segments, basal ones broad and very narrow, distal ones quadrangular (see fig. 6b).

External ♀ genitalia (as usual in the genus) only developed in form of a distinct concavity in hind margin of St. VIII (see fig. 6b). Subanal plates sheltered under dorsal prolongation of Tg. X. Cerci black in distal 1/2, light on inner edge of proximal 1/2. Maxilla (see fig. 6c) with very short distal segment of maxillary palp, which is typical for the genus.

3. **Apteryoperla longicauda** Illies

RECORDS: 1 larva, Cape Expedition, Tucker Cove, creek, 4 km from sea, 9. IV. 1946, J. H. Sorensen (Dominion Mus.); 1 larva, headwater of stream between Faye Ridge & N. W. Coast, 10. II. 1958, R. J. Street (Dominion Mus.); 52 larvae, Mt. Dumas, streams, 22. I. 1961, P. M. Jones (Canterbury Mus.); 2 larvae, Tucker Cove, stream rocks, 4. XII. 1961, Gressitt (BISHOP); 9 larvae, N. slopes Mt. Dumas, 160 m, ex stream, 5. II. 1963, Wise; 25 larvae, Smoothwater Bay, under stones in stream, 16. II. 1963, Wise; 15 larvae, N. slopes Mt. Dumas, 160 m, ex stream, 18. II. 1963, Rennell; 161 larvae, Smoothwater Bay, NW slopes of Moubray Hill, 150 m down to 10 m under stones in small stream, 2. III. 1963, Rennell, Wise; 1 larva, Smoothwater Bay, ex pool in shore rocks (nr. stream outlet), 2. III. 1963, Rennell; 1 larva, Lookout Bay, Perseverance Harbor, ex stream, 2. III. 1963, Wise; 4 larvae, Tucker Cove, on stone in stream, 3. III. 1963, Wise.

DISTRIBUTION: Endemic species for Campbell I. Streams inhabited by this species are shown on the map (see fig. 1). Some other streams on the island obviously have no stonefly fauna. Wise in his report states: "Aquatic stoneflies were taken in the Tucker Cove and Lookout Bay streams near sea-level, at ca. 160 m in the Camp Cove stream on the northern slopes of Mt. Dumas, and at ca. 50 m in a streamlet on a steep open face

on the southwest slopes of Moubray Hill. All these streams empty into Perseverance Harbour. On the northern slopes of Moubray Hill a stream flows down an old slip into Smoothwater Bay and aquatic stoneflies were taken in this stream from ca. 150 m down to the shore rock platform where one specimen was taken in a small pool adjacent to the stream outlet. Stoneflies were not found in streams at Middle Bay and on the southern slopes of Mt. Azimuth, or in the outlet stream from the lake at Monument Harbour."

Ecology: Completely apterous. Larvae live in streams and have never been found outside of water. Well-developed gill tufts and long cerci (fig. 5 a, b) prove, that the larvae are fully adapted to aquatic conditions. The rich material on hand shows that this species is rather numerous in streams. Variation in size of larvae is remarkably great. Ninety-three specimens of the greatest sample (Smoothwater Bay-Stream, 2. III. 1963, Rennell) have been measured and found to belong to the following size-classes (length of body without antennae and cerci):

4 : 2.5 mm	4 : 6 mm	5 : 12 mm
13 : 3 mm	2 : 6.5 mm	3 : 13 mm
3 : 3.5 mm	3 : 7 mm	3 : 14 mm
13 : 4 mm	3 : 8 mm	1 : 15 mm
6 : 4.5 mm	3 : 9 mm	2 : 16 mm
6 : 5 mm	6 : 10 mm	1 : 17 mm
4 : 5.5 mm	6 : 11 mm	1 : 21 mm

This pattern of size-classes can only be interpreted by the assumption that the development of the larvae takes more than 1 year and consequently, different year-classes of the species are represented in the same sample. Adults from subantarctic islands have only been found in December and early January. It must be because of this, that no adult was found during the intensive collecting-work on the island in February and March 1963. Coming to the banks of streams in mid-summer (December) one should find the adults of this species under stones and on rocks.

General conclusions: The family Gripopterygidae, to which the genera *Aucklandobius* and *Apteryoperla* belong, is restricted to the Southern Hemisphere and is richly developed there (30 genera with about 60 species). The members of the 4 subfamilies of this family have extended their range of distribution far to the South and represent the order on the southern tips of Australia, New Zealand, South America and on the subantarctic territories. Tierra del Fuego, as I have shown recently (Illies 1963a) has a rather large complement of Plecoptera, which was obviously recruited out of the rich number of nearby Patagonean species.

The rest of the subantarctic islands seem to have no Plecoptera. They have never been recorded from the Falkland or Kerguelen Is. in spite of extensive collections made there, and also the recent investigation of Macquarie I., according to Gressitt brought no evidence of stoneflies. On Chatham I., however, stoneflies are said to be present (Gressitt 1961), but nothing in detail is known about them in the literature and there remains some doubt until they have been extensively studied.

So it is just Campbell and Auckland of all subantarctic islands, which are known with any certainty to be inhabited by stoneflies. The complement with 3 species of this order on Campbell I. must be called rather rich. These 3 species (as well as those from Auckland) belong to the genera *Aucklandobius* End. and *Apteryoperla* Wisl. (family Gripopterygidae,

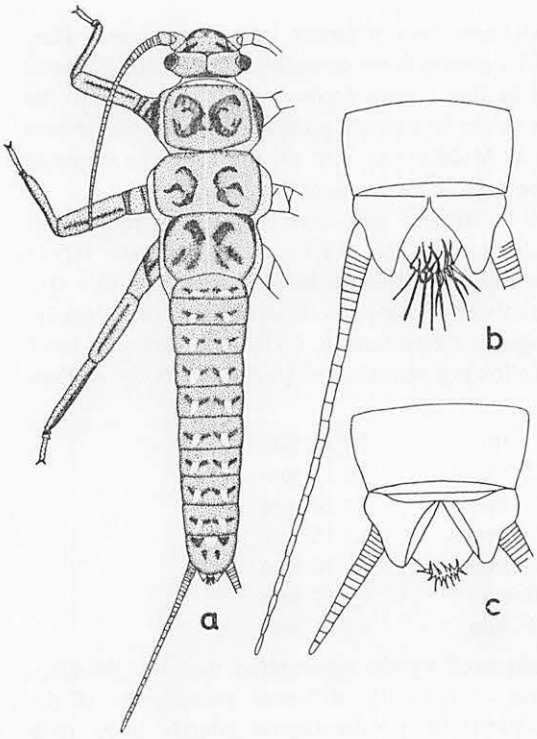

Fig. 5. a, *Apteryoperla longicauda* Ills., full grown larva (length of body ca. 20 mm); b, tip of abdomen of same specimen, ventral view; c, *A. campbelli* Ills., tip of abdomen of full grown larva, ventral view.

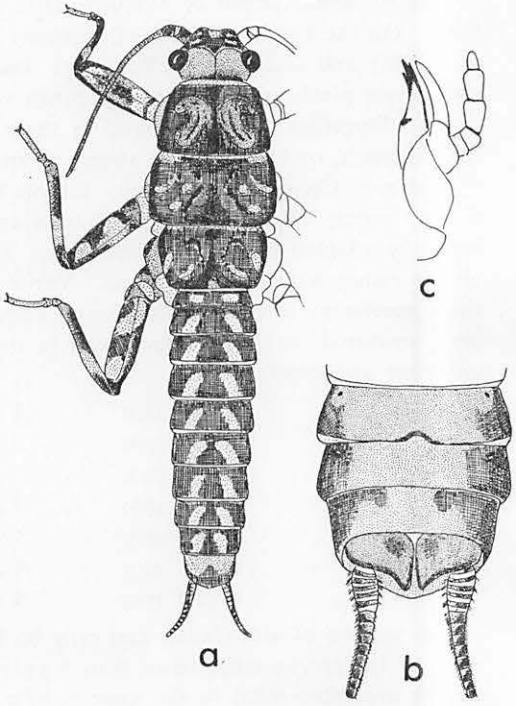

Fig. 6. *Apteryoperla campbelli* Ills., adult ♀. a, whole specimen, dorsal view; b, abdominal tip of same specimen, ventral view; c, left maxilla, ventral view.

subfamily Leptoperlinae), which are otherwise restricted to New Zealand. Thus the close relationship between the mainland of New Zealand and its subantarctic islands as well as the status of the whole territory as a faunistic subregion of its own can be stated anew.

The species of the genus *Aucklandobius* End. are fully winged and probably active flyers. The dispersal of specimens by wind may be improbable over distances such as 450 km, but as Gressitt (1961) has shown in a series of trapping experiments, few individuals of various orders of insects (no plecopteran up to date), occur in the wind drift in much greater distances from land. As *Aucklandobius complementarius* End. is endemic common to Auckland as well as Campbell I., the theory of such mode of dispersal must be seriously considered as an explanation of its occurence on both islands.

In *Apteryoperla* Wisl., however, all species are completely wingless. There is no means of passive dispersal (therefore, transportation on sea, by birds or by man can be excluded), and we have to postulate a former land connection between the isolated areas of the recent representation of this genus. Gressitt (1961) does not agree in all cases with this type of reasoning and mentions, that "material reduction in wing size can take place in a few tens of thousands of years and that the rate of wing reduction is more rapid on islands that are smaller and subject to adverse weather conditions." This may be true in cases

where an endemic wingless species of an otherwise fully-winged genus occurs on an isolated island, especially if the fauna of the island lies under the permanent pressure of wind selection. But it must be emphasized, that all members of *Apteryoperla* Wisl.—on the mainland as well as on the islands—are wingless, while the rest of the Plecoptera in these territories are fully-winged. Absence of wings, therefore, is a common character of the genus (which, according to some further morphological details forms a well-defined phylogenetical unit), and if we postulate a dispersal by flight, it must have been the flight of an ancestor of the whole genus. The genera, however, are very old units in Plecoptera, especially in the archaic family of Gripopterygidae, and their origin must be placed in the Mesozoic. The order Plecoptera is known from the Permian (of Australia and Russia) and members of the family Gripopterygidae are present in the Southern Hemisphere since Jurassic to Cretaceous times at least. There is no reason, therefore, why the origin of *Apteryoperla* Wisl. could not have taken place in Mesozoic terriory which includes New Zealand and its later isolated subantarctic islands. This is, according to my opinion, the most reasonable explanation for the recent distribution and separation of the genus.

Assuming this to be true (to which I see no alternative), we are able to learn something of the climatic history of these islands. It can be stated that the Plecoptera are revealed to be very useful tracer organisms for the study of the climatic and geological history of isolated territories. The presence of terrestrial species of *Apteryoperla* on Campbell I. (as well as on Auckland and New Zealand) shows that within this genus there is a general trend to the evolution of such forms under suitable conditions of high, subantarctic latitudes. It shows moreover, that considering the fact that this species has remained on the island since Mesozoic times, the favorable conditions for the terrestrial larvae, *i. e.* cool and wet climate, must have lasted continuously in at least some places of this island since the time when the land connection with the mainland disappeared. And as the 3rd Plecoptera of the Island, *Apteryoperla longicauda* Ills. is clearly aquatic and obligatorily related to the existence of courses of running fresh water, we can furthermore postulate that the existence of such permanent, running fresh water environments on the Island must also have lasted at least since the breakdown of land connections. All severe volcanic activities or more general changes of climate, therefore, can be excluded from the whole history of Campbell I. considering its plecopteran fauna.

I am greatly indebted to Mr. K. A. J. Wise for his invaluable information as well as for the photographs and a corresponding map of the localities, which he kindly offered me for the preparation of this paper.

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INSECTS OF CAMPBELL ISLAND. ORTHOPTERA: RHAPHIDOPHORIDAE OF AUCKLAND AND CAMPBELL IS.[1]

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Abstract: The Rhaphidophoridae of Auckland Is. and Campbell I. are described, and reference is made to the paucity of Orthoptera in this region. Two new monotypic genera, *Dendroplectron* n. gen. and *Notoplectron* n. gen., are erected, and the species *D. aucklandensis* n. sp. and *N. campbellensis* n. sp. are described. These are the only known members of the family occurring on the islands.

To the south of New Zealand lie a number of islands which have become known collectively as the Subantarctic Islands of New Zealand. These islands include the Antipodes Is., Auckland Is., Bounty Is., Campbell I. and the Snares. In 1839, the first scientific expedition visited the islands, when the corvettes *Astralobe* and *Zelee*, under Admiral D'Urville, called at Auckland I. This French expedition was accompanied by the naturalists Hombron and Jacquinot. Although insects were collected, there is no record of any Orthoptera. The following year, Sir James Ross visited Campbell and Auckland Is. in H.M.S. *Erebus* and *Terror*. Insects collected on this expedition were later presented to the British Museum, but again there is no mention of Orthoptera.

In 1874, a French Expedition visited Campbell I. to observe the transit of Venus, and at the same time a German Expedition visited the Auckland Is. In both cases extensive scientific collecting was carried out. H. Krone, of the German Expedition, lists the insects collected as Diptera, Lepidoptera and Coleoptera (see Gourlay, 1950). From then on, because of the periodic visits of the New Zealand Government steamer, numerous scientific visits were made to the islands. In the 1890's the first Orthoptera to be recorded from these islands was collected from the Bounty Is. by Captain Fairchild of the New Zealand Government steamer *Hinemoa*. It consisted of a single species which Hutton (1897) placed in a monotypic genus belonging to the family Rhaphidophoridae as *Ischyroplectron isolatum* Hutton. Its habitat was recorded as being "under rocks." Hudson (1909) referred to the species as being endemic to the Bounty Is.

In 1907, a major expedition, consisting of leading New Zealand scientists, visited the subantarctic islands. In 1909, the results were published by the Philosophical Institute of Canterbury in two volumes as *The Subantarctic Islands of New Zealand*. Only one orthopteran is recorded from this expedition—"*Onosandrus pallitarsis* Walker?" (fam. Henicidae) found on Snares by H. B. Kirk. G. V. Hudson (1909) considered it to be "closely allied to, if

1. Partial results of field work supported by National Science Foundation grant G-23720 from the U. S. Antarctic Research Program.

not specifically identical with *O. pallitarsis* Walker" a species already described from New Zealand. Salmon (1950) placed *O. pallitarsis* in his new genus *Zealandosandrus* as *Z. subantarcticus* Salmon after examination of Hudson's material and fresh specimens collected by Dr. R. A. Falla. He records the insect as being found "in burrows of petrels."

During the 1939–45 war, members of the New Zealand military forces were stationed on Campbell I. and the Auckland Is. They were requested to collect zoological specimens under the direction of Dr. R. A. Falla, then of the Canterbury Museum, Christchurch. This was known as the Cape Expedition. It was during this period that the first specimens of Rhaphidophoridae were collected from both these areas. Unfortunately the material was not adequate for detailed examination.

In December 1962 and January 1963, an expedition sponsored by the New Zealand Government, and known as the Dominion Museum/D. S. I. R. Auckland Islands Expedition 1962/3, spent some time on the Auckland Is. During this period an excellent series of Rhaphidophoridae was collected from the northern islands of the group.

The Campbell I. specimens described in this paper were collected by J. H. Sorensen, who was stationed on the island during and just after the 1939–45 war; and also by collectors from Bishop Museum, Honolulu, in 1962. Unfortunately this material does not form a good series, the majority of the specimens being very immature nymphs. Further collecting of this species is required in the future.

Like those from the Bounty Is., the Rhaphidophoridae of Campbell I. and the Auckland Is. are represented in each case by a monotypic genus. The Bounty Is. material has not been examined by me, but from Hutton's description these three genera seem to be in no way related. The poor representation of Orthoptera, and the lack of spiecation in these islands is strange when compared with the large number of species present on the North and South Islands of New Zealand, but is in agreement with the paucity of species occurring on the Chatham Is. (Richards, 1958).

Rhaphidophorids are nocturnal insects, hiding during the day and emerging at night to feed on the surrounding vegetation. It is possibly due to this behavior that they escaped detection by the scientific expeditions of the last century. On Bounty Is. they were found under rocks. On Campbell I. they occurred in tussock, or on *Coprosma* and *Dracophyllum*, often associated with moss and lichen. On Auckland Is. they were most commonly taken at night from the trunks of rata and *Olearia*, and during the day from under the bark of *Olearia*; they were also collected from under logs, from rocks near a shag colony and were found living in petrel burrows. One specimen collected from the burrow of *Pterodroma lessoni* (the White-headed Petrel) had the spines on the hind tibiae worn down, presumably due to digging. Rhaphidophorids have been found in petrel burrows on the Chatham Is. (Richards, 1958), and on off-shore islands round the coast of New Zealand, and it is my opinion that they probably also occupy this ecological niche on Campbell I. and the Bounty Is.

Genus **Dendroplectron** Richards, n. gen.

Body clothed with numerous short setae. Legs long and slender. Antennae very long and tapering, almost touching at their bases; scape about 4× as large as pedicel, which is narrower than scape, but broader than other segments; from segment 4 onwards seg-

ments subequal in length, although steadily decreasing in size; all segments thickly clothed with short setae. A single anterior, median ocellus present. Fastigium rising abruptly, convex, grooved medianly and longitudinally. Maxillary palps with segments 3 & 4 subequal in length. Metasternum bearing a median tubercle. Fore coxae each armed with a retrolateral spine. All femora sulcate ventrally. Apical spines on femora, tibiae, proximal segments 1 & 2 of hind tarsi constant in number. Fore femur bears 2 apical spines beneath, 1 prolateral and 1 retrolateral; fore tibia bears 4 apical spines, 1 above and 1 beneath both prolaterally and retrolaterally; fore tarsus unarmed. Mid femur bears 2 apical spines beneath, 1 prolateral and the other retrolateral; mid tibia bears 4 apical spines, 1 above and 1 beneath, both prolaterally and retrolaterally; mid tarsus unarmed. Hind femur unarmed; hind tibia bears a pair of long apical spurs above, a pair of subapical spines above and a pair of short apical spurs beneath, 1 from each pair being prolateral and the other retrolateral; 2 proximal segments of hind tarsus each bear 2 apical spines above, 1 prolateral and 1 retrolateral; the other 2 segments unarmed. Subgenital plate of ♀ absent. Subgenital plate of ♂ triangulate with a median groove; it bears 2 large lobes.

Type species: *Dendroplectron aucklandensis* n. sp.

Dendroplectron aucklandensis Richards, n. sp. Fig. 1.

Color: Basic color light brown, with pronotum, mesonotum, metanotum and abdominal terga irregularly mottled with mid brown and ochreous; femora and tibiae banded with light brown and ochreous; tarsi ochreous; antennae light brown; ovipositor light reddish brown. *Body*: Length up to 20 mm. Body thickly clothed with setae. Ovipositor 0.65× length of body. Antennae broken. Fastigium longer than high, with base touching scape of antennae. Pronotum margined anteriorly and laterally; mesonotum margined laterally. *Antenna*: As in generic description. Segment 3 on dorsal aspect 1.4× as long as pedicel; on ventral aspect 1.5× as long as pedicel. Sexual dimorphism absent. No spines present on flagellum of either ♂ or ♀. *Legs*: Fore and mid legs subequal in length, with hind leg 1.6× length of fore and mid legs. Sexual dimorphism absent. Tibiae and proximal 2 segments of hind tarsi armed with variable numbers of linear spines. No linear spines occur on femora or fore or mid tarsi (tab. 1). Apical spines constant in number, as in generic description. Length of proximal segment of hind tarsus subequal with other 3 segments together. Ratio of length of legs to length of body: fore leg 1.2 : 1; mid leg 1.2 : 1; hind leg 1.9 : 1.

Genitalia: ♀: Suranal plate, fig. 1a (SAP), concave laterally, distal margin very slightly trilobed; distal margin clothed with short setae. Subgenital plate, apparently absent, as not present in 10 specimens examined; a small V-shaped flap of intersegmental membrane, fig. 1b (V), was present in some specimens. ♂. Suranal plate, fig. 1c (SPL), concave laterally, distal margin trilobed and deeply emarginate between lobes, all lobes pointed apically; median lobe 1.3× as long as lateral lobes; entire plate sparsely clothed with setae. Subgenital plate, fig. 1 c, d (H), triangulate, convex proximally, tapering distally to a rounded apex which is indented medianly. Proximal portion of plate bearing 2 large lobes clothed with setae. Distal portion of plate with a median groove on both dorsal and ventral surfaces. On dorsal surface, proximal portion of plate bears setae, distal portion glabrous; on ventral surface plate clothed with short setae. Laterally, plate bears 2 styli clothed with setae. Proximal 1/2 of prolateral margin of each stylus fused to subgenital plate;

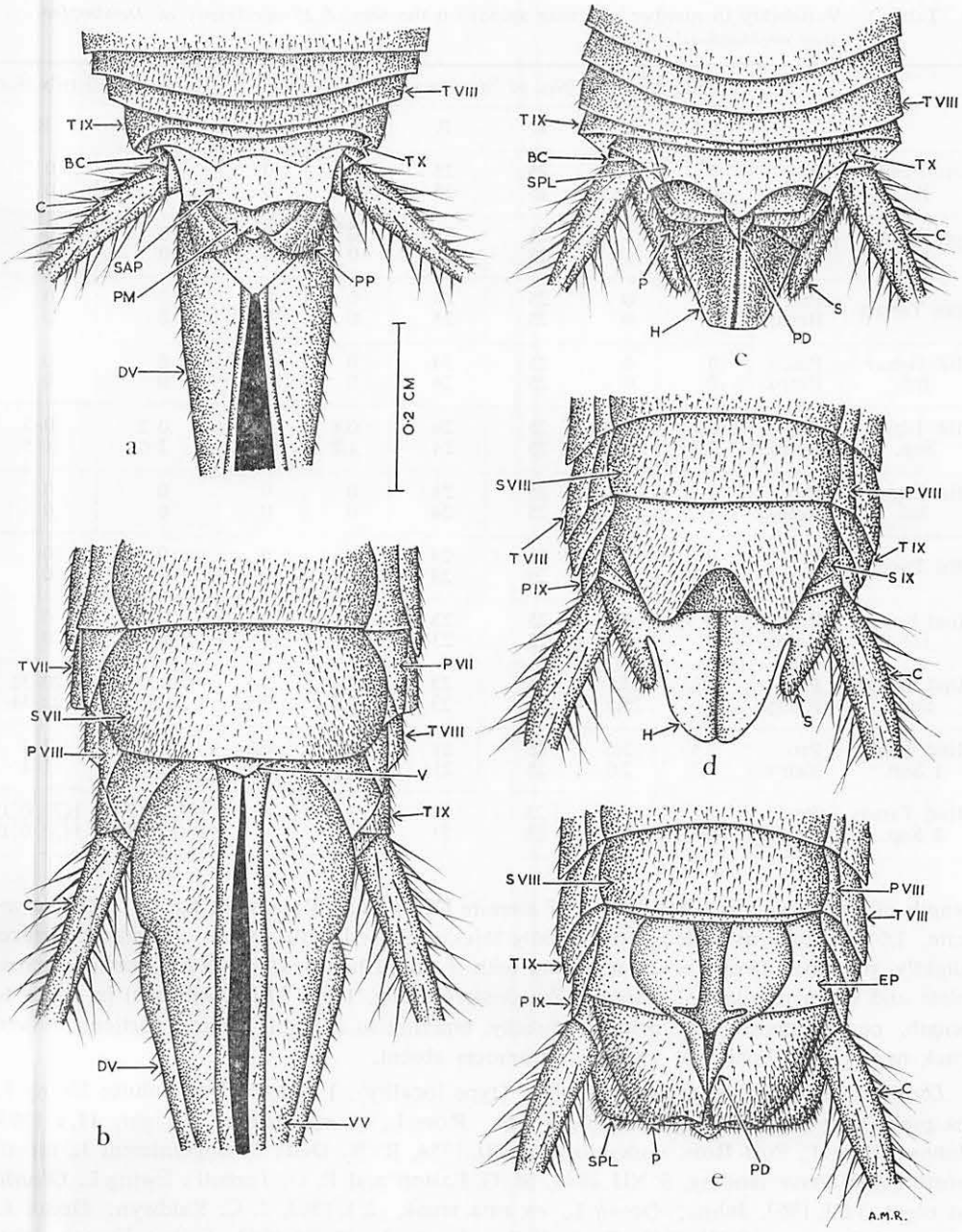

Fig. 1. *Dendroplectron aucklandensis* n. sp. a, ♀ genitalia, dorsal view; b, ♀ genitalia, ventral view; c, ♂ genitalia, dorsal view; d, ♂ genitalia, ventral view; e, ♂ genitalia, ventral view, subgenital plate removed to expose structures beneath.

Table 1. Variability in number of linear spines on the legs of 25 specimens of *Dendroplectron aucklandensis* n. sp.

		Arith. Mean		No. of Specimens		Std. Dev.		Range (or distribution)	
		L	R	L	R	L	R	L	R
Fore Femur Inf.	Pro.	0	0	25	25	0	0	0	0
	Retro.	0	0	25	25	0	0	0	0
Fore Tibia Inf.	Pro.	1	1	25	25	0	0	0	0
	Retro.	1	1	25	25	0	0	0	0
Fore Tarsus	Pro.	0	0	25	25	0	0	0	0
	Retro.	0	0	25	25	0	0	0	0
Mid Femur Inf.	Pro.	0	0	25	24	0	0	0	0
	Retro.	0	0	25	24	0	0	0	0
Mid Tibia Sup.	Pro.	0.9	0.9	25	24	0.8	0.9	0-2	0-3
	Retro.	3.5	3.2	25	24	1.2	1.1	2-6	1-5
Mid Tibia Inf.	Pro.	1	1	25	24	0	0	0	0
	Retro.	1	1	25	24	0	0	0	0
Mid Tarsus	Pro.	0	0	25	24	0	0	0	0
	Retro.	0	0	25	24	0	0	0	0
Hind Femur Inf.	Pro.	0	0	25	23	0	0	0	0
	Retro.	0	0	25	23	0	0	0	0
Hind Tibia Sup.	Pro.	24.4	23.8	25	23	2.4	2.5	20-33	20-32
	Retro.	25	25.5	25	23	2.2	2.5	20-31	22-34
Hind Tarsus 1 Sup.	Pro.	2.3	2.5	25	21	0.6	0.6	1-3	2-4
	Retro.	2.7	2.6	25	21	0.8	0.7	1-4	1-4
Hind Tarsus 2 Sup.	Pro.	0	0	25	21	-	-	1(1), 0(24)	1(2), 0(19)
	Retro.	0	0	25	21	-	-	1(1), 0(24)	1(3), 0(18)

length of each stylus is 0.5× length of sternite IX (S IX). Parameres, fig. 1 c, e (P), elongate, 1.6× as long as wide; retrolaterally thickly clothed with setae; on ventral surface, slightly proximal from apex, each plate with a raised band extending horizontally across plate and down retrolateral margin. Pseudosternite, fig. 1 c, e (PD), subequal in width to length, convex proximally, concave distally, tapering to a point; lateral portions curved back over plate. Penis not visible. Paraprocts absent.

Locality: Rose I., under bank at night (type locality), 1. XII. 1963, P. Johns; Ewing I., ex rocks near shag colony, 1. I. 1963, Johns; Rose I., ex rata trunks at night, 11. I. 1963, Johns; Rose I., Port Ross, under logs, 19. III. 1954, R. K. Dell; Disappointment I., top of north ridge above landing, 9. XII. 1944, M. G. Easton and E. G. Turbott; Ewing I., *Olearia* at night, 14. I. 1963, Johns; Ocean I., ex rata trunk, 2. I. 1963, J. C. Yaldwyn; Ocean I., ex petrel burrow, 17. IX. 1943, R. A. Falla; Ewing I., 18. XI. 1943, Falla; French Islet, Auckland I., ex burrow of *Pterodroma lessoni* (White-headed Petrel), 29. XII. 1962, Falla; Adams I., 2. II. 1944, Falla; Ocean I., 5. I. 1943, Falla; Auckland I, II. 1943, W. H. Dawbin; Ewing I., under bark of *Olearia*, 5. I. 1963, J. L. Gressitt; Ewing I., boatshed, no date (probably 1942), G. Prichard Paire.

Types: Holotype ♂, allotype ♀ and paratypes 2♂♂ and 2♀♀ in Canterbury Museum, Christchurch, New Zealand. Paratypes ♂ and ♀ in Dominion Museum, Wellington, New Zealand; paratypes 2♂♂ and 2♀♀ in Bishop Museum, Honolulu.

Remarks: Possibly due to its isolation, the genus *Dendroplectron* appears to be in no way related to any of the known genera of Macropathinae (Rhaphidophoridae) occurring in the Southern Hemisphere. Its main distinguishing characters are the number of its apical spines and the structure of the ♂ genitalia.

Genus **Notoplectron** Richards, n. gen.

Body clothed with numerous short setae. Legs long and slender. Antennae very long and tapering, almost touching at their bases; scape about 4× as large as pedicel, which is narrower than scape, but broader than other segments; from segment 4 onwards segments subequal in length, although steadily decreasing in size; all segments thickly clothed with short setae. A single, anterior, median ocellus only. Fastigium rising abruptly, convex, grooved medianly and longitudinally. Maxillary palps with segments 3 & 4 subequal in length. Fore coxae each armed with a retrolateral spine. All femora sulcate ventrally. Apical spines on femora, tibiae, proximal segments 1 & 2 of hind tarsi constant in number. Fore femur unarmed; fore tibia bears 4 apical spines, 1 above and 1 beneath both prolaterally and retrolaterally; fore tarsus unarmed. Mid femur bears 1 prolateral apical spine beneath; mid tibia bears 4 apical spines, 1 above and 1 beneath, both prolaterally and retrolaterally; mid tarsus unarmed. Hind femur unarmed; hind tibia bears a pair of long apical spurs above, a pair of subapical spines above, a pair of short apical spurs beneath and a pair of subapical spines beneath, 1 from each pair being prolateral and the other retrolateral; 2 proximal segments of hind tarsus each bear 2 apical spines above, 1 prolateral and 1 retrolateral; the other segments unarmed. Subgenital plate of ♀ trilobed. Subgenital plate of ♂ bilobed and slightly keeled distally; it bears 2 small tubercles, 1 on either side of keel; distal portion of plate consisting of several layers.

Type species: *Notoplectron campbellensis* n. sp.

Notoplectron campbellensis Richards, n. sp. Fig. 2.

Color: Basic color light brown. Color pattern variable; some specimens with pro-, meso-, metanotum and abdominal terga irregularly mottled with mid brown and ochreous; others with a broad, median, longitudinal band of ochreous down all thoracic and abdominal terga, in the center of which is a narrow longitudinal band of light brown expanding in width from mesonotum to abdominal tergum 2; lateral to ochreous band on either side is a narrow longitudinal band of mid brown extending to abdominal tergite 9; rest of tergites irregularly mottled with mid brown and ochreous. Femora banded with light brown and ochreous; tibiae banded with mid brown and ochreous; tarsi ochreous. Antennae light brown. Ovipositor reddish brown. *Body*: Length 18 mm in ♀, and 14 mm in ♂. Body thickly clothed with setae. Ovipositor 0.4× length of body. Antennae broken. Fastigium longer than high, with base touching scape of antennae. Pro- and mesonotum margined laterally. Abdominal sternum 7 in ♀ with 2 well developed lateral tubercles, 1 to each side, thickly clothed with long setae. *Antenna*: As in generic description. Segment 3 on dorsal and ventral aspects subequal in length with pedicel. Sexual dimorphism ab-

sent. No spines present on flagellum of ♂ or ♀. *Legs*: Fore and mid legs subequal in length, with hind leg 1.7× length of fore and mid legs. Sexual dimorphism absent. Fore, mid and hind tibiae armed with variable numbers of linear spines. No linear spines occur on femora or tarsi (tab. 2). Apical spines constant in number, as in generic description. Length of proximal segment of hind tarsus subequal with other 3 segments together. Ratio of length of legs to length of body: Fore leg, ♂ 1 : 1; ♀ 0.7 : 1. Mid leg, ♂ 1 : 1; ♀ 0.7 : 1. Hind leg, ♂ 1.6 : 1; ♀ 1.2 : 1.

Table 2. Variability in number of linear spines on the legs of 16 specimens of *Notoplectron campbellensis* n. sp.

		Arith. Mean		No. of Specimens		Std. Dev.		Range (or distribution)	
		L	R	L	R	L	R	L	R
Fore Femur Inf.	Pro.	0	0	16	16	0	0	0	0
	Retro.	0	0	16	16	0	0	0	0
Fore Tibia Inf.	Pro.	3	3	16	16	0	–	0	3(15), 2(1)
	Retro.	2	2	16	16	0	0	0	0
Fore Tarsus	Pro.	0	0	16	16	0	0	0	0
	Retro.	0	0	16	16	0	0	0	0
Mid Femur Inf.	Pro.	0	0	16	16	0	0	0	0
	Retro.	0	0	16	16	0	0	0	0
Mid Tibia Sup.	Pro.	0	0	16	16	0	0	0	0
	Retro.	0	0	16	16	0	0	0	0
Mid Tibia Inf.	Pro.	3	3	16	16	–	–	3(15), 2(1)	3(14), 2(1), 4(1)
	Retro.	2	2	16	16	–	0	2(15), 1(1)	0
Mid Tarsus	Pro.	0	0	16	16	0	0	0	0
	Retro.	0	0	16	16	0	0	0	0
Hind Femur Inf.	Pro.	0	0	16	12	0	0	0	0
	Retro.	0	0	16	12	0	0	0	0
Hind Tibia Sup.	Pro.	9.9	9.9	16	12	0.5	0.6	9-11	9-11
	Retro.	10.2	10.5	16	12	0.8	0.9	9-11	9-12
Hind Tarsus 1 Sup.	Pro.	0	0	16	12	0	0	0	0
	Retro.	0	0	16	12	0	0	0	0
Hind Tarsus 2 Sup.	Pro.	0	0	16	12	0	0	0	0
	Retro.	0	0	16	12	0	0	0	0

Genitalia: ♀. Suranal plate, fig. 2a (SAP), concave laterally; distal margin rounded and clothed with long setae. Subgenital plate, fig. 2b (SGP), trilobed, each lobe rounded apically, 2 lateral lobes 0.2× longer than median lobe; distal portions of lateral lobes clothed with setae, median lobe glabrous. Sternite VII bears 2 large tubercles, each thickly clothed with long setae around distal border. ♂. Suranal plate, fig. 2c (SPL), concave laterally; distally the plate is curved back onto ventral surface, distal margin indented medianly and clothed with long and short setae, rest of plate clothed with short setae. Subgenital plate, fig. 2d (H), triangulate, convex proximally changing to concave distally;

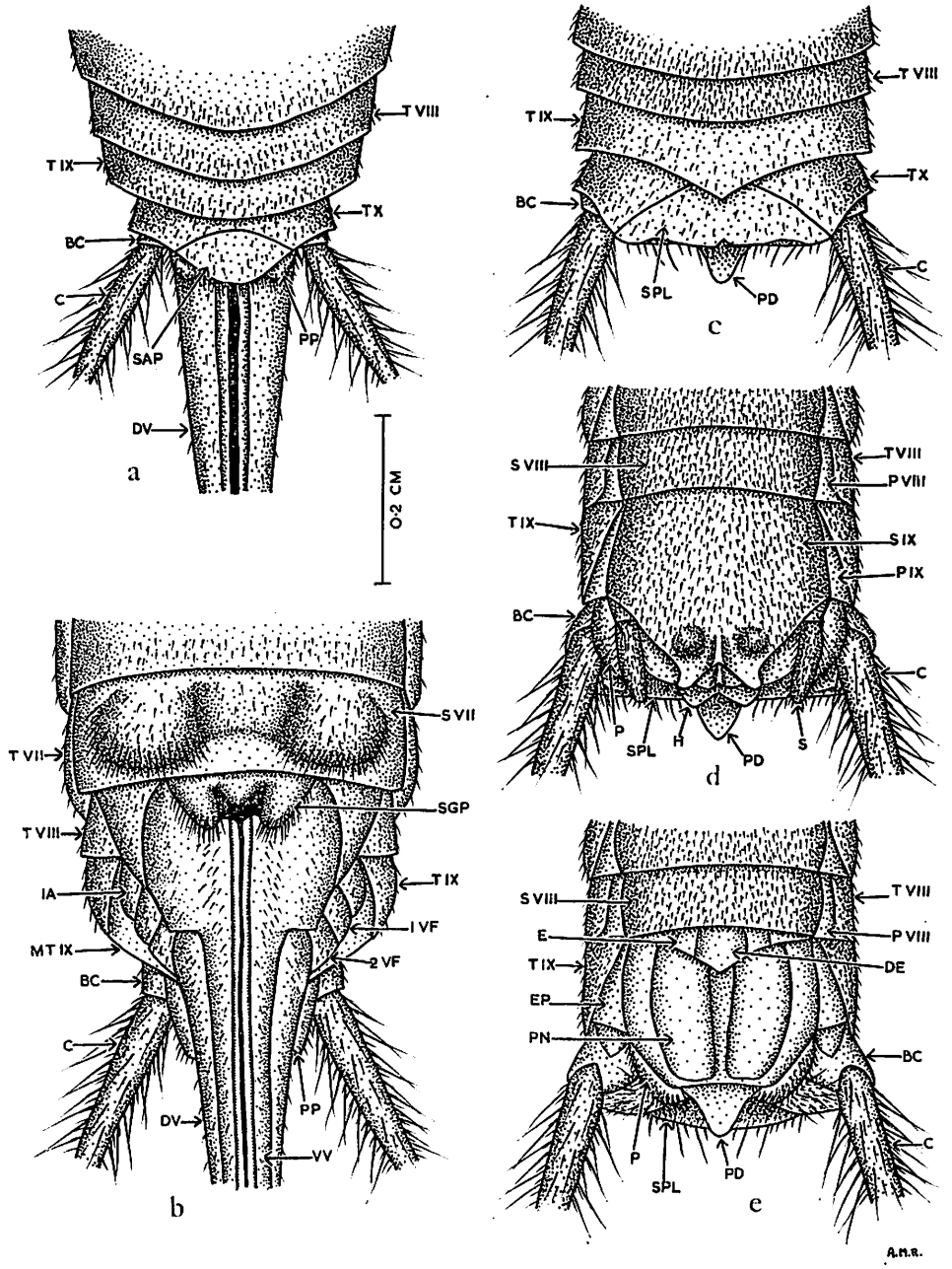

Fig. 2. *Notoplectron campbellensis* n. sp. a, ♀ genitalia, dorsal view; b, ♀ genitalia, ventral view; c, ♂ genitalia, dorsal view; d, ♂ genitalia, ventral view; e, ♂ genitalia, ventral view, subgenital plate removed to expose structures beneath.

distal portion of plate several layers thick forming a complex structure, 2 upper layers slightly keeled, all layers bilobed, upper layer deeply emarginate between lobes; it bears 2 small tubercles, 1 on either side of keel. Entire plate, except for distal lobes, thickly clothed with setae. Laterally, plate bears 2 styli clothed with setae, length of each stylus being 0.4× length of sternite IX (S IX). Parameres, fig. 2 d, e (P), elongate, approximately 1/2 as wide as long, retrolaterally thickly clothed with setae. Pseudosternite, fig. 2 c–e (PD), subequal in length to width, convex laterally, tapering to a rounded apex; from proximal margin distad 0.7 length of pseudosternite plate is overlaid by a thin chitinous plate. Penis, fig. 2e (PN), 2-lobed, each lobe approximately 2× as long as wide. Paraprocts absent.

Locality: Campbell I. (type locality), Tucker Valley, moss on *Dracophyllum* trees, 13.VIII. 1962, K. P. Rennell; Courrejolles Point, east slope, ex tussock, 12. II. 1962, K. A. J. Wise; Beeman, ex *Coprosma*, 13. VIII. 1962, 14. XII. 1962, Rennell; Beeman Hill, moss, lichen, low plants, 11. II. 1963, Wise; Beeman Cove, ex *Coprosma*, 25. VIII. 1962, Clark; Beeman Hill, ex *Coprosma*, 13. VIII. 1962, Clark; Beeman Camp, 28. VII. 1962, Rennell; Campbell I., 16. X. 1944, C. Doley; Tucker Cove Valley, ex lichen on *Dracophyllum scoparium*, 13. VIII. 1947, 15. VIII. 1947, Sorenson; Campbell I., 26. V.1942, V. 1946, Sorenson.

Types: Holotype ♂, allotype ♀, and paratype ♂ in Dominion Mus., Wellington, New Zealand.

Remarks: Although differing in the number and position of the apical spines on the femora, the genus *Notoplectron* shows some affinities with *Pleioplectron* Hutton (as redefined in Richards, 1959) in the structure of the ♂ and ♀ external genitalia. It appears to be unrelated to any of the other known genera of Macropathinae.

Acknowledgements: I am indebted to Dr. R. A. Falla, Director, Dominion Museum, Wellington; Mr. P. Johns of the Zoology Department, Canterbury University, Christchurch; and Dr. J. L. Gressitt, Bishop Museum, Honolulu, for the loan of material.

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INDEX TO TABLES

Arith. Mean—Arithmetic mean.
L.—Left leg.
Pro.—Prolateral.
Retro.—Retrolateral.
Std. Dev.—Standard Deviation.
Inf.—Inferior.
Mid.—Middle.
R.—Right leg.
Sup.—Superior.

INDEX TO TEXT-FIGURES

BC—basal segment of cercus.
C—cercus.
DE—ductus ejaculatorius.
DV—dorsal valve.
E—endapophysis.
EP—endoparamere.
H—subgenital plate, ♂.
IA—intersegmental apodeme.
MT IX—membrane of tergite IX.
P—paramere (ectoparamere).
P VII, P VIII, P IX—pleurite VII, VIII, IX.
PD—pseudosternite.
PM—perianal membrane.
PN—penis.
PP—paraproct.
S—stylus.
S VII, S VIII, S IX—sternite VII, VIII, IX.
SAP—suranal plate, ♀.
SGP—subgenital plate, ♀.
SPL—suranal plate, ♂.
T VII, T VIII, T IX, T X—tergite VII, VIII, IX, X.
1 VF—1st valvifer.
2 VF—2nd valvifer.
VV—ventral valve.
V—V-shaped flap.

Pacific Insects Monograph 7: 226-229 July 15, 1964

INSECTS OF CAMPBELL ISLAND. PSOCOPTERA[1]

By C. N. Smithers

AUSTRALIAN MUSEUM, SYDNEY

Abstract: This paper reports on the Psocoptera known from Campbell I. Three species, *Spilopsocus avius* n. sp., *Trogium pulsatorium* (L.) and *Austropsocus insularis* Smithers are here recorded, the last named having been described from Macquarie Island (Smithers, 1962).

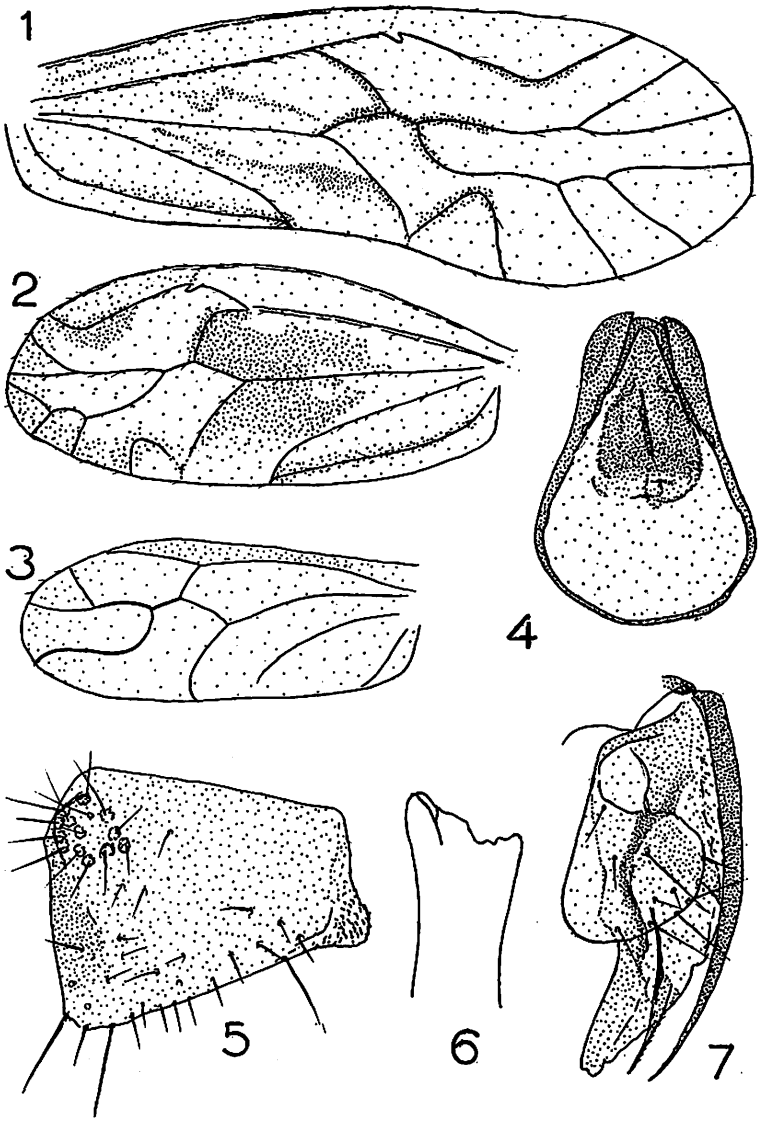
Family ELIPSOCIDAE

Spilopsocus avius Smithers, n. sp.

♀. *Coloration* (in alcohol): Head light buff with pale brown markings as follows: a crescent-shaped patch adjacent to inner margin of each compound eye, a rectangular patch on vertex on each side of median epicranial suture, a semicircular area between the median ocellus and epistomial suture, the straight edge of which lies along suture and a ring around the base of each antenna. Genae pale. Antenna darker than the light buff of head but not as dark as head markings. Eye black. Ocelli pale, bordered on their adjacent edges with pale brown. Maxillary palp pale, segment 4 colored as antenna. Dorsum of mesothorax light buff with anterior part of antedorsum and median areas of lateral lobes pale brown. Scutellum bordered in pale brown. Dorsum of metathorax similar but whole scutellum light buff. Legs pale except for the dark brown tarsal segment 3. Fore wing (fig. 2) hyaline, very faintly tinged with brown, marked with brown as in figure. Veins brown. Hind wing (fig. 3) hyaline, very faintly tinged with brown in costal region. Abdomen very pale except for pale brown transverse markings on dorsum of segment 1 and for pale brown tergite 9 which has a fine, dark brown line along anterior margin. Terminal structures pale brown.

Morphology: Brachypterous. Length of body 2.4 mm. Epicranial suture distinct; vertex and frons bearing strong, dark brown setae; those on postclypeus pale, finer and shorter. Eye fairly large, but not reaching level of vertex when viewed from side. IO/D : 2.8; PO : 0.71. Three ocelli present, not prominent. Lacinia (fig. 6). Measurements of hind leg : F, 0.5 mm; T, 0.9 mm; t_1, 0.25 mm; t_2, 0.075 mm; t_3, 0.10 mm; rt, 3.3 : 1.0 : 1.3; ct, 11, 0, 0. Claws with small preapical tooth; pulvillus broad. Fore wing: length, 1.5 mm; width, 0.65 mm. Hind wing: length, 1.2 mm; width, 0.5 mm. Fore wing reduced, somewhat curved, the reduction involving especially distal 1/2 of wing; the pterostigma lies entirely well within distal 1/2 of wing. Cu_2 setose, setae of veins and wing margin small and fine. Hind wing reduced. Cu_1 strongly recurved near wing margin. Setae of mar-

1. Partial results of field work supported by the National Science Foundation grant G-23720 from the Office of Antarctic.



Figs. 1–7. *Spilopsocus avius* n. sp. 1, ♂ fore wing; 2, ♀ fore wing; 3, ♀ hind wing; 4, ♂ phallosome; 5, ♀ paraproct; 6, ♀ lacinia; 7, ♀ gonapophyses.

gin, between R_{2+3} & R_{4+5} only, very small and fine. Epiproct in form of an equilateral triangle with hind angle rounded. Paraproct (fig. 5) with small, rugose protruberance on posteroventral angle. Subgenital plate simple, posterior lobes reduced but with single seta remaining to represent the group usually present in this family at apex of each lobe. Transverse band of preapical setae present. Gonapophyses (fig. 7) with ventral valve strong and pointed; dorsal valve with divided apex; external valve rounded.

♂. *Coloration* (in alcohol): Similar to that of ♀; antenna brown beyond middle of 1st flagellar segment. Fore wing (fig. 1).

Morphology: Length of body 2.0 mm. Head similar to that of ♀ but relatively smaller. Eyes fairly large, but not reaching level of vertex when viewed from side. IO/D : 2.0; PO : 0.71. Three ocelli present, larger than in ♀. Lacinia as in ♀. Measurement of hind leg : F, 0.55 mm; T, 0.92 mm; t_1, 0.27 mm; t_2, 0.085 mm; t_3, 0.11 mm; rt, 3.2 : 1.0 : 1.2; ct, 13, 0, 0. Fore wing: length, 2.5 mm; width, 1 mm. Fore wing with setae fine and short. Cu_2 setose. Hind wing: length, 2 mm; width, 0.8 mm. Cu_2 strongly recurved near hind margin. Marginal setae between R_{2+3} & R_{4+5} fine and short. Epiproct simple, rounded behind, setose. Paraproct simple without duplex setae, with a field of about 22 trichobothria. Hypandrium with hind margin curved and with small lateral lobes. Phallosome (fig. 4).

MATERIAL EXAMINED. CAMPBELL I.: 2♀♀ (including holotype), 2♂♂ (including allotype), 0–30 m, Tucker Cove, ex *Dracophyllum*, 7. VIII. 1962, K. Rennell; 5♀♀, Shoal Pt., swept ex *Hebe elliptica*, 7. II. 1963, K. A. J. Wise; 1 nymph, Beeman Camp, 2–50 m; ex *Coprosma*?, 26–30.XI.1961, J. L. Gressitt; 2♂♂, nr. Shoal Pt., ex *Hebe elliptica*, 7.II.1963, Rennell; 3 nymphs, Beeman Beach, ex *Hebe elliptica*, 16.XII.1961, Gressitt; 2♀♀, 1 nymph, Beeman Camp, ex *Dracophyllum*, 21–25. XI. 1961, Gressitt; 1♀, St. Col Ridge, 180–280 m, 24, 26, 30. XI. 1961, Gressitt; 2♂♂, Tucker Cove, 1–50 m, ex *Dracophyllum*, 1–5. XII. 1961, Gressitt; 3 nymphs, Beeman, 20 m, ex *Poa laterosa*, 16.XII.1961, Gressitt; 2♀♀, 2 nymphs, Beeman, 100–150 m, ex *Coprosma*, 3.VIII.1963, Rennell; 4 nymphs, Beeman Camp, 2–50 m, 12–17. XII. 1961, Gressitt; 3♀♀, 1♂, Beeman Camp, ex *Dracophyllum scoparium*, 13. XII. 1961, Gressitt; 1♂, by shore, Lookout Bay Beach, ex *Hebe*, 16, 19. XII. 1961; 1♂, Moubray Hill, 100 m, ex *Dracophyllum*, 12. XII. 1961, Gressitt; 1♂, Tucker Cove, ex *Coprosma*, 1. XII. 1961, Gressitt; 1♀, Moubray Hill, 100 m, ex *Coprosma*, 12. XII. 1961, Gressitt; 1♀, Beeman Hill, 40 m, ex *Dracophyllum*, 21. XI. 1961, Gressitt; 4♀♀, 12♂♂, Beeman Pt., ex *Dracophyllum scoparium*, 25. II. 1963, Wise; 1♂, Beeman Hill, sweeping, 2. II. 1963, Wise; 3♀♀, 4♂♂, Shoal Pt., swept ex *Dracophyllum longifolium*, 7.II.1963, Wise; 1♂, 2 nymphs, surface of water barrel, 8. XI. 1947, J. H. Sorensen.

Holotype ♀, allotype ♂ and ♂ paratype in Dominion Museum, Wellington; ♂ and ♀ paratypes in Bishop Museum and Australian Museum.

This species is placed in the genus *Spilopsocus* with some reservation as the form of the subgenital plate in the ♀ has hardly any indication of lobing other than the setal arrangement and the pulvillus is broad instead of being narrow. On other characters, however, including genitalia, it seems preferable to place the present species in *Spilopsocus*. It can be distinguished from other species genus by the form of the wing pattern, which is very much more extensive and darker in *S. ruidis* Smithers. In *S. stigmaticus* (Tillyard) R_1 is more strongly curved before the apex of the pterostigma than in *S. avius* and the distal part of the pterostigma is more darkly colored. The ♀ genitalia also show differences in

proportions, especially of the dorsal and external valves.

Family PHILOTARSIDAE

Austropsocus insularis Smithers

MATERIAL EXAMINED. CAMPBELL I.: 1♀, 1♂, Tucker Cove, ex *Coprosma*, 6. VIII. 1962, H. M.; 1♀, 1♂, 2 nymphs, NW bay, ex tussock, 30. XII. 1962, Rennell; 1 nymph, nr. beach, Monument Harbor, ex tussock, 9. II. 1963, Rennell; 1♂, Shoal Pt., ex tussock, 7.II. 1963, Wise.

Family TROGIIDAE

Trogium pulsatorium (L.)

MATERIAL EXAMINED. CAMPBELL I.: 6♀♀, 1 nymph, IX. 1961, V. O'Neill.

REFERENCE

Smithers, C. N. 1962. Insects of Macquarie Island. Psocoptera: Philotarsidae. Pacific Ins. 4 (4): 929–32, 6 figs.

Pacific Insects Monograph 7: 230-234 July 15, 1964

INSECTS OF CAMPBELL ISLAND. PHTHIRAPTERA

By Theresa Clay

BRITISH MUSEUM (NAT. HIST.), LONDON

Abstract: Over 25 species of biting lice (1 on sheep; rest from sea birds) and 2 species of sucking lice (from rat and sea lion), were taken on Campbell I.

MALLOPHAGA

Family MENOPONIDAE

Austromenopon affine (Piaget), 1890

Type host: *Diomedea exulans* Linn.

CAMPBELL I.: ♂♂ and ♀♀ from *Diomedea e. epomophora.*

Austromenopon ossifragae Eichler, 1949

Type host: *Macronectes giganteus* (Gmelin).

CAMPBELL I.: ♂♂ and ♀♀ from the type host.

Austromenopon elliotti Timmermann, 1954

Type host: *Pelecanoides urinatrix* (Gmelin).

CAMPBELL I.: ♀♀ from *Pelecanoides urinatrix exsul* are almost certainly this species, though ♂♂ are needed to confirm the identification.

Family PHILOPTERIDAE

Austrogoniodes concii (Kéler, 1952)

Type host: *Eudyptes crestatus* (J. F. Miller).

CAMPBELL I.: ♂♂ and ♀♀ from *Eudyptes pachyrhynchus sclateri* belong to this species. It has previously been taken from this host on the Antipodes Is. and New Zealand (collection of the Canterbury Museum, Christchurch, New Zealand).

Austrogoniodes cristati Kéler, 1952

Type host: *Eudyptes crestatus* (J. F. Miller).

CAMPBELL I.: ♂♂ and ♀♀ taken from rockhopper penguin's nest. This species has been taken in addition to the type host from a number of penguins, namely: *Eudyptes chrysolophus, E. chrysocome* (Macquarie I.; collection of A.N.A.R.E.) and *E. pachyrhynchus sclateri* (New Zealand; Canterbury Museum).

Harrisoniella hopkinsi Eichler, 1952

Type host: *Diomedea exulans* Linn.

CAMPBELL I.: ♂♂ and ♀♀ from *Diomedea e. epomophora.* Kéler 1957: 504 recorded this species from the same host.

Harrisoniella grandis (Piaget, 1880)

Type host: *Stercorarius* sp.

CAMPBELL I.: A ♀ nymph and ♀♀ from *Catharacta skua lonnbergi* are *H. grandis* which has previously been taken from this host species.

Perineus Harrison, 1936

There are 2 distinct groups of species included in this genus, which may have to be separated generically. They are listed here under *Perineus sens. str.* and *sens. lat.*

Perineus sens. str.

CAMPBELL I.: ♀♀ from *Diomedea e. epomophora* and *Diomedea chrysostoma* are not identifiable without ♂♂.

Perineus sens lat.

Perineus (s. l.) diomedeae (J. C. Fabricius, 1775) Fig. 1.

Type host: *Diomedea melanophris* Temminck.

CAMPBELL I.: ♂♂ and ♀♀ from the type host and *Phoebetria palpebrata*; it is well known from both these host (see Clay, 1940: 302).

Perineus (s. l.) obscurus (Rudow, 1869)

Type host: *Macronectes giganteus* (Gmelin).

CAMPBELL I.: ♂♂ and ♀♀ from type host.

Perineus (s. l.) sp.

CAMPBELL I.: A ♀ from *Diomedea chrysostoma* is not identifiable without a ♂.

Halipeurus sp.

CAMPBELL I.: Nymphs from *Puffinus griseus* are not identifiable.

Philoceanus garrodiae (Clay, 1940)

Type host: *Garrodia nereis* (Gould).

CAMPBELL I.: ♂♂ and ♀♀ from the type host.

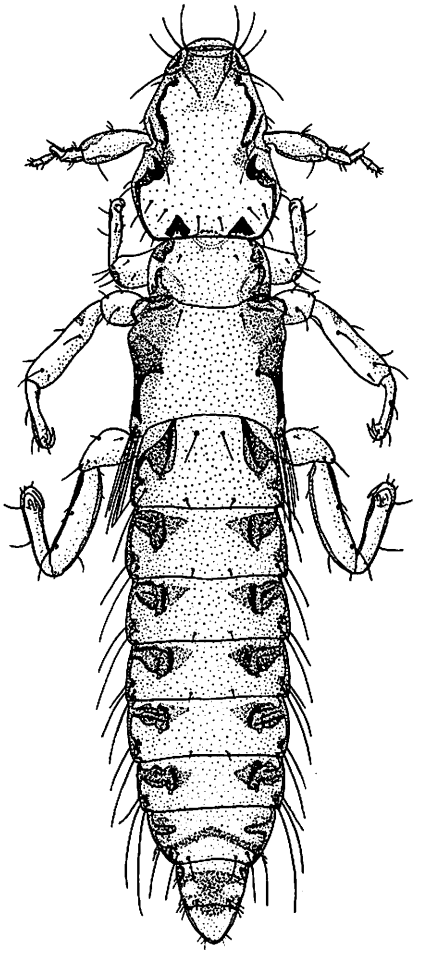


Fig. 1. *Perineus diomedeae*, dorsal view of ♂.

Pelmatocerandra setosa (Giebel, 1876)

Type host: *Pelecanoides urinatrix exsul* Salvin.

CAMPBELL I.: ♂♂ and ♀♀ from the type host.

Trabeculus hexacon (Waterston, 1914)

Type host: *Procellaria aequinoctialis* Linn.

CAMPBELL I.: ♂♂ and ♀♀ from *Puffinus griseus* are included under this species as *sensu lato.* This term denotes that these specimens from the population parasitic on *Puffinus griseus,* belong to the species *T. hexacon,* but differ somewhat (in measurements) and do not warrant nomenclatorial recognition (see also Clay, 1962: 200).

Docophoroides brevis (Dufour, 1835)

Type host: *Diomedea exulans* Linn.

CAMPBELL I.: ♂♂ and ♀♀ from *Diomedea epomophora.* A nymph from the type host probably also belongs to this species.

Docophoroides murphyi (Kellogg, 1914)

Type host: *Macronectes giganteus* (Gmelin).

CAMPBELL I.: ♂♂ and ♀♀ from the type host.

Pectinopygus

Identification of material in this genus must be postponed.

Saemundssonia stresemanni Timmermann, 1949

Type host: *Catharacta s. skua* Brünnich.

CAMPBELL I.: ♂♂ and ♀♀ from *Catharacta skua lonnbergi* belong to this species.

Saemundssonia lari (O. Fabricius, 1780)

Type host: *Larus hyperboreus* Gunnerus.

CAMPBELL I.: ♂♂ and ♀♀ from *Larus dominicanus* and *Larus novaehollandiae scopulinus* are included under this species as *sens. lat.* See under *Trabeculus* for discussion of this term.

Saemundssonia sp.

CAMPBELL I.: ♀♀ from *Starna vittata bethunei* are not identifiable without ♂♂.

Quadraceps fuscolaminulatus (Enderlein, 1908)

Type host: *Larus dominicanus* Lichtenstein.

CAMPBELL I.: ♂♂ and ♀♀ from type host.

Quadraceps lingulatus (Waterston, 1914)

Type host: *Larus novaehollandia hartlaubii* Bruch.

CAMPBELL I.: ♂♂ and ♀♀ from *Larus novaehollandiae scopulinus* belong to this species.

Familly TRICHODECTIDAE

Damalinia ovis (Schrank, 1781)

Type host: *Ovis aries* Linn.

CAMPBELL I.: ♂♂ and ♀♀ from the type host.

ANOPLURA

Family HOPLOPLEURIIDAE

Polyplax spinulosa (Burmeister, 1839)

Type host: *Rattus norvegicus* (Berkenhout).

CAMPBELL I.: ♂♂ and ♀♀ from rats.

Family ECHINOPHTHIRIDAE

Antarctophthirus microchir (Trouessart & Neumann, 1888)

Type host: *Otaria hookeri* Gray.

CAMPBELL I.: A ♂ and ♀ from the type host.

HOST–PARASITE LIST

Birds

SPHENISCIFORMES	
Eudyptes pachyrhynchus sclateri	*Austrogoniodes concii* (Kéler, 1952).
Eudyptes crestatus crestatus	*Austrogoniodes cristati* Kéler, 1952.
PROCELLARIIFORMES	
Diomedea e. epomophora	*Austromenopon affine* (Piaget, 1890).
	Harrisoniella hopkinsi Eichler, 1952.
	Perineus (*sens. lat.*) sp.
	Docophoroides brevis (Dufour, 1835).
Diomedea melanophris impavida	*Perineus diomedeae* (J. C. Fabricius, 1775).
Diomedea chrysostoma	*Perineus* (*sens. str.*) sp.
	Perineus (*sens. lat.*) sp.
Diomedea e. exulans	*Docophoroides* sp.
Phoebetria palpebrata	*Perineus diomedeae* (J. C. Fabricius, 1775).
Macronectes giganteus	*Austromenopon ossifragae* Eichler, 1949.
	Docophoroides murphyi (Kellogg, 1914).
	Perineus obscurus (Rudow, 1869).
Puffinus griseus	*Trabeculus hexacon* (Waterston, 1914) *sens. lat.*
	Halipeurus sp.
Garrodia nereis	*Philoceanus garrodiae* (Clay, 1940).
Pelecanoides urinatrix exsul	*Austromenopon* probably *elliotti* Timmermann, 1954.
	Pelmatocerandra setosa (Giebel, 1876).

PELECANIFORMES	
Phalacrocorax c. campbelli	*Pectinopygus* sp.
CHARADRIIFORMES	
Stercorarius skua lonnbergi	*Saemundssonia stresemanni* Timmermann, 1949.
	Harrisoniella grandis (Piaget, 1880).
Larus dominicanus	*Quadraceps fuscolaminulatus* (Enderlein, 1908).
	Saemundssonia lari (O. Fabricius, 1780) *sens. lat.*
Larus novaehollandiae scopulinus	*Quadraceps lingulatus* (Waterston, 1914).
	Saemundssonia lari (O. Fabricius, 1780) *sens. lat.*
Sterna vittata bethunei	*Saemundssonia* sp. ♀♀ only.

Mammals

Sheep	*Damalinia ovis* (Schrank, 1781).
Rats	*Polyplax spinulosa* (Burmeister, 1839).
Otaria hookeri	*Antarctophthirus microchir* (Troessart & Neumann, 1888).

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Kéler, S. von. 1957. Die Mallophagen von Sturmvögeln und Ruderfüssern I. *Harrisoniella* Bedford und *Perineus* Thompson. Beitr. Ent. Berlin **7**: 493–527.

Pacific Insects Monograph 7: 235 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
THYSANOPTERA[1]

By Lewis J. Stannard

ILLINOIS NATURAL HISTORY SURVEY

Family THRIPIDAE

Taeniothrips hawaiiensis (Morgan)

A single ♀ taken on Mt. Honey, 560 m, Campbell I., 17. XII. 1961, by J. L. Gressitt, seemingly represents *hawaiiensis*. This sole specimen bears 7 segments in each antennae.

Considerable variation and many synonyms apply to members of the widespread *hawaiiensis* complex. Forms having 8 segments in each antenna are typical of *Taeniothrips* whereas forms having 7 segments in each antenna could be and have been placed in the genus *Thrips*, as currently defined. There is need for a thorough review of the entities and forms involved as well as a revision of the 2 aforementioned genera before profitable analyses can be made on these isolated colonies. Man may have been an important agent in the present distribution of these thrips.

1. Results of field work supported by National Science Foundation grant G-18800 from the U, S, Antarctic Research Program,

Pacific Insects Monograph 7: 236-237 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HEMIPTERA. HOMOPTERA: APHIDIDAE

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Abstract: A collection of 146 specimens of aphids from Campbell Island has been examined. The species identified are *Aulacorthum circumflexum* (Buckt.), *A. malvae* (Mosley), *A. solani* (Kalt.), *Brachycaudus helichrysi* (Kalt.), *Jacksonia papillata* Theo., *Myzus ascalonicus* Doncaster, and *Rhopalosiphoninus staphyleae* (Koch). These are all introduced species, *Myzus ascalonicus* being the most widespread in its distribution.

A collection of aphids made on Campbell Island during visits of collectors from Bishop Museum, Honolulu, during the last three years, has been sent to me for examination. This opportunity of studying these aphids from one of the outlying islands of New Zealand is much appreciated. The collection consists of 15 alates, 59 apterae and 72 immature forms. Most of these immature forms could not be identified with certainty and these do not appear in the records listed below.

All the species recorded are introduced and are known from New Zealand (cf. Cottier, 1953) and other parts of the world. The most interesting ones to me are *Myzus ascalonicus* Doncaster and *Jacksonia papillata* Theo. To my knowledge *M. ascalonicus* is recorded in New Zealand in one collection from Lincoln, Canterbury, only (Commonwealth Institute of Entomology Distribution Maps of Pests, Series A, No. 113, June 1960) whereas on Campbell I. it appears to be distributed fairly widely. *J. papillata* is also recorded in New Zealand only at Lincoln, Canterbury (Eastop, 1962); there is only one specimen from the collection from Campbell I. The species identified are as follows:

Aulacorthum circumflexum (Buckton) 1876

Tucker Cove, 0–100 m, *Dracophyllum* leaf mold, Berlese funnel, 1.II.1963, K. A. J. Wise; Tucker Cove, *Bulbinella rossii* Hook. f., 13. XII. 1961, J. L. Gressitt.

Aulacorthum malvae (Mosley) 1841

On imported *Pelargonium*, 1. III. 1963, Wise.

Aulacorthum solani (Kaltenbach) 1843

Shoal Point, 0–10 m, 7. II. 1963, K. Rennell; Tucker Cove, lichens on *Dracophyllum*, Berlese funnel, 1. II. 1963, Rennell; Venus Cove, tussock, 2. II. 1963, Rennell.

Brachycaudus helichrysi (Kaltenbach) 1843

Filhol Peak, 213 m, lichens and moss, Berlese funnel, 9. II. 1963, Wise; Monument Har-

bor, lichen on shore rocks near beach, Berlese funnel, 9. II. 1963, Wise; Shoal Point, tussock, 1. XII. 1962, Rennell; Shoal Point, *Tillaea* on shore rock, Berlese funnel, 7. II. 1963, Wise; Shoal Point, nest with 2 black gull chicks *Larus dominicanus* previously used this season by Antarctic terns, *Sternavittata bethunei*, Berlese funnel, 7. II. 1963, Wise; Shoal Point, 0–10 m, swept from tussock, 29. VII. 1962, Rennell.

Jacksonia papillata Theobald 1923

Beeman Hill, 100–180 m, *Pleurophyllum speciosum* Hook. f., 11, 16. XII. 1961, Gressitt.

Myzus ascalonicus Doncaster 1946

Beeman Camp, 2–50 m, Trap Nets Set 1 (1–6), 6–11. XII. 1961, Gressitt; Beeman Camp, 2–50 m, Trap Nets Set (1–6), 6–11. XII. 1961, Gressitt; Beeman Camp, 2–50 m, Trap Nets Set 1(1–6), Box 2, 1–5. XII. 1961, Gressitt; Beeman Hill, *Pleurophyllum*, 2. II. 1963, Wise; Beeman Hill, 100–180 m, *Pleurophyllum speciosum* Hook.f., 11, 16. XII. 1961, Gressitt; Camp Cove, sweeping long grass along banks of stream, 5. II. 1963, Rennell; Lookout Bay, 3 m, *Stilbocarpa polaris* (Homb. & Jacq.) Gray, 30. XII. 1961, Rennell; Lyall-Beeman Saddle, 70 m, *Pleurophyllum*, 3, 5, 8, 12. XII. 1961, Gressitt; Moubray Hill, low plants near summit, 16. II.1963, Wise; Mt. Honey, 140 m, low plants on rock, Berlese funnel, 24.II.1963, Wise; Perseverance Harbor, 4 m, shag resting place in plants growing in grass, 25. VII. 1961, Rennell; Perseverance Harbor, Berlese funnel, 24. II. 1963, Wise; Shoal Point, *Tillaea* on shore rock, Berlese funnel, 7. II. 1963, Wise; Shoal Point, nest with 2 black gull chicks *Larus dominicanus*, previously used this season by Antarctic terns *Sternavittata bethunei*, Berlese funnel, 7.II.1963, Wise; Tucker Cove, 4 m, *Stellaria* ?, 23. XI. 1961, Gressitt; Tucker Cove, 4 m, Malaise Trap, 26. III. 1963, Wise; Tucker Cove, 0–100 m, *Dracophyllum* leaf mold, Berlese funnel, 1. II. 1963, Wise; Tucker Cove, grass, 1. XII. 1963, Gressitt; Venus Cove, tussock, 2. II. 1963, Rennell.

Rhopalosiphoninus staphyleae (Koch) 1854

Lookout Bay, 3 m, *Stilbocarpa polaris* (Homb. & Jacq.) Gray, 30. XII. 1961, Rennell, Tucker Cove, 0–100 m, *Myrsine* leaf mold, 26. II. 1963, Wise.

Acknowledgements: I would like to thank Dr. V. F. Eastop of the British Museum (Nat. Hist.) for the identification of *Myzus ascalonicus* and *Jacksonia papillata* and for checking over my identifications in general; also Miss Dorothy Read of this Division for her work in preparing the material for examination.

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INSECTS OF CAMPBELL ISLAND.
HOMOPTERA: COCCOIDEA[1]

By John W. Beardsley

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Apparently, there have been no prior records of Coccoidea from Campbell I. Recent collections by Gressitt and others, which form the basis for the present study, contained representatives of 4 species of this superfamily. Of these, 3 are mealybugs (family Pseudococcidae) which appear to fall within 2 well known and widely distributed genera; *Trionymus* Berg (1 species), and *Nipaecoccus* Sulc (2 species). The 4th Campbell I. coccoid is of particular interest in that it is clearly congeneric with *Phenacoleachia zealandica* (Maskell), a species sometimes considered to constitute a monotypic family, the Phenacoleachiidae (Balachowsky, 1942). For reasons which are discussed following the description of this new species, it appears that *Phenacoleachia* is definitely allied to the mealybugs, and probably should be treated as a primitive subfamily of the Pseudococcidae.

The zoogeographic affinities of the Campbell I. Coccoidea appear to lie with the New Zealand subregion. The Campbell I. *Trionymus* seems conspecific with one described from Stewart I.; 1 of the 2 new *Nipaecoccus* species and the new *Phenacoleachia* occur also in the Auckland I. group; and the genus *Phenacoleachia* is known elsewhere only from New Zealand. The possible relationship of the Campbell I. forms to the fauna of southern South America is unknown, as the Coccoidea of the latter area are virtually unstudied.

Males of 3 of the 4 Campbell I. coccoids have been available for study. Although the majority of ♂ coccoids are winged, it is of interest that the ♂♂ of the 3 Campbell I. species are completely apterous.

KEY TO CAMPBELL ISLAND COCCOIDEA

1. Adult ♀♀ 2
   Adult ♂♂ 5
2. Antennae 9-segmented; without definite cerarii consisting of conical setae and associated trilocular pores ..... **Phenacoleachia australis***
   Antennae with 8 or fewer segments; definite cerarii present, at least on anal lobes ... 3
3. Circulus present; with 1 or 2 pairs of well defined marginal cerarii; oral rim tubular ducts absent ..... **Trionymus danthoniae**
   Circulus absent; with 3 or more pairs of cerarii; oral rim tubular ducts present 4

1. Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Technical Paper No. 678.

* New species

4. With 3 or 4 pairs of marginal cerarii; dorsal setae mostly in form of elongate slender spines, 15–50 μ long..... **Nipaecoccus longispinus***
With 7 or 8 pairs of marginal cerarii; dorsal setae 27 μ or less in length, some definitely conical or slightly lanceolate in form scattered over entire surface ... . **Nipaecoccus campbellensis***
5. Size relatively large, 3.5–4.0 mm long; head with a compact row of 5 simple eyes on each side; penial sheath bifid at apex..... **Phenacoleachia australis**
Size small, length 1.5 mm or less; head with 3 widely separated eyes on each side, 1 dorsal, 1 lateral and 1 ventral; penial sheath not bifid at apex..... 6
6. Dorsal setae elongate, mostly 40–75 μ in length; posterior extension of penial sheath relatively broad, about 13 μ wide at 9 μ before tip ..... **Nipaecoccus longispinus**
Dorsal setae relatively short, mostly 27 μ or less in length; posterior extension of penial sheath narrower, about 7 μ wide at 9 μ before tip ..... **Trionymus danthoniae**

Genus **Phenacoleachia** Cockerell

Phenacoleachia Cckll, 1899, Canad. Ent. **31**: 274.—Morrison & Morrison, 1922, Proc. U. S. Nat. Mus. **60** (12): 14. Type of genus: *Leachia zealandica* Maskell.

Heretofore, the genus *Phenacoleachia* has been known only from the type species, *P. zealandica*, with distribution restricted to New Zealand. Adult ♀♀ of this coccid possess certain rather distinctive morphological facies (*e. g.* 11-segmented antennae and a setigerous anal ring; absence of abdominal spiracles or a ventral ovisac-forming pore band) which set the species apart from certain of the larger coccoid families; the Margarodidae, Ortheziidae and Pseudococcidae; to which it seems most closely allied.

The discovery of a 2nd species of *Phenacoleachia* from the Auckland and Campbell Is. is of considerable systematic and zoogeographic interest. The presence of dorsal ostioles, heretofore considered to be a typical pseudococcid feature, in the new species suggests that *Phenacoleachia* may be most closely allied to the true mealybugs, and perhaps should be treated as comprising a primitive subfamily of the Pseudococcidae.

Phenacoleachia australis Beardsley, n. sp. Figs. 1 & 2.

Adult ♀ (fig. 1): Length of slide-mounted specimen about 6 mm. Body fusiform, broadest across anterior abdominal segments, conspicuously narrower posteriorly. Antenna 9-segmented, about 0.86 mm long; scape relatively broad, about 18 μ wide by 150 μ long; pedicel 120 μ long by 96 μ maximum width, with a circular sensorium on dorsal surface near apex; flagellar segments relatively short and broad, the central seta-bearing portion of each segment sclerotized, the basal and distal portions membranous; segments 3–9 measuring approximately 60·45·75·60·75·75·125 μ in length respectively. Antenna clothed with slender setae about 75 μ maximum length; segment 8 with 1 and segment 9 with 2 or 3 thicker, recurved, finger-like setae on apical portion. Labium 3-segmented, about 330 μ long. Legs of moderate size, subequal; hind femur about 370 μ long; hind tibia about 320 μ long; tarsi 1-segmented, about 195 μ long, bearing a circular dome-like sensorium about 10 μ diameter on outer margin near base, and several small peg-like sensoria in a groove on lower surface near apex; hind tarsal claws about 60 μ long, with the character-

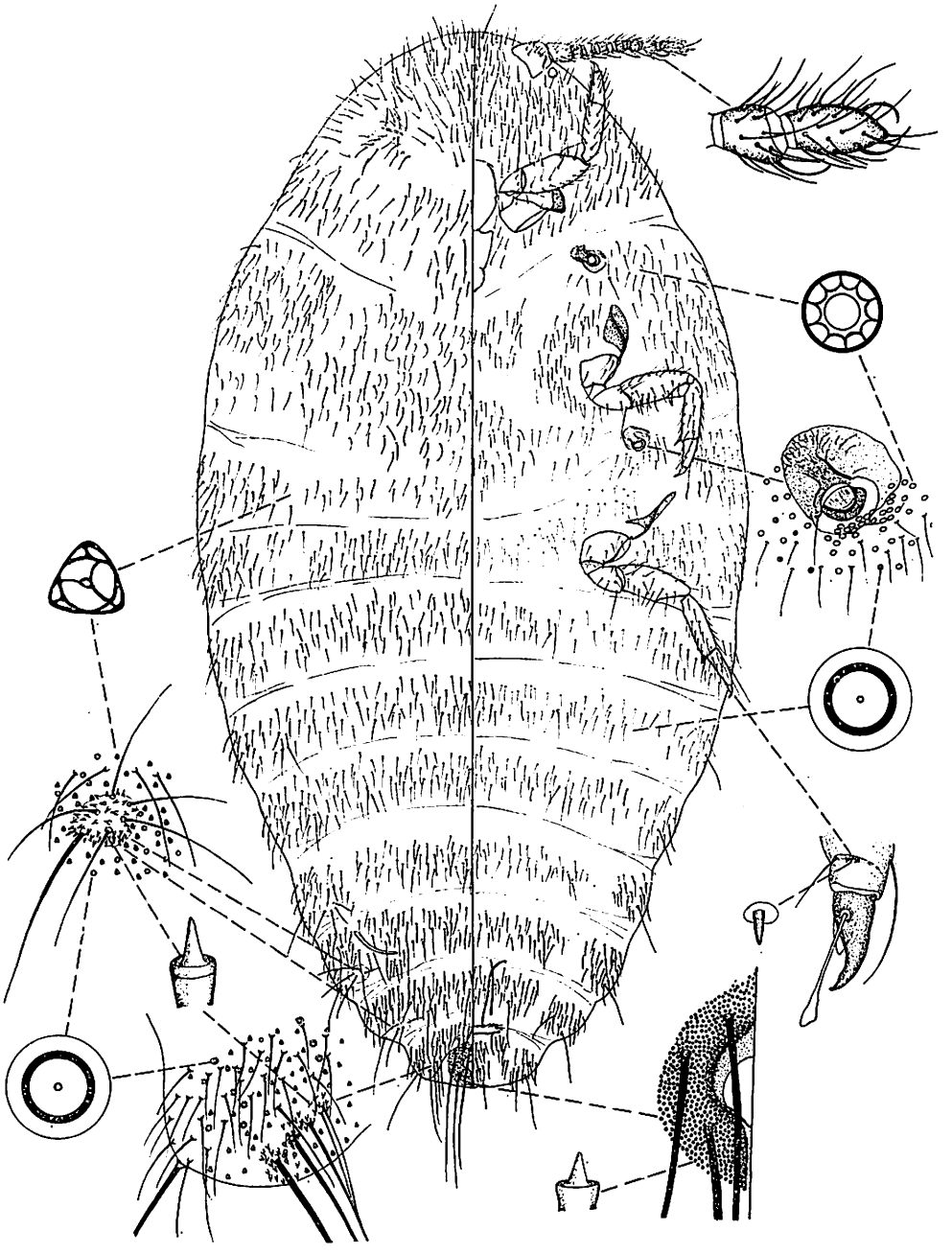

Fig. 1. *Phenacoleachia australis*, n. sp., adult ♀.

istic tooth-like projection on inner margin near apex reduced to a barely discernible bump; digitules of claws apparently dimorphic as in *P. zealandica*, one elongate with a flat ex-

panded apex, the other represented by a pointed membranous flap, or not discernible.

Anal ring at posterior apex of dorsum about 230 μ wide, inner portion composed of numerous small roughly circular pores, outer portion composed largely of small conical papilla-like structures each bearing a pointed apical process; derm between pores along inner margin somewhat sclerotized, outer margin not precisely defined; bearing 6 large elongate setae, about 450 μ maximum length. Vulva with 2 pairs of narrow, elongate, bar-like scleroses extending internally from opening.

Dorsum of abdominal segment 7 with a well-defined dorsal ostiole on each side near lateral margin; a smaller, less distinct pair of ostioles on posterior margin of dorsum of head. Thoracic spiracles well defined; a small sclerotized patch surrounding each spiracle, those around posterior spiracles larger and more clearly defined than those around anterior spiracles. Eyes small, barely discernible.

Derm moderately densely clothed with slender setae of various sizes; those of dorsum mostly 40–75 μ long; a few on dorsum of head and along lateral margins up to 150 μ long. Ventral setae mostly 40–75 μ long; a few on head, along lateral margins of abdominal segments, and in a submedian longitudinal row of 1 or a few on each side of each abdominal segment much longer, particularly on posterior portion of abdomen, up to 220 μ in length. Derm bearing 3 distinct types of pores; multilocular disc pores about 7–8 μ diameter, uniformly rather densely distributed over entire venter, much more sparsely scattered on dorsum; triangular pores about 6 μ wide, with a small central loculus and 3 large and 3 small lateral loculi, rather densely scattered over dorsum and along lateral margins of venter, apparently absent in mid-ventral region; circular ring pores each consisting of a narrow sclerotized ring 6.5–7 μ diameter, surrounded by a roughly circular hyaline area of slightly greater diameter than multilocular disc pores, scattered over both dorsum and venter, moderately numerous but noticeably fewer than triangular pores on dorsum or multilocular pores on venter. Dorsum of 5 posterior abdominal segments bearing small protruding papilliform structures, each consisting of a cylindrical base about 4 μ diameter and 5 μ high with a small pointed projection about 3–4 μ long protruding from the center of its outer end; dorsum of abdominal segment 9 with a group of about 30 such papillae on each side associated with a sublateral row of 4 or 5 long setae, up to 220 μ maximum length; dorsum of segments 7 and 8 each with a conspicuous sublateral hump on each side bearing 30–40 such papillae and several long setae up to 220 μ in length; segment 8 with a less strongly developed submedian hump bearing 20–25 papillae, on each side; dorsum of abdominal segment 6 with a smaller sublateral group of about 20–25 papillae on each side; dorsum of segment 5 with a few (2–5) such papillae on each side; papillae similar to but larger than those of outer portion of anal ring.

Penultimate instar ♀. Similar to adult but smaller; slide mounted specimens about 3 mm long. Antenna 7-segmented, about 450 μ long. Labium 2-segmented, about 200 μ long. Hind femur about 200 μ long by 100 μ maximum width; hind tibia about 200 μ long; hind tarsus about 135 μ long; hind tarsal claws about 45 μ long. Anal ring similar to that of adult but with fewer pores, about 100 μ across; anal ring setae about 320 μ maximum length. Posterior dorsal ostioles less strongly defined than in adult, but discernible; anterior ostioles sometimes not discernible.

Derm bearing triangular, multilocular, and ring pores, distributed as in adult although less numerous. Papilliform structures of dorsal derm present on abdominal segments 6–9,

less numerous than in adult, and not borne on hump-like projections. Body setae slightly shorter and somewhat less abundant than in adult.

Holotype, mature ♀, and 3 penultimate instar ♀♀ on 1 slide: Auckland I., Bivouac Hill, 300 m, on *Pleurophyllum*, 16. I. 1963, Gressitt.

In addition to the Auckland I. material, several lots of specimens from Campbell I. are at hand which appear to belong to the same species. Unfortunately, the Campbell I. material contains only a single, small, teneral, adult ♀. This specimen differs from the holotype in possessing slightly fewer of the small papilliform structures of the dorsal derm; and in having the appendages slightly smaller (antenna about 750 μ long; hind femur about 330 μ long). Penultimate instar ♀♀ from Campbell I. seem to agree well with those from Auckland. On the basis of the material available, the Campbell I. specimens have been tentatively assigned to *P. australis*.

The Campbell I. material includes 3 adult ♂♂. The adult ♂ is described below, but an allotype will not be designated as it is possible that the Campbell and Auckland forms eventually may prove to be distinct.

Adult ♂ (fig. 2): Completely apterous, without vestiges of wings. Thorax unsclerotized except for usual pleural remnants associated with bases of coxae. Length of slide-mounted specimens 3.5–4.0 mm; body elongate, roughly fusiform, widest across meso- and metathorax. Head broadly joined to thorax, without any appreciable constriction marking the cervical region. Antenna 10-segmented, about 1.05 mm long; scape broad, about 120 μ long by 140 μ wide; pedicel slightly longer than broad, about 105 μ long by 100 μ maximum width; segment 3 narrower, about 105 μ long; segments 4–8 subequal, each about 90 μ long; segment 9 about 105 μ long; segment 10 about 165 μ long. Segments 3–9 bearing 2 whorls of elongate slender setae 100–125 μ in length, plus a number of very small, fine setae 10–20 μ long, usually situated around bases of elongate setae; scape bearing a number of fine setae about 60 μ in length; pedicel with a group of similar setae on dorsal surface and a row of longer setae, up to 120 μ in length, and associated very small setae on ventral surface. Ocular sclerites present, 1 on each side of head behind base of antenna. Each ocular sclerite bearing a dorsoventral row of 5 simple eyes plus a single ocellus just behind middle member of row; simple eyes 15–24 μ diameter. A narrow bar-like preocular ridge present ventrally extending from base of antenna to ventral plate; ventral plate well developed, bearing vestigial mouth opening at its posterior apex; other cephalic sclerites not discernible. Legs well developed; tarsi 2-segmented, basal segment very small, apical segment bearing a small circular dome-shaped sensorium on outer margin near base, and a row of minute peg-like sensoria in groove on lower surface near apex as in ♀; hind femur about 390 μ long; hind tibia about 440 μ long; hind tarsus exclusive of claw about 200 μ long; hind tarsal claw about 55 μ long; tarsal claws each with a small poorly developed denticle on inner margin near apex; digitules of claws apparently dimorphic as in ♀. Legs clothed with moderately numerous slender setae mostly 50–75 μ long; inner apices of tarsi each with 3 spine-like setae 45–55 μ long; trochanters each with 5 dorsal and 5 ventral circular sensoria. Two pairs of dorsal ostioles present, the anterior pair small and poorly defined, the posterior pair larger; 7 pairs of small, unsclerotized, irregular or slit-like abdominal spiracles present, 1 situated intersegmentally near lateral margin of venter between each abdominal segment; those between posterior segments less well defined and difficult to locate.

Penial sheath well defined, about 360 μ total length, tapering posteriorly to a moderately broad distinctly bilobate tip. Sheath sclerotized dorsally and laterally, except tips of apical

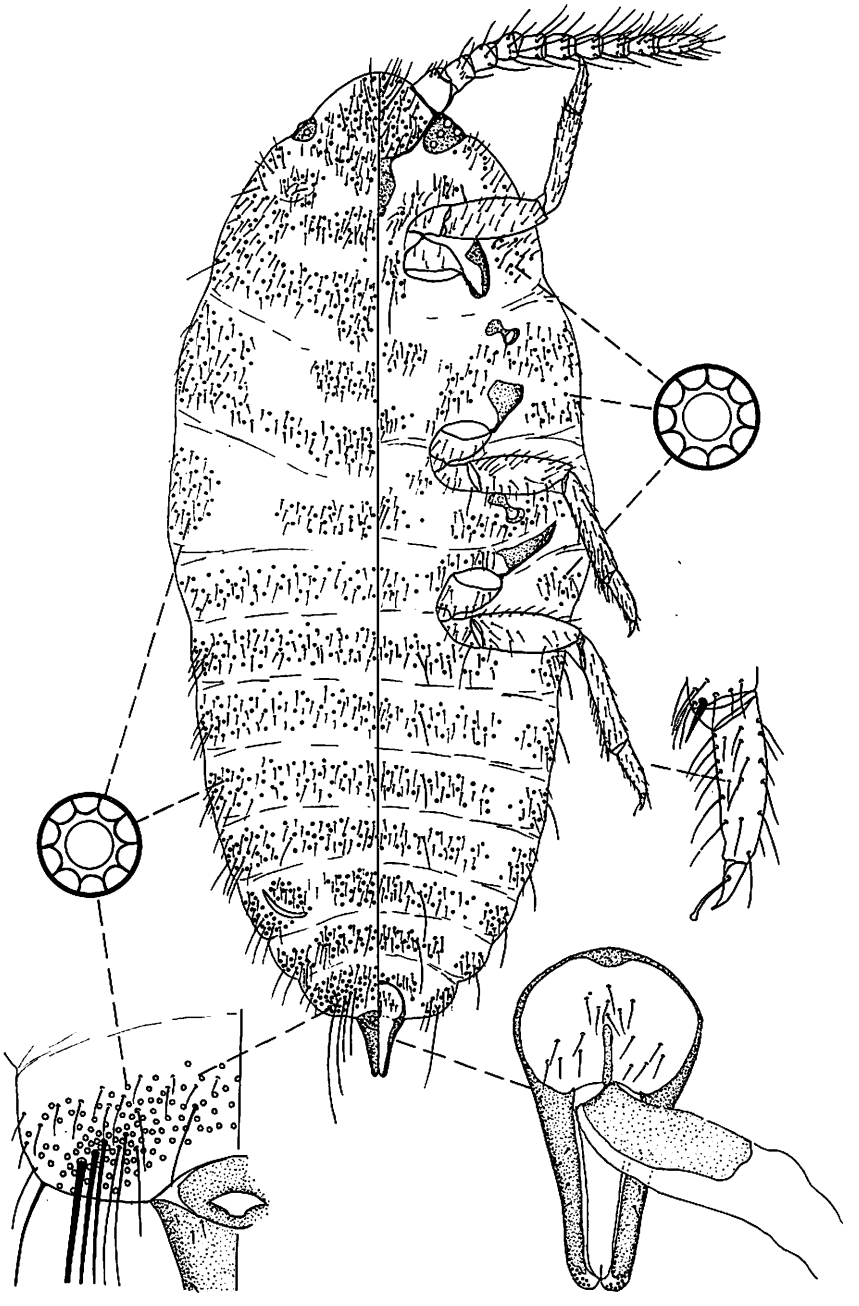

Fig. 2. *Phenacoleachia australis*, n. sp., adult ♂.

lobes; sclerotized area extending ventrally to form ventrolateral margins, and recurved internally to form a ventral longitudinal groove; basal portion of venter of sheath less heavily sclerotized or largely membranous and bearing a number of setae 20–30 μ long; apical sclerotized parts of sheath with scattered very small setae 3–5 μ long; unsclerotized portion of apical lobes with numerous small circular pores or sensoria about 2–3 μ diameter. Aedeagus appearing as a broad, sclerotized structure resembling an apically rounded truncate cone, about 150 μ long, and about 95 μ wide at base. (In 1 specimen a long membranous tube, nearly as long as the abdomen, appears to have everted from the aedeagus). Anal opening simple, roughly semicircular, surrounded by a small sclerotized plate at base of penial sheath dorsally.

Body moderately densely clothed in slender setae mostly 40–60 μ long; venter of head and lateral margins of abdominal segments with conspicuously longer setae up to 150 μ or more in length; venter with a submedian longitudinal series of long setae on each side, composed of 1 seta 140 μ or less in length on each abdominal segment. Dorsolateral areas of penultimate abdominal segment with a row of 3 or 4 very long setae, up to 400 μ in length, on each side.

Multilocular disc pores similar to those of adult ♀, distributed over dorsum and venter, slightly more concentrated on lateral margins of abdominal segments, particularly around very long setae on dorsal margins of penultimate segment. Triangular and ring type pores absent. Papilliform structures of dorsal derm apparently absent on 2 specimens; about 4 discernible on antipenultimate segment of 3rd specimen.

Described from 3 specimens: CAMPBELL I.: 2, Mt. Honey, 550 m, low plants below summit, 24. II. 1963, K. A. J. Wise, ex Berlese funnel; 1, Mollymawk Colony, 230 m, 12. II. 1963, Wise, under stones.

♀♀ of *Phenacoleachia australis* differ from those of *P. zealandica*, as the latter has been described by Maskell (1890) and redescribed by Morrison & Morrison (1922), in the possession of 9-segmented antenna (vs. 11-segmented in *P. zealandica*); a less well developed denticle on the inner face of the tarsal claws; and in the possession of 2 pairs of what appear to be typical pseudococcid-type dorsal ostioles. The ♂♂ from Campbell I. differ from those of *P. zealandica* as the latter has been characterized by Theron (1962), in being completely apterous without development of the usually thoracic sclerites; in having the head broadly joined to the thorax, not distinctly separated; in having shorter antennae, and having a relatively small ocular sclerite bearing only 5 simple eyes, rather than 8 as in *P. zealandica* ♂♂. In addition, Theron makes no mention of the presence of dorsal ostioles in *P. zealandica* ♂♂, and mentions the presence of multilocular disc pores only in conjunction with the tail-forming setae of the penultimate abdominal segments.

Theron (1962) has reported the presence of 7 pairs of small, apparently unsclerotized abdominal spiracles in the ♂♂ of *P. zealandica*. Similar simple openings and associated tracheae were found in ♂♂ of *P. australis* when slide mounts were examined with a phase contrast microscope, but were difficult or impossible to locate with an ordinary bright field microscope. The presence of abdominal spiracles and certain other 'primitive' features of the anatomy of the ♂ of *P. zealandica* has prompted Theron to suggest that *Phenacoleachia* is most closely allied to the Margarodidae. As stated earlier, the presence of dorsal ostioles, a cellular anal ring, and certain other features of the ♀♀ suggest a closer relationship with the mealybugs, and *Phenacoleachia* might well be regarded as constituting a primitive subfamily of the Pseudococcidae.

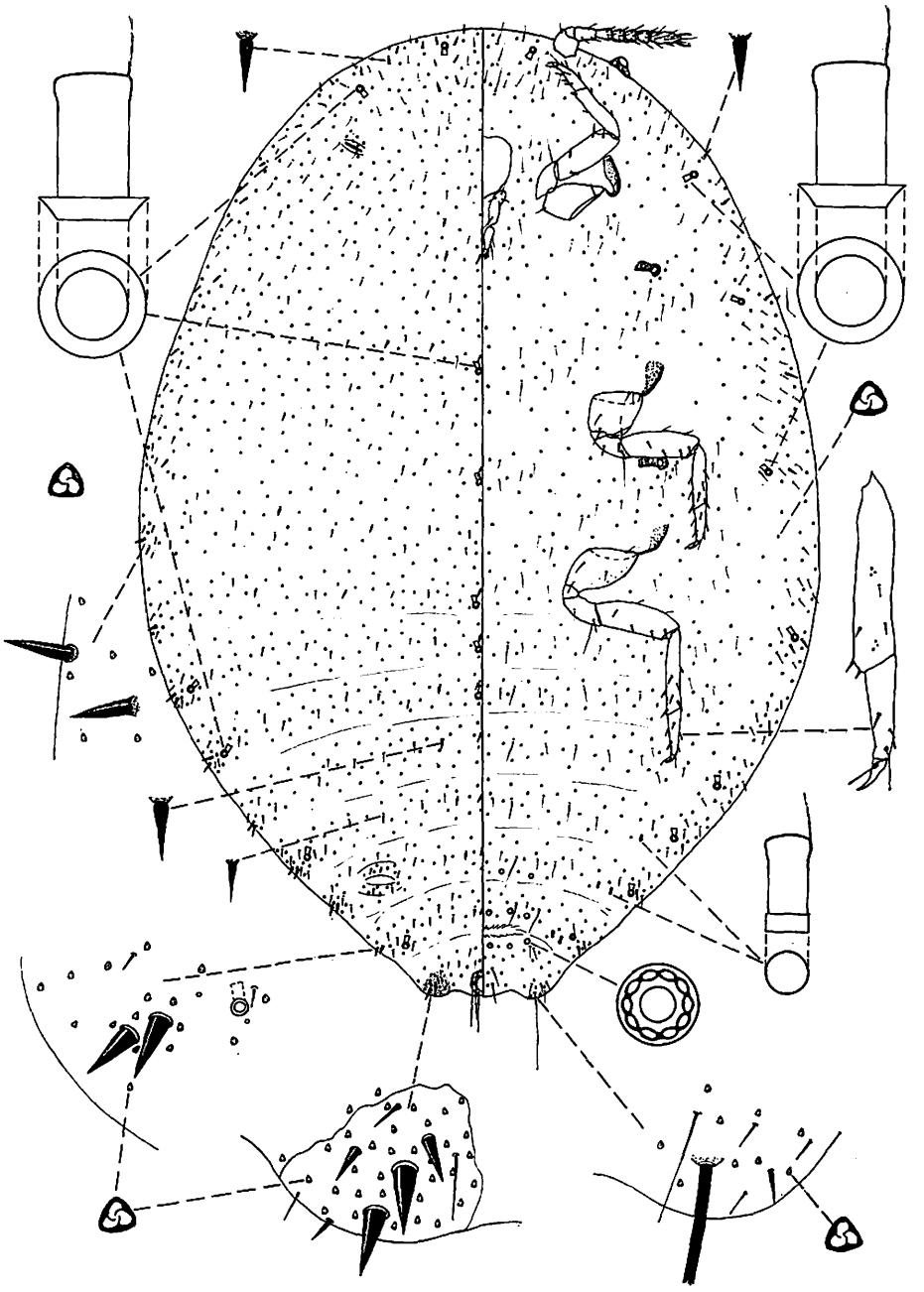

Fig. 3. *Nipaecoccus campbellensis*, n. sp., adult ♀.

Genus **Nipaecoccus** Sulc

Nipaecoccus Sulc, 1945, Acta Soc. Sci. Nat. Moravia **17** (3). Type of genus: *Dactylopius nipae* Maskell.

Nipaecoccus campbellensis Beardsley, n. sp. Fig. 3.

Adult ♀: Body at maturity broadly oval; length of slide-mounted specimens 2.5–3.5 mm. Antenna 7-segmented, rather short, around 415 μ total length. Legs moderately small; hind femur about 230 μ long, hind tibia around 200 μ long, hind tarsus about 110 μ long; tarsal claws moderately elongate, those of hind legs about 45 μ in length, without a tooth-like projection on inner margin; digitules of tarsal claws slender, hair-like, slightly spatulate apically. Hind coxa with a few (around 30 or less) small translucent spots or micropores on outer face; hind tibia with a few such translucent spots on upper face as indicated in figure; translucent spots apparently absent on other segments of legs. Labium 3-segmented, about 165 μ long.

Anal ring cellular, about 70 μ wide, bearing setae about 110 μ maximum length. Two pairs dorsal ostioles present, anterior pair sometimes poorly defined and difficult to locate. Eye very prominent, situated on a well-developed, protruding, sclerotized ocular cone about 45 μ long and around 60 μ diameter at base; paraocular discoidal pores absent. Circulus absent.

With 7–8 discernible pairs of marginal cerarii. Anal lobe cerarii each with 2 large conical setae 30–36 μ long plus 2 or 3 smaller conical setae, 1–2 spine-like setae, and 20–30 scattered trilocular pores, borne on a roughly triangular sclerotized area. Penultimate cerarii each with 2 conical setae 27–30 μ long plus a few (7–10) associated trilocular pores; surrounding derm unsclerotized. Cerarii of abdominal segments 6–7 similar to penultimate pair; those of anterior abdominal segments usually with 2 more widely separated, more slender conical setae, sometimes with but a single such seta. Head and thorax lacking definite cerarii, although scattered slender conical setae present on margins of these areas. Venter of anal lobes unsclerotized; anal lobe seta about 180 μ long.

Dorsum with around 15–20 oral rim tubular ducts, each about 6 μ inside diameter and 10 μ across rim, 1 situated laterally near each penultimate cerarius, 1 near each of some cerarii on abdominal segments 2–6, 1–2 on each side of anterior margin of head, and a longitudinal row of 4–6 mid-dorsally, 1 duct on each of several of the thoracic and anterior abdominal segments; 16–20 such ducts situated on lateral margins of venter, 1 on each side of most abdominal and thoracic segments, and a pair on anterior margin of head between bases of antennae. A very few (around 8–12) small oral collar tubular ducts, around 4 μ diameter, on venter of posterior abdominal segments, 1–3 sublaterally on each side of segments 6–8. Multiocular disc pores confined to venter of posterior abdominal segments, 10–15 around margins of vulva on segments 8 and 9, plus 3–6 on posterior margin of segment 7. Trilocular pores evenly, moderately densely scattered on dorsum and venter.

Dorsal body setae short, 27 μ or less in length, spiniform to conical or slightly lanceolate in form; the larger more conspicuous conical or lanceolate setae sparsely scattered over dorsum, most numerous on anterior part of head. Similar conical or lanceolate setae scattered on lateral margins of venter. Setae on midregions of venter more elongate, slender; those of a submedian longitudinal series of setae on abdomen 45–60 μ long; others mostly 10–30 μ long; long setae on venter of head anterior to mouthparts up to 125 μ long.

Holotype (D. S. I. R.) and 3 paratypes: Campbell I., Beeman Camp beach, 2–5 m, ex moss and weeds, 12–17. XII. 1961, Gressitt, Berlese funnel. 21 paratypes on 8 slides; all Campbell I.: Beeman Hill, 2–50 m, on old trunk of *Dracophyllum*, 21–25. XI. 1961, Gressitt; Tucker Cove, 1–50 m, ex moss and lichen, 21–25. XI. 1961, Gressitt, Berlese funnel; Beeman Hill, 50–100 m, on *Poa* roots, 5. XII. 1961, Gressitt; Tucker Cove, old camp, 50 m, 6–11. XII.1961, Gressitt, under board; Beeman Camp beach, ex moss and weeds, 12–17.XII.1961, Gressitt, Berlese funnel; Courrejolles Peninsula, 200 m, ex *Diomedia* nest, 14. XII. 1961, Gressitt; Tucker Cove, 2. II. 1963, Wise, under debris.

Nipaecoccus campbellensis is allied to *N. longispinus* from Campbell and Auckland Is. *N. campbellensis* differs from the latter in possessing fewer tubular ducts of both oral rim and oral collar types, fewer multilocular disc pores, and in having 7-segmented rather than 6-segmented antenna. In addition, the dorsal setae of *N. campbellensis* are distinctly shorter than those of *N. longispinus*. The longer dorsal setae of the latter species are long slender conical spines up to 50 μ in length; while the larger dorsal conical or somewhat lanceolate setae of *N. campbellensis* range up to about 27 μ maximum length.

Males of *N. campbellensis* are unknown.

Nipaecoccus longispinus Beardsley, n. sp. Fig. 4.

Adult ♀: Body at maturity broadly oval; length of slide-mounted specimens 2.5–3.5 mm. Antenna 6-segmented, relatively short, about 310 μ total length. Legs moderately small; hind femur about 195 μ long, hind tibia about 165 μ long, hind tarsus about 90 μ long; tarsal claws moderately elongate, those of hind legs about 45 μ in length, without a tooth-like projection on inner margin; digitules of tarsal claws slender, hair-like, slightly spatulate apically. Hind coxa with about 60–70 translucent spots or micropores scattered on both upper and lower surfaces along outer margin; hind tibia with about 5–10 such translucent spots discernible on upper surface, distributed as indicated in figure; translucent spots apparently absent on other segments of legs. Labium 3-segmented, about 165 μ long.

Anal ring cellular, about 90 μ wide bearing 6 setae about 140 μ maximum length. Two pairs of dorsal ostioles present; anterior pair sometimes poorly defined and difficult to locate. Eye prominent, with a well developed basal sclerotized cone about 35–40 μ diameter at base; paraocular discoidal pores absent. Circulus absent.

With 3 or 4 pairs of definite marginal cerarii. Anal lobe cerarii each with 2 large conical setae about 26 μ maximum length, and about 20 scattered trilocular pores borne on a roughly triangular, moderately well-defined sclerotized area; 2 or 3 spine-like setae, mostly 20–30 μ in length, sometimes longer, situated around margins of sclerotized area. Penultimate cerarii each with 2 conical setae about 25 μ maximum length, several slender spine-like setae, and a few scattered trilocular pores; the surrounding derm unsclerotized. Antepenultimate cerarii similar but with conical setae usually more slender; cerarii of abdominal segment 6 usually represented by 1 or 2 relatively elongate, slender, conical or spine-like setae, 30–35 μ long; sometimes wanting.

Venter of anal lobes unsclerotized; anal lobe seta about 125 μ long.

Dorsum with rather numerous oral rim tubular ducts, each about 6 μ inside diameter and about 10 μ across rim; these distributed in approximately transverse rows of 6–10 or more on anterior abdominal and thoracic segments; 1 such duct present on each side on

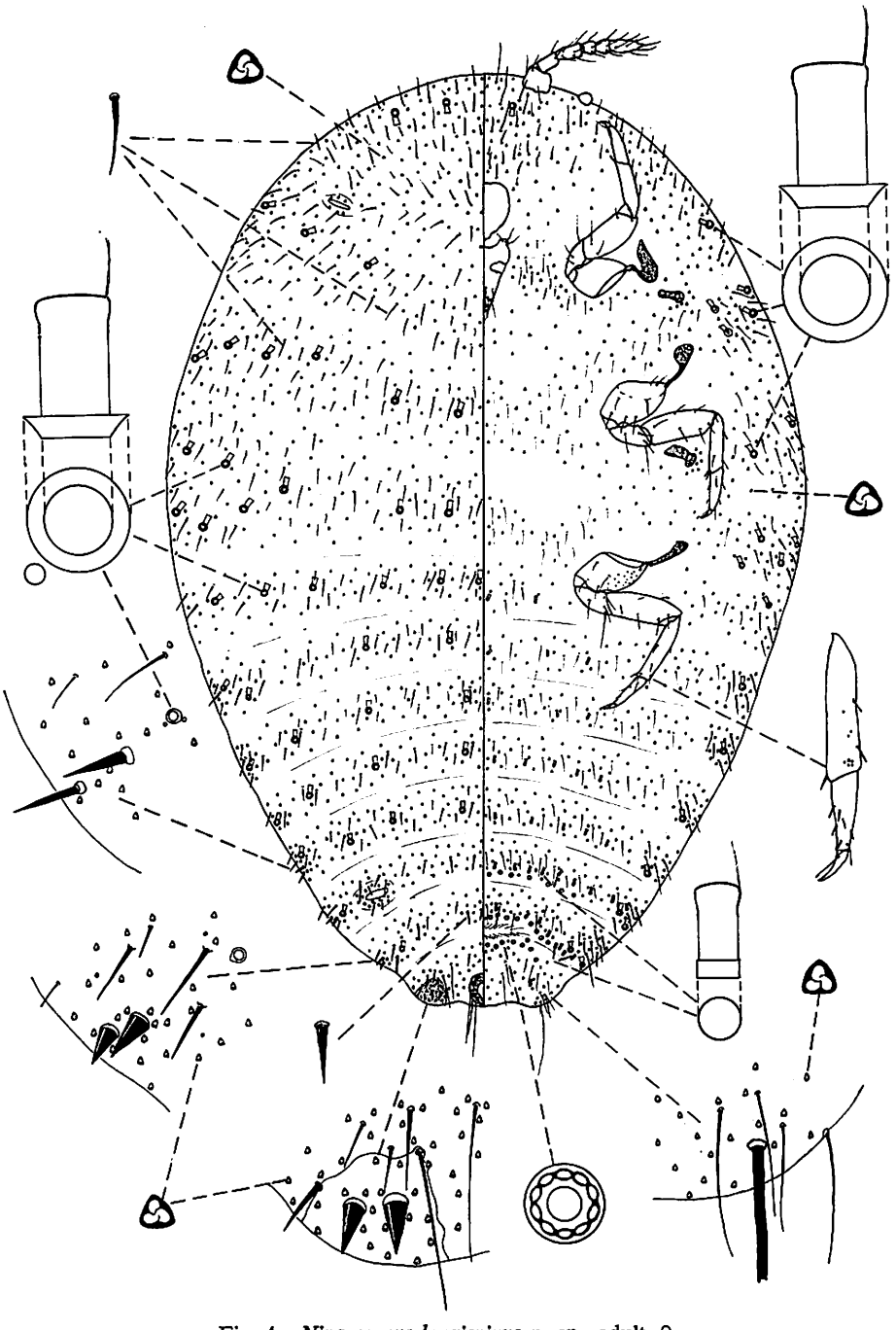

Fig. 4. *Nipaecoccus longispinus* n. sp., adult ♀.

abdominal segments 7 and 8; usually absent on segment 9; 2–4 such ducts on dorsum of head. Similar rim tubular ducts distributed along lateral margins of venter, 1–2 on each side of each abdominal segment except 9th; several on each side of each thoracic segment, and usually 1 on each side of venter of head. Small oral collar tubular ducts, about 3–4 μ diameter, scattered on posterior margins of abdominal segments; occasionally a few on venter of thorax; a few sometimes replaced by weakly to moderately well developed oral rim tubular ducts in some specimens. Multilocular disc pores confined to posterior portion of venter of abdomen; around 40–50 such pores distributed around vulva on segments 8 and 9, and in a row along posterior margin of segment 7. Trilocular pores moderately densely, evenly, scattered on dorsum and venter.

Dorsal body setae in form of elongate slender spines, 15–50 μ in length. Two or 3 in midregion of dorsum of abdominal segment 8 noticeably broader basally, in form of elongate conical setae. Setae on lateral margins of venter similar to those of dorsum; setae of midventral areas more slender, up to 75 μ in length on mid-region of abdomen; long hairs on venter of head between antennae about 90 μ maximum length. Setae of legs, particularly the tarsi, spiniform.

Holotype ♀ (D. S. I. R.): Campbell I., Lyall-Beeman Saddle, 70 m, on *Poa* roots, 3–12. XII. 1961, J. L. Gressitt. 58 paratypes on 13 slides, all Campbell I.: Beeman Beach, inside *Colobanthus* cushion, 2–6.XII.1961, Gressitt; Mt. Lyall, 200–400 m, ex moss, 3–12.XII. 1961, Gressitt; St. Col Ridge, 180–280 m, ex moss, 7.XII.1961, Gressitt; St. Col Ridge, 180–280 m, ex moss and rock, 24–30.XI.1962, Gressitt, Berlese funnel; Mt. Lyall, 300 m, 13.XII. 1962, Rennell, in (?) growing on Ko; St. Col Peak, 250 m, ex low plants on rocks, 23. II. 1963, Wise, Berlese funnel; Perseverance Harbor, Lookout Bay, ex leaf mold under tussock, 3.II.1963, Wise, Berlese funnel; Mt. Honey, 140 m, ex low plants on rock, 24. II. 1963, Wise, Berlese funnel; Smoothwater Bay, 5 m, under moss and rocks, 1. III. 1963, Rennell.

Nipaecoccus longispinus appears allied to *N. campbellensis* described earlier in the paper. The important differences between these 2 species are discussed following the description of the latter.

A single ♂ adult was found among ♀♀ of 1 lot of *N. longispinus* specimens, and is described below.

♂: Length of slide-mounted specimen 1.1 mm. Body elongate-oval, 0.43 mm maximum width. Antenna incompletely 7-segmented; relatively short, about 295 μ total length (fig. 5D); length of individual segments from scape outward 40·54·63·27·33·78 μ respectively; apical segment incompletely divided into 2 subsegments 36 and 42 μ long respectively. Antenna clothed with moderately slender digitiform setae about 25 μ maximum length, plus slender filamentous setae mostly 40–70 μ long. Larger specialized sensory setae of 2 apical segments about 40 μ maximum length. Dorsal midcranial ridge poorly defined; ventral postocular ridge moderately well developed. Three pairs eyes present, small; dorsal pair each about 22 μ diameter; ventral pair each about 20 μ diameter; lateral eyes about same size as dorsal. Head relatively broadly joined to thorax; separated by but a slight constriction.

Completely apterous; thoracic sclerotization vestigial except for pleural remnants. Fused propleural-cervical bar-like sclerite present, pronotal ridge apparently wanting.

Dermal disc pores, 5–6 μ diameter, each with 4 or 5 peripheral loculi, moderately numer-

ous on both dorsum and venter, in scattered rows or bands across abdominal segments, on thorax, and on dorsum of head. Tail-forming pore clusters restricted to pair on abdominal segment 9; each consisting of about 30 stellate pores 5–6 μ diameter, similar to dermal discs, plus 2 well separated long hairs about 175 μ in length. Minute simple circular pores, about 2 μ diameter, scattered among disc pores on dorsum and venter. Dorsal body setae filamentous, elongate, mostly 45–75 μ in length; those along lateral margins posterior abdominal segments up to 120 μ long; ventral body setae shorter, mostly 30–45 μ long. Digitiform setae absent on body.

Penial sheath (fig. 5C) about 120 μ long, with a pair of small, fairly well defined median lobes; posterior extension tapering to a rounded apex about 13 μ wide at 9 μ before tip. Dorsum of abdominal segments with weakly developed sclerotized areas extending across entire width. Similar weakly sclerotized area present on dorsum of head and thorax.

Legs of moderate size; hind femur about 135 μ long; hind tibia about 130 μ long; hind tarsus about 80 μ long; hind tarsal claws about 35 μ long; tarsus apparently all 1-segmented. Setae of legs filamentous, mostly 30–45 μ in length.

CAMPBELL I.: Mt. Honey, 140 m, ex low plants on rock, 24. II. 1963, Wise, Berlese funnel.

A single ♂ found associated with ♀♀ of *N. longispinus* from Auckland Is. differs from the Campbell I. ♂ in having 8-segmented antenna about 330 μ long, and in having 2-segmented tarsi, the basal segment being very narrow and ring-like. The specimen is otherwise very similar to the Campbell I. ♂.

Genus **Trionymus** Berg

Trionymus Berg, 1899, Comun. Mus. Nac. Buenos Aires **1**: 78. Type of genus: *Westwoodia perisii* Signoret.

Trionymus danthoniae Morrison

Trionymus danthoniae Morr., 1925, J. Agric. Res. **31** (5): 494, fig. 5.

This species was described from 2 specimens from the Maskell collection of coccids. The holotype was taken on a grass, *Danthonia*, on Stewart I., and was originally misidentified by Maskell as *Dactylopius calceolariae* Maskell. The 2nd specimen, which Morrison designated a paratype, was from a lot of specimens labeled as *D. calceolariae*, but without further data.

At my request, the late Dr. Morrison compared specimens from Campbell I. with the paratype specimen of *T. danthoniae*, and concluded that they were probably conspecific.

The majority of the Campbell I. specimens at hand agree well with Morrison's description of *T. danthoniae*, although some variation has been noted in certain structures. For example, among 17 slide-mounted adult specimens examined 6 have either 7-segmented or incompletely 8-segmented antennae, while the remaining specimens have the antennae 8-segmented as in the types. In 1 specimen there is, in addition to the small, oval, somewhat variable sized circulus between abdominal segments 4 and 5, a 2nd much smaller nearly round circulus about 30 μ diameter, on the fold between segments 5 and 6. On the basis of experience with other mealybugs the variations noted do not seem to be of any greater magnitude than what is normally encountered among individuals of other species.

The 17 adult ♀♀ studied are from the following Campbell I. collections: Beeman Hill, 50–100 m, on *Poa* roots, 2. XII. 1961, Gressitt; Lyall-Beeman Saddle, 70 m, on *Poa* roots 3–12. XII. 1961, Gressitt; Beeman Camp, 2–50 m, on *Poa* roots, 6–14.XII.1961, Gressitt; Courrejolles Pen., 200 m, ex *Diomedia* (Mollymawk) nests, 14.XII.1961, Gressitt; Courrejolles, ex moss and leaf mold, 3. X. 1962, Rennell; Venus Cove, on tussock grass, 2. II. 1963, Wise; Shoal Pt., 6–10 m, 7.II.1963, Wise; Courrejolles Pen., 200 m, on rock cliff, Mollymawk Colony, 14. II. 1963, Wise; Rocky Bay, penguin colony, south Mt. Dumas, ex cushion plant, 18. II. 1963, Wise, Berlese funnel; Mt. Lyall, 390 m, on low plants, below summit, 19 II. 1963, Wise, Berlese funnel.

Several adult ♂♂ were present in collections containing ♀♀ determined as *T. danthoniae*, and the ♂ of this species is described below.

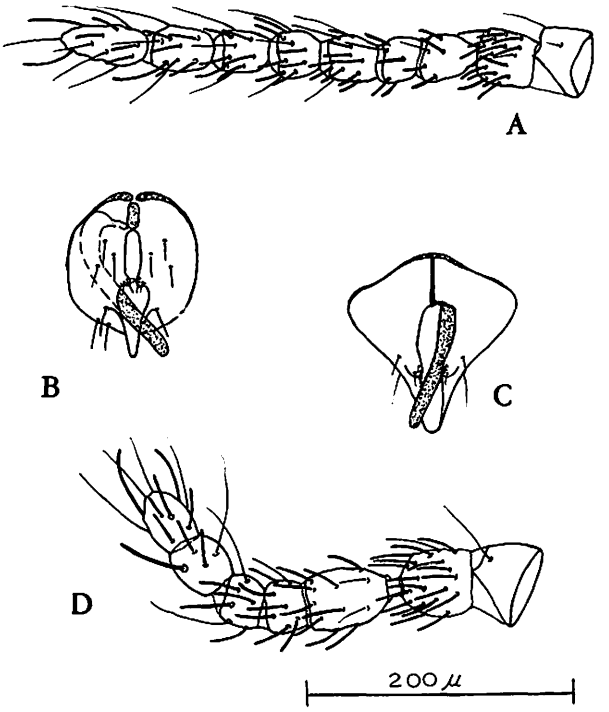

Fig. 5. A, *Trionymus danthoniae* Morrison, adult ♂ antenna, dorsal aspect; B, *T. danthoniae*, adult ♂ penial sheath, ventral aspect; C, *Nipaecoccus longispinus*, adult ♂ penial sheath, ventral aspect; D, *N. longispinus*, adult ♂ antenna, dorsal aspect.

♂: Length of slide-mounted specimen about 1.3 mm; body elongate, about 0.41 mm maximum width. Antenna (fig. 5A) 9-segmented, about 450 μ long; lengths of individual segments from scape outward 40·60·50·42·48·45·45·55·65 μ respectively. Antenna clothed with moderately slender digitiform setae mostly 18–20 μ long, plus a few slender filamentous setae about 45 μ maximum length; segments 7 and 8 each with 1, and segment 9 with 3 longer digitiform setae, up to 42 μ in length, near apex. Midcranial suture poorly defined dorsally; ventral postocular ridge well defined; ocular sclerites weakly sclerotized except around margins of eyes. Three pairs of eyes present, moderately small, dorsal pair each about 24 μ diameter, ventral pair each about 25 μ diameter; lateral eyes slightly smaller.

Completely apterous, without wing vestiges, thoracic sclerotization vestigial, absent except for pleural remnants associated with bases of coxae, a very weakly sclerotized mesosternum, a well defined pronotal ridge, and fused bar-like propleural-cervical sclerite on each side.

Dermal disc pores, 5–6 μ diameter, with 3–5 peripheral loculi, fairly numerous on dorsum; distributed in transverse rows of 6–10 across abdominal segments 2–7; 2 or 3 on each side of abdominal segment 8; scattered bands or double rows of 10–15 on dorsum of thoracic segments; and 4–8 on each side of dorsum of head between dorsal eye and base of an-

tenna. Relatively few discs on venter; 2–4 on venter of each thoracic segment; absent on venter of abdomen in most specimens, sometimes 1–3 on 1 or more of basal abdominal segments. Tail forming pore clusters limited to pair on abdominal segment 9, each composed of around 45–60 stellate pores of about 4 μ diameter; 2 elongate setae, about 190 μ in length, set close together in center of pore cluster, plus 4 or 5 shorter hairs along anterior margin of cluster. Dorsal dermal discs interspersed with minute circular pores about 2 μ diameter. Body clothed with moderately elongate filamentous setae; a transverse row across dorsum and venter of each abdominal segment; scattered on dorsum and venter of head and thorax. Dorsal setae mostly 27 μ or less in length; ventral setae longer, up to about 40 μ maximum length; digitiform setae wanting on body.

Penial sheath (fig. 5B) around 110 μ long; median lobes represented by small setigerous humps; posterior extension relatively narrow, tapering to a rounded apex about 7 μ wide at 9 μ before tip. Aedeagus relatively narrow, curved, sclerotized.

Legs of moderate length; hind femur about 144 μ long, hind tibia about 190 μ, hind tarsus about 90 μ long, hind tarsal claws about 30 μ long. Tarsi 2-segmented; basal segment small, triangular. Setae of legs mostly filamentous, up to about 45 μ maximum length; a few small digitiform setae sometimes discernible on tibiae and tarsi.

Abdominal sclerotized patches absent; posterior dorsal ostioles present but very poorly defined.

Described from 6 specimens, all Campbell I.: 4, Beeman Camp, 2–50 m, on *Poa* roots, 6–11. XII. 1961, Gressitt; 1, Courrejolles Pen., 200 m, ex Mollymawk nest, Gressitt.

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Pacific Insects Monograph 7: 253-254 July 15, 1964

INSECTS OF CAMPBELL ISLAND. TRICHOPTERA[1]

By K. A. J. Wise[2]

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Abstract: One species of Trichoptera, *Oxyethira albiceps* (McLach.), was found on Campbell I. It is also newly recorded from the Auckland and Chatham Is.

The order Trichoptera (caddis-flies) has not previously been recorded from Campbell I. The 1 species there, *Oxyethira albiceps* (McLachlan, 1862), is the common microcaddis (family Hydroptilidae) of New Zealand where the case-bearing larvae frequent slime-weed in flowing waters. On Campbell I., I (accompanied by Mr. K. P. Rennell of the N. Z. Meteorological Service) discovered adults flying over streams, a few active larvae in slime-weed, and the typical pupal cases on stones in streams, during February—March 1963. It was subsequently found that Dr. J. L. Gressitt had taken a few adults during the previous summer (XI–XII. 1961).

Family HYDROPTILIDAE

Oxyethira albiceps (McLachlan), 1862

CAMPBELL I.: 1♂, Tucker Cove, 1–50 m, *Poa*, 21–25. XI. 1961, J. L. Gressitt; 1♂, Beeman Camp, 2–50 m, *Poa* by stream, 26–30. XI. 1961, Gressitt; 2♂♂, 2♀♀, Tucker Cove, 4 m, by Malaise trap, 1–3 & 18–21. XII. 1961, Gressitt; 19♂♂, 3♀♀, Lookout Bay, swept above stream, 3. II. 1963, 2. III. 1963, K. A. J. Wise; 1♀, *ibid.*, 3. II. 1963, K. P. Rennell; 6♂♂, 1♀, Tucker Cove, banks of stream, 5–6. II. 1963, Rennell; 10♂♂, 1♀, Tucker Cove, swept above stream, 6, 23. II & 3. III. 1963, Wise; 2♂♂, Beeman Camp, at light, 6 & 14. II. 1963, Wise; 1♀, Beeman Camp, 15 m, alive in freshwater tank, 14. II. 1963, Rennell; 3 active larvae, Lookout Bay, ex slime-weed from stream, 2. III. 1963, Wise; numerous pupal cases, Smoothwater Bay, on stones in stream, 16.II & 2. III. 1963, Wise; 13 pupal cases, Tucker Cove, on stones in stream, 3. III. 1963, Wise.

DISTRIBUTION. NEW ZEALAND: Widespread and common throughout the North and South Islands. CAMPBELL I.: Recorded above in three streams. AUCKLAND I.: Not previously recorded but I recently collected it on the northern end and will present records in a forthcoming paper. CHATHAM I.: Not previously recorded but one typical pupal case was collected by the Chatham Island 1954 Expedition. This specimen, now in the Canterbury Museum, was first examined and determined by Mr. A. G. McFarlane, of Christchurch, N. Z. Mr. McFarlane and the Director, Canterbury Museum, have kindly

1. Results of field work supported by National Science Foundation grant G-23720 from the U. S. Antarctic Research Program.

2. Mail address: c/o Canterbury Museum, Christchurch 1, N. Z.

given permission for this record to be included here. The species record will, however, have to be confirmed by collection of adults.

As yet there is no indication as to how *Oxyethira albiceps* became thus distributed. On Campbell I. immature stages were found in two streams (Tucker Cove, Lookout Bay) flowing into Perseverance Hbr. and one stream (Smoothwater Bay) on the east coast. In these streams they were less than 30 m above sea-level and within 400 m of the sea-shore but further investigation may prove them to occur more extensively.

Pacific Insects Monograph 7: 255-259 July 15, 1964

INSECTS OF CAMPBELL ISLAND. LEPIDOPTERA: TINEIDAE, ELACHISTIDAE, HYPONOMEUTIDAE, OECOPHORIDAE, TORTRICIDAE, PTEROPHORIDAE, NOCTUIDAE[1]

By Kôji Yano[2]

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Abstract: This paper concerns records of 10 species in 7 families. Four species are new to Campbell I. Previously 2 additional species of Microlepidoptera were recorded from the island.

The following species of Lepidoptera were collected mainly by Dr. J. L. Gressitt, Mr. K. P. Rennell and Mr. K. A. J. Wise on Campbell I. during 1961–63. The material treated in this paper consists of 477 specimens. It contains 10 species belonging to 7 families, of which 4 species are recorded here for the first time from Campbell Island. *Endrosis lactella* Den. & Schiff. is recorded as the first species of Oecophoridae from the island.

I express my gratitude to Dr. J. L. Gressitt, Bishop Museum, for the opportunity to study the material.

Family TINEIDAE

Proterodesma byrsopola Meyrick, 1909, Subantarct. Is. New Zealand 1: 74. Fig. 1.

Specimens examined: 16♂♂, 2♀♀, 1 ex., Tucker Cove, 4 m, Malaise trap, 27.XI–1.XII.1961, Gressitt; 38♂♂, 10♀♀, 3 exs., *ibid.*, 1–21.XII.1961, Gressitt; 1♂, Tucker Cove, 0–100 m, 1.II.1963, Wise; 3♂♂, Shoal Pt., 0–10 m, tussock, 29.VII.1962, Rennell; 1♂, E of Shoal Pt., sweeping tussock above beach, 7.II.1963, Rennell; 1♂, Beeman Camp, 2–50 m, dead *Dracophyllum* wood, 1–5.XII.1961, Gressitt; 1♂, *ibid.*, on building, 26.VII.1962, Rennell; 1♂, *ibid.*, *Coprosma*, 13.VIII.1962, Rennell; 1♀, Beeman Camp, 15 m, 1.IX.1962, Rennell; 2♂♂, Beeman Camp station, 7–14.II.1963, Wise; 1♀, Lookout Bay, Perseverance Harbor, sweeping, 3.II.1963, Wise; 2♂♂, 1♀, Campbell I., 23.X.1961, Wise; 1 larva, 1 pupa, Garden Cove, 27.VIII.1962, Rennell.

DISTRIBUTION: New Zealand, Auckland I. (Norman's Inlet), Campbell I.

This well characterized species was described by Meyrick based on specimens collected

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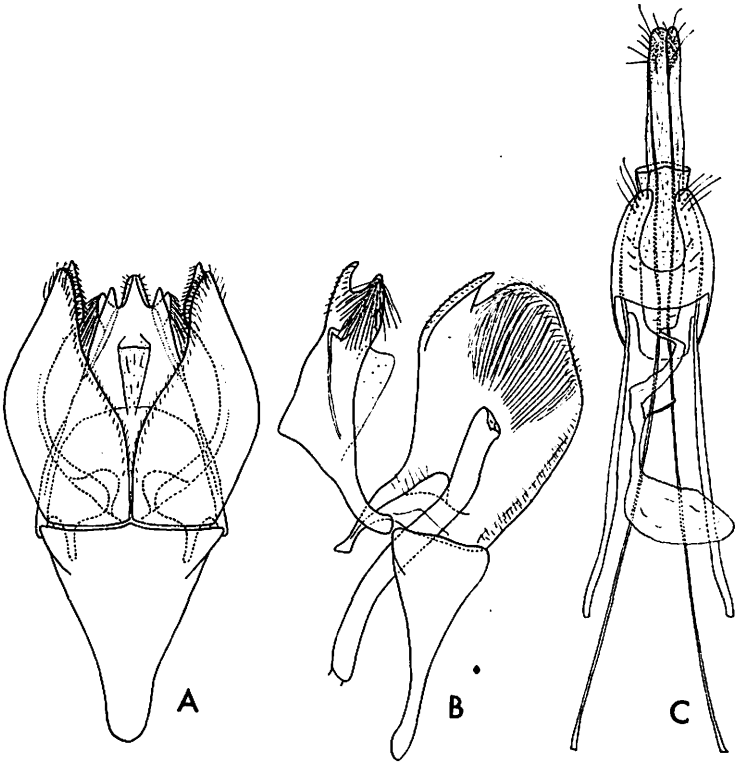

Fig. 1. *Proterodesma byrsopola* Meyrick. A, ♂ genitalia, excluding aedeagus; B, ditto, lateral view, excluding left valva; C, ♀ genitalia.

on Auckland I. Hudson (1909) gave a note on this species in the same work where Meyrick described it. Later, Hudson (1928) and Salmon (1956) recorded it from New Zealand, Auckland Is., and Campbell I. The ♂ and ♀ genitalia of this species are shown in fig. 1.

Family ELACHISTIDAE

Euproteodes galathea Viette, 1954, Ent. Medd. 27: 21, fig.

SPECIMENS EXAMINED: 1♂, 1♀, Tucker Cove, 4 m, 21–23. XI. 1961, Gressitt; 56♂♂, 3 ♀♀, Tucker Cove, 1–50 m, 21. XI–17. XII. 1961, Gressitt; 5♂♂, *ibid.*, *Poa*, 21–25. XI. 1961, Gressitt; 6♂♂, 1♀, *ibid.*, on sedge, 6–11. XII. 1961, Gressitt; 4♂♂, 2♀♀, Tucker Cove, 0–100 m, sedge, 7. VIII. 1962, Rennell; 2♀♀, Tucker Cove, 0–100 m, 1. II. 1963, Wise; 1♂, 1♀, *ibid.*, sedge, 25. II. 1963, Wise; 1♂, Tucker Cove, 0–30 m, *Dracophyllum*, 7. VIII. 1962, Rennell; 1♂, *ibid.*, 18. I. 1962, reared by Rennell; 1♂, Tucker Valley, 25 m, 27. XII. 1961, Rennell; 7♂♂, 3♀♀, Tucker Cove–St. Col Ridge, 30.XI.1961, Gressitt; 3♂♂, *ibid.*, sedge, *Carex trifida*, 30. XI. 1961, Gressitt; 8♂♂, Beeman Camp, 2–50 m, sedge, 26–30. XI. 1961, Gressitt; 1♂, *ibid.*, *Bulbinella*, 26–30. XI. 1961, Gressitt; 1♂, *ibid.*, *Poa*, 26–30. XI. 1961, Gressitt; 12♂♂, 1♀, *ibid.*, 1–21.XII.1961, Gressitt; 3♂♂, Beeman Camp, 30 m, sedge, 27.

VII. 1962, Rennell; 12♂♂, Beeman Camp, 15–50 m, sedge, 25. III. 1962, Rennell; 1♀, Beeman Cove, 1. I. 1962, Rennell; 1♀, Beeman, 15 m, 13. II. 1962, Rennell; 1♂, 1♀, Beeman Hill, 100–180 m, 2. XII. 1961, Gressitt; 1♀, *ibid.*, *Bulbinella*, 2. XII. 1961, Gressitt; 5♂♂, 1 ♀, Beeman Hill, swept ex tussock & sedge, 2. II. 1963, Wise; 5♂♂, 1♀, *ibid.*, sweeping, 2–11. II. 1963, Wise; 1♂, Beeman Hill summit, 190 m, swept ex tussock, 11. II. 1963, Wise; 3♂♂, 1♀, Beeman Pt., sweeping, 28. II. 1963, Wise; 10♂♂, Lookout Bay, beach, 3. XII. 1961, Gressitt; 2♂♂, *ibid.*, sedge, *Carex trifida*, 3.XII.1961, Gressitt; 1♂, *ibid.*, *Poa*, 19.XII. 1961, Gressitt; 1♀, Lookout Bay, Perseverance Harbor, sweeping, 3. II. 1963, Wise; 1♂, 1 ♀, Garden Cove, beach, 25. XI. 1961, Gressitt; 1♂, Northwest Bay, beach, rocks, 29. XI. 1961, Gressitt & Rennell; 2♂♂, Northwest Bay, 5 m, tussock, 30. XII. 1962, Rennell; 2 ♀♀, Northwest Bay area, swept ex tussock, 5. II. 1963, Wise; 2♂♂, Mt. Lyall, 250 m, 5. XII. 1961, Gressitt; 3♂♂, Mt. Lyall, below summit, 390 m, tussock, 19. II. 1963, Wise; 2 ♂♂, Moubray Hill, 200 m, *Poa*, 12. XII. 1961, Gressitt; 1♂, Moubray Hill, north slopes, 16. II. 1963, Wise; 1♂, Mt. Dumas, slope, *Poa*, 20. XII. 1961, Gressitt; 1♂, *ibid.*, 20. XII. 1961, sedge, Gressitt; 1♂, Rocky Bay, 0–20 m, 20. I. 1962, Rennell; 1♀, Venus Cove, 2 m, tussock, 2. II. 1963, Rennell; 1♂, Camp Cove, sweeping long grass on edge of stream, 5. II. 1963, Rennell; 2♂♂, Camp Cove, sweeping, 6. II. 1963, Wise; 1♀, Shoal Pt., sweeping, 7. II. 1963, Wise; 1♂, Filhol Peak, sweeping, 9. II. 1963, Wise; 2♂♂, Monument Harbor, sweeping tussock above beach, 9. II. 1963, Rennell; 2♂♂, Mt. Azimuth, 470 m, *Bulbinella*, 13. II. 1963, Rennell; 1♂, *ibid.*, sweeping, 13. II. 1963, Wise; 4♂♂, St. Col Peak, 210–250 m, 23. II. 1963, Wise; 2♂♂, 3♀♀, Campbell I., Rennell.

DISTRIBUTION: Campbell I.

Family HYPONOMEUTIDAE

Tinearupa sorenseni Salmon & Bradley, 1956, Rec. Dominion Mus. 3 (1): 66, figs. 10–15.

SPECIMENS EXAMINED: 20♂♂, 5♀♀, 1 ex., 1 larva, Monument Harbor, nr. beach, 20 m, on rocks above shore, 10.XII.1961, Gressitt; 1♀ (with pupal case and cocoon), *ibid.*, 17. XII. 1961, Rennell; 4♂♂, 2♀♀, Monument Harbor, shore rocks, 9. II. 1963, Wise; 2♂♂, 2♀♀, *ibid.*, shore rocks, 9. II. 1963, Rennell; 1♂, Davis Pt., 1–3 m, shore rocks, 12. XII. 1961, Gressitt; 5♂♂, 2♀♀, Courrejolles Pen., 200 m, ground about mollymawk nests, 14. XII. 1961, Gressitt & Rennell; 2♀♀, Courrejolles, 20. II. 1962, reared by Rennell; 1♀, Courrejolles Pen., 200 m, 3. XII. 1962, Rennell; 4♂♂, 4♀♀, Courrejolles Pen., 220–230 m, mollymawk colony, on rock cliffs, 12. II. 1963, Rennell; 18♂♂, 10♀♀, Courrejolles Pen., 230 m, mollymawk colony, on rock cliffs, 13. II. 1963, Rennell; 12♂♂, 10♀♀, *ibid.*, mollymawk colony, on rock cliffs, 13. II. 1963, Wise; 1♂, Mt. Azimuth, 350–450 m, 14. XII. 1961, Gressitt & Rennell; 1♂, Azimuth-Courrejolles, 240 m, sweeping, 13.II. 1963, Rennell; 1♂, 1 ex., Smoothwater Bay, rock cliffs, 16. II. 1963, Wise.

DISTRIBUTION: Campbell I.

Salmon & Bradley (1956) gave a note on the habitat of this species. According to the data of the present material, Mr. K. P. Rennell captured the larvae of this species at the Courrejolles Pen., and reared them. Two ♀♀ emerged from them. Data as follows: captured as larvae on 4. XII. 1961, pupated on 6. I. 1962, emerged on 20. II. 1962.

Campbellana attenuata Salmon & Bradley, 1956, Rec. Dominion Mus. 3 (1): 69, figs. 38–41.

SPECIMENS EXAMINED: 1♂, Tucker Cove, 0–100 m, sedge, 7. VIII. 1962, Rennell; 3♂♂, Mt. Lyall, below summit, 390 m, low plants, 19. II. 1963, Wise.

DISTRIBUTION: Campbell I.

This species was described on 2 specimens. According to the note given by Salmon & Bradley (1956), this species is uncommon in the island. I found 4 specimens in the present material.

Family OECOPHORIDAE

Endrosis lactella Denis et Schiffermüller, 1775, Ank. Syst. Werk. Schmett. Wien., 139.

SPECIMENS EXAMINED: 1♀, Tucker Cove, 1–50 m, 21–25. XI. 1961, Gressitt; 1♀, Beeman Camp, 15 m, 5. X. 1962, Rennell; 1♂, *ibid.*, 11. XII. 1962, Rennell.

DISTRIBUTION: Europe, India, Ceylon, Australia, New Zealand, Auckland I., Campbell I., Hawaiian Is., N. & S. America, Africa.

This species is distributed throughout most of the world. Salmon (1956) recorded it from Auckland I. This is the first record of this species from Campbell I.

Family TORTRICIDAE

Capua plagiatana Walker, 1864, List Lep. Ins. Coll. Brit. Mus. **28**: 370.

SPECIMENS EXAMINED: 29♂♂, 4♀♀, Tucker Cove, 4 m, Malaise trap, 27. XI–21. XII. 1961, Gressitt; 1♂, Tucker Cove, 20 m, 4. XII. 1961, Gressitt; 1♀, Tucker Valley, 25 m, under lichen on *Dracophyllum*, 13. VIII. 1962, Rennell; 1♂, Beeman Camp, 2–50 m, 13. XII. 1961, Gressitt; 1♀, Beeman Camp, on lighted window, 2. V. 1962, Rennell; 1♂, 1♀, *ibid.*, 8. V. 1962, on window, Rennell; 1♀, Beeman Camp, 100 m, *Dracophyllum*, 3. VIII. 1962, Rennell; 2♂♂, Beeman Camp, 100–150 m, *Coprosma*, —. 1962, Rennell; 1♀, Beeman Hill, sweeping, 2. II. 1963, Wise; 1♂, Mt. Lyall, 150 m, fern, 3–12. XII. 1961, Gressitt.

DISTRIBUTION: New Zealand, Auckland I. (Norman's Inlet), Campbell I.

Tortrix melanosperma Meyrick, 1916, Trans. N. Z. Inst. **48**: 414.

SPECIMEN EXAMINED: 1♂, Tucker Cove, 4 m, 16–18. XII. 1961, Malaise trap, Gressitt.

DISTRIBUTION: New Zealand, Campbell I.

The present specimen, which is in rather good condition, may be best regarded as *melanosperma* from New Zealand as it well agrees with the original description. This is the first record of this species from Campbell I.

Family PTEROPHORIDAE

Platyptilia aeolodes Meyrick, 1902, Trans. Ent. Soc. Lond. **1902**: 278.

SPECIMEN EXAMINED: 1♂, Beeman Camp, Inside building, 22. II. 1962, Rennell.

DISTRIBUTION: New Zealand, Chatham Is., Auckland I., Campbell I.

This species was originally described from the Chatham Is. It is also found in New Zealand, Auckland I. and Campbell I. Salmon (1956) examined 15 specimens of this species from the latter two islands.

Platyptilia falcatalis (Walker)

Platyptilus falcatalis Walk. 1864, List. Lep. Ins. Coll. Brit. Mus. **30**: 931.

SPECIMENS EXAMINED: 1♀, Tucker Cove, 4 m, Malaise trap, 27.XI–1.XII.1961, Gressitt; 2♂♂, Beeman Camp, 15 m, 10–18.X.1962, Rennell; 1♂, *ibid.*, off lighted windows, 29.IX.1962, Rennell; 1♀, St. Col Ridge, 150 m, 10–18.X.1962, Rennell; 1♀, Mt. Dumas, 100 m, 10–18.X.1962, Rennell.

DISTRIBUTION: New Zealand, Campbell I.

This species is recorded here for the first time from Campbell I. It is closely allied to the preceding species and *repletalis* Walker from New Zealand, but these are separated from each other by characters in the description and note of *aeolodes* given by Meyrick (1902), and the redescriptions of this species and *repletalis* given by Fletcher (1926).

Family NOCTUIDAE

Agrotis ipsilon (Hufnagel)

Noctua ipsilon Hufnagel, 1766, Berl. Mag. **3**: 416.

SPECIMENS EXAMINED: 1♂, Tucker Cove, found alive in Tech. Bldg., 20.XII.1961, Gressitt; 2♂♂, 1♀, Beeman Camp, caught inside, 12.III.1962, Rennell; 1♂, *ibid.*, 12.XII.1962, Rennell; 1♂, Beeman Station, in building, 18.II.1963, Wise; 1♀, *ibid.*, at light, 18.II.1963, Wise; 1♂, Mt. Lyall, 400 m, under stone, 19.II.1963, Rennell; 1♂, Beeman Camp, at light, 21.II.1963, Rennell; 1♂, 1♀, Beeman Camp, 20 m, in building, 7–14.II.1963, Rennell; 1♀, east end of Courrejolles Pen., 240 m, in small cave, 12.II.1963, Rennell.

DISTRIBUTION: Europe, Sachalin, Japan, Korea, Ryukyu Is., Taiwan, China, French Oceania, Australia, New Zealand, Chatham Is., Auckland Is., Campbell I., N. America.

This species is here recorded for the first time from Campbell I. Salmon (1956) recorded it from the Auckland Is.

Note: Two additional species not found in the present collection were recorded from Campbell I. by Salmon & Bradley, each as the type of a new genus:

Cosmopterygidae: *Reductoderces fuscoflava* Salmon & Bradley, 1956
Tortricidae: *Sorensenata agilitata* Salmon & Bradley, 1956

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INSECTS OF CAMPBELL ISLAND.
LEPIDOPTERA: PYRALIDAE

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Abstract: Eleven pyralid moth species from Campbell I., including 1 n. sp., 1 n. subsp. and 2 n. comb., belonging to 5 genera (including 1 n. gen.) are reported upon.

COMPOSITION AND RELATIONSHIPS OF FAUNA

The present collection, made by Dr. J. L. Gressitt and associates, contains 9 species of Pyralidae. Four additional species have been recorded in literature (Hudson, 1909; Salmon & Bradley, 1956). Of these, 1 is different from anything in the present material; the other 3 may well be identical with species reported here under other names. Even if they are not, they will not change the aspect of the fauna significantly.

We may consider, then, the confirmed pyralid fauna of the island as consisting of 10 species. These are referable to 5 genera: 1 of Nymphulinae, 3 of Scopariinae, and 1 that has been referred, perhaps correctly, to Crambinae. This last genus is so generalized in its characters, however, that it might equally well be placed in Scopariinae. The Pyraustinae, Pyralinae, Galleriinae, Phycitinae and higher Crambinae, all groups that are commonly represented on oceanic islands, are not known from Campbell I. The single nymphuline genus is Indo-Australian and is represented by a species that occurs in both Australia and New Zealand. The 3 genera of typical Scopariinae are also represented in New Zealand. One is endemic in the New Zealand region; the other 2 are world-wide or nearly so. Only one of these three genera is represented in temperate South America. The 1 crambiform genus is closely related to a genus that occurs on the Auckland Is. These 2 genera resemble in a general way a group of primitive Crambinae distributed in cool environments in New Zealand and Australia, but in structure of genitalia they are widely different from, and probably more primitive than, any of these. It seems that they form a genuine relict group, confined, according to present information, to the Subantarctic Islands of New Zealand, and structurally connecting 2 of the most primitive surviving groups of Pyralidae. Nothing similar is known in America or Africa.

On the species level the 3 genera of typical Scopariinae show a close relationship to the fauna of the New Zealand mainland. Five are identical with New Zealand forms, 1 is subspecifically distinct, 1 is a distinct species of a rather closely knit New Zealand group, and only 1 is a really distinctive species of uncertain New Zealand relationships. This is unusual in Scopariinae, which characteristically show a high degree of endemism on islands, but it is paralleled on other islands in the New Zealand area, *e. g.*, the Auckland,

Antipodes, Chatham and Kermadec Is. It would appear that the Campbell I. Pyralidae are mostly recent arrivals, but that there is a minority of species that arrived at earlier, and probably different, dates.

Key to Campbell Island genera of Pyralidae

1. Wings narrow and pointed, not fitted for flight ..... **Exsilirarcha**
   Wings normal..... 2
2. Fore wing with termen excised behind apex..... **Musotima**
   Fore wing with termen evenly curved 3
3. Ventral margin of valve of ♂ genitalia bearing a prominent spine..... **Scoparia**
   Ventral margin of valve of ♂ genitalia entire..... 4
4. Juxta of ♂ genitalia narrow and paddle-shaped; penis armed with a group of small cornuti..... **Antiscopa**
   Juxta of ♂ genitalia pyriform; penis unarmed or with minute scobinations only ... . **Witlesia**

Genus **Exsilirarcha** Salmon and Bradley

Wings slender and pointed, with reduced venation. Femora and front coxa thickened and compressed, adapted for jumping. ♂ genitalia with well-developed uncus and gnathos, pyriform juxta, and simple unarmed valve; penis unarmed. ♀ genitalia with short broad ductus and globular bursa.

This genus is extremely primitive in structure. It was described in Crambinae, but could equally well be put in Scopariinae, though the apparent association of the larva with grasses is a crambine rather than a scopariine habit. Except for the reduction of the wings and the development of a jumping habit, this genus may well be close to the common ancestor of the 2 subfamilies. It is closely related to the genus *Protyparcha* Meyrick, from the Auckland Is., but I know of no very close relative elsewhere. Only the type species is known.

Exsilirarcha graminea Salmon and Bradley Fig. 1.

Exsilirarcha graminea Salm. & Brad., 1956: 75, figs. 24–30.

Wings reduced; body and wings uniformly light buff in fresh specimens; body blackish in rubbed specimens.

Material examined: 25 specimens, Tucker Cove, 7. VIII. 1962, K. P. Rennell; Shoal Pt., 29. VII, 21. X. 1962, Rennell; Beeman, 26–30. XI. 1961, J. L. Gressitt, 26. VII, 31. XII. 1962, Rennell; W. slopes of Mt. Dumas, above Middle Bay, 300 m, 23. XI. 1962, Rennell; Mt. Lyall, 200–400 m, 5–12. XII. 1961, Gressitt.

One additional specimen was reared from a larva captured in a grass tussock. This larva made a cocoon of bits of grass in the tussock. A 2nd similar cocoon containing a pupa was taken on St. Col Ridge, 250 m, 2. II. 1962; both collected by K. P. Rennell. Additional larvae, apparently of this species, were collected. They will be described in a later publication.

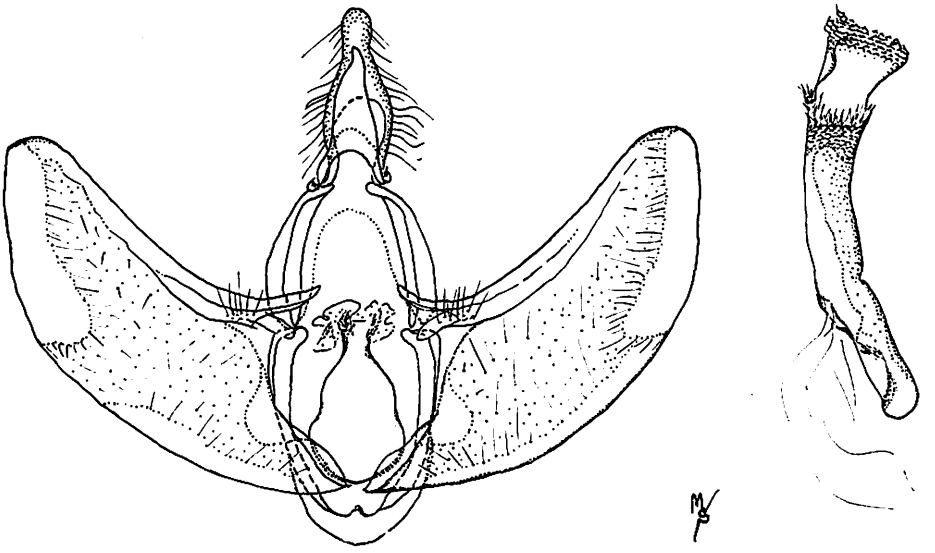

Fig. 1. *Exsilirarcha graminea* Salmon & Bradley, ♂ genitalia.

Genus **Scoparia** Haworth

Wings normal, functional. ♂ genitalia with valve armed on ventral margin with a spine-like process; juxta oval, subquadrate or semicircular, not pyriform or paddle-shaped; penis in some species with strong cornuti.

This genus is a large and homogeneous one, of world-wide distribution, except for oceanic islands, from which it is mostly absent, though with a few exceptions, *e.g.*, the Azores, where there are several species. There are many species in New Zealand, and also a considerable number in temperate South America. All the species of each of these 2 regions are endemic, except for extensions to neighboring small islands, and there is no particular evidence of direct relationship between the species of the 2 areas. Some New Zealand species appear to be directly related to some Australian species. Three of the species found on Campbell I. are identical with New Zealand forms. The 4th, known only from the type specimen, has not been dissected, and its generic position and geographic relationships remain uncertain. It is a species of very distinctive appearance and it is presumably endemic. A 5th species, *S. halopis* Meyrick, is recorded without comment by Salmon (*In* Salmon & Bradley, 1956). This species is common on the Auckland Is. but is not represented in the present collection from Campbell I. and the record requires confirmation. If it proves to be authentic the distributional pattern of the islands will not be materially altered, because the species is known from New Zealand also.

Key to Campbell Island species of Scoparia

1. Fore wing largely orange-brown, with some white and pale-ochreous markings .....
.....**albafascicula**

Fore wing above with grey or greyish brown ground color and some black or black-

ish markings 2
2. Fore wing above uniformly light greyish brown with 2 contrasting black longitudinal streaks ..... **rotuella**
Fore wing above somewhat variegated grey with complex or obscure markings 3
3. Fore wing above with a large, triangular, black, medial patch on costa, or with black, quadrate, reniform and claviform spots arranged to form a triangle with the round orbicular dot; an oblique, rufous, antemedial line present ..... **parmifera**
Fore wing above without rufous antemedial line or black costal patch; claviform never and reniform rarely large, black and quadrate 4
4. Reniform small, black, triangular, closely followed by a black line paralleling its outer border ..... **triscelis**
Reniform large, X-shaped or anvil-shaped (occurrence requiring confirmation)... **halopis**

Scoparia rotuella (Felder and Rogenhofer)

Crambus rotuellus Feld. & Rogenh., 1874: 7, pl. 137, fig. 30.
Xeroscopa rotuella: Meyrick, 1885: 113.
Scoparia rotuella: Hudson, 1928: 200, pl. 21, fig. 41.—Salmon, IN Salmon & Bradley, 1956: 62.

Fore wing uniformly pale brownish grey; a contrasting black dash from base behind cell; reniform and orbicular united by a black band to form a contrasting black streak. Hind wing pale grey.

♂ genitalia: Uncus rather narrow, distally pointed; gnathos strong and decurved, spike-like; juxta subquadrate; vinculum rather thick; valve short, distally rounded; sacculus ending in a strong decurved spine; penis short and slightly sinuous, with 2 strong cornuti followed by some finer ones.

MATERIAL EXAMINED: 29 specimens, Beeman Camp, at light, 6.IV, 2.VIII, 24, 29.IX.1962, Rennell; same locality, 2–4. II. 1963, K. A. J. Wise; Tucker Cove, Malaise trap, 27. XI–21. XII. 1961, Gressitt; Mt. Dumas, above 400 m, 6. II. 1963, Wise; Shoal Pt., 1. XII. 1962, Rennell; Lookout Bay, Perseverance Harbor, bank of stream, 3. II. 1963, Rennell.

The species occurs also on the North and South Islands of New Zealand. The Campbell I. specimens average small, but otherwise normal.

Scoparia halopis Meyrick

Scoparia halopis Meyr., 1909: 72, pl. 2, fig. 3.—Hudson, 1909: 63, Nomen nudum, 1928: 199, pl. 24, fig. 50.—Salmon, IN Salmon & Bradley, 1956: 63.

Fore wing above dull grey, somewhat mottled and variegated; considerable variation in the intensity of development of dark markings; a black longitudinal dash from base to antemedial line present or absent; orbicular spot elongate-oval, brownish, usually outlined in black, sometimes very heavily, especially along posterior edge; claviform small, brownish, often outlined or suffused with black, sometimes united with black basal dash; reniform black, variable in size and definition, when reduced often situated on a brown patch, anvil-shaped or X-shaped; antemedial and postmedial lines inconspicuous, light grey, weakly edged with fuscous, the antemedial oblique, the postmedial angled distad behind costa and more strongly opposite cell. Hind wing pale brownish grey.

♂ genitalia: Uncus pointed, dorsally setose; gnathos strong and decurved; juxta parallel-sided; vinculum narrow; valve fairly short and broad, distally expanded, ventral margin with a short, stout spine; penis cylindrical, slightly sinuous, fairly thick, 1 short thick cornutus and a group of 3, also short, but more slender.

The above description was made from topotypical specimens from the Auckland Is. The species was recorded from Campbell I. by Salmon, without remark. As Auckland material was collected by the same expedition and also as confusion with *Witlesia pachyerga*, not recorded by Salmon, would easily be possible, I regard Salmon's record as somewhat doubtful.

Scoparia triscelis Meyrick

Scoparia triscelis Meyr., 1909: 71, pl. 2, fig. 11.—Hudson, 1909: 62, Nomen nudum; 1928: 191, pl. 21, fig. 4.—Salmon, IN Salmon & Bradley, 1956: 62.

Fore wing dark grey; orbicular spot small and annular or obscure; claviform a large black dash; reniform a triangular black patch, bordered narrowly with buff and followed by a short black line parallel to its outer margin; postmedial line narrow, pale buff, inwardly then outwardly angled behind costa; a dark subapical dash in marginal area; pale longitudinal streaks in marginal area. Hind wing above grey.

♂ genitalia: Uncus distally rounded, laterally setose; gnathos slender, tip slightly bulbous, shaft finely spinulose dorsally; juxta semicircular; valve fairly narrow, costa nearly straight, sacculus produced in a strong spine; penis cylindrical, armed with 1 strong thorn-like cornutus and numerous fine spinules.

MATERIAL EXAMINED: 18 specimens, Tucker Cove, Malaise trap, 27. XI.–21. XII. 1961, Gressitt; Beeman Camp, 2–50 m, 26–30. XI. 1961, Gressitt.

This species was described from the Auckland Is.; it occurs also on North I. and South I., New Zealand. It has not previously been recorded from Campbell I.

Scoparia parmifera Meyrick

Scoparia parmifera Meyr., 1909: 72, pl. 2, fig. 2.—Hudson, 1909: 62, 66, Nomen nudum; 1928: 186, pl. 22, fig. 13.—Salmon, IN Salmon & Bradley, 1956: 62.

Fore wing dark grey, with an outwardly oblique, rufous antemedial line; orbicular, reniform and claviform spots usually united in a large, somewhat irregular, costal patch; when separate, the orbicular a dot, the reniform and claviform quadrate patches; postmedial line narrow, fuscous; a broad, fuscous, subterminal band. Hind wing dark grey.

♂ genitalia: Uncus rather narrow; gnathos slender and pointed; juxta oval; valve broad and distally rounded; sacculus produced in a fairly stout decurved spine; penis moderately thick, without cornuti.

MATERIAL EXAMINED: 90 specimens, Tucker Cove, 27. XI.–21. XII. 1961, Malaise trap, Gressitt; Lookout Bay Beach, 31. XII. 1961, Gressitt; Beeman Camp, 2–50 m, 26. XI.–1. XII. 1961, Gressitt; Mt. Azimuth, 350–450 m, 14. XII. 1961, Gressitt & Rennell; Northwest Bay Beach, 29. XI. 1961, Gressitt; Six-Foot Lake, 2 m, 10. XII. 1961, Gressitt; Moubray Hill, 200 m, 12. XII. 1961, Gressitt; Tucker Cove to St. Col Ridge, 30. XI. 1961, Gressitt; Garden Cove, 25. XI. 1961, Gressitt; Mt. Eboulé, 150 m, 17. XII. 1961, Gressitt.

This species was described from the Auckland Is. and Campbell I., the former being the

type locality by lectotype selection (Munroe, 1960). It has subsequently been discovered in the South I. of New Zealand. There are no obvious geographic differences in the populations.

Scoparia (?) albafascicula Salmon

Scoparia albafascicula Salm., IN Salmon & Bradley, 1956: 78, fig. 35.

Not represented in present collection. I reproduce Salmon's description:

"Expanse of the fore wings 18 mm. Fore wing medium orange-brown lightly suffused with white and ochreous scales at the base, continuing as a broad but lightly suffused band of white along the axis of the wing, as far as the second line which is faintly indicated as a broad, irregular shading of pale ochreous scales that sweep back from the costa towards the dorsum; between the second line and the apex a broad area of ochreous scales with a broad, irregular, subterminal line of white scales passing from this down the termen. A further series of patches of white and ochreous scales along the termen; cilia of long ochreous scales tipped with white. Hind wing medium brown with evenly scattered white scales interspersed amongst the brown; the cilia ochreous. Head and thorax deep orange-brown, palps ochreous, abdomen brown banded with gold on anterior segments but with dark ochreous on posterior segments."

Only the type specimen, in the Dominion Museum, Wellington, N. Z., is known. It was collected on Campbell I. by J. H. Sorensen.

Genus **Antiscopa** Munroe, n. gen.

Type-species: *Scoparia epicomia* Meyrick.

Labial palpus porrect; maxillary palpus prominent, tufted with scales at apex; antenna filiform or compressed in ♂, filiform in ♀; body slender; legs normal. Fore wing triangular; R_1 from before angle of cell; R_2 from near angle, approximated to R_{3+4} at base; R_3 and R_4 stalked; R_5 from angle of cell, not approximated to R_{3+4}; M_1 from discocellular at 1/3 from anterior angle; discocellular weakly curved; M_2 and M_3 arising close together at posterior angle of cell, their basal parts not approximated; Cu_1 from distinctly basad of angle; Cu_2 farther from Cu_1 than Cu_1 from M_3; anals normal. Hind wing with Sc and Rs strongly anastomosed; M_1 arising from anterior angle of cell close to Sc; discocellular moderately curved; M_2 and M_3 from posterior angle of cell, basally approximated; Cu_1 from just basad of angle, not approximated to M_3; Cu_2 from cell at 3/5; Cu not pectinated; cell rather large; three anals present.

♂ genitalia: Uncus triangular in basal 1/2, parallel-sided in distal 1/2, tip rounded and slightly decurved; gnathos slender and pointed; tegumen high; vinculum narrow; juxta vase-shaped or paddle-shaped, ventrally carinate; valve slightly expanded, outer margin oblique, costa narrowly inflated, distal 1/2 of valve longitudinally striated; penis moderately slender, cylindrical, vesica armed with a group of small cornuti.

Close in structure to *Witlesia* Chapman, but is distinguished by the shape of the juxta and by the presence of cornuti. Shape of uncus similar to several primitive genera of the subfamily and it seems likely that this genus has arisen from an ancestor more primitive than *Witlesia* rather than being an offshoot of that world-wide genus. *Antiscopa* is confined to the New Zealand area. In addition to the type-species it contains **Antiscopa elaphra**

(Meyrick), n. comb., and **A. acompa** (Meyrick), n. comb., both described in *Scoparia*. Only the type-species is known from Campbell I.

Antiscopa epicomia (Meyrick), n. comb.

Scoparia epicomia Meyr., 1885: 99.—Hudson, 1928: 195, pl. 21, fig. 33.

Fore wing rather broadly triangular, light grey, with rufous basal area, bordered distally by an inwardly oblique, blackish, antemedial band; an outwardly oblique fuscous line on discocellulars; postmedial line fine, fuscous, somewhat thickened on costa, angulate basad, then distad, behind costa. Hind wing light grey.

MATERIAL EXAMINED: 5 specimens, Tucker Cove, 4 m, Malaise trap, 27. XI–XII. 1961, Gressitt; Windlass Bay, 100 m, 25. XI. 1962, Rennell.

This species was described from Dunedin, New Zealand. Occurs on North and South islands and on Kermadec Is. It has been reported from the Auckland Is. but not previously from Campbell I. Hudson says there is considerable individual variation in New Zealand, but that northern specimens are generally brighter than southern ones. The Campbell I. specimens are large and washed out, with black band narrow and weak and basal patch rather pale.

Genus **Witlesia** Chapman

External structure as in *Scoparia*. ♂ genitalia with uncus rounded or sometimes distally truncate; gnathos claviform or triangular, not decurved; juxta pyriform; valve with ventral margin entire, tip rounded; penis whithout cornuti.

This large genus is distributed in most parts of the world, but is apparently absent from temperate South America. It is well represented on oceanic islands and has many species in New Zealand. Campbell I. species are identical with or directly related to New Zealand forms.

Three species are represented in this collection. Two additional species, **Witlesia paltomacha** (Meyrick), n. comb., and W. **sabulosella** (Walker), n. comb., described in *Scoparia* and *Crambus*, respectively, and both currently placed in *Scoparia*, were recorded by Salmon (IN Salmon & Bradley, 1956) from Campbell I. Of these, the record of *W. sabulosella* certainly refers to the species here described as *W. gressitti*, and that of *W. paltomacha* very probably refers either to the same species or to pale or worn specimens of W. **psammitis** (Meyrick), n. comb.

KEY TO CAMPBELL ISLAND SPECIES OF WITLESIA

1. Fore wing above light brown, almost immaculate ..... **gressitti**
   Fore wing above light or dark grey, with normal maculation..... 2
2. Fore wing very narrow, with oblique termen; orbicular annular; antemedial line oblique; ground color light or dark grey.....**psammitis campbellensis**
   Fore wing of normal width, termen nearly erect; orbicular a solid dark spot; antemedial line arcuate, dentate on Cu; ground color dark grey..... **pachyerga**

Witlesia pachyerga (Meyrick), n. comb. Fig. 2.

Scoparia pachyerga Meyr., 1927: 697.—Hudson, 1928: 196, pl. 52, fig. 9.

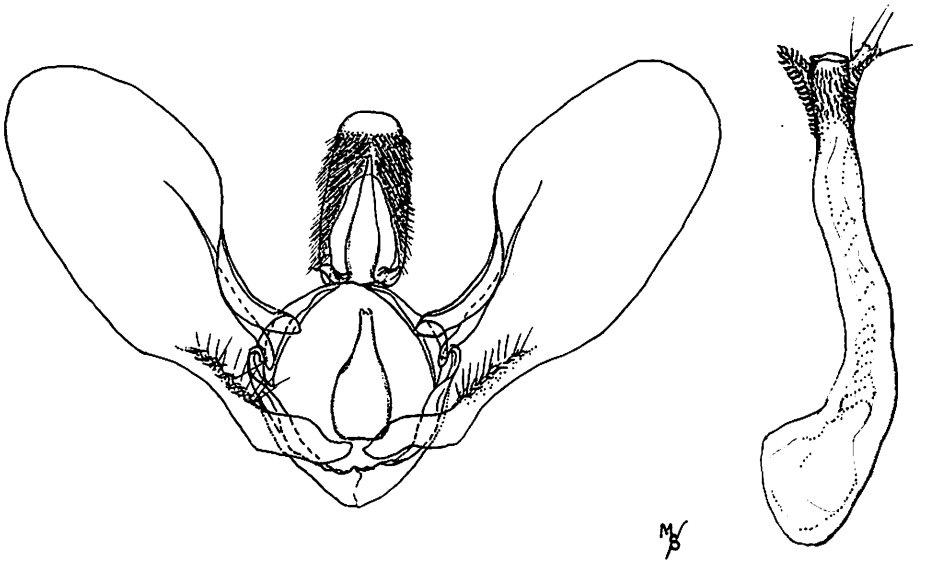

Fig. 2. *Witlesia pachyerga* (Meyrick), ♂ genitalia.

Fore wing rather broadly triangular, termen only slightly oblique; ground color above dark grey; basal area with 2 black dashes; antemedial line arcuate, slightly indented on Cu, pale grey, followed by blackish; orbicular a blackish spot; claviform a blackish dash, its base behind orbicular; reniform broadly X-shaped; postmedial line narrow, pale grey, preceded by blackish, weakly inwardly oblique, then weakly outwardly oblique, obtusely angled, and weakly inwardly oblique to posterior margin; fuscous subapical, subtornal and subterminal triangles. Hind wing above dark grey.

♂ genitalia: Uncus long and parallel-sided, distally truncate but with rounded corners; gnathos narrowly triangular, not as long as uncus; juxta pyriform, dorsal part very slender, apex minutely excised; vinculum small; valve large and ear-shaped, costa inflated on basal 1/2, a prominent curvature beyond end of inflation; penis fairly slender, weakly sinuated, vesica finely scobinated.

MATERIAL EXAMINED: 8 specimens, Beeman Camp, 2–50 m, 17.XII.1961, Gressitt; Beeman Camp Station, at light, 7. II. 1963, Wise; Tucker Cove, 4 m, Malaise trap, 5–21. XII. 1961, Gressitt; Tucker Cove, 1–50 m, 18–21. XII. 1961, Gressitt.

This species is recorded by Hudson only from subalpine forest on Mt. Holdsworth on the Tararua Range, southern North I., New Zealand. It is represented in the British Museum only by the type. The present series agrees excellently with the type in both maculation and genitalia, and I think there is no doubt of the identity. Probably the species will prove to be more widely distributed in the New Zealand mountains.

Witlesia psammitis campbellensis Munroe, n. subsp. Fig. 3.

Frons somewhat oblique, rounded anteriorly, roughly scaled, light brownish grey, with an

inconspicuous row of paler scales laterally; vertex with erect pale-buff scaling, darker behind; labial palpus porrect, exceeding head by about its length, dark fuscous, with a fine admixture of light grey, ventrally pale buff, most broadly so at base, 3rd segment partly exposed, cylindrically scaled, lying along terminal scale-tuft of 2nd; maxillary palpus prominent, distally somewhat dilated with scales, dark fuscous, each segment light buff terminally; proboscis well developed, scaled basally with light buff; eye large, eye and ocellus fuscous; antenna dark fuscous, somewhat thickened and compressed in ♂, filiform in ♀, alternate scale-rows pale buff and raised; side of head and prothorax with a fuscous stripe from eye to wing-base; thorax above light greyish buff, somewhat ochreous laterally and posteriorly; abdomen above a little darker than thorax, distal margins of segments paler; thorax beneath and legs light grey, anterior surface of fore leg, and dorsal surfaces of mid and hind tarsi and tibiae fuscous, narrowly banded with light grey; abdomen beneath brownish grey, segments with narrow paler terminal bands. Fore wing long and narrow, distal margin oblique, size of wing a little reduced in some ♀♀; ground color above light grey, considerably darkened in some ♀♀, normally sparsely and variably dusted with fuscous; markings usually weak, but enhanced in melanistic ♀♀; a longitudinal dash of fuscous dusting in median fold at base; antemedial line strongly oblique distad, pale grey, followed by a zone of fuscous dusting, expanded posteriorly; orbicular longitudinally oval, weak, fuscous, annular, filled with light buff; claviform a round, fuscous patch, posterior to basal part of orbicular, or even somewhat posterobasal to it; reniform subquadrate to X-shaped, weakly outlined in dark fuscous, filled with pale buff in normal specimens, infuscated in dark ones; postmedial line blackish fuscous, normally very weak, oblique distad from costa to R_5, there acutely angled, retracted to an acute angle on M_1, then broadly excurved, retracted towards Cu_2, there gradually curved, oblique basad to posterior margin; a subtornal fuscous patch preceded by a pale spot; a row of subterminal blackish wedges between veins, tending to be prolonged basad as short streaks; fringe buff, with an interrupted fuscous line at basal 1/3 and a much weaker one at distal 1/3. Hind wing above

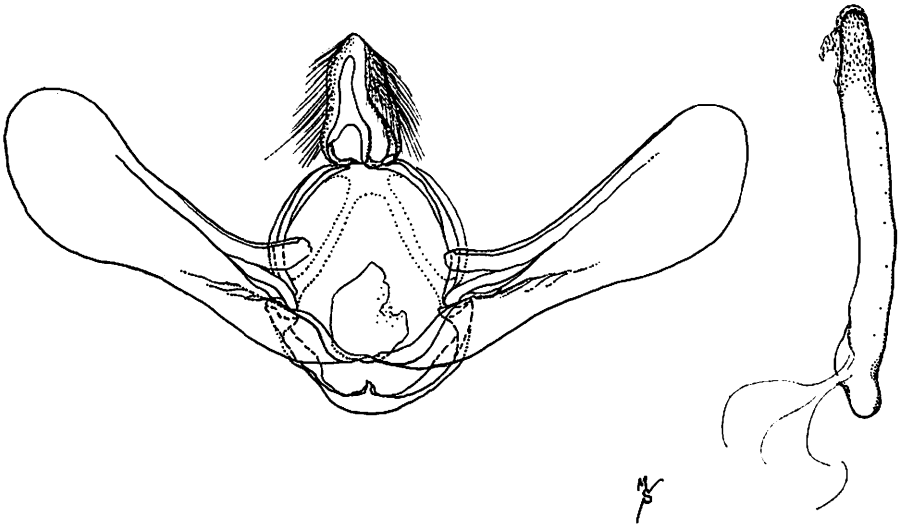

Fig. 3. *Witlesia psammitis campbellensis*, n. subsp., ♂ genitalia.

translucent grey, with faintly darker postmedial and terminal bands; fringe light buff. Wings beneath light grey with faint traces of darker markings; fringes light buff. Expanse 21–23 mm.

♂ genitalia: Uncus hood-shaped, with decurved sides and tip, distal part more slender than basal part; gnathos divided basally, distally slender and digitate; juxta tapering dorsally; vinculum narrow; valve slender, weakly and only moderately asymmetrically expanded distally, tip rounded, costa narrowly inflated to 3/4, sacculus more broadly inflated to 1/2; penis slender and nearly straight, unarmed.

Holotype ♂ (D. S. I. R., Nelson), Tucker Cove, 1–50 m, Campbell I., sedge, 1–5. XII. 1961, Gressitt; allotype ♀ (D. S. I. R.), same locality and collector, 21–25. XII. 1961. 20 paratypes: Tucker Cove, 4 m, Malaise trap, 1–18. XII. 1961, Gressitt; Tucker Cove, 20 m, 8. XII. 1961, Gressitt; Tucker Cove, 1–50 m, 6–12. XII. 1961, Gressitt; Beeman Camp Station, 6. II. 1963, Wise; Southwater Bay, 2. III. 1963, shore cliffs, Wise; Beeman Beach, 19. XII. 1961, Gressitt; Shoal Pt., 3. XII. 1961, Gressitt, 7. II. 1963, Wise; Monument Harbour, 9. II. 1963, shore rocks, Wise; N. slope Courrejolles Pen., 220 m, mollymawk colony, under stones, 12. II. 1963, Wise. Paratypes in Bishop Museum, Honolulu, and the Canadian National Collection, Ottawa, type No. 8460.

Common and widespread on the main islands of New Zealand. The Campbell I. subspecies is darker and more strongly marked.

Witlesia gressitti Munroe, n. sp. Fg. 4.

Frons rounded, light brown; vertex light brown, roughly scaled; a pale line along eye on both frons and vertex; labial palpus slender, porrect, exceeding head by about 1.5× its length, 3rd segment largely concealed in scales of 2nd, color dorsally brownish fuscous, with fine pale-buff dusting, ventrally whitish buff; maxillary palpus prominent, brownish fuscous, with fine pale-buff dusting, distally strongly dilated with scales; eye and ocellus fuscous; antenna with basal segment light brown, dusted with pale buff; shaft somewhat thickened and compressed in ♂, filiform in ♀, light brown; thorax above light brown; abdomen above light buff, somewhat roughly scaled; body beneath pale buff; legs brown. Fore wing fairly narrow, above light brown, nearly immaculate; cell, anal fold and veins obscurely scaled with darker brown; traces of an obliquely 8-shaped reniform, the posterior loop filled with pale brown; traces of dark-brown dots at vein-ends; some specimens with traces of a pale, oblique, postmedial line; fringe light brown, darker in basal 1/2. Hind wing above pale grey; fringe whitish grey. Wings beneath silky grey; hind wing a little paler than fore wing.

♂ genitalia: Uncus long and narrow, sides curved, tip narrowly truncate; gnathos narrow and awl-shaped; juxta pyriform, irregularly truncate dorsally; valve narrow, weakly expanded and rounded distally, costa narrowly inflated to 4/5; penis slender, with fine scobinations on vesica.

Holotype ♂ & allotype ♀ (D.S.I.R., Nelson), Tucker Cove, Malaise trap, 18–21 & 16–18. XII. 1961, Gressitt. 36 paratypes: same locality and collector, 27. XI–21. XII. 1991; Mt. Dumas slope, 20. XII. 1961, Gressitt, and lower slopes, 6. II. 1963, Wise; Beeman Camp, 15. II. 1963, Rennell, and Station, 1, 2. II. 1963, Wise; Filhol, 200 m and peak, 9. II. 1963, Rennell; Lookout Bay, Perseverance Harbor, 3. II. 1963, sweeping and bank of stream, Wise;

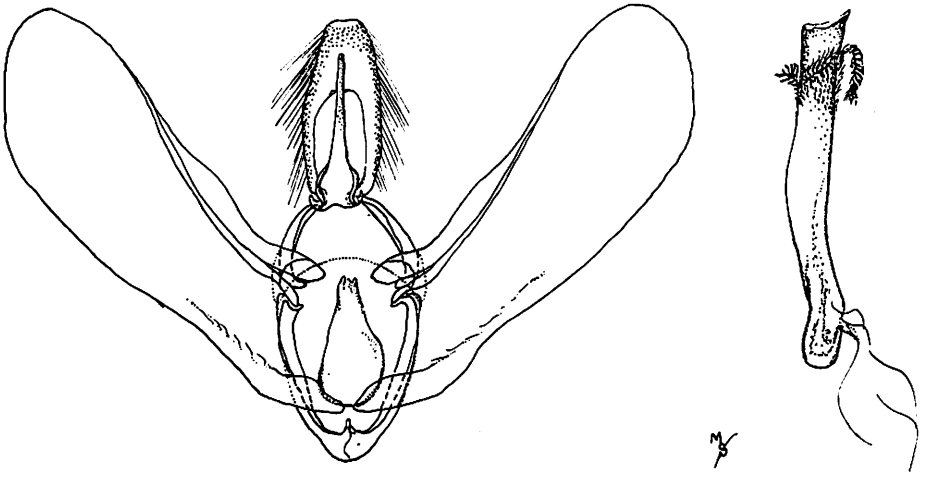

Fig. 4. *Witlesia gressitti* n. sp., ♂ genitalia.

Moubray Hill, N. slopes, 16. II. 1963, Wise; Shoal Pt., 7. II. 1963, sedge and tussock about seal elephant wallows, Wise; Camp Cove, 6.II.1963, sweeping grass nr. stream mouth, Rennell; Tucker Cove, 4 m, 5. II. 1963, tussock, Rennell; Venus Bay, 2. II. 1963, A. Wright. Paratypes in Bishop Museum, Honolulu, and Canadian National Collection, type No. 8461.

Previous records of *W. paltomacha* probably refer either to this species or to worn specimens of *W. psammitis campbellensis*; records of *W. sabulosella* certainly refer to *W. gressitti*. *W. gressitti* is close to both species, but *W. paltomacha* has the valve of the ♂ genitalia greatly and unsymmetrically expanded and the moth is larger with distinct bands of dark dusting between the pale veins. *W. sabulosella* has the uncus parallel-sided and distally truncate and the gnathos wider and triangular; the fore wing above has a pale subcostal stripe and a distinct black discocellular dot, among other differences in maculation. The 3 species belong to a compact New Zealand group.

Genus **Musotima** Meyrick

This genus belongs to the most primitive section of the Nymphulinae, and in structure and biology shows a close relationship to the Scopariinae. The larva is terrestrial (not aquatic as in higher Nymphulinae) and feeds on ferns, like some Scopariinae. The genus ranges from India and China to New Zealand, and has close relatives in *Neurophyseta* and *Omphaloptera* from Tropical America. So far as known the group is unrepresented in temperate South America. The species now recorded from Campbell I. is known from the Auckland and Chatham Is. and is widespread in New Zealand and Australia.

Musotima nitidalis (Walker)

Isopteryx nitidalis Walk., 1865: 1317.
Musotima nitidalis: Meyrick, 1884: 290.—Hudson, 1928: 177, frontsp., fig. 22, pl. 19, fig. 18.

Fore wing above brown, with irregular, obliquely transverse, pale bands, edged medially with black; a pair of white spots on discocellular; a prominent white lunule on costa just

basad of postmedial line; an irregular row of subterminal spots. Hind wing above pale grey with a prominent dark triangular spot on termen in anal area.

MATERIAL EXAMINED. 1 damaged specimen, Northwest Bay Beach, 29. XI. 1961, rocks, Gressitt & Rennell. Confirmation of this record is desirable, as the single specimen is so crushed it might easily have been brought in accidentally in collecting equipment. However, the occurrence of the species is intrinsically not unlikely, and I accept the record provisionally.

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INSECTS OF CAMPBELL ISLAND.
DIPTERA: TRICHOCERIDAE AND TIPULIDAE

By Charles P. Alexander

AMHERST, MASSACHUSETTS

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*) *arthuriana* (Alexander) and *Limonia* (*Idioglochina*) *kronei* (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. Harrrison, 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*) *kronei*, 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.

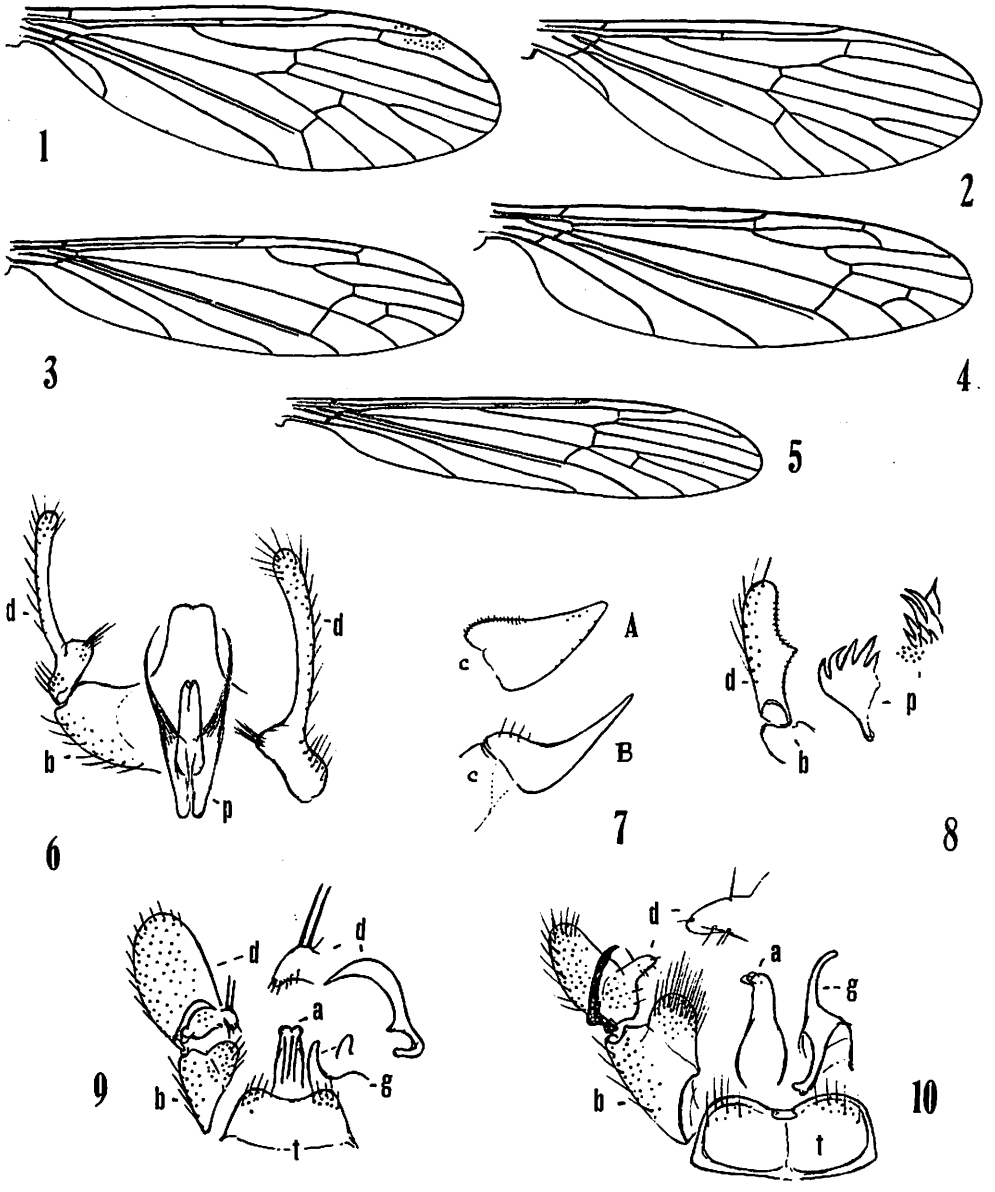
The unique type, a legless ♀, was taken on Campbell I., 17. VII. 1903, by L. Cockayne. A 2nd record from Campbell was in 1943 by Sorensen (Alexander, 1955). What seems certainly to be this same species, represented only by a fragment, was from Pigeon Bay, Auckland I., taken in November 1943, by R. A. 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*) *kronei* (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*) *kronei* (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_2 closed but in 1 specimen (fig. 2) cell M_2 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_2, stigma very pale brown; in cases, wings virtually unpatterned. Venation: *Rs*, 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 *Rs*. 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[1].

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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INSECTS OF CAMPBELL ISLAND.
DIPTERA: PSYCHODIDAE[1]

By Laurence W. Quate

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Abstract: Six species of Psychodidae, including 3 new ones, are recorded from Campbell I. in the subantarctic. All species belong to *Psychoda*. A key and illustrations are given.

As a result of the field work carried out on Campbell I. mainly by Dr. J. L. Gressitt and Mr. K. P. Rennell in 1961 and 1962, a large collection of Psychodidae has become available. Campbell I. is due S of New Zealand at 52° S latitude. A description of the island and its biota is given in a separate paper by Gressitt.

There are 6 species of psychodids on Campbell, all belonging to the genus *Psychoda*. Two species, *P. pulchrima* and *spatulata*, have been recorded from the island by Harrison (1955); *P. severini* and 3 new species are additions to the fauna, but it is doubtful if *severini* is established. *P. pulchrima* and a related new species are the most abundant ones on the island. A peculiar species with reduced wings and eyes, related to a similarly modified psychodid from Bounty Is., *P. acutipennis* Tonnoir, is the second example of brachyptery in the family and is the only psychodid on Campbell which shows an adaptive response to the rigorous environment.

The Campbell I. psychodids are related zoogeographically to those of New Zealand. Three of the 6 species also occur in New Zealand. Two of the new species have close Australasian relatives and eventually also may be found in New Zealand, since they show no unusual features which would indicate long isolation or endemicity. Only one species, as mentioned above, is an obvious endemic. None of the species are known elsewhere in the Pacific, beyond New Zealand and the subantarctic islands. (However, *inornata* of Hawaii may be the same as *severini*, but until males are known their status is uncertain. This complex has not been found in Polynesia or Micronesia.)

Key to Campbell Island species of Psychoda

1. Wing normal; eyes not reduced, bridges fully developed, separated by only 2–3 facet diameters 2
   Wing reduced to less than 1/2 normal size, narrow and acutely pointed; eyes reduced, bridges tapering and inner margins acute, separated by 5 or more facet diameters; antenna 16-segmented, ascoids Y-shaped but very small ..... **brachyptera**
2. Antenna 16-segmented, terminal 3 segments separated 3

1. Results of field work supported by National Science Foundation grants (G-18800, G-23720) from the U. S. Antarctic Research Program.

Antenna apparently 14-segmented 5

3. Median projection of hairs on frons extending to row 2 of facets from lower eye margin, hairs on vertex not below upper margin 4

Median projection of frons hairs not extending beyond row 1 of facets, often not reaching eye margin, vertex hairs extending to rows 2–3 of facets from upper margin; antennal internodes rather short and with a swelling near center; ♂ surstyle short and stocky, paramere symmetrically bilobed; vestiture of pinned specimens white on scutum with dark brown or black spot centrally and wing with 2 white bands beyond center ..... **campbellica**

4. Antennal internodes very long and slender, segment 4 of ♂ with internode 2.5× node, ♀ 1.5× node; ♂ eye bridge often with 5 rows of facets; ♂ paramere symmetrical, unilobed; ♀ subgenital plate with setose, bilobed structure on inner face by digit; vestiture of pinned specimen gray or brown with 2 white spots on posterior wing fringe ..... **pulchrima**

Antennal internodes shorter, segment 4 of ♂ with internode 1.5× node, ♀ subequal; ♂ eye bridge with only 4 rows of facets; ♂ paramere asymmetrically bilobed with deep notch off-center; ♀ subgenital plate with U-shaped setose lobe on inner face far basad of digit, but without lobes near digit ..... **eremita**

5. ♀ subgenital plate with truncated heart-shaped apical lobes, genital digit slender, longer than wide; ♂ aedeagus simple, apparently of 1 piece; vestiture of pinned specimen white with dark band across wing ..... **spatulata**

♀ subgenital plate with apical lobes parallel-sided, genital digit about as wide as long; ♂ unknown on Campbell I.; vestiture gray without markings ..... **severini**

Psychoda brachyptera Quate, n. sp. Figs. 1, 2.

♂: Eyes widely separated by distance equal to length of scape; bridge with 3 rows of facets but acute on median, connected with heavy suture; frons with rectangular patch of hairs without median projection. Labellum with 2 setae and 3 teeth, innermost tooth posterior of and well removed from others; cibarium short, 2× as long as wide; palpus rather short, extending to antennal segment 5, ratio of segments 15 : 21 : 22 : 23. Antenna 16-segmented, terminal 3 segments separated but pressed together and against 13, node of segment 3 large and pyriform and with short internode, other nodes globular and internodes short but progressively longer than 3; ascoids Y-shaped but small, especially posterior arm which is invisible unless seen from side.

Thorax smaller than other *Psychoda* compared to abdomen; halteres large with enlarged capitulum and short pedicel. Wing about 3× as long as wide, greatly reduced beyond fold and base of normal size except alula small, apex thinly acute; membrane uniformly brown beyond fold; veins thickened; forks on same level at apex of R_1. Legs thicker, with different ratio and larger apical tarsal segments and claws than usual in *Psychoda*, ratio of fore leg 28 : 29 : 14, mid leg 38 : 37 : 17, hind leg 37 : 39 : 17.

Genitalia as figured; aedeagus simple, straight, divided beyond foramen and ends in bilobed apex, paramere (lobe beneath aedeagus) setose and strongly bilobed; surstyle long and moderately slender with short tenaculum. Wing length 1.2–1.6 mm (M=1.4, SD=0.2, N=11); wing width 0.4–0.6 mm; antenna 1.0–1.2 mm.

♀: Similar to ♂. Eyes separated by 1.3× length of scape. Genitalia as figured; sub-

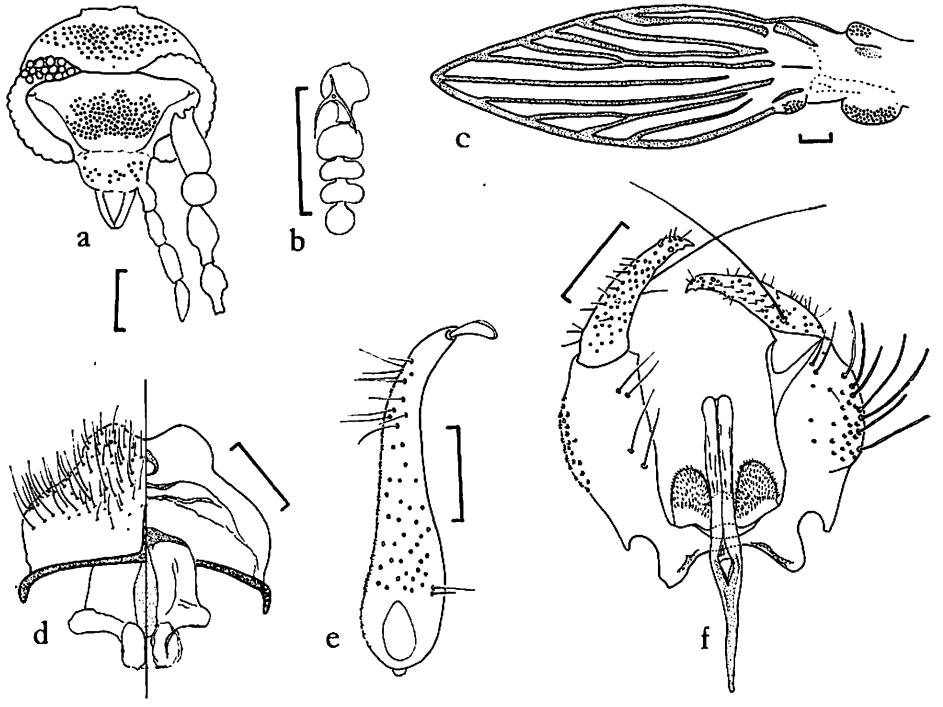

Fig. 1. *Psychoda brachyptera*. a, ♂ head; b, ♂ antennal segments 12–16; c, ♂ wing; d, ♀ genitalia; e, ♂ surstyle; f, ♂ genitalia, left coxite and aedeagus in dorsal view, right coxite in ventral view. Scale line=0.1 mm.

genital plate with shallow apical concavity, genital digit small and pointed, spermatheca small. Wing length 1.5 mm; wing width 0.5 mm; antenna 1.1 mm.

Pupa: Usual *Psychoda* appearance; respiratory horn and abdominal ornamentation as figured. Length 1.9–2.3 mm (slide-mounts).

Larva: Tergal plates present only on thorax and last 2 segments, pair of small, separated plates on segments 1 & 2 and metatergal plates[2] on segment 9, slender mesotergal and larger rectangular metatergal plate on segment 10; vestiture of thorax finely setose, setae with punctiform bases grouped in clusters of 2 or 3; vestiture of abdomen coarser, setal bases large and plaque-like, setae multifurcate. Other vestiture and details as figured.

Holotype ♂, allotype ♀, (D. S. I. R.) Rocky Bay, Campbell I., penguin nest, 28.XI.1961, 20. XII. 1961, Gressitt. Paratypes: 6♂♂, 2♀♀, 3 pupae, same data; 13♂♂, 4♀♀, same but 20. XII. 1961, 18. II. 1963, Gressitt, Wise, Rennell.

ADDITIONAL SPECIMENS: Numerous larvae from some locality as types; 2♀♀, same, but 25. VII–3. VIII. 1962, Rennell.

The reduced wings and eyes of *P. brachyptera* are striking features shared with *P. acuti-*

2. For terminology see Satchell, 1949, Trans. R. Ent. Soc. Lond. **100**: 414.

pennis Tonnoir (see Satchell, 1950a), but with no other known psychodid. These are probably adaptations to the wind-swept islands on which these flies live and have been discussed by Satchell (*l. c.*).

The morphological similarity of *brachyptera* and *acutipennis* strongly suggests that they

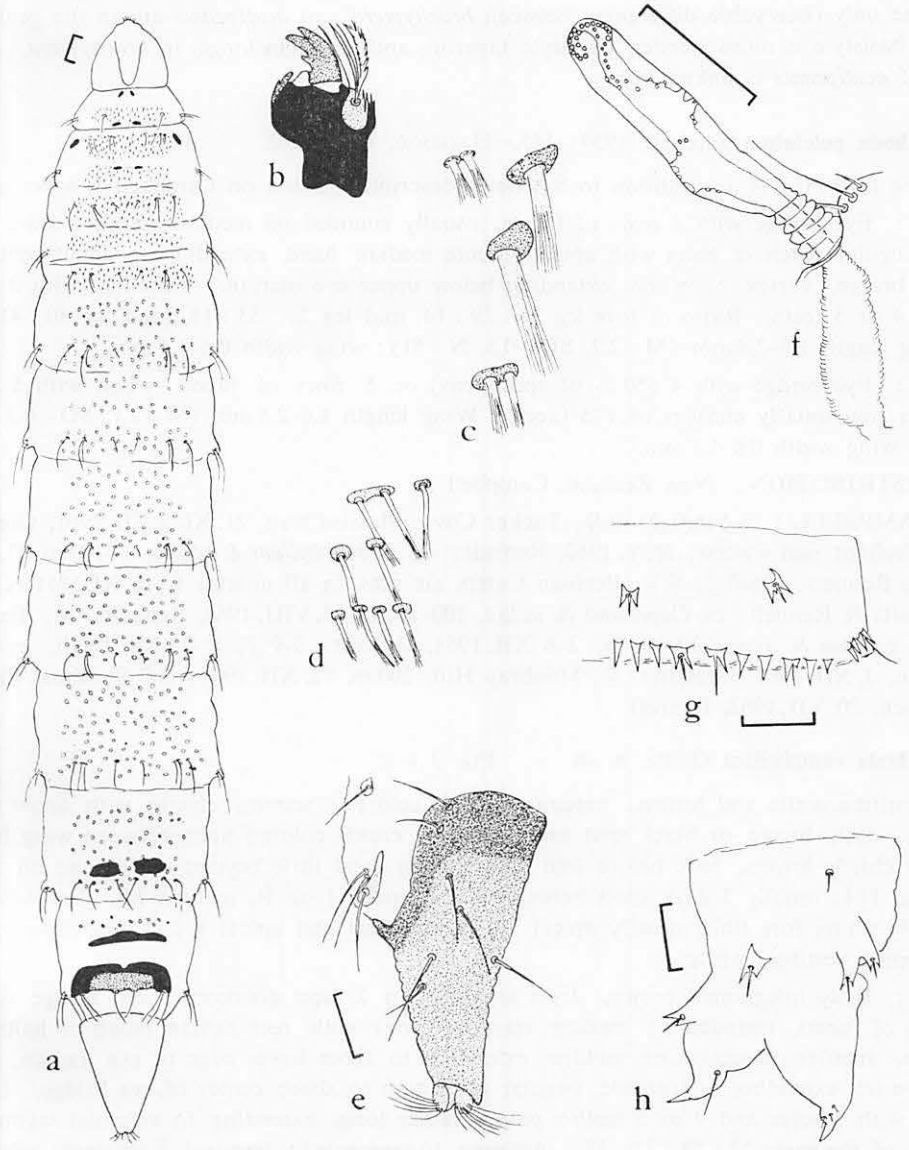

Fig. 2. *Psychoda brachyptera.* a-e, larva. a, dorsal view; b, mandible; c, dorsal elements, metatergal division of segment 5; d, ventral elements of segment 5: e, respiratory siphon, lateral view. f-h, pupa. f, respiratory horn; g, 1/2 of abdominal sternite 4; h, terminal segment, lateral view, Scale line=1.0 mm.

are of common stock and are not simply products of parallel evolution. In addition to the wings and eyes, antennae, ascoids, palpi, head shape, and ♂ genitalia point to a close relationship. It would seem quite certain that one of these species has evolved from the other after part of the parent population had become isolated on another island. There is no clear relationship between these species and other known ones.

The only observable differences between *brachyptera* and *acutipennis* are in the genitalia. The basistyle is more slender, dististyle tapering and aedeagus longer in *brachyptera*. (The ♀ of *acutipennis* is unknown.)

Psychoda pulchrima Satchell, 1954: 485.—Harrison, 1955: 210. Fig. 3 a, b.

The following is an addition to Satchell's description based on Campbell I. specimens:

♀: Eye bridge with 4 rows of facets, usually rounded on median margin; frons with rectangular patch of hairs with apically acute median band extending to about center of eye bridge, vertex hairs not extending below upper eye margin. Labellum with 2 setae and 4 or 5 teeth. Ratio of fore leg 26 : 29 : 14, mid leg 27 : 33 : 15, hind leg 30 : 41 : 17. Wing length 1.6–2.8 mm (M=2.2, SD=0.3, N=51); wing width 0.6–1.1 mm.

♂: Eye bridge with 4 (50 % of specimens) or 5 rows of facets, when with 5 rows, lower row usually consists of 1–3 facets. Wing length 1.6–2.5 mm (M=2.1, SD=0.3, N=28); wing width 0.6–1.1 mm.

DISTRIBUTION: New Zealand, Campbell I.

CAMPBELL I.: 548♂♂, ♀♀, Tucker Cove, Malaise trap, 21. XI–2. XII. 1961, Gressitt; in elephant seal wallow, 16. V. 1962, Rennell; ex *Dracophyllum* & sedge, 0–100 m, 7. VIII. 1962, Rennell; 206♂♂, ♀♀, Beeman Camp, air nets, in all months from XI. 1961–X. 1962, Gressitt & Rennell; ex *Coprosma* & sedge, 100–150 m, 3. VIII. 1962, Rennell; ♀, Beeman Hill, ex *Poa* & moss, 30–100 m, 2–6. XII. 1961, Gressitt; 7♂♂, ♀♀, Mt. Lyall, ex fern, 150 m, 3. XII. 1961, Gressitt; ♀, Moubray Hill, 200 m, 12. XII. 1961; 3♀♀, Shoal Pt., ex tussock, 20. VII. 1962, Rennell.

Psychoda campbellica Quate, n. sp. Fig. 3 c–g.

Vestiture white and brown; antenna cream colored; scutum chiefly with snow white hairs, dark brown or black spot surrounded by cream colored hairs between wing bases; wing chiefly brown, base before fold white, white band little beyond center and on about apical 1/4; usually 2 dark spots between white bands, 1 on R_4 and on M_1. Leg vestiture chiefly white, fore tibia, usually apical 1/2 of mid tibia and apical 1/2 of hind tibia brown; abdomen vestiture white.

♀: Body integument brown. Eyes separated by 2 facet diameters; eye bridge with 4 rows of facets, rounded on median margin; frons with rectangular patch of hairs and short, angular projection on midline extending to about lower edge of eye margin, hairs on vertex extending in truncate, angular projection to about center of eye bridge. Labellum with 2 setae and 4 or 5 teeth; palpus rather long, extending to antennal segment 6, ratio of segments 22 : 28 : 27 : 32. Antenna 16-segmented; terminal 3 segments subequal, clearly separated from each other and 13, node of segment 3 pyriform, remaining nodes globular, internodes rather stout and with a small swelling near center; ascoids Y-shaped.

Wing membrane pale brown, little darker in costal cell; forks complete but base of R_3

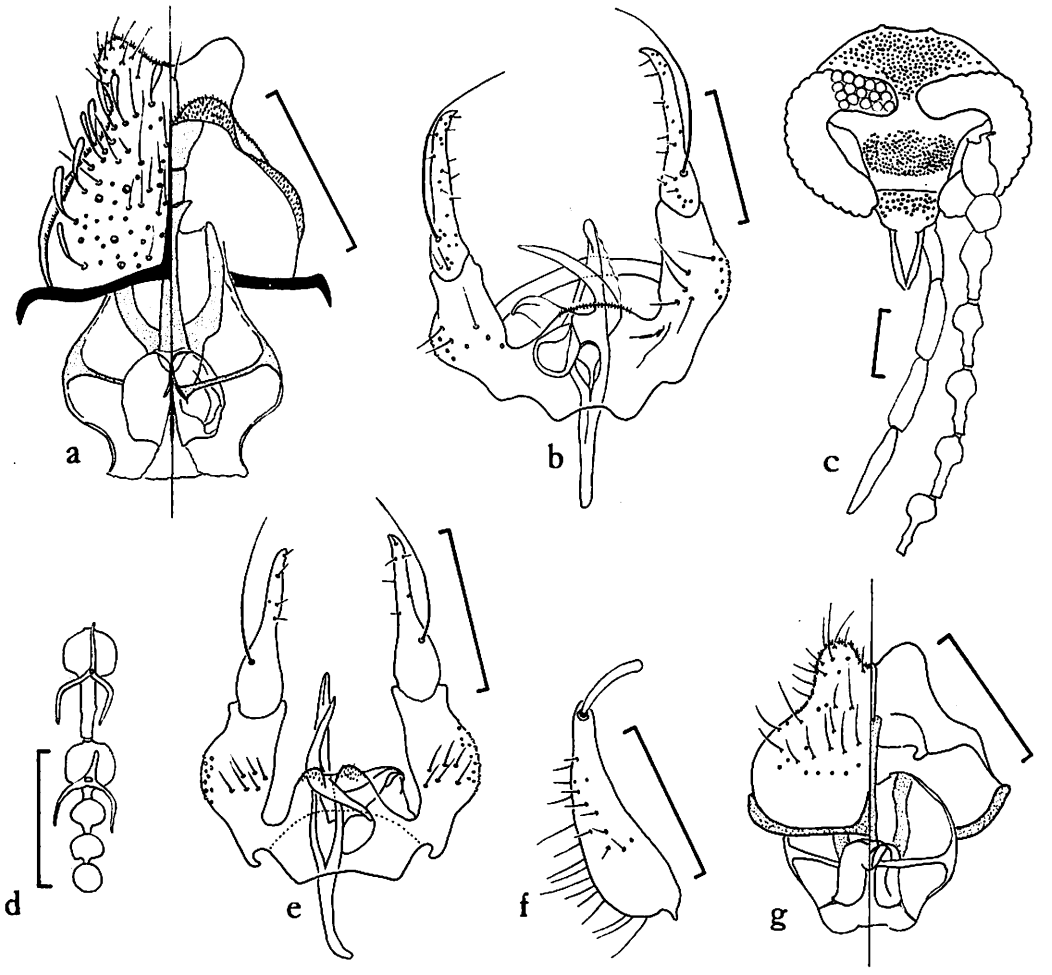

Fig. 3. a, b. *Psychoda pulchrima.* a, ♀ genitalia; b, ♂ genitalia, ventral view. c–g. *Psychoda campbellica.* c, ♀ head; d, ♀ antennal segments 12–16; e, ♂ genitalia, ventral view; f, ♂ surstyle; g, ♀ genitalia. Scale line=0.1 mm.

and M_2 usually weakened. Ratio of fore leg 24 : 24 : 12, mid leg 26 : 31 : 13, hind leg 30 : 36 : 13.

Genitalia as figured; apex bilobed, base before lobes shorter and broader than in *pulchrima*; inner face with pair of small rounded knobs projecting basally. Wing length 1.5–2.9 mm (M=2.3, SD=0.3, N=50); wing width 0.8–1.1 mm; antenna 1.0–1.5 mm.

♂: Similar to ♀; eyes separated by 1 facet diameter, bridge truncate on median margin, median projection of vertex hairs acute. Genitalia as figured; main shaft of aedeagus nearly straight, lateral shaft strongly curved at base, dististyle swollen basally and distal 2/3 slender, seta about as long as dististyle; paramere setose, bilobed; surstyle moderately short and stocky. Wing length 1.7–2.4 mm (M=2.2, SD=0.2, N=23); wing width 0.7–

1.0 mm; antenna 1.2–1.5 mm.

Holotype ♂, allotype ♀, (D. S. I. R.), 16–18. XII. 1961 and Tucker Cove, Campbell I., 4 m, Malaise trap, 20.XII.1961, Gressitt. Paratypes: 200♀♀, 21♂♂, Tucker Cove, Malaise trap and ex *Poa*, 27. XI–20. XII. 1961, 21–25. XI. 1961 & 12–17. XII. 1961; 3♂♂, 6♀♀, Beeman Camp, 2–50 m, 21–30. XI. 1961 & 1–3.XII.1961, all Campbell I., collected by Gressitt.

ADDITIONAL SPECIMENS: 15♂♂, 24♀♀, Beeman Camp, Campbell I., air nets, XI, XII. 1961, II–V, VIII, X. 1962, Rennell & Gressitt.

P. campbellica is closely related to *pulchrima*, but pinned specimens are easily separated; *campbellica* is distinctly marked with white hairs on the thorax and the brown spot between the wings and white bands on the wings, but *pulchrima* is gray or brown with 2 white spots on the posterior wing fringe. Slide mounts reveal the close relationship of the two; *campbellica* differs from *pulchrima* in having shorter antennal internodes, a broader and shorter ♀ subgenital plate without pair of hairy lobes on the inner face, which is characteristic of *pulchrima*, and shorter surstyli and large, bilobed paramere of the ♂ genitalia.

Psychoda eremita Quate, n. sp. Fig. 4 a–f.

♀: Eyes separated by 2 facet diameters; eye bridge with 4 rows of facets, rounded on median margin; frons with rectangular patch of hairs and median, triangular projection extending to nearly center of eyes, vertex hairs extending in short, truncate projection to little below upper eye margin. Labellum with 2 setae and 4 teeth; ratio of palpal segments 20 : 25 : 29 : 33. Antenna 19-segmented, terminal 3 segments subequal, clearly separated from each other and 13, node of segment 3 slightly pyriform, others globular; ascoids Y-shaped.

Wing membrane clear, pale brown in costal cell; forks complete; both costal nodes with dense patch of hair sockets, but without hairs or scales in slidemounts; ratio of fore leg 23 : 25 : 14, mid leg 29 : 33 : 15, hind leg 31 : 38 : 16.

Genitalia as figured; subgenital plate with apical concavity well marked, lobes well developed, inner face with marked folds extending in curve to digit and with U-shaped, setose lobe at base of digit, digit without apical seta. Wing length 1.9–2.0 mm; wing width 0.8 mm; antenna 1.2 mm.

♂: Similar to ♀; eyes separated by about 1/2 facet diameter, bridge truncate on median margin; wing with dense patch of small, spatulate, non-deciduous hairs on lower surface of 2nd (distal) costal node. Genitalia as figured; lateral shaft long and widely curving at base, paramere hairy, bilobed and with deep notch to side of midline making it asymmetrical; surstyle short and stocky. Wing length 1.9 mm; wing width 0.8 mm; antenna 1.3 mm.

Holotype ♀, allotype ♂, (D. S. I. R.), Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961 & 18–21. XII. 1961. Paratypes: ♀, Tucker Cove, 1–50 m, ex *Poa*, 21–25. XI. 1961; 2♀♀, Lookout Bay Beach, ex *Poa*, 19. XII. 1961; ♀, Courrejolles Penin., 200 m, gray-headed mollymawk nest; all Campbell I., collected by Gressitt.

ADDITIONAL SPECIMEN: ♀, Beeman Camp, Campbell I., air nets, 24. VII. 1962, Rennell.

This species is related to *pulchrima* and *campbellica*, but is separable from them by the ridges and hairy lobe on the internal face of the ♀ subgenital plate and the long lateral shaft and notched paramere of the ♂ genitalia.

Psychoda spatulata Satchell, 1950b: 478. Fig. 4 g–h.

The following is an addition to Satchell's description based on Campbell I. specimens:

♀: Eyes separated by about 1 facet diameter, bridge with 3 or 4 rows of facets; frons with crown-shaped patch of hairs and median, triangular band extending nearly to upper eye margin. Labellum with 2 setae and 4 teeth.

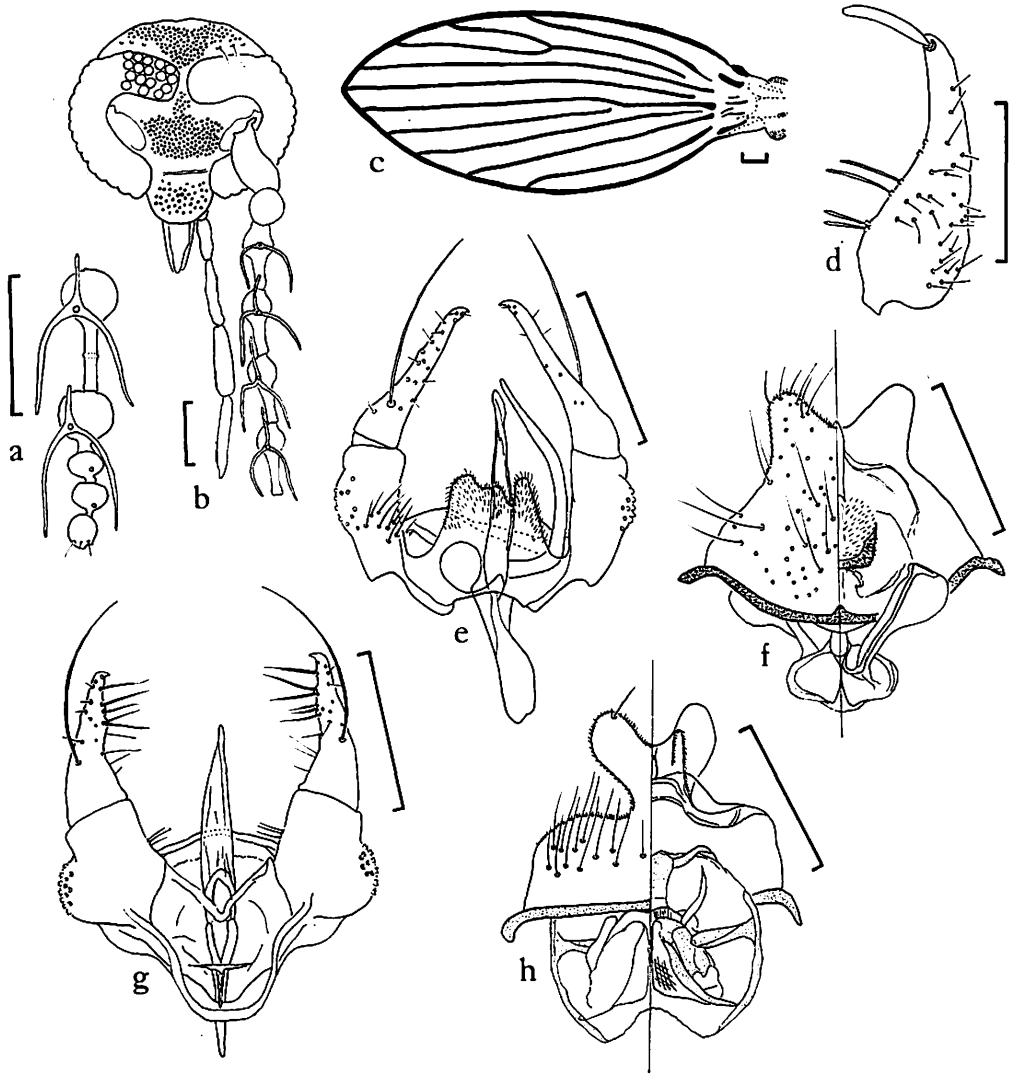

Fig. 4. a–f. *Psychoda eremita.* a, ♂ antennal segments 12–16; b, ♂ head; c, ♀ wing; d, ♂ surstyle; e, ♂ genitalia, left coxite and aedeagus in ventral view, right coxite in dorsal view; f, ♀ genitalia. g–h. *Psychoda spatulata.* g, ♂ genitalia, ventral view; h, ♀ genitalia. Scale line= 0.1 mm.

Wing length 1.6–2.5 mm (M=2.1, SD=0.2, N=12).

♂: Wing length 1.9–2.2 mm.

DISTRIBUTION: Australia, New Zealand, Antipodes, Macquarie I., Campbell I.

CAMPBELL I.: 10♂♂, ♀♀, Tucker Cove, Malaise trap, 1–5, 16–18. XII. 1961, Gressitt; 2♀♀, in elephant seal wallow, 16. V. 1962, Rennell; 245♂♂, ♀♀ Beeman Camp, air nets, in all months of I–X. 1962, except VIII, Rennell; 6♂♂, ♀♀, ex *Pleurophyllum criniferum*, *Poa* and on ground, 6–11, 21–30. XI. 1961, 12–17. XII. 1961, Gressitt; at light, 1–5.XII.1961, 2. II. 1963, Gressitt & Wise; ♂, Courrejolles Penin., on mollymawk nest, 200 m, 14. XII. 1961, Gressitt; 2♀♀, Monument Harbor, ex black-backed gull nest & tussock, 17.XII.1961, 4. II. 1962, Gressitt & Rennell; ♂, ♀, Northwest Bay, ex rocks & tussock, 29. XI. 1961, 30. XII. 1962, Gressitt & Rennell; 8♂♂, ♀♀, Shoal Pt., ex tussock, 29.VII.1962, Rennell; ♀, Lookout Bay, ex *Stilbocarpa*, 10.II.1962, Rennell; ♀, Davis Pt., Moubray Hill, ex *Poa*, 12. XI. 1961, Gressitt; 7♂♂, ♀♀, Mt. Azimuth, under dead albatross in nest, 250 m, 12. II. 1963, Wise; 5♂♂, ♀♀, Mt. Dumas, Berlese funnel, 150 m, 5. II. 1963, Wise.

Psychoda severini Tonnoir, 1922, Ann. Soc. Ent. Belg. **62**: 78.

DISTRIBUTION: Holarctic, Australia, New Zealand.

CAMPBELL I.: ♀, Beeman Camp, 2–50 m, chicken yard debris, Berlese funnel, 6–11. XII. 1961, Gressitt.

P. severini is probably not established on the island. It is "extremely common" in New Zealand (Satchell, 1950b) and if it were established, more than a single specimen would have been collected in the year. The record is considered adventitious.

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Satchell, G. H. 1950a. On *Psychoda acutipennis* Tonnoir, a semi-apterous, island-living species. Proc. R. Ent. Soc. Lond. ser. B, **19**: 42–46.

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———— 1954. Keys to the described species of New Zealand Psychodidae with descriptions of eight new species. *Ibid.* **105**: 475–91.

Pacific Insects Monograph 7: 289-291 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
DIPTERA: CERATOPOGONIDAE[1,2]

By Masaaki Tokunaga

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Abstract: *Monohelea campbellensis*, n. sp. is here described for the first time.

Monohelea campbellensis Tokunaga, n. sp. Figs. 1–3.

Medium-sized, brownish ochreous, rather strongly shining species. Wings without special markings. ♂ not known.

♀: Body 2.12 mm long. Wing 1.63×0.6 mm. Head dark brown; eyes bare, separated as wide as 2.5 facets; proboscis short, about 1/2 of head length. Antenna generally dark brown, basal parts of all flagellar segments more or less pale ochreous; segments III–IX short-oval, X–XIV cylindrical, XIV rather sharply pointed; antennal ratio of length of X–XIV to II–IX combined 1.07, relative lengths of distal 8 segments 12 : 12.5 : 12.5 : 16.5 : 20 : 21 : 24 : 34. Mandible with 7–8 cutting teeth; clypeus with 6 lateral setae; palp 5 segmented (10 : 18 : 23 : 12 : 16), dark brown, segment III slightly thickened, with very small sensory pore on apical 1/3, V clavated.

Scutum shiny, ochreous, setigerous with dark strong setae, 3 distinct fuscous vittae; scutellum yellowish ochreous, with 4 strong bristles and 4 small setae; postscutellum brown; pleura brownish ochreous; sternum brown. Legs strongly setigerous, ochreous and dark brown, but not distinctly banded; fore leg largely ochreous, brownish only on basal corner of coxa, apical parts of femur and tibia and entire length of last tarsal segments, dark on basal end of tibia; middle similar in color to fore, but lateral side of coxa more widely brown, tibial end not brownish, tarsal segments II–V brownish; hind more widely brownish, coxa and tarsal segments entirely brown, distal 1/2 of femur and 2/3 of tibia dark brown. Spurs and spine-like bristles: in fore, tibia with 1 apical, tarsal segment I with 3–4 ventral besides 1 apical, II–III each with 1 apical; in mid, tarsal I with 3–4 ventral besides 2 apical, II with 2 apical, III with 1 apical; in hind, tibia with 4–6 bristles of apical comb, tarsal I with 1 basal and 3 apical. Claws of fore and mid legs small, simple, equal, shorter than 1/2 of last tarsal segments (12 : 31), claw of hind single, unequally bifid, slightly shorter than last segment (34 : 37). Tarsal ratios of length of segment I to II and relative lengths

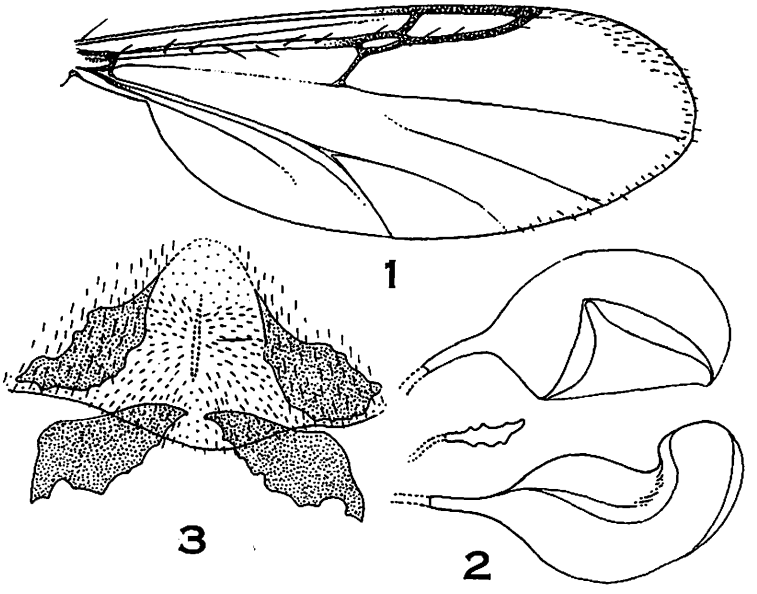
1. Contribution from the Laboratory of Entomology, Kyoto Prefectural University, No. 91.
2. Field work supported by the National Science Foundation grant G-23720 from the U. S. Antarctic Research Program.

of segments, excluding coxae and trochanters, 1.67 and 34 : 34.5 : 14 : 8.5 : 6 : 4.5 : 7.5 in fore, 1.85 and 42 : 40.5 : 18.5 : 10 : 6.5 : 4 : 7.5 in mid, 2.08 and 49 : 49 : 19.8 : 9.5 : 7 : 6.5 : 9.4 in hind.

Wing (fig. 1) very pale brown, but veins around 2 radial cells brown; macrotrichia present only along apical margin between ends of costa and M_{3+4}. Venation: costa extending about 3/4 (97 : 125) of wing length, ending slightly beyond end of M_{3+4}, relative lengths of veins, R, M, stem of fMCu, R_1 and Rs 48 : 47 : 49 : 17 : 36, radial cell II about 2.6 of I in length (22 : 8.6), M_{1+2} as long as r-m (7.5 : 7.5), fMCu under r-m. Halter white.

Abdomen brown, but caudal 3 segments very pale, tergal setae arising from pale spots; cerci brown; spermathecae (fig. 2) dark brown, oval, rather large, subequal, 66–69×51–54 μ, each with slender chitinized part of duct; subgenital plates (fig. 3) paired, irregularly triangular.

Holotype: ♀ (D. S. I. R., Nelson), Middle Cove, Northwest Bay, Campbell I., 5. II. 1963, K. A. J. Wise, by sweeping.



Figs. 1-3. *Monohelea campbellensis*, ♀. 1, wing; 2, spermathecae; 3, subgenital plates.

General appearance of this species is similar to that of New Zealand *ferruginea* Macfie and *clavipes* Macfie, except for the lack of distinct bandings of legs. The first allied species may be distinctive in larger antennal ratio (about 1.12), more setigerous scutellum bearing 6 bristles and longer radial cell II (about 3× as long as I) from the new species. The 2nd differs from the present species in possession of subcylindrical antennal segments III–IX, highly setigerous scutellum bearing 9 bristles and mid spine-like bristle of hind basitarsus besides basal and apical. *Tasmaniensis* Lee may be another allied species, but all basitarsi are provided with only a single stout spine at both base and apex, hind tarsal

claw is far longer than the last segment and wings are more widely hairy differing from *campbellensis*.

Relative lengths of antennal and palpal segments were measured under magnification of 600 (1 unit=0.003 mm) and those of leg segments and wing veins under magnification of 150 (1 unit=0.013 mm).

Pacific Insects Monograph 7: 292-299 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
DIPTERA: SCIARIDAE

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Abstract: *Xylosciara brevipes* Steffan, *Corynoptera subantarctica* Steffan, and *Bradysia campbellensis* Steffan are described as new. *Bradysia rubra* (Harrison) is assigned a new status. A key is provided for the identification of the above genera and species.

A number of fungus gnats of the family Sciaridae were collected on recent expeditions to Campbell I. One described and 3 new species, representing 3 genera, are represented in this material. The recent works of Frey (1942, 1948) and Tuomikoski (1960) have provided a sound basis for clarification of the taxonomy of this family. Since sciarids can be transported easily it is possible that these species have been described elsewhere; however, after a careful study of the literature, 3 of these species appear to be new. The generic concepts of Tuomikoski, even though based chiefly on European material, are used in this paper. The types are to be deposited in the D. S. I. R., Nelson, New Zealand. The paratypes are to be distributed by Bishop Museum, Honolulu.

Methods: An adequate study of these flies requires several methods of specimen preparation. Specimens mounted on paper points and preserved in alcohol were studied for gross morphological and color characters; however, for detailed morphological studies, specimens of each species, if available, were slide mounted, using Euparal or Hoyer's mounting media. Hoyer's proved to be more satisfactory both in respect to optical properties and handling ease.

Measurements were made with the use of an ocular micrometer mounted in a compound microscope. Head: antennal and leg ratios were measured under low power (35×); 10 divisions on the ocular micrometer scale=.19 mm. The head measurement was taken from tip of the labrum to the top of the anterior ocellus. The leg ratio consists of length of femur, tibia, and basitarsus respectively. The tibial spur ratio consists of the measurement, in micrometer units under high power (440×), of each of the tibial spurs of the front, middle, and hind legs respectively. The ratios of the various wing veins were calculated under low power (250×), each 10 divisions=.135 mm.

The drawings are based on photographs taken of the slide mounted material; however, before completion, the drawings were compared with the original slide material, specimens preserved in alcohol, and specimens mounted in glycerine.

Acknowledgments: I am indebted to Dr. J. L. Gressitt for the opportunity of studying the Campbell Island sciarid fauna. I also wish to thank Dr. R. A. Harrison and Mrs. B. M. May for the loan of the type material of *Bradysia rubra* (Harrison). Dr. Frank R. Cole, Dr. R. L. Usinger, and Dr. P. D. Hurd were also kind enough to read and correct

the manuscript.

KEY TO GENERA AND SPECIES

1. Palpi 2-segmented; legs shortened; setae of apex of tibia$_I$ undifferentiated .... **Xylosciara brevipes**
   Palpi 3-segmented; apex of tibia$_I$ with well differentiated unilateral tibial comb; legs normally elongated 2
2. Wing reduced in both sexes, shorter than antenna ..... **Corynoptera subantarctica**
   Wing longer than antenna..... 3
3. Palpal segment 3 approximately 1/2 diameter of 1 & 2, and 2× as long as 2; ♂ genitalia basally with distinct tuft of setae; inner surface of clasper concave ..... **Bradysia rubra**
   Palpal segment 3 same diameter as 1 & 2, approximatey 1.5× as long as 2; ♂ genitalia basally without differentiated setae; inner surface of clasper straight to slightly convex..... **Bradysia campbellensis**

Xylosciara brevipes Steffan, n. sp. Fig. 1 a, b.

♀. *Head*: Eyes haired, eye-bridge with 2 rows of facets. Head/antennal ratio: 10 : 30. Antennae clothed with setae as long as or longer than width of flagellar segments; scape and pedicel globular, scape 2/3 size of pedicel, both with single band of setae; flagellar segments short with 2–3 bands of setae on each segment; flagellar segment 3, 3/4 as long as wide; 1st and terminal flagellar segments 2× as long as others. Front with patch of 8–10 setae; frontoclypeus bare. Labrum and labellum considerably reduced. Palpi 2-segmented (fig. 1B); segment 1 swollen, with 3 strong preapical setae; segment 2 reduced to short peg, with 2 apical setae. *Thorax*: Notum with weak bristles. Scutellum with 2 strong posterior median bristles and 4 weak laterals. Posterior pronotum bare; anterior pronotum with 3 setae: prothoracic episternum with 5 setae. Posterior dorsal angle of katepisternum slightly greater than 90°. Posterior extension of mesothoracic epimeron short. *Wings* (fig. 1A): 1.05 mm, 2× as long as antennae. Sc indistinct. Costa, R_1, and R_5 with macrotrichia; posterior veins bare and very faint. R_1 ending well before base of M-fork; costa ending approximately 3/4 distance between tips of R_5 and M_1. Ratio of base of M to r-m: 25 : 7. Halteres covered with dense pubescence and with sparse longitudinal row of setae. *Legs* short; leg ratio: anterior, 13 : 15 : 5; posterior: 19 : 20 : 8. Coxa$_{III}$ with 3 setae on dorsal surface. Tibia$_I$ without distinct setal arrangement at apex. Tibial spurs subequal, ratio: 25 : 20 : 20 : 20 : 20; hind tibial spurs slightly shorter than width of tibial apex. Abdomen sparsely covered with short setae; posterior segments weakly sclerotized.

This species is described from a single specimen, which is, unfortunately, a ♀; however, it is so distinct that I do not hesitate to name it. Relationships cannot be indicated until the ♂ is found. In Frey's key (1942) this species would key out to the genus *Cosmosciara*, which Tuomikoski places in the genus *Plastosciara* Berg sensu Tuomikoski. This species could possibly fit into the enlarged concept of this genus, but the ♀ characters indicate a closer relationship to *Xylosciara* Tuomikoski. The discovery of the ♂ should clarify this problem.

Holotype ♀ (D. S. I. R.), Tucker Cove, 4 m, Campbell I., Malaise trap, 27.XI–1.XII.1961, J. L. Gressitt.

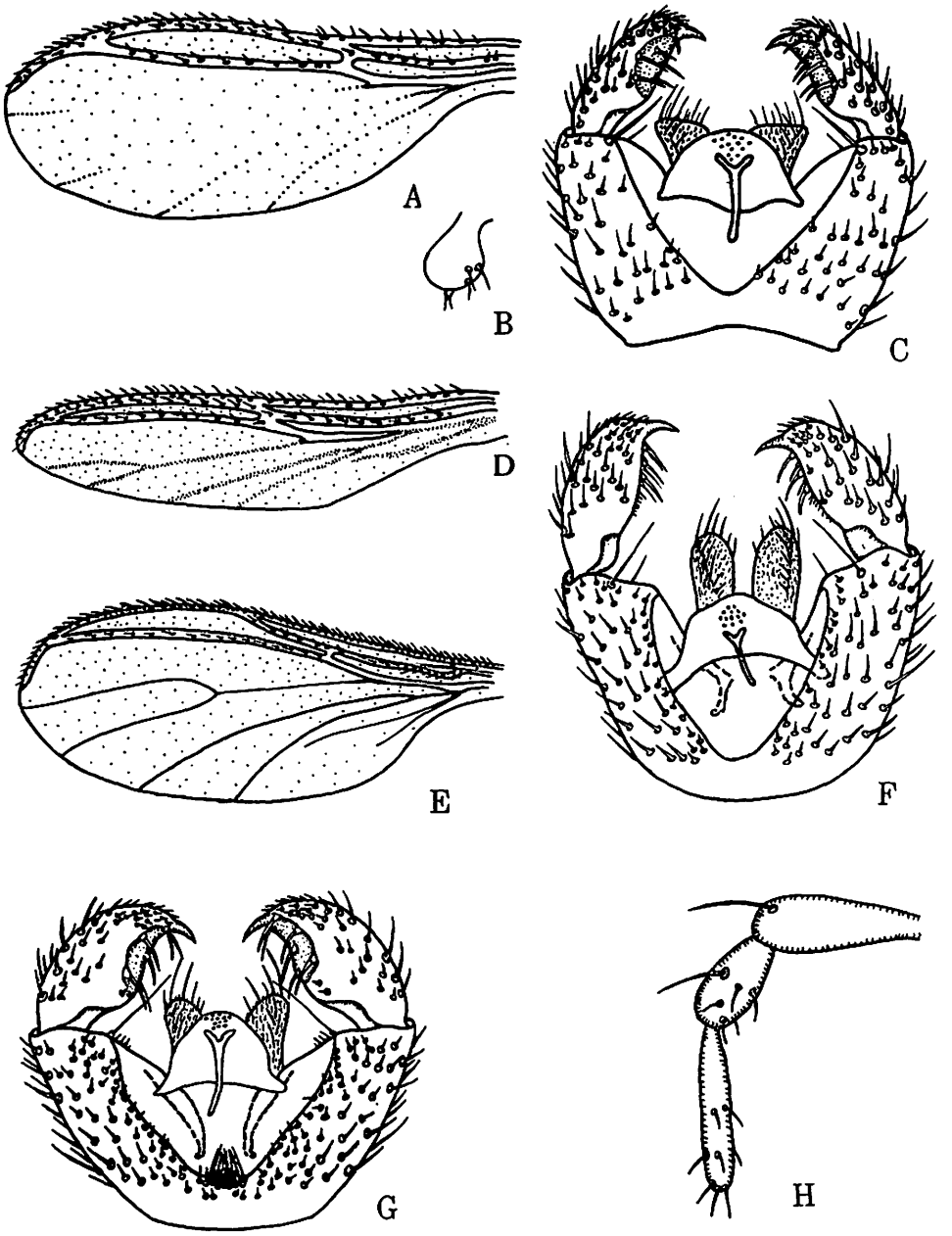

Fig. 1. A, *Xylosciara brevipes* n. sp., wing; B, same, palpus; C, *Corynoptera subantarctica* n. sp., ventral view of ♂ genitalia; D, same, ♂ wing; E, *Bradysia campbellensis* n. sp., ♂ wing; F, same, ventral view of ♂ genitalia; G, *B. rubra* (Harrison), ventral view of ♂ genitalia; H, same, palpus.

Corynoptera subantarctica Steffan, n. sp. Fig. 1 c, d.

♂. *Head* dark brown. Eyes haired, eye-bridge with 2–3 rows of facets. Antenna yellowish brown, thickly clothed with short setae; scape and pedicel globular, subequal; scape with a single diagonal row of 4–5 setae; pedicel with 2–3 rows of setae; flagellar segments subequal with slight decrease in length apically, segment 3, 2× as long as wide, neck 1/5 length of segment; terminal segment bullet-shaped, as long as flagellar segment 1. Front with patch of 16–20 setae; frontoclypeus with 2 median setae. Palpi 3-segmented; segments 1–2 subequal, 3 about 1.2× longer than 2; segment 1 with strong preapical seta and median dorsal group of 4–8 sensory pegs; segment 2 with 1 strong median seta and 3–5 shorter subapical setae; segment 3 with 2 apical and 1–2 subapical setae. Head/antennal ratio: 20 : 70. *Thorax* yellowish brown. Notum with strong dorsocentrals becoming weaker anteriorly; weak acrosticals; 3 strong supra-alars. Scutellum with 4 strong bristles, 2 outer ones 3/4 as long as 2 inner ones. Posterior pronotum bare; anterior pronotum with 1 strong and 2 weaker setae; prothoracic episternum with 4 weak setae. Posterior dorsal angle of katepisternum approximately 90°. *Wings* (fig. 1D) reduced: 1.52 mm, shorter than antennae. Sc faint to absent. Costa, R_1, and R_5 with macrotrichia, posterior wing veins bare. R_1 ending in costa well before base of M-fork. Costa ending approximately 1/2 distance between tips of R_5 and M_1. Ratio of r-m to M-petiole: 5 : 20; ratio of base of M to Cu-petiole: 20 : 10. Halteres brownish yellow, covered with minute hairs and a single row of strong setae. *Legs* brownish yellow; leg ratio: anterior, 20 : 25 : 12; posterior, 30 : 37 : 16. $Coxa_{III}$ with 6–8 setae on dorsal distal 1/2. $Tibia_I$ with unilateral apical tibial comb consisting of 8 setae separated from the shorter tibial setae by bare triangular area, 3 long setae immediately proximad of tibial comb. Tibial spurs subequal, ratio: 40 : 42 : 42 : 45 : 45; posterior spurs somewhat longer than width of tibial apex. *Abdomen* yellowish brown, covered with brown to black setae except sternites II and III which have only 1–10 setae in median portion of sclerites. *Genitalia* (fig. 1C): Tergite IX 3/4 as long as wide, uniformly bristled. Tergite X lobed, squared to slightly rounded at apex and densely haired with several long setae extending from apical margins of lobes. Claspers about 3× as long as wide; inner margin broadly concave on apical 1/2, with a single stout terminal spur; concave area bordered proximally by 4 strong bristles (equal to length of spur or longer), bordered distally by 2 strong bristles, 1 on each side of spur; 1 median bristle near center of concave area. Entire genital apparatus covered with bristles.

♀: Similar to ♂ except for genitalic differences and shorter antennae. Head/antennal ratio: 20 : 40. Penultimate flagellar segment as long as wide. Flagellar segment 3, 1.4× as long as wide.

In the 11 slide-mounted specimens measured the following variations were noted: Head: 1–2 setae on frontoclypeus; palpal segment 1 with 1–2 setae (usually 1). Legs: leg ratio: anterior, 20 : 22 : 10/20 : 25 : 12; posterior, 28 : 35 : 16/30 : 37 : 16. Wings: Costa ends 1/2–2/3 before tip of M_1; ratio of base of M to r-m: 20 : 5/20 : 10. Tibial spur ratio: 30 : 32 : 33 : 35 : 35/42 : 45 : 45 : 50 : 50.

This species fits in the group of *Corynoptera* (*C. blanda* group of Tuomikoski) which have a 3-rowed eye-bridge, normally veined wings and normal halteres, the shorter flagellar segments, 1 seta on palpal segment 1, and the claspers with the distinct terminal spurs and concave areas. It differs from other members of this group in the possession of a rather distinct tibial comb. In Frey's 1942 key it would be placed in the genus *Bradysia*. This

species differs from all others of this region by the greatly reduced wings of both sexes.

Holotype ♂ (D. S. I. R.), Beeman Beach, Campbell I., *Bulbinella*, *Poa*, turf, moss, 11–15. XII. 1961, J. L. Gressitt; allotype ♀, Courrejolles Penin., 200 m, Campbell I., in mollymawk nest, 14. XII. 1961, Gressitt. The following series of paratypes are all from Campbell I.: 3♀♀, Tucker Cove, 4 m, Malaise trap, 1–3.XII.1961, Gressitt; 2♀♀, Tucker Cove, 1–50 m, 1–5. XII. 1961, Gressitt; 1♂, 1♀, Tucker Cove, 1–50 m, Berlese of moss, 21–25. XI. 1961, Gressitt; 1♀, Beeman Camp, 20–30 m, *Dracophyllum*, 12.XII.1962, K. P. Rennell; 1♂, Beeman Camp, 15 m, 13. II. 1962, Rennell; 1♂, Beeman Camp, 2–50 m, Berlese of debris on beach, 12–17.XII.1961, Gressitt; 1♂, Beeman Camp, 2–50 m, *Poa*, 18–21.XII.1961, Gressitt; 2♀♀, St. Col Ridge, 180–280 m, *Bulbinella* and *Coprosma*, 7. XII. 1961, Gressitt; 1♂, St. Col Ridge, 180–280 m, Berlese of moss on rocks, 24, 26, 30. XI. 1961, Gressitt; 1♀, Mt. Azimuth, 350–450 m, 14. XII. 1961, Gressitt; 1♂, Shoal Pt., 7. II. 1963, K. A. J. Wise; 1♂, Lookout Bay, Perseverance Harbor, Berlese of leaf mold under tussock, 3. II. 1963, Wise; 1♀, Mt. Dumas above 400 m, 6. II. 1963, Wise.

Bradysia campbellensis Steffan, n. sp. Fig. 1 e, f.

♂: *Head* dark brown. Eyes haired, eye-bridge with 3–4 rows of facets. Antenna brown, thickly clothed with short setae; scape and pedicel globular, subequal; scape with diagonal row of 4–5 setae 2× as long as those of pedicel; pedicel with 2–3 horizontal rows of setae; flagellar segments subequal throughout; 3rd segment 2.1× as long as wide, neck 1/5 length of segment; terminal segment as long as or longer than flagellar segment 1. Front with patch of 18 setae; frontoclypeus with 1 median seta situated dorsally. Palpi 3-segmented, segments 1 & 2 subequal, segment 3 about 1.5× longer; segment 1 with 1 strong preapical seta and median dorsal group of 18–20 sensory pegs enclosed in a relatively distinct pit; segment 2 with 2 preproximal, 2 strong median, and 4 preapical setae; segment 3 with 2 apical and 4 subapical setae. Head/antennal ratio: 20 : 75. *Thorax* brown. Notum with strong dorsocentrals becoming slightly weaker anteriorly; weak acrosticals; 5 strong supra-alars. Scutellum with 2 strong bristles and 6 weak laterals in 2 rows. Posterior pronotum bare: anterior pronotum with 1 strong and 2 weak setae; prothoracic episternum with 5 strong setae. Posterior dorsal angle of katepisternum approximately 100°. *Wing* (fig. 1E): 2.18 mm, approximately 1.5× longer than antenna. Sc indistinct. R_1 ends approximately 1/2–3/4 distance of r-m before base of M-fork. Costa ends approximately 3/4 distance between tips of R_5 and M_1. Costa, R_1, and R_5 with macrotrichia, posterior wing veins bare. M-petiole weak to absent. Ratio of r-m to M-petiole: 30 : 110; ratio of base of M to Cu-petiole: 35 : 20. Halteres yellowish brown with dense pubescence and single longitudinal rows of setae. *Legs* brownish yellow; leg ratio: anterior, 27 : 31 : 16; posterior, 35 : 46 : 20. $Coxa_{III}$ with 4 strong and 4 weaker setae on dorsal distal 1/2. $Tibia_I$ with unilateral apical comb consisting of 8 setae separated from shorter tibial setae by bare triangular area, 2–3 setae immediately proximad of tibial comb. Tibial spurs almost subequal, ratio: 40 : 40 : 50 : 55 : 60. *Abdomen* dark brown, covered with light brown to brown setae except sternites I, II, and III which are bare on at least anterior 1/2. Tergite VIII bordered posteriorly by 2 rows of setae. *Genitalia* (fig. 1F): Tergite IX about 3/4 as long as wide, uniformly bristled except for 3 long bristles on posterior margin. Tergite X lobed, rounded at apex, covered with dense hairs and several long setae on apical margins. Inner edge of apex of basiforceps with long, whip-like hair extending posteriorly 1/2 length of clasper. Claspers approximately 2× as long as wide, inner margin straight to slightly

convex, with stout terminal spur; 6 long (longer than spur) bristles on inner, upper 1/2 of clasper in 2 rows. Ventral base of genitalia without distinct tuft of setae.

♀: Similar to ♂ except for genitalic differences and the following characters. Head/antennal ratio: 20 : 50; flagellar segment 3, 1.6× longer than wide. Two setae on frontoclypeus. Wing length 2.08 mm. Leg ratio: anterior, 23 : 25 : 12; posterior, 30 : 39 : 17.

In 20 slide-mounted specimens the following variations were noted. Head: 1–3 setae on frontoclypeus; palpal segment 1 with 1–2 setae. Wings: length, 1.9/2.28 mm; Costa ends 2/3–3/4 distance between tips of R_5 and M_1; ratio of r-m to base of M: 34 : 42/35 : 57. Leg ratio: anterior, 23 : 25 : 12/30 : 36 : 20; posterior, 30 : 39 : 17/40 : 55 : 25.

This species belongs to the genus *Bradysia* Winnertz sensu Tuomikoski (1960) by virtue of possession of the following characters: eyes hairy; maxillary palpi 3-segmented, segment 1 with sensory pegs contained in a distinct pit; posterior pronotum bare; $tibia_I$ with distinct apical comb; spurs of $tibia_{II}$ and $tibia_{III}$ subequal; wing veins M and Cu without macrotrichia. *B. campbellensis* appears to fit in Tuomikoski's group F (*B. bicolor* group). It can be distinguished easily from *B. rubra* (Harrison) by the shorter and thicker palpal segment 3 and the character of the ♂ genitalia (absence of basal patch of setae and flat or slightly convex inner surface of clasper).

Holotype ♂ (D. S. I. R.), Tucker Cove, 4 m, Campbell I., Malaise trap, 27. XI–1. XII. 1961, Gressitt; allotype ♀, Tucker Cove, 4 m, Campbell I., Malaise trap, 1–3. XII. 1961, Gressitt. The following series of paratypes are all from Campbell I.: Tucker Cove, 4 m, Malaise trap, Gressitt: 6♂♂, 6♀♀, 27. XI–1.XII.1961; 15♂♂, 10♀♀, 1–3. XII. 1961; 1♂, 8♀♀, 3–5. XII. 1961; 3♂♂, 3♀♀, 5–8. XII. 1961; 1♂, 10♀♀, 16–18.XII.1961; 1♂, 6♀♀, 18–21. XII. 1961. Tucker Cove, 1–50 m Gressitt: 1♂, 21–25. XI. 1961; 1♂, 26–30. XI. 1961; 2♂♂, 1♀, 1–5. XII. 1961; 2♀♀, 6–11. XII. 1961. 1♀, Beeman Hill, 2–50 m, 21–25.XI.1961, Gressitt; 7♂♂, Lookout Bay Beach, 16–19.XII.1961, Gressitt; 1♂, 1♀, Northwest Bay area, 5. II. 1963, Wise.

Bradysia rubra (Harrison), n. comb. Fig. 1 g, h.

Sciara rubra Harrison, 1955, Rec. Dom. Mus. 2 (4): 213.

♂: *Head* brown to reddish brown. Eyes short haired, eye-brige with 3 rows of facets. Antennae brown; scape and pedicel globular, subequal; scape with diagonal row of 4–5 setae, all except one, which is about 2× as long, same size as setae of pedicel; pedicel with 2–3 rows of setae; flagellar segments subequal throughout; flagellar segment 3, 2.5× as long as wide, neck about 1/6 length of segment; terminal flagellar segment as long as or slightly longer than flagellar segment 1. Front with patch of 18–20 setae; frontoclypeus with 1 dorsal seta. Palpi (fig. 1H) 3-segmented; segments 1 & 3 subequal, 3, 1/2 diameter of 1 & 2, 2 about 1/2 as long as 1; segment 1 with 1 strong preapical seta almost as long as segment 2, also with 18–20 sensory pegs in median dorsal area; segment 2 with 1 long median seta and 5 weaker setae on distal 1/2; segment 3 with 3 apical and 5 median-subapical setae. Head/antennal ratio: 20 : 80. *Thorax* brown to reddish brown. Notum with 2 strong dorsocentrals, anterior dorsocentrals weaker; acrosticals weak; 4–5 strong supra-alars. Scutellum with 2 strong median posterior bristles and 6 or more weak laterals. Posterior pronotum bare; anterior pronotum with 4–6 setae; prothoracic episternum with 8 setae. Posterior dorsal angle of katepisternum slightly greater than 90°. *Wing* 2.37 mm, about 1.5× as long as antenna. Sc present but weak. R_1 ends about length of r-m from

base of M-fork. Costa ends approximately 3/4 distance between tips of R_5 and M_1. Costa, R_1, and R_5 with macrotrichia; posterior wing veins bare. M-petiole weak to absent. Ratio of r-m to M-petiole: 35 : 115; ratio of base of M to Cu-petiole: 45 : 35. Halteres brown, lighter at base, with dense pubescence and single longitudinal row of setae. *Legs* brown; leg ratio: anterior, 30 : 38 : 20; posterior, 40 : 55 : 22. $Coxa_{III}$ with 4–6 setae on dorsal distal 1/2. $Tibia_I$ with unilateral tibial comb consisting of 8 setae separated from shorter tibial setae by bare triangular area, 3 setae immediately proximad at comb. Tibial spurs almost subequal, ratio: 55 : 55 : 70 : 75 : 75. Posterior tibial spurs longer than width of apex of tibia. *Abdomen* brown to reddish brown, covered with brown to black setae except for sternites I, II, and VIII which have setae only on margins. Median 1/2 of tergite VIII bare. *Genitalia* (fig. 1G): tergite IX 1/2–2/3 as long as wide, setae somewhat denser near lateral margins, apical area bare. Tergite X lobed, gently rounded, covered with dense short hairs and several long setae around posterior margins. Inner apical margin of basiforceps with single long whip-like seta extending to middle of clasper. Clasper about 2× as long as wide; inner margin strongly concave on distal 1/2; concave area bordered by 6 long tuberculed bristles and one stout terminal spur. Ventral base of genitalia with distinct tuft of setae. Claspers and basiforceps uniformly covered with long and short setae.

♀: Similar to ♂ except for genitalic differences and the following characters. Palpal segment 1 with 1–2 setae, sensory area more distinctly bordered; palpal segment 2 with 8–10 setae; 3 with 7 median-subapical setae.

In 20 slide-mounted specimens studied the following variations were noted. Head/antennal ratio: 20 : 75/20 : 80. Zero–2 setae on frontoclypeus. Palpal segment 2: ♂, 5–6 setae; ♀, 7–10 setae. Six–8 setae on prothoracic episternum. Leg ratio: anterior, 26 : 31 : 17/30 : 40 : 20; posterior, 35 : 45 : 20/41 : 60 : 25.

This redescription is based on the large series of specimens listed below. I have compared these specimens with the types and find them to be the same. The types are damaged but the key structures are present. This species also belongs to the *B. bicolor* group of Tuomikoski. It differs from the preceding species (*B. campbellensis*) by the much longer and more slender palpal segment 3, the more numerous setae on palpal segment 2, and the ♂ genital characters; especially the tuft of setae at the ventral base of the genitalia and the concave inner surface of the claspers.

Holotype, allotype & paratypes in D. S. I. R., from Campbell I., 1943, J. H. Sorensen; Additional records all from Campbell I.: Tucker Cove, 4 m, Malaise trap, Gressitt: 2♂♂, 4♀♀, 27. XI–1. XII. 1961; 8♂♂, 1–3. XII. 1961; 2♀♀, 3–5. XII. 1961; 1♂, 1♀, 5–8. XII. 1961; 4♂♂, 16–18. XII. 1961; 2♂♂, 18–21. XII. 1961. 1♂, 1♀ Tucker Cove, 1–50 m, *Poa*, 21–25. XII. 1961, Gressitt; 3♀♀, Tucker Cove, 0–100 m, sedge, 7. VIII. 1962, Rennell; 1♂, Tucker Cove, 1–50 m, 6–11.XII.1961, Gressitt; 1♀, Tucker Cove, 4 m, 26–30.XI.1961, Gressitt; 2♀♀, Lookout Bay Beach, 16–19.XII.1961, Gressitt; 1♀, Perserverance Harbor, 2 m, 25.VII.1962, Rennell; 1♀, Moubray Hill, 200 m, 12.XII.1961, Gressitt; 2♀♀, Beeman Camp, 2–50 m, *Bulbinella*, 26–30. XI. 1961, Gressitt; 1♂, 1♀, Beeman Camp, 2–50 m, *Poa*, 12–17. XII. 1961, Gressitt; 1♀, Beeman Camp, 30 m, flowering *Dracophyllum*, 3.VIII.1962, Rennell; 1♀, Beeman Camp, 100–150 m, *Coprosma*, 3. VIII. 1962, Rennell; 1♀, St. Col Ridge, 180–280 m, *Bulbinella*, 7. XII. 1961, Gressitt; 1♀, Tucker, Cove—St. Col Ridge, 30. XI. 1961, Gressitt; 1♀, Beeman Hill, 100–180 m, 2.XII.1961, Gressitt; 1♀, Beeman Lookout, 19.XII.1961,

Gressitt; 1♂, St. Col Ridge, 180–280 m, lichens on *Dracophyllum*, 4, 7, 8, 13. XII. 1961, Gressitt; 1♂, Beeman Camp, 30 m, sedge, 27. VII. 1962, Rennell; 1♂, Mt. Lyall, 150 m, on fern, 3.XII.1961, Gressitt; 1♂, Lookout Bay Beach, sedge: *Carex trifida*, 3.XII.1961, Gressitt; 1♂, Shoal Pt., bank of stream, 7. II. 1963, Rennell.

Discussion: One other species, *Sciara annulata* Meigen, has been recorded from Campbell I.; however, the specimen is a ♀ and the record should be questioned. Tuomikoski (1960) has synonymized *Sciara annulata* Meigen under *Sciara hyalipennis* Meigen which he in turn designated as type of his genus *Ctenosciara*. I have compared the descriptions of this species with that of *S. annulata*, Tonnoir and Edwards (1927) and do not think they are the same. This problem will remain obscure until the material of Tonnoir and Edwards can be examined and compared with the European material.

A worthwhile project for a worker in the New Zealand-Australian region would be to revise the Sciaridae of this area, including the Sciaridae of Campbell I. and Macquarie I. (Colless, 1962), in the light of the new and sounder concepts made available by Frey and Tuomikoski.

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INSECTS OF CAMPBELL ISLAND.
DIPTERA: CECIDOMYIIDAE

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Specimens of Cecidomyiidae from Campbell I. were taken by J. L. Gressitt during Dec. 1961 and include representatives of 2 new gall midges. One belongs to the genus *Cordylomyia* Felt, the other to the genus *Holoneurus* Kieffer. There is a 3rd species which seems to belong to the tribe Cecidomyiariae but these are not in good enough condition for identification. I wish to express my thanks to J. L. Gressitt, L. W. Quate and C. M. Yoshimoto for their aid and advice.

Genus **Cordylomyia** Felt

Cordylomyia Felt, 1911: 35; 1913: 194.—Kieffer, 1913b: 295.—Felt, 1926: 266.—Edwards, 1938: 199.—Pritchard, 1947: 29.

Prosaprionus Kieffer, 1913a: 54; 1913b: 300 (type species *Prosaprionus cellularis* K.; synonymy after Edwards, 1938).

Type species: *Cordylomyia coprophila* Felt.

Genus characterized by flagellate antennal segments bearing 1 or 3 crenulate whorls of short stout, usually recurved spines or sometimes very long bristles in ♂, ♀ usually with 11 or 12 antennal segments, occasionally more or less, without crenulate whorls. Palpus 4-segmented, eye bridge often well developed, ♂ genitalia with basistyle broadly united below.

Cordylomyia gressitti Yukawa, n. sp. Fig. 1.

This species is distinguished from other members of the genus by: 14 antennal segments in both sexes, claws about 2× length of pulvilli, ♂ genitalia with spines arising from tuberculate bases at apex of dististyle.

♂: Predominantly dark brown. Antenna nearly as long as body, 14-segmented, haired dark brown, antennal segment 1 slightly longer than wide, segment 2 globose, segment 3 (or flagellar segment 1) elongate, last segment slightly reduced, tapering to a subacute apex, other segments with stem about 2/3 length of base, base about 1.5× as long as wide and with 3 crenulate whorls of long curved bristles, 1 complete at middle and 2 on upper 1/2, incomplete. Palpus 4-segmented, brown with few setae, segment 1 roundish large, 2 elliptical, 3 slightly longer than 2, segment 4 about 1/3 longer than 3. Thorax dark brown on dorsum, brown on sides. Legs dark brown. Claws simple, bent at nearly right angle, about 2× length of pulvilli. Wings sparsely haired, vein M rudimentary, obsolete distad and

varied in length in each specimen. Abdomen dark brown. Genitalia as figured, dististyle curved slightly, 2× as long as wide, very hairy on inner surface and some spines arising from tuberculate bases at apex, basistyle broad, terminal tergum broadest in middle, caudal margin shallowly concave with scattered setae. Wing length: 1.5–1.9 mm.

♀: Colored like ♂ and almost same size, with 14 antennal segments, flagellar segments tapering, subsessile, without crenulate whorls as in ♂, subbasal whorl sparsely haired, nearly 2× longer than middle whorl, subapical short, scattered. Two equal ovoid spermathecae brown, about 0.09 mm maximum diameter; 0.06 mm minimum one, duct not visible.

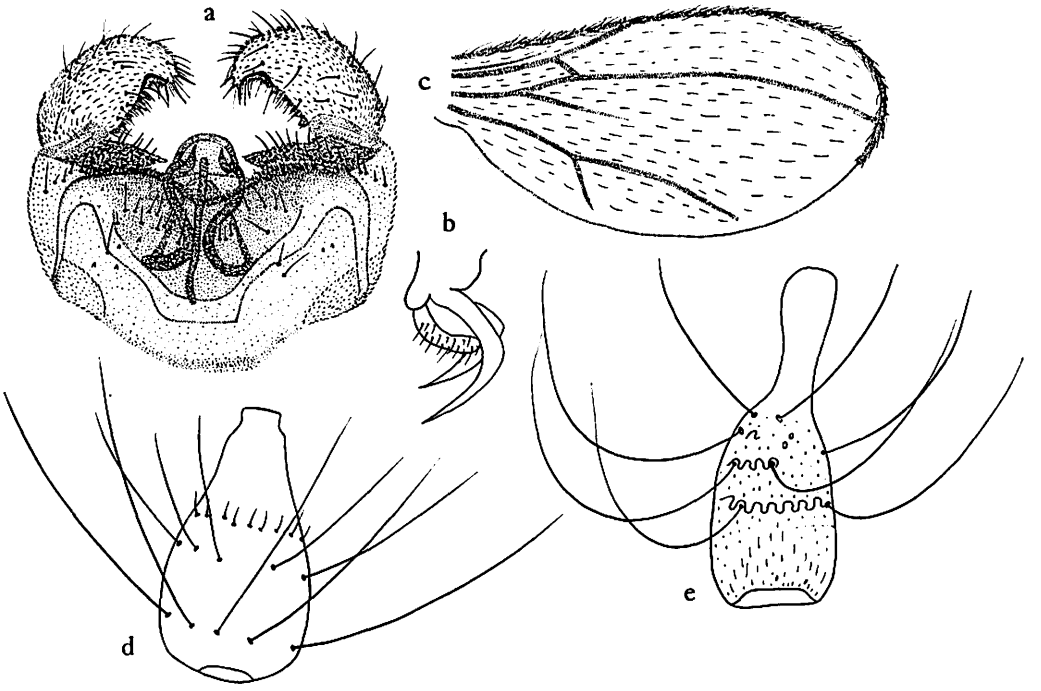

Fig. 1. *Cordylomyia gressitti*, n. sp. a, ♂ genitalia; b, ♂ claw and pulvilli; c, ♂ wing; d, ♀ flagellar antennal segment; e, ♂ flagellar antennal segment.

Holotype ♂ (on slide) (D. S. I. R., Nelson), Campbell I.: Tucker Cove, 4 m, Malaise trap, 16–18. XII. 1961, J. L. Gressitt. Allotype ♀ (on slide) (Bishop 3607) same data. Paratypes: 1♂ (on paper point), 2♀ (1 on slide, 1 on paper point), same data.

This genus has been recorded hitherto only from North America and Europe. From a study of the above specimens it is clear that this species belongs to the genus *Cordylomyia* and the occurrence on Campbell I. is a considerable extension of the range of the genus.

Genus **Holoneurus** Kieffer

Holoneura Kieffer, 1894: 316.
Holoneurus Kieff., 1895: 115; 1896: 15; 1897: 43.—Felt, 1908: 420; 1911: 41.—Kieffer,

1913b: 264.—Felt, 1916: 188; 1919: 287.—Foote, 1956: 49.—Marikovskii, 1958: 1884.

Type species: *Holoneurus cinctus* (Kieffer).

This genus has crossvein nearly parallel to costa, 3 long veins, vein Cu simple, claws simple or sometimes with tooth, as long as or longer than pulvilli, palpus 4-segmented, ♂ dististyle with small apical claw.

Holoneurus aliculatus Yukawa, n. sp. Fig. 2.

This species is closely allied to *H. elongatus* Felt a North American species, but distinguished by its rather slender dististyle with 2 small teeth apically in ♂ genitalia and flagellate antennal segments with base about 1.3× as long as wide. ♀ wing reduced.

♂. Antenna 16-segmented, slightly dark brown, sparsely haired, flagellar segments with stem about 2× length of base, base about 1.4× as long as wide, terminal segment 3× as wide, tapering, pedicel roundish, segment 1 larger than 2. Palpus 4-segmented, brown, with few setae, segment 1, 2× as wide, 2 about 1.3× longer than 1, 3 about 1.3 longer than 2, 4 about 1.5 as long as 3. Thorax brown on dorsum, brown to yellowish brown on sides. Legs slightly dark brown, claws simple, curved about 1.8 longer than pulvilli. Wing with

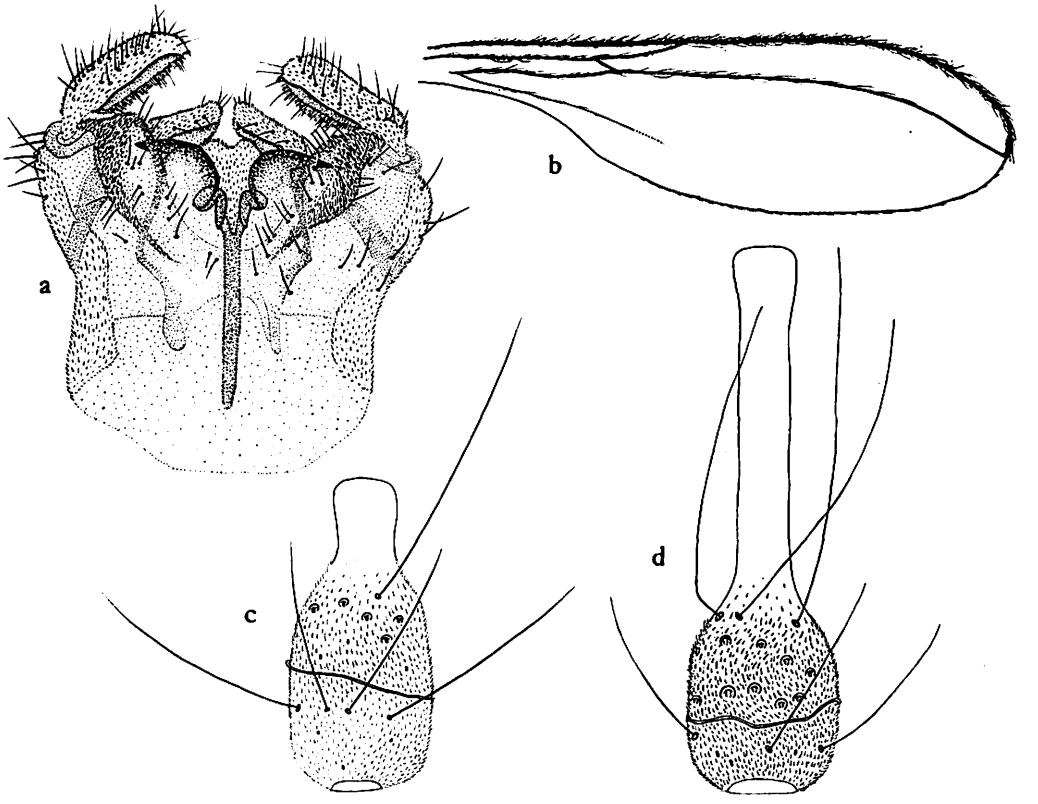

Fig. 2. *Holoneurus aliculatus*, n. sp. a, ♂ genitalia; b, ♂ wing; c, ♀ flagellar antennal segment; d, ♂ flagellar antennal segment.

crossvein nearly parallel to costa, 3 long veins, vein Cu simple, rudimentary distally. Abdomen brown to yellowish brown. Genitalia as figured, dististyle rather slender, 3× longer than wide, very hairy on inner surface and with two small teeth apically. Wing length: 1.9–2.2 mm.

♀. Colored like ♂, antenna 13-segmented, flagellar segments slightly more slender than in ♂, tapering with stem about 1/3 length of base, base about 1.8× as long as wide and sparsely haired, last segment slightly reduced, tapering. Wing greatly reduced, to mere flaps without distinct venation. Spermathecae globular, colorless, about 0.11 mm in diameter, duct distinct and very long. Wing length: 0.30–0.34 mm.

Holotype ♂ (on slide), (D.S.I.R., Nelson), Campbell I.: Beeman Hill, 100–180 m, *Pleurophyllum* leaf mold, 2–6.XII.1961, J. L. Gressitt. Allotype ♀ (on slide) (BISHOP 3608), same data. 2 paratypes: ♂ (on paper point), Campbell I.: Moubray Hill, 200 m, 12.XII. 1961, Gressitt; ♀ (on slide), Campbell I.: Beeman Hill, 100–180 m, 2–6.XII.1961, Gressitt.

At least 7 species of the genus are known from Europe, 5 from North America and 1 from Panama. The above species extends the range of the genus to Campbell I.

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INSECTS OF CAMPBELL ISLAND. DIPTERA[1]

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Abstract: This paper presents records of 45 species of 14 families of Campbell Island Diptera. Eight new species are described in 5 families, and several other species are newly recorded. Six species previously recorded from the island are lacking in the new collections.

This report is on the majority of the Diptera collected mainly by Bishop Museum during 1961 and 1963. Families not dealt with here are being reported on by other workers.

All holotypes are deposited in the collection of the Entomology Div., D. S. I. R., Nelson, New Zealand. Paratypes and duplicates are shared, as numbers permit, between the following institutions: B. P. Bishop Museum, Hawaii; Dominion Museum, Wellington, N. Z.; Entomology Div., Nelson, N. Z.; Lincoln Coll., Canterbury, N. Z.; Canterbury Museum, Christchurch, N. Z.; British Museum (Nat. Hist.), London; U. S. National Museum, Washington; C. S. I. R. O., Canberra, Australia; and the California Academy of Sciences. Specimens collected by C. M. Clark and J. Sorensen are Dominion Museum material. Specimens designated with an (*) in the text are preserved in alcohol.

I wish to thank Dr. Gressitt for giving me the opportunity of examining this large collection and to acknowledge the help of Mr. H. Oldroyd and Dr. P. Freeman, British Mus. (Nat. Hist.), in comparing some specimens with the type material.

Family SIMULIIDAE

Austrosimulium vexans (Mik)

SPECIMENS EXAMINED: Lookout Bay, Perseverance Harbor, sweeping, 3. II. 1963, 4 ex, Wise. Shoal Pt., shore, 7. II. 1963, 7 ex, Wise. Tucker Cove, 4 m, malaise trap, 27. XI–1. XII. 1961, 1 ex; 1–3. XII. 1961, 1 ex; 5–8. XII. 1961, 1 ex; 12–17. XII. 1961, 1 ex; 16–18. XII. 1961, 4 ex; 18–21. XII. 1961, 1 ex, Gressitt; 1–50 m, streamrocks, 1–5. XII. 1961, 1 larva, Gressitt.

Family MYCETOPHILIDAE

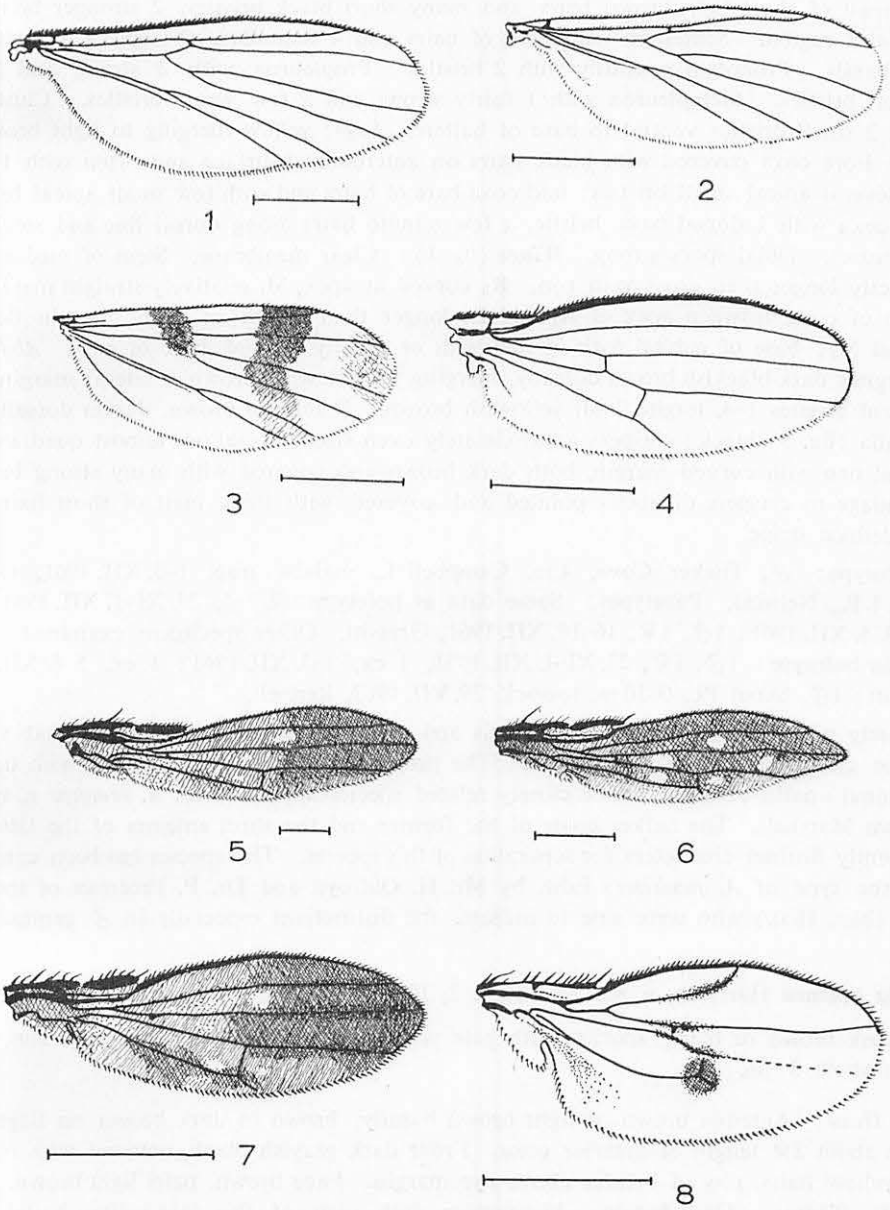
Allodia antennata Harrison, n. sp. Figs. 1, 9.

A yellowish brown species with darker brown markings dorsally. Body length about 3.5

1. Results of field work supported by the National Science Foundation grants G-18800 & G-23720 from the U. S. Antactic Research Program.

mm, wing length about 3.5 mm.

♂, ♀. *Head*: Antenna yellow basally, flagellum brown; about 2.5× length of anterior



Figs. 1–8. Wings. 1, *Allodia antennata*; 2, *A. brunnea*; 3. *Mycetophila campbellensis*; 4, *Heloclusia brevicaudata*; 5, *Scatella brevis*; 6, *S. acutipennis*; 7, *S. nitidifrons*; 8, *Leptocera rennelli*. Scale: figs. 1, 2, 3, 4, 7, 8: 1 mm; figs. 5, 6: 0.2 mm.

coxa. Front dark brown covered with even matt of light brown hairs, about 3 bristles above eye and small bristles along anterior margin of front. Face pale yellow, palpi pale yellow. Eyes covered with short hairs. *Thorax*: Mesonotum and scutellum brown dorsally merging to yellow laterally, lateral pleurites yellow or light brown. Mesonotum covered with matt of short light brown hairs and many short black bristles, 2 stronger bristles at post alar region. Scutellum with matt of hairs and 4 scutellars, the apical pair stronger than basals. Pronotum generally with 2 bristles. Propleuron with 2 strong and 1 or 2 weaker bristles. Metapleuron with 1 fairly strong and a few weak bristles. Cluster of about 2 small bristles ventral to base of haltere. *Legs*: yellow merging to light brown on tarsi. Fore coxa covered with black hairs on anterodorsal surface and often with 1 basal and several apical small bristles; mid coxa bare of hairs and with few small apical bristles; hind coxa with 1 dorsal basal bristle, a few minute hairs along dorsal line and small apical bristles. Tibial spurs strong. *Wings* (fig. 1): Clear membrane. Stem of median fork distinctly longer than cross vein r-m. R_5 curved at apex, M_1 relatively straight making the length of costa between apex of R_1 and R_5 longer than length of wing margin between R_5 and M_1; base of cubital fork in line with or usually beyond base of r-m. *Abdomen*: ♂ tergites dark blackish brown dorsally, merging to yellowish brown at lateral margin especially of tergites 1–4, tergite 7 all yellowish brown. ♀ tergites brown, darker dorsally. ♂ genitalia (fig. 9) black; claspers approximately even sized, dorsal one almost quadrangular, ventral one with curved margin, both dark brown and covered with many strong bristles; appendage to claspers distinctly pointed and covered with thick matt of short hairs in a well defined stripe.

Holotype: ♂, Tucker Cove, 4 m, Campbell I., malaise trap, 1–3. XII. 1961, Gressitt (D. S. I. R., Nelson). Paratypes: Same data as holotype: 2♂♂, 27. XI–1. XII. 1961; 1♂, 1♀, 3–5. XII. 1961; 1♂, 1♀, 16–18. XII. 1961, Gressitt. Other specimens examined: Same data as holotype: 1♂, 1♀, 27. XI–1. XII. 1961, 1 ex, 1–3. XII. 1961; 1 ex, 5–8. XII. 1961, Gressitt; 1♂, Shoal Pt., 0–10 m, tussock, 29. VII. 1962, Rennell.

Closely related to *A. quadriseta* Edwards and most readily separated from that species by the characters of the ♂ genitalia. The propleural bristles are usually 2 with up to 2 additional smaller bristles. Other closely related species appear to be *A. brunnea* n. sp. and *A. flava* Marshall. The darker color of the former and the short antenna of the latter are sufficiently distinct characters for separation of this species. This species has been compared with the type of *A. quadriseta* Edw. by Mr. H. Oldroyd and Dr. P. Freeman of the Brit. Mus. (Nat. Hist.) who were able to indicate the distinctions especially in ♂ genitalia.

Allodia brunnea Harrison, n. sp. Figs. 2, 10.

A dark brown or black species with pale yellow legs. Body length about 3 mm, wing length about 3 mm.

♂. *Head*: Antenna brown or light brown basally, brown to dark brown on flagellum; length about 2× length of anterior coxa. Front dark grayish black, covered with matt of pale yellow hairs, row of bristles above eye margin. Face brown, palpi light brown. Eyes haired. *Thorax*: Dark brown. Mesonotum with matt of fine pale yellow hairs, small black bristles over most of surface, the 3 or 4 at postalar region strong. Scutellum with few fine pale hairs and 4 scutellar bristles, the basal pair just smaller than apicals. Pro-

notum with 2 fairly strong bristles. Propleuron with usually 3 bristles. Metapleuron with 1 fairly strong bristle and 2 or 3 smaller more dorsal bristles. One or 2 bristles ventral to base of haltere. *Legs*: All coxa brown at extreme basal region; fore coxa with light colored hairs, small black bristles irregularly along posterodorsal margin and at apex; mid coxa with a bristle and few hairs apically; hind coxa with 1 dorsal basal and 1 dorsal apical bristle and few hairs apically and sometimes about dorsal margin. Tibial spurs strong. *Wings* (fig. 2): Clear membrane. Similar to *A. antennata* n. sp. except R_5 not so curved at apex and base of cubital fork in line with or before base of r-m. *Abdomen*: Dull black or dark brown. Segment 7 slightly glossy black. ♂ genitalia (fig. 10): Claspers uneven in size, brown: dorsal clasper about 1.5× length of ventral and with smooth rounded apex, ventral clasper almost rectangular in shape; both claspers with strong bristles, those on dorsal clasper strongest; clasper appendage rod shaped and rounded at apex.

Holotype ♂, Tucker Cove, 4 m, Campbell I., Malaise trap, 1–3. XII. 1961, Gressitt (D. S. I. R.). Paratypes: Same data as holotype, 5♂♂: 27. XI–1. XII. 1961, 4♂♂; 5–8. XII. 1961, 2♂♂; 16–18. XII. 1961, 5♂♂; 18–21. XII. 1961, 1♂, Gressitt. Beeman Camp, 2–50 m, *Poa* by stream, 26–30. XI. 1961, 1♂, Gressitt. Other specimens examined: Shoal Pt., 6. IX. 1962, 1♀(*), Clark. Tucker Cove, 4 m, Malaise trap, 27.XI–1. XII. 1961, 2♂♂, 1♀; 1–3. XII. 1961, 1♂, 4♀♀; 3–5. XII. 1961, 1♀; 5–8. XII. 1961, 1♂, 2♀♀; 16–18.XII.1961, 2♂♂, 4♀♀, Gressitt.

Separated most readily from *A. antennata* n. sp. by the general dark coloration, the relatively shorter antenna and distinct differences in size of clasper and shape of appendage, and from *A. flava* Marshall by the darker color and relatively long antenna. The ♀ of this species has the same dark appearance as the ♂ with brown abdominal segments on posterior margin. From the series of specimens available in the genus *Allodia* it has not always been possible to separate ♀♀ and connect them with appropriate ♂♂ to the degree of certainty required to establish some of them as paratypes of this species.

Exechia hiemalis (Marshall)

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Poa*, 26–30. XI. 1961, 2♀♀, Gressitt; 15–50 m, sedge, 2. VIII. 1962, 1♂, Rennell. Beeman Hill, swept ex tussock and sedge, 2. II. 1963, 1♂, 1♀, Wise. Beeman Pt., sweeping, 28. II. 1963, 1♂, Wise. Shoal Pt., 0–10 m, tussock, 29. VII. 1962, 1♂, Rennell. Tucker Cove, 1–50 m, 21–25. XI. 1961, 1♂; *Coprosma*, 1–5. XII. 1961, 1♂; in house, 1–5. XII. 1961, 1♂, 1♀; 4 m, Malaise trap, 27.XI.1961, 23♂♂, 31♀♀; 1–3. XII. 1961, 7♂♂, 26♀♀; 3–5. XII. 1961, 3♂♂, 2♀♀; 5–8. XII. 1961, 4♂♂, 6♀♀; 16–18. XII. 1961, 9♂♂, 12♀♀; 18–21. XII. 1961, 1♂, Gressitt; 0–100 m, sedge, 7. VIII. 1962, 1♂, Rennell.

Mycetophila campbellensis Harrison, n. sp. Fig. 3.

A reddish brown species with yellow and light brown legs and distinct wing pattern. Body length about 2.75 mm, wing length about 2.75 mm.

♂, ♀. *Head*: Antenna yellowish brown basally, browner towards apex, about 2.25× length of anterior coxa. Front dark brown. Face light brown; palpi light reddish brown. Eyes haired. *Thorax*: Mesonotum and pleurites dark reddish brown. Mesonotum with matt of small light colored hairs, bristles around margin strongest at posterior lateral corners.

Scutellum with a few minute hairs and 4 strong marginal bristles. Two or 3 small bristles on pteropleurite and other very small hairs. *Legs*: Fore coxa with matt of small hairs and a few bristles on posterior margin and at apex. Mid and hind coxa bare and distinctly dark brown at apex. Mid tibia with 2 anterodorsal bristles, 5 posterodorsals, one of these apical, 2 ventral bristles (of these the mid ventral the stronger), hind tibia with strong antero- and postero- dorsals. *Wings* (fig. 3): Dark band from costa to median fork, a brown area at apex and between these 2 areas a dark brown irregular band traversing wing, lighter brown at posterior margin. Halteres pale yellow. *Abdomen*: Dark reddish brown with posterior margin of tergites lighter brown. External ♀ genitalia: genital plates yellow. External ♂ genitalia light brown.

Holotype: ♀, Above Camp cove, Campbell I., sweeping, 6. II. 1963, Wise (D. S. I. R.). Paratype: Campbell I.: Shoal Pt., 0–10 m, tussock, 29. VII. 1962, ♀, Rennell. Other specimens examined: Beeman Camp, 15–50 m, sedge, 3. VIII. 1962, 1♀, Rennell. Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂, 1♀, Gressitt.

Closest to *M. submarshalli* Tonnoir and distinguished most readily from it by the wing pattern. In *M. submarshalli* the central band is much wider than in the present species. The 3 specimens from the malaise trap and Beeman Camp are damaged and do not warrant being made paratypes.

Paradoxa fusca Marshall

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, 21–25. XI. 1961, 1♂, Gressitt. Beeman Hill, 2–50 m, old *Dracophyllum* trunk, 21–25. XI. 1961, 1♂, Gressitt. St. Col Ridge, 30. XI. 1961, 1♀, Gressitt. Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961, 3♂♂; 1–3. XII. 1961, 2♂♂, 2♀♀; 3–5. XII. 1961, 2♂♂, 1♀; 5–8. XII. 1961, 1♂, 3♀♀; 16–18. XII. 1961, 3♂♂, 1♀, Gressitt.

A new record for Campbell I.

Platyura brevis Tonnoir

SPECIMENS EXAMINED: Lookout Bay, beach, 19. XII. 1961, ♀ Gressitt. Tucker Cove, 4 m, Malaise trap, 1–3. XII. 1961, 1♀; 16–18. XII. 1961, 3♀♀; 18–21. XII. 1961, 2♀♀, Gressitt.

Vein R_4 varies to the extent of being present, very weak and not complete, and being absent. These specimens have been compared with the type and agree in all respects except for the above variation. A new record for Campbell I.

Tetragoneura minima Tonnoir

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, 19. XII. 1961, 1♀: *Dracophyllum*, 6–11. XII. 1961, 1♀; 12–17. XII. 1961, 1♀; 18–21. XII. 1961, 1♀: *Bulbinella*, 26–30. XI. 1961, 1♀: *Poa*, 1♀; 12–17. XII. 1961, 4♂♂, 18–21. XII. 1961, 1♂, Gressitt: *Dracophyllum*, 23. XII. 1962, 1♂, Rennell. Beeman Hill, 100–180 m, *Bulbinella*, 16. XII. 1961, 1♂, 3♀♀, Gressitt; sweeping, 2. II. 1963, 1♂, Wise. Beeman Lookout, 19. XII. 1961, 2♂♂, Gressitt. Courrejolles Penin., 200 m, Grey-headed Mollymawk nest, 14. XII. 1961, 3♀♀, Gressitt. De la Vivre Pt., 12. XII. 1961, 1♂, Rennell. Lookout Bay, Beach, 16–19. XII. 1961, 1♂, 1♀; *Bulbinella*, 3. XII. 1961, 1♂; *Dracophyllum*, 3. XII. 1961, 1♂; *Poa*, 19. XII. 1961, 3♂♂, 2♀♀, Gressitt. Moubray Hill, 200 m, 12. XII. 1961, 1♂; *Bulbinella*, 12. XII. 1961, 1♂, Gressitt. Mt. Dumas, slope, sedge, 20. XI. 1961, 1♂, Gressitt. Mt. Eboulé, 150 m, 17. XII. 1961, 3♀♀, Gressitt. St. Col

Ridge, 180–280 m, *Bulbinella*, 7. XII. 1961, 1♂, Gressitt. Tucker Cove: 1–50 m, 1–5. XII. 1961, 1♀; 6–11. XII. 1961, 1♂, 1♀; 12–17. XII. 1961, 2♂♂; *Bulbinella*, 12–17. XII. 1961, 1♀; 18–21. XII. 1961, 1♂; moss, 21–25. XI. 1961, 1♀; under rocks, intertidal zone, 7. XII. 1961, 1♀(*); 4 m, Malaise trap, 1–3. XII. 1961, 2♂♂; 3–5. XII. 1961, 1♂; 5–8. XII. 1961, 3♂♂; 16–18. XII. 1961, 3♂♂, 2♀♀; 18–21. XII. 1961, 4♂♂, 1♀, Gressitt: 0–100 m, swept above stream, 23. II. 1963, 1♂, Wise. Tucker, sedge, 29. XII. 1961, 1♂, Rennell.

A new record for Campbell I.

Tetragoneura sp.

SPECIMENS EXAMINED: Tucker Cove, 4 m, 1–3. XII. 1961, 1♂(*), Gressitt.

This specimen does not key to any known species and could be regarded as a new one. However, it is not a perfect specimen and its occurrence on Campbell I. is recorded as an indication that at least 2 species of *Tetragoneura* occur there.

Zygomyia similis Tonnoir

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, 21–25. XI. 1961, 1♀, Gressitt: 100–150 m, *Coprosma*, 3.VIII.1962, 1♂, 1♀, Rennell. Perseverance Harbor, ex sedge and scrub, 5. VIII. 1962, 1♂, Clark. Tucker Cove, 1–50 m, *Bulbinella*, 21–25. XI. 1961, 1♂: 4 m. Malaise trap, 27. XI–1. XII. 1961, 2♂♂, 1♀; 5–8. XII. 1961, 1♂, Gressitt.

A new record for Campbell I.

Zygomyia submarginata Harrison

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Dracophyllum scoparium*, 17–21. XII. 1961, 2♂♂(*), Gressitt. Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, 1♂, 5♀♀(*), Gressitt. Lookout Bay, beach, *Bulbinella*, 2. XII. 1961, 2♂♂(*), Gressitt. Rocky Bay, penguin nest, 20. XII. 1961, 1♂(*), Gressitt. Shoal Pt., 6.IX.1962, 1♀, Clark. Smooth-water bay, swept above stream, 2. III. 1963, 1♀, Wise. Tucker Cove: 1–50 m, *Dracophyllum*, 1–5. XII. 1961, 1♂(*), Gressitt: 4 m, 5–8. XII. 1961, 2♂♂: 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂, 1♂(*), 1♀; 1–3. XII. 1961, 7♂♂; 3–5. XII. 1961, 3♂♂, 1♀; 16–18. XII.1961, 5♂♂; 18–21. XII. 1961, 1♂, Gressitt.

Family DOLICHOPODIDAE

Acropsilus borboroides Oldroyd

SPECIMENS EXAMINED: Beeman Camp, 20–30 m, *Bulbinella*, 12. XII. 1961, 3♂♂, 9♀♀, Rennell. Beeman Hill, 100–180 m, *Pleurophyllum* leaf mold, 2–6. XII. 1961, 1♂(*), Gressitt. Beeman and Lyall Saddle, *Poa*, 5.XII.1961, 1♀, Gressitt. Courrejolles Penin., 200 m, rocks, moss around mollymawk colony, 14. XII. 1961, 1♀, Gressitt & Rennell. Lookout Bay, 3 m, *Stilbocarpa polaris*, 30. XII. 1961, 3♀♀, Rennell; Perseverance Harbor, roots of *Stilbocarpa*, 3. II. 1963, 1♂, Rennell. Mt. Azimuth, nr. summit, *Bulbinella*, 14.XII.1961, 1♀, Gressitt & Rennell; 350–450 m, *Bulbinella* flowers, 3.XII.1962, 2♂♂, 3♀♀, Rennell. Mt. Dumas, 100 m, west slopes above Middle Bay, *Bulbinella*, 1♀(*), Rennell. Mt. Lyall, 400 m, 5. XII. 1961, 1♂; 200–400 m, 5. XII. 1961, 1♀, Gressitt. Northwest Bay area, sweeping, 5. II. 1963, 1♀, Wise. Rocky Bay, under rocks, 20.XII.1961, 1♂, Gressitt. Shoal Pt., 0–10 m, tussock, 29. VII. 1962, 1♀(*), Rennell. St. Col Ridge, 16–260 m, moss on rocks, Berlese funnel, 24,

26, 30. XI. 1961, 1♀(*), Gressitt. II. 1963, 1♀, Rennell.

Schoenophilus pedestris campbellensis Harrison, n. subsp.

♂, ♀: Similar in all respects to the nominate subspecies *S. pedestris pedestris* Lamb, 1909, as revised by Kohn (1962), except for the following:

♂ with apex of wings flared out to a small disc; clasper of ♂ hooked apically, slightly more so than in the nominate subspecies.

Holotype ♂, Mt. Lyall, 200–400 m, Campbell I., 3, 5, 12. XII. 1961, Gressitt (D. S. I. R.). Paratypes: All Campbell I., 1♀, Courrejolles Penin., tussock above mollymawk colony, 13. II. 1963; 220–230 m, under stones above mollymawk colony, 13. II. 1963, 1♀, Rennell; 1♀, N. slope, 220 m, under stones mollymawk colony, 12. II. 1963; 1♀, 13. II. 1963, K. A. J. Wise. Courrejolles—Azimuth, on boulders, 18. XII. 1963, 2♂♂, Gressitt & Rennell. 1♂, Mt. Dumas, North spur, 310 m, at top, 6.II.1963, Wise; 310 m, on exposed peat, 6.II.1963, 1♀ (*), Rennell; 2♀♀, summit, 500 m, among stones, 6. II. 1963, Rennell. Mt. Lyall, 250 m, 5. XII. 1961, 1♀, Gressitt; 1♂, 2♀♀, 390 m, below summit, low plants, 19.II.1963, Wise. As holotype 1♀, Gressitt. 1♂, Mt. Puiseux, 400 m, 17.XII.1961, Gressitt. 1♂, Moubray Hill, 200 m, 12. XII. 1961; 200 m, moss, 12. XII. 1961, 1♀, Gressitt. St. Col Ridge, 180–280 m, 7.XII. 1961, 2♂♂, 2♀♀, Gressitt; moss on rocks, 7. XII. 1961, 1♀, Gressitt.

There are 9♂♂ in the series and the wing shows some variation in that the flared-out apex starts about mid point of wing or about apical 1/3. All ♀♀ have wings without disc. Wing atrophy would appear to have not advanced, as yet, so constantly as in the Macquarie I. subspecies, indicating a later arrival of the parent stock into the environment of Campbell I.—favorable for wing reduction. A new record for Campbell I.

Family SYRPHIDAE

Helophilus antipodus Schiner

SPECIMENS EXAMINED: Beeman Camp, 15 m, 11. XII. 1962, 1♀, Rennell; station, 11. XII. 1963, 1♀, Wise. Beeman Hill, 100–180 m, 16.XII.1961, 1♂, Gressitt. Tucker Cove, 4 m, Malaise trap, 1–3. XII. 1961, 1♂; 16–18. XII. 1961, 1♂, Gressitt.

Helophilus campbellicus Hutton

SPECIMENS EXAMINED: Beeman Hill, 100–180 m, 2. XII. 1961, 1♂, Gressitt. Lookout Bay, beach, elephant seal wallow, 16. XII. 1961, 2♂♂, Gressitt. Monument Harbor, nr. beach, 17. XII. 1961, 1♀, Gressitt. Tucker Cove, 1–50 m, *Bulbinella*, 18–21. XII. 1961, 2♀♀; on beach, 1–5. XII. 1961, 1♀; 4 m, Malaise trap, 27. XI–1. XII. 1961, 6♂♂; 1–3. XII. 1961, 1♂; 5–8. XII. 1961, 3♀♀; 16–18. XII. 1961, 1♂, 6♀♀; 18–21. XII. 1961, 3♀♀, Gressitt; 1–50 m, 21–25. XI. 1961, 1♂, Gressitt.

Syrphus flavofaciens Miller

SPECIMENS EXAMINED: Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961, 2 ex; 1–3. XII. 1961, 9 ex; 3–5. XII. 1961, 5 ex; 5–8. XII. 1961, 4 ex; 16–18. XII. 1961, 3 ex, Gressitt; 0–100 m, swept above stream, 6. II. 1963, 1 ex, Wise.

Campbell I. specimens differ slightly from New Zealand mainland specimens in color

characters. The abdomen is very dark blue or almost black and the blue black stripe on oral margin and over cheeks varies in width from as broad as cheek below eye to a stripe about 1/2 as broad. A new record for Campbell I.

Syrphus novaezealandiae Macquart

SPECIMENS EXAMINED: Tucker Cove, 4 m, Malaise trap, 3–5. XII. 1961, 1♀; 5–8. XII. 1961, 1♂; 16–18. XII. 1961, 1♀; 1–50 m, *Dracophyllum*, 21–25. XII. 1961, 1♀(*), Gressitt.

Family SAPROMYZIDAE

Poecilohetaerella bilineata (Hutton)

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Poa*, 6–11. XII. 1961, 2♀♀; *Poa*, 12–17. XII. 1961, 4♀♀; *Bulbinella*, 6–11. XII. 1961, 1♂, 1♀; 18–21. XII. 1961, 3♀♀, Gressitt; 15 m, 11. XII. 1962, 1♀; 20–30 m, *Bulbinella*, 12. XII. 1962, 1♀; *Dracophyllum*, 23. XII. 1962, 1♀, Rennell. Beeman Hill, 100–180 m, 11–16. XII. 1961, 1♀, Gressitt. Camp Cove, sweeping long grass on edge of stream, 5. II. 1963, 1♀, Rennell. Lookout Bay, beach, 3. XII. 1961, 1♀; *Bulbinella*, 3. XII. 1961, 2♀♀, Gressitt. Northwest Bay area, sweeping, 5. II. 1963, 1♀, Wise. Shoal Pt., sweeping, 7. II. 1963, 1♂, Wise. Six-foot Lake, 2 m, 10. XII. 1961, 1♀, Gressitt. Tucker Cove, 1–50 m, 21–25. XI. 1961, 1♀; *Bulbinella*, 21–25. XI. 1961, 1♂; 1–5. XII. 1961, 1♀; *Dracophyllum*, 1–5. XII. 1961, 1♀; *Poa*, 1–5. XII. 1961, 1♂, on beach, 1–5. XII. 1961, 1♂; 6–11. XII. 1961, 1♀; 12–17. XII. 1961, 1♀; 18–21. XII. 1961, 1♀; *Bulbinella*, 18–21. XII. 1961, 4♂♂, 10♀♀; 4 m, Malaise trap, 16–18. XII. 1961, 1♂, Gressitt. Tucker, sedge, 29. XII. 1961, 2♀♀, Rennell. Venus Bay, 2. II. 1963, 1♀, A. Wright. Venus Cove, tussock, 2. II. 1963, 1♂, Anon.

Family HELOMYZIDAE

Heloclusia (Heluscolia) antipoda Harrison Fig. 11.

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Bulbinella*, 26–30. XII. 1961, 1♀, Gressitt. Beeman Lookout, 19. XII. 1961, 1♂, Gressitt. Courrejolles Penin., 200 m, grey-headed mollymawk nests, 14. XII. 1961, 1♂; 200 m, 14. XII. 1961, 1♂, Gressitt. Garden Cove, 25. XI. 1961, 1♀, Gressitt. Lookout Bay, beach, 16–19. XII. 1961, 2♀♀; 3. XII. 1961, 1♂, Gressitt. Mt. Azimuth, S. side, 250 m, in nest of royal albatross under dead chick, 12. II. 1963, 1♀, Wise. St. Col—Azimuth, 230 m, dead albatross carrion, 12. II. 1963, 2♂♂, Rennell. Tucker Cove: 1–50 m, *Poa*, 21–25. XI. 1961, 1♂, 1♀: grass in seal wallow, 21–25. XI. 1961, 1♀; 1–5. XII. 1961, 1♀; 26–30. XI. 1961, 1♂; Malaise trap, 27. XI–1. XII. 1961, 2♂♂, 2♀♀; 1–3. XII. 1961, 1♂, 2♀♀; 16–18. XII. 1961, 2♂♂, 5♀♀, Gressitt.

♂♂ have been collected for the first time. Additional notes on the description of *H. antipoda* are given as follows: External ♂ genitalia (fig. 11). Genital arch very large, anteroventral region slightly produced to an acute angled corner; some few scattered short bristles over surface of arch, a strong one dorsally and cluster of stronger bristles at ventral angle. Anal plate with irregular inner and outer row of hairs, outer row with a strong bristle ventrally. Claspers sinuous, bare and fairly heavily chitinized.

Heloclusia (Heluscolia) brevicaudata Harrison, n. sp. Figs. 4, 12.

Dark brown or blackish brown species. Body length about 3 mm, wing length about 2.75 mm.

♂, ♀. *Head*: Arista dark brown, about 6–8× length of antennal segment 3, rays of pubescence greater than diameter of basal segments of arista. Antenna blackish brown; segment 2 with distinct apical bristles, stronger one dorsally and about 4 stronger ones ventrally. Front dark brown with lighter brown anteriorly. Three fronto-orbitals, posterior 1 directed outwards; ratio of lengths, anterior to posterior 3 : 4 : 4. Face light brown. Cheeks light brown or yellowish brown. Vibrissa strong; 2nd oral bristle close to vibrissa and about 1/3 to 1/4 of its length. Occiput black. Eyes bare. Vertical diameter of eye about 1.5× width of cheek in same axis. Proboscis light brown, palpi dark brown. *Thorax*: Blackish brown. Prescutellars distinctly longer than hairs on mesonotum; some enlarged acrostichal hairs near suture; apical scutellars about 1.5× length of basals; 1 sternopleural; 1 inter alar. *Legs* all dark brown. Fore femur with strong bristles on posterodorsal and posteroventral surfaces; fore tibia with small apical, mid tibia with strong apical, hind tibia with small apical. *Wings* clear (fig. 4). Veins light brown. Pair of strong bristles at base of costa and at distal costal break; short stout costal spines ending at apex of vein 2; costa with 2 rows of well separated small spines on dorsal and ventral surfaces. Wing indices: costal about 9; 4th vein about 4.5; 4c about 0.75; 5× about 1.2. Halteres dark brown with light brown stalk. *Abdomen*: Dark brown, genitalia in both sexes darker brown.

External ♂ genitalia (fig. 12). Genital arch broad, dark brown, not very greatly enlarged as in other species of the subgenus; 1 strong dorsal bristle on each side of arch, 1 or 2 smaller bristles on middle of arch and hairs mostly on posterior 1/2 of arch; anal plate with fine hairs; clasper narrow, curved and pointed, with hairs.

Holotype: ♂ (*), Beeman Camp, 2–50 m, Campbell I., chicken yard, 6–11. XII. 1961, Gressitt (D. S. I. R). Paratypes: Same data as holotype, 2♂♂, 3♀♀(*).

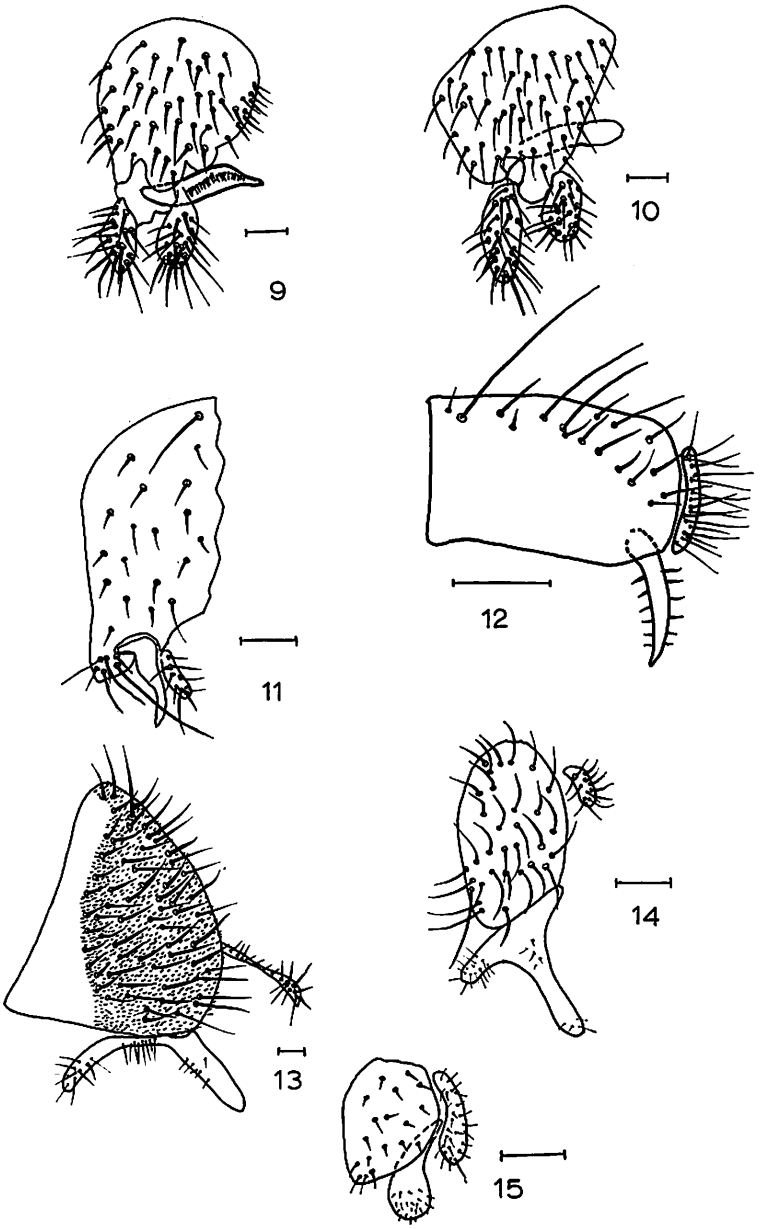
All types are preserved in alcohol. The long pubescent arista shows that there could be some close relationship with *H. aristata* Harrison. Chief distinguishing characters are the wide cheek, and character of genital arch and clasper in ♂♂. This species would appear to belong to the *antipoda* species group.

Family COELOPIDAE

Baeopterus robustus Lamb Fig. 13.

SPECIMENS EXAMINED: Northwest Bay: Middle Cove, under kelp, 5. II. 1963, 1♂; 20. II. 1963, 1♀, Wise: 5 m, among stones on beach, 1 pupa; 30. XII. 1962, 1♀; bred ex pupa, reared 3. II. 1963, Rennell. Rocky Bay: beach, rotting *Durvillea*, 28. XI. 1961, 17♂♂, 26♀♀, Gressitt & Rennell: among rocks on beach, 23. XI. 1962, 4♀♀, Gressitt & Rennell; kelp on beach, 20. XII. 1961, 8♂♂, 11♀♀, Gressitt: beach, under kelp and stones, 18. II. 1963, 1♀, Wise: kelp, 20. XII. 1961, 17♂♂, 24♀♀(*); 28. XI. 1961, 10♂♂, 18♀♀(*), Gressitt.

Additional notes on the description of this species are given as follows: ♂ genitalia (fig. 13). Genital arch narrow dorsally, very broad ventrally, anteroventral corner bare of hairs and bristles, elsewhere a thick matt of fine hairs and bristles. Anal plate very



Figs. 9–15. ♂ genitalia. 9, *Allodia antennata*; 10, *A. brunnea*; 11, *Heloclusia antipoda*; 12, *H. brevicaudata*; 13, *Baeopterus robustus*; 14, *Coelopa debilis*; 15, *Macrocanace australis*. Scale: 0.1 mm.

narrow and covered with bristles slightly weaker than those on arch. Posterior clasper straight and rod-like.

Pupa: Length 12 mm, greatest breadth 4 mm.

Icaridion nasutum Lamb

SPECIMENS EXAMINED: Beemen-Lyall Saddle, *Poa*, XII. 1961, 1♀, Gressitt. Beeman beach: 1–2 m, rotting kelp at high tide mark, 20. XI. 1962, 1♂, 4♀♀; 1–2 m, among rocks at high tide level, 1♂, Rennell. Beeman Camp, 2–50 m, kelp on beach, 18–21.XII.1961, 1♂, Gressitt. De la Vire Pt., kelp on beach, 18. XI. 1962, 3♂♂, 5♀♀, Rennell. Lookout Bay: beach, 2 m, among rocks, 14. XII. 1962, 2♂♂, 2♀♀; kelp on beach, 27. VII. 1962, 7♂♂, 9♀♀, Rennell. Perseverance Harbor, in rotting kelp on beach, 3. II. 1963, 1♀, Wise; beach, 25. VII. 1962, 13 ex(*), Clark. Middle Bay, beach, kelp on beach, 29. XI. 1961, 1♂, Gressitt. Middle Cove, NW Bay, under kelp and stones, 5.II.1963, 1♂, 1♀, Wise. Monument Harbor, nr. beach, kelp, 17. XII. 1961, 7♂♂, 1♀, Gressitt. Northwest Bay: beach, 29. XI. 1961, 6♂♂, 4♀♀, 1 pupa, Gressitt; 5 m, among rocks and kelp on beach, 30. XII. 1962, 2♀♀, Rennell. Rocky Bay; beach, rotting *Durvillea*, 28.XI.1961, 24♂♂, 7♀♀, Gressitt & Rennell; kelp on beach, 20. XII. 1961, 29♂♂, 2♀♀, 18♂♂(*), 8♀♀(*); 28. XI. 1961, 10♂♂, 18♀♀(*), Gressitt; 20. XII. 1962, 3♂♂, 1♀, Rennell; beach, under kelp and stones, 18. II. 1963, 3♂♂, Wise. Shoal Pt., 0–30 m, rotting kelp on beach, 1.XII.1962, Rennell.

This large series of specimens shows that the species is very common on Campbell I. and is found among rocks and kelp on the shore line.

There is a very great variation in ♂♂ especially with the chaetotaxy. In this series there is a graduation in size of ♂♂ from about 3.5 mm–8.0 mm. Associated with this size range is a range of general hairiness of abdomen and legs, the larger specimens having in general a thicker matt of hairs and relatively longer hairs. Also associated with size of the specimens is size of the humeral and anterior notopleural bristles. In small individuals these bristles are normal bristles and range from about equal to or 2/3 length of posterior notopleural. In larger specimens, these bristles are reduced and in the largest specimens they tend to be reduced to small thick stumpy bristles while the posterior notopleural remains normal size. Likewise in large individuals, the hairs on anterior of mesonotum tend to be reduced to small stumpy hairs.

The ♀♀ do not vary in size as much as ♂♂ and their length is mostly between 4–6 mm. The humeral and notopleural bristles are normal and long with the humeral being shorter generally than the 2 notopleurals.

Pupa: Length about 9 mm.

Coelopa debilis Lamb Fig. 14.

SPECIMENS EXAMINED: Beeman Beach, 1–2 m, 6.IV.1962, 1♀, Rennell; 16.XII.1961, 1♂(*), Gressitt. Beeman Camp: 2–50 m, traps, 16. XII. 1961, 1♂; 2–50 m, kelp on beach, 6–11. XII. 1961, 1♀; 18–21. XII. 1961, 2♂♂, 3♀♀; *Poa*, 18–21. XII. 1961, 2♀♀; 6–11. XII. 1961, 1♀, Gressitt; on lighted windows, 6. IV. 1962, 1♂, Rennell; area, 1958–59, 1♂, Anon. Beeman Cove, 20 m, on windows, 31. VIII. 1962, 1♀; at light, 4. VI. 1962, 1♂, 2♀♀, Clark. Beeman Hill, 100–180 m, air nets, 11–16. XII. 1961, 1♂, Gressitt. Davis Pt., shore rocks, 1–3 m, 12. XII. 1961, 1♂, Gressitt. Garden Cove: on beach, 25. XI. 1961, 1♀; sea elephant wallows, 25.XI.1961, 3♂♂, Gressitt. Lookout Bay: on kelp, high water level, 30.XII.1961,

3♀♀, Rennell; beach, 16–19. XII. 1961, 2♂♂, 32♀♀, 1♂(*), Gressitt. Monument Harbor, nr. beach, kelp, 17. XII. 1961, 2♀♀, Gressitt. Northwest Bay: beach, rocks, 29. XI. 1961, 1♂, 3♀♀, Gressitt & Rennell; 5m, among rocks and kelp on beach, 30. XII. 1962, 1♀, Rennell. Shoal Pt., bred ex pupa on kelp, coll. 11. II. 1962, emerged 19.II.1962, 1♀, 1 pupal case, Gressitt & Rennell; beach, 7.II.1963, 2♀♀, Wise; 6.IX.1962, 2♀♀, Clark. Smoothwater Bay, shore cliffs, 2. III. 1962, 1♀, Wise. Tucker Cove, 4 m, Malaise trap, 1–3. XII. 1961, 1♀, 16–18. XII. 1961, 1♀, Gressitt. 1943, 1♂, J. H. Sorensen. X. 1959–I. 1960, 1♂(*), G. Poppleton.

Most specimens are ♀♀ and key to *C. debilis*. The ♂♂ available give a clue to the great degree of variation possible in the species. As with other species it appears that larger ♂♂ have a tendency to be more thickly and strongly haired and for these specimens to have the bristles and hairs of anterior mesonotum thickened and reduced in length. Thus, the relative lengths of humeral to notopleural is not constant. Chaetotaxy of basal segment of mid tarsus in ♂ appears to have a range of from 1–3 anteroventral spines, the larger number being on larger individuals and these bristles being relatively thicker than those on small individuals.

The ♂ genitalia (fig. 14) has a distinctly bilobed clasper and differs from that for *C. nigrifrons* Lamb as illustrated by Hardy (1962) in the following minor points. Mid dorsal region of genital arch with 2 strong bristles; posterior arm of clasper with distinct hair especially on inner surface and hairs extending whole length of anterior arm of clasper; anal plate with fine hairs evenly over surface and no obvious aggregation ventrally.

The large series of this species has enabled a study of the variations to be made. When large series of related species from other areas become available, it should be possible to make a critical evaluation of the group of species.

Coelopella plebia Malloch

Not represented in the present collection.

Chaetocoelopa littoralis (Hutton)

Not represented in the present collection.

Family SPHAEROCERIDAE

Leptocera (Limosina) rennelli Harrison, n. sp. Fig. 8.

Chocolate brown species with dark brown spot on wing. Body length about 2.75 mm; wing length about 2.5 mm.

♂, ♀. *Head*: Arista blackish brown; rays of pubescence minute, less than diameter of basal segment. Antenna light yellowish brown; segment 2 with apical black bristles especially on inner margin. Front gray with fairly heavy dusting and a blackish gray "M" shaped mark between vertex and anterior margin and around line of orbital bristles. Two equally strong fronto-orbitals; ocellars and verticals strong; post verticals about 1/2 length of verticals. Face very light brown with light dusting of light gray. Cheeks blackish brown. Vibrissa strong, distinct row of strong hairs along ventral cheek margin. Occiput dark gray brown. Eyes bare. Vertical diameter of eye 2× width of cheek in same axis. Proboscis brown, palpi light reddish brown. *Thorax*: Chocolate brown with some lighter

reddish brown areas on pleura. Pair of enlarged hairs at position of prescutellars; 3 dorsocentrals, anterior 2 pairs short and not much bigger than hairs, posterior bristle strong; basal scutellar about 3/5 length of apicals; 1 strong humeral, presutural and notopleural equally strong; interalar equal to basal costal bristles; supra-alar and posterior pair of postalars equally weak, other postalar as strong as posterior dorsocentral; sternopleural bristle strong, few minute hairs on propleuron. *Legs* in ♂: Fore femur with posterodorsal bristles and similar ones on apical 1/4 to 1/2 of anteroventral surface. Mid femur and curved mid tibia with cluster of short spines at base and apex respectively of ventral surfaces, mid tibia with pair of dorsal bristles at basal 1/4 and apical 1/4. *Legs* in ♀: Without cluster of spines on mid leg and a small mid ventral bristle. *Wings* (fig. 8): Shaded light brown with distinct darker brown area about posterior cross vein; veins brown or light brown. Costal index about 1.0. Hairs on basal portion of costa fairly strong. Halteres very light reddish brown. *Abdomen*: Dark chocolate brown.

Holotype. Tucker Cove, 4 m, Campbell I., Malaise trap, 3–5. XII. 1961, ♂, Gressitt (D. S. I. R.). Paratypes: Same data as holotype, 3♂♂, 2♀♀: 27. XI–1. XII. 1961, 1♂, 1♀; 1–3. XII. 1961, 1♂, 2♀; 5–8. XII. 1961, 1♂; 16–18. XII. 1961, 1♂, 1♀, Gressitt. Garden Cove, 25. XI. 1961, 1♀, Gressitt. Lookout Bay, beach, elephant seal wallow, 16–19.XII.1961, 1♂, Gressitt. Tucker Cove: 1–50 m, *Poa*, 21–25. XI. 1961, 2♂♂, 1♀; *Bulbinella*, 21–25. XII. 1961, 1♀; elephant seal wallow, 12–17. XII. 1961, 1♂, Gressitt. Other specimens examined: Beeman Camp, rat, 27. XI. 1961, 1♂(*), Gressitt. Lookout Bay, *Poa*, 19. XII. 1961, 1♀, Gressitt. Smoothwater Bay, leaf mold under sedge, Berlese funnel, 16. II. 1963, 1♂, 1♀(*), Wise. Tucker Cove, 4 m, Malaise trap, 1–3. XII. 1961, 2♂♂, 1♀; 3–5. XII. 1961, 1♀; 16–18. XII. 1961, 1♀; 1–50 m, 21–25. XI. 1961, 1♂(*), Gressitt.

Named for Mr. K. P. Rennell who has made many interesting collections of insects during his stay on Campbell I.

Closely related to *L. thomasi* and perhaps *L. empirica*, but distinguished from both these species by the distinctive shading on the wing. Although close to being a member of the *plumosula* species group, it, like *L. thomasi* is not placed in this group yet until more is known of the New Zealand and Southern Hemisphere sphaerocerids.

Leptocera (Limosina) thomasi Harrison

SPECIMENS EXAMINED: Tucker Cove: 1–50 m, 12–17. XII. 1961, 1♂; 1–50 m, *Poa*, 21–25. XI. 1961, 1♂; 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂; 1–3. XII. 1961, 3♂, 1♀; 16–18. XII. 1961, 2♂♂, Gressitt.

A new record for Campbell I.

Leptocera pectinifera (Villeneuve)

Not represented in the present collection.

Family CANACEIDAE

Macrocanace australis (Hutton) Fig. 15.

SPECIMENS EXAMINED: Beeman Beach, 1–2 m, 6. IV. 1962, 1♂, 2♀♀, Rennell; 16. XII. 1961, 1♀(*), Gressitt. Beeman Camp, 2–50 m, kelp on beach, 18–21. XII. 1961, 2♂♂, 2♀♀,

Gressitt. Davis Pt., shore rocks, 1–3 m, 12. XII. 1961, 5♀♀, Gressitt. Garden Cove, sea elephant wallows, 25. XI. 1961, 1♂, 4♀♀, Gressitt. Lookout Bay: beach, 16–19. XII. 1961, 2♂♂, 4♀♀; kelp on beach, 16. XII. 1961, 1♀, Gressitt; on kelp, high water level, 30. XII. 1961, 21♂♂, 25♀♀, Gressitt & Rennell; *Hebe* by shore, 16–19.XII.1961, 1♂(*), Gressitt. Mt. Lyall, 390 m, below summit, low plants, 19. II. 1963, 1♀, Wise. Monument Harbor, nr. beach, 17. XII. 1961, 4♂, 1♀, Gressitt; tussock, 9.II.1963, 1♂, Wise. Northwest Bay, beach, rocks, 29.XI.1961, 33♂, 39♀♀, Gressitt. Rocky Bay, rockhopper penguin rookery, 20.XII. 1961, 3♂♂, 1♀: *Colobanthus*, 20.XII.1961, 1♂, Rennell; beach, swept ex shore, 18.II.1963, 1♂, Wise. Shoal Pt., 7.II.1963, 1♂, Wise. Six-foot Lake, 2 m, 10.XII.1961, 5♂♂, 1♀, Rennell. Smoothwater Bay, shore cliffs, 7. III. 1963, 1♀, Wise. St. Col-Azimuth, 250 m, albatross carrion, 12. II. 1963, 1♂, Rennell. Tucker Cove, 1–50 m, sweeping cliff along shore in rain, 21–25. XI. 1961, 1♂, 1♀, Rennell.

Additional notes on the description of this species are as follows: Wings often with fairly distinct but irregular darker shaded area at proximal area of posterior cell 1.

External ♂ genitalia (fig. 15). Genital arch shield-shaped on each side of mid dorsal line, with scattered small bristles on surface and a cluster of about 10 bristles at ventral corner. Anal plate with fine hairs over most of surface and small fine bristles stronger ventrally. Clasper strong club-like with a few fine hairs scattered over distal area.

Family EPHYDRIDAE

Hydrellia enderbii (Hutton)

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Bulbinella*, 6–11. XII. 1961, 1♂, Gressitt; 20–30 m, *Bulbinella*, 12. XII. 1962, 1♂, Rennell. Beeman Cove, 4. III. 1962, 17 ex(*), Clark. Beeman Hill, 100–180 m, 2. XII. 1961, 1♀; 11–16. XII. 1961, 5♂♂, 2♀♀, Gressitt. Beeman Lookout, 19. XII. 1961, 3♂♂, 7♀♀, Gressitt. Beeman Pt., sweeping, 28. II. 1963, 1♂, Wise. Camp Cove, sweeping long grass on edge of stream, 5.II.1963, 2♂♂, 10♀♀, Wise. Garden Cove, 25. XI. 1961, 7♂♂, 17♀♀; on beach, 25. XI. 1961, 24♂♂, 17♀♀, Gressitt. Lookout Bay, Perseverance Harbor, sweeping, 3. II. 1963, 5♂♂, 3♀♀, Wise. Middle Cove, NW Bay, sweeping, 5. II. 1963, 1♀, 1♀, Wise. Monument Harbor, sweeping tussock above beach, 9. II. 1963, 1♀, Rennell. Moubray Hill, N. slopes, 16. II. 1963, 1♂, Wise. Mt. Dumas, lower slopes, sweeping, 6. II. 1963, 1♂, 1♀, Wise. Northwest Bay, beach, rocks, 29. XI. 1961, 4♀♀, Gressitt & Rennell; sweeping, 5. II. 1963, 3♀♀, Wise; sweeping, 30. XII. 1962, 1♀, Rennell. Shoal Pt., sedge and tussock about elephant seal wallow, 7. II. 1963, 1 ♂, Wise. St. Col Ridge, 180–280 m, 7. XII. 1961, 1♂, Gressitt; 210–250 m, 23. II. 1963, 2 ♀♀, Wise. Tucker Cove: 1–50 m, 21–29. XI. 1961, 2♀♀; grass in seal wallow, 21–25. XI. 1961, 1♂, 1♀; 4 m, Malaise trap, 27. XII. 1961, 1♂, 6♀♀; 1–50 m, elephant seal wallow, 12–17. XII. 1961, 21♂♂, 40♀♀; 1–50 m, 18–21. XII. 1961, 1♀; *Poa*, 18–21. XII. 1961, 1♀; 1–50 m, *Bulbinella*, 12–17. XII. 1961, 2♂♂, 3♀♀, Gressitt; sedge, 29. XII. 1961, 4♂♂, 2 ♀♀, Rennell; 0–100 m, swept above stream, 23. II. 1963, 2♂♂, Wise. Tussock by Six-foot Lake, Monument Harbor, 9. II. 1963, 1♀(*), Wise. Venus Bay, tussock, 2. II. 1963, 1♂(*), H. Wright; 2. II. 1963, 1♂, 1♀, Wise.

A new record for Campbell I.

Scatella acutipennis Harrison, n. sp. Fig. 6.

A blackish brown species with reduced wings. Body length about 2.0 mm; wing length about 1.0 mm long and 0.3 mm wide.

♂, ♀ *Head*: Arista black, pubescence minute. Antenna blackish brown, basal 2 segments blacker; segment 2 with distinct dorsal bristle. Front with large ocellar triangle and orbits shining blackish brown, areas between triangle and orbits dull black. Verticals, ocellars and fronto-orbitals all approximately equally strong. Face heavily dusted, parafacials silvery gray with tinge of green, median haired area of face often more golden dusted, this distinction in face coloration more marked in ♀♀. Vertical diameter of eye 4× width of cheek in same axis. Palpi blackish gray. *Thorax*: Blackish brown mesonotum with faint black vittae on median longitudinal axis, and on dorsocentral lines. One pair of acrostichals just anterior to transverse suture about 1/2 length of posterior dorsocentrals. Short bristle on scutellum about 1/3 length of strong apical scutellars. Propleuron with few fine hairs ventrally. Prosternum bare. *Legs* grayish black with fore coxa gray. Fore femur with bristles on posteroventral surface, mid femur with bristles on apical 1/2 of anterior surface. Mid tibia with very weak preapical and slightly stronger apical. *Wings* (fig. 6): Shaded with distinct blackish brown and with unshaded areas as follows: middle of submarginal cell, apical 1/3 and basal 1/4 of 1st posterior cell, near base of 2nd posterior cell and at apical 1/4 of discal cell. Veins blackish brown and tendency to undulate about the clear areas of membrane. Costal breaks distinct, with distal break very deep. Costa ends at tip of 4th vein. Wing indices: costal about 6.6; 4th vein about 1.3; 4c about 0.4; 5× about 1.0. Halteres yellowish brown. *Abdomen*: Blackish brown. ♂ with tergite 5 enlarged, genital arch narrow dorsally, both genital arch and anal plate bare.

Holotype: ♂, Beeman Camp, 2–50 m, Campbell I., moss by beach, 18–21. XII. 1961, Gressitt (D. S. I. R.). Paratypes: All Campbell I. Courrejolles Penin.: 200 m, ground rocks moss around mollymawk colony, 14. XII. 1961, 3♂♂, 2♀♀, Gressitt; 220–230 m, cushion plant, mollymawk colony, 12. II. 1963, 1♂, Rennell; 19. X. 1962, 1 ♀, Rennell. Rocky Bay, beach, on seepage, 18. II. 1963, 1♂, 1♀, Wise. Beeman Beach, 1–2 m, among rocks at high tide level, 19. XII. 1962, 1♂, Rennell. Lookout Bay, beach, rocks and kelp on beach, 16–19.XII.1961, 1♀, Gressitt. Other specimens examined: Courrejolles Penin.: 200 m, ground, rock moss around mollymawk nests, 14. XII. 1961, 1♀, Gressitt & Rennell; North slope, 220 m, under stones, mollymawk colony, 12. II. 1963, 1♀, Wise; 200 m, 3. XII. 1962, 1♀, Rennell. Rocky Bay, under weed on top big rock among rockhopper penguins, 20. I. 1962, 1♂, 1♀, Rennell.

Distinguished from all other New Zealand species except *S. brevis* n. sp. by having reduced wings. It differs from this latter species most markedly in the ♂ by the different wing shading and in the ♀ by the coloration of the face.

Scatella brevis Harrison, n. sp. Fig. 5.

A blackish brown species with slight greenish coloration and with reduced wings. Body length about 2.5 mm, wing length about 1.5 mm, wing width about 0.4 mm.

♂, ♀. *Head*: Arista blackish brown, pubescence minute. Antenna blackish brown, segment 3 lighter brown basally, segment 2 with several dorsal apicals, 1 larger than others. Front slightly dusted, orbits more heavily dusted. Verticals, orbitals and ocellars all equal-

ly strong. Face all heavily dusted with golden brown. Vertical diameter of eye about 5× width of cheek in same axis. Palpi black. *Thorax*: Dark brown, usually a pair of lighter colored vittae anteriorly on mesonotum. Pair of acrostichals just anterior to suture about 3/5 length of anterior dorsocentrals; basal scutellars just under 1/2 length of apical scutellars. Propleuron with few minute hairs. *Legs* blackish brown. Fore femur with strong bristles on posteroventral surface; mid femur with much shorter bristles on apical 1/2 of anterior surface; mid tibia with very weak dorsal preapical and strong ventral apical. *Wings* (fig. 5): ♂♂ with wings shaded over whole of surface, this shading distinctly darker on distal 1/2 of wing, a small area at middle of submarginal cell clearer than elsewhere on wing. ♀♀ with wing evenly shaded over whole surface and with clear white areas as follows: middle of submarginal cell, proximal 1/4 and distal 1/3 of 1st posterior cell, discal cell near cross vein and 2nd posterior cell near cross vein. Costal breaks distinct, with distal one very deep. Costa ends at 4th vein. Wing indices: costal about 8; 4th vein about 1.6; 4c about 0.3; 5x about 1.0. Halteres yellowish brown. *Abdomen*: Blackish brown. ♂ with tergite 5 enlarged. Genital arch and anal plates with only fine hairs.

Holotype: ♂, Courrejolles Penin., 200 m, Campbell I., rocks, moss around mollymawk nests, 14. XII. 1961, Gressitt (D. S. I. R.). Paratypes: Same data as holotype, 6♂♂, 6♀♀. Other specimens examined: Same data as holotype, 2♀♀.

Separated from all other New Zealand species except *S. acutipennis* n. sp. by the reduced wings and from this latter species by the dark distal shading in wing of ♂ and the golden dusting on face of ♀♀. Wings of ♀♀ are very similar to *S. acutipennis*. The sexual dimorphism in wing pattern parallels that described in this paper for *S. nitidifrons* and it appears that this reduced wing species—*S. brevis* has evolved from *S. nitidifrons*.

Scatella nitidifrons Tonnoir and Malloch Fig. 7.

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Poa*, 6–11. XII. 1961, 1♀, Gressitt. Beeman Hill, 100–180 m, 6. XII. 1961, 1♀, Gressitt. Garden Cove, 25. XI. 1961, 2♀♀; beach, 25. XI. 1961, 2♂♂, 1♀, Gressitt. Lookout Bay, beach, elephant seal wallow, 16–19. XII. 1961, 1♂, Gressitt. Monument Harbor, nr. beach, 9. II. 1963, 1♀(*), Wise. Moubray Hill, 200 m, 12. XII. 1961, 1♂, Gressitt. Northwest Bay, beach, 29. XI. 1961, 1♀; rocks, 29. XI. 1961, 1♂, Gressitt & Rennell. St. Col-Azimuth, 250 m, albatross carrion, 12. II. 1963, 1♀, Rennell. St. Col Ridge, 21–25. XI. 1961, 2♀♀; 26–30. XI. 1961, 2♀♀; 30.XI.1961, 1♀; 1–50 m, 6–11. XII. 1961, 3♀♀, Gressitt. Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961, 20♂♂, 30♀♀, Gressitt. Venus Cove, tussock, 2. II. 1963, 1♂, Rennell.

A new record for Campbell I. Also it is the first time that ♂♂ have been collected and the following is the description of the ♂.

♂: As in ♀ (Harrison, 1959) except: Wing (fig. 7) shaded with brownish gray, and darker on apical 1/2 of wing, veins dark brown. Small clear or white spots, not distinctly defined, near middle of submarginal cell, at basal 1/4 of 1st posterior cell, at apical 1/5 of discal cell and near base of 2nd posterior cell. No spots in apical 1/2 of 1st posterior cell.

Abdomen with tergite 5 nearly 2× length of 4. Genital arch narrow dorsally, anal plate with small bristles visible *in situ*.

There appears to be no doubt that, from the collecting data of this series, ♂♂ and ♀♀ are of the same species. There is thus sexual dimorphism present to an extent which is

greater than in other species of *Scatella* from the New Zealand subregion. Apart from sexual characters the main difference is in the shading of the wings. The ♂ has shading of the wing that is reminiscent of *S. nubeculosa* with its dark apical 1/2 of wing, but the differences are distinct and constant in the series available for study.

Scatella nelsoni Tonnoir and Malloch

Not represented in the present collection.

Family MILICHIIDAE

Australimyza anisotomae Harrison

SPECIMENS EXAMINED: Beeman Beach: 1–2 m, 6. IV. 1962, 1♂, Rennell; 16. XII. 1961, 1♂ (*); 2–5 m, *Dracophyllum scoparium*, 12–17. XII. 1961, 1♂(*), Gressitt. Beeman Camp: 2–50 m, 26–30. XI. 1961, 1♀; *Coprosma*, 26–30. XI. 1961, 1♂; *Dracophyllum*, 12–17. XII. 1961, 3♂♂, 5♀♀; *Poa*, 6–11. XII. 1961, 1♀, Gressitt; 100 m, *Poa*, 3. VIII. 1962, 2♀♀; 30 m, sedge, 27. VII. 1962, 1♀; 40 m, *Dracophyllum*, 27. VII. 1962, 1♀; 20–30 m, *Bulbinella*, 12. XII. 1962, 1♀, Rennell; at light, 15.II.1963, 1♂, Rennell. Beeman Cove, *Coprosma*, 25.VIII. 1962, 5♀♀(*), Clark. Beeman Hill, 100–180 m, *Anisotome*, 2.XII.1961, 11♂♂, 18♀♀; *Bulbinella rossi*, 11. XII. 1961, 10♂♂, 7♀♀; *Dracophyllum*, 2.XII.1961, 1♀; moss, Berlese funnel, 2–6. XII. 1961, 4♂♂, 7♀♀(*); 7 ex(*), Gressitt. Beeman Lookout, 19.XII.1961, 1♂, Gressitt; Courrejolles-Azimuth, *Bulbinella*, 14.XII.1961, 1♂, Rennell. Garden Cove, elephant seal wallow, 25. XI. 1961, 2♂♂, 2♀♀; beach, 25.XI.1961, 1♀; *Dracophyllum*, 25.XI.1961, 1♀, Gressitt. Lookout Bay, beach, *Hebe* by shore, 16–19.XII.1961, 2♂♂(*); *Dracophyllum*, 3.XII.1961, 1♀; 16–19. XII. 1961, 7♂♂, 5♀♀, Gressitt; *Stilbocarpa polaris*, 4 pupae coll., 10. II. 1962, adults 7. III. 1962, 1♂, 1♀(*), Rennell; sweeping, 3. II. 1963, 1♂, Wise. Monument Harbor, nr. beach, 9.II.1963, 1♂(*), Wise. Moubray Hill, 200 m, 12. XII. 1961, 1♂, 5♀♀, Gressitt. Mt. Eboulé, 150 m, 17. XII. 1961, 1♂, 1♀, Gressitt. Mt. Lyall, 350 m, 5. XII. 1961, 1♂, Gressitt. Northwest Bay, beach, rocks, 29. XI. 1961, 6♂♂, 1♀, Gressitt & Rennell; 5 m, tussock, 30. XII. 1962, 5♂♂, 10♀♀, 2♀♀(*), Rennell; sweeping, 5. II. 1963, 1♂, Wise. Perseverance Harbor, ex sedge scrub, 5. VIII. 1962, 2♂♂, 5♀♀, Clark. Rocky Bay, beach, rotting *Durvillea*, 28. XI. 1961, 1♀, Gressitt & Rennell. Shoal Pt., 0–10 m, tussock, 21. X. 1962, 1♂, 7♀♀; 0–30 m, tussock, 1. VII. 1962, 1♂, 3♀♀; 0–10 m, tussock, 29. VII. 1962, 13♂♂, 25♀♀, Rennell; 6. IX. 1962, 11♂♂, 7♀♀, Clark. Six-foot Lake, 2m, 10. XII. 1961, 1♂, Gressitt. St. Col Ridge, 180–280 m, *Bulbinella*, 7. XII. 1961, 7♂♂, 1♀; *Coprosma*, 4–7. XII. 1961, 5♂♂, 2♀♀, Gressitt. Tucker Cove, 1–50 m, *Dracophyllum*, 21–25. XI. 1961, 2♀♀(*); *Poa*, 21–25. XI. 1961, 1 ex(*); 21–25. XI. 1961, 2♂♂, 2♀♀; 1–5. XII. 1961, 1♂, 1♀; 12–17. XII. 1961, 1♀; on rocks, 1–5. XII. 1961, 1♂, 1♀, Gressitt; 0–30 m, *Dracophyllum*, 7. VIII. 1962, 1♂, Rennell; 1–50 m, fern 6–11. XII. 1961, 1♀ Gressitt; sedge, 7. VIII. 1962, 1♂, 13. VIII. 1962, 1♂, Clark; 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂, 4♀♀; 1–3. XII. 1961, 4♂♂, 1♀; 3–5. XII. 1961, 1♀; 5–8. XII. 1961, 2♀♀; 16–18.XII. 1961, 2♂♂, Gressitt. Venus Cove, tussock, 2. II. 1963, 1♂, Rennell.

Family CALLIPHORIDAE

Calliphora icela (Walker)

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, ex fresh human excrement, 12–17. XII.

1961, 2♂♂, 1♀, Gressitt. Lookout Bay, beach, *Bulbinella*, 3. XII. 1961, 1♂, Gressitt. Northwest Bay, beach, rocks, 29. XI. 1961, 1♀, Gressitt & Rennell. Tucker Cove, 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂, 5♀♀; 5–8. XII. 1961, 4♂♂, 1♀; 16–18. XII. 1961, 2♂♂, 3♀♀, Gressitt.

A new record for Campbell I.

Calliphora quadrimaculata Swederus

SPECIMENS EXAMINED: Beeman Camp: 11. II. 1962, 1♀, Rennell; 2–5 m, 1–5. XII. 1961, 1♂; ex fresh human excrement, 12–17. XII. 1961, 4♀♀; 18–21. XII. 1961, 1♀, Gressitt. Garden Cove, 25. XI. 1961, 1♀; on elephant seal, 25.XI.1961, 1♂, Gressitt. Tucker Cove: 1–5. XII. 1961, 1♀; 4 m, Malaise trap, 27. XI–1. XII. 1961, 1♂, 2♀♀; 1–3. XII. 1961, 1♂, 1♀; 3–5. XII. 1961, 1♀; 5–8. XII. 1961, 4♂♂, 6♀♀; 16–18. XII. 1961, 1♂, Gressitt; 2m, 6. VIII. 1962, caught as larvae and pupae, emerged 2–6. IX. 1962, 3♂♂, 2♀♀, 7 pupal cases, Rennell. Ex rat burrow, 5. IX. 1962, 2♀♀, Clark.

Calliphora viridiventris (Malloch)

SPECIMENS EXAMINED: Beeman Camp: 15 m, 15. X. 1962, 1♂, Wise; 2–50 m, 12–17. XII. 1961, 4♂♂, 2♀♀; ex fresh human excrement, 12–17. XI. 1961, 1♀, Gressitt. Beeman Cove, 18 m, 12. IX. 1962, 1♂; 20 m, 2. X. 1962, 1♂, Clark. Beeman Hill, 100–180 m, 2. XII. 1961, 3♂♂, 1♀, Gressitt; sweeping, 2. II. 1963, 1♀, Wise. Davis Pt., shore rocks, 1–3 m, 12. XII. 1961, 1♀, Gressitt. Middle Cove, NW Bay, sweeping, 5. II. 1963, 1♂, Wise. Mt. Azimuth, 350–450 m, 14. XII. 1961, 1♀, Gressitt & Rennell. St. Col Ridge, 180–280 m, 4–7. XII. 1961, 1♀, Gressitt. Tucker Cove: 1–50 m, 21–25. XI. 1961, 1♂, 1♀; 30. XI. 1961, 1♀; on beach, 1–5. XII. 1961, 1♂; 4 m, Malaise trap, 27. XI–1. XII. 1961, 10♂♂, 11♀♀; 1–3. XII. 1961, 1♂; 3–5. XII. 1961, 3♂♂, 3♀♀; 5–8. XII. 1961, 9♂♂, 14♀♀; 16–18. XII. 1961, 9♂♂, 5♀♀, Gressitt.

Additional characters are as follows: Eyes with widely separated fine hairs visible under high magnification. (Previously the eyes of this species were described as bare.) Eyes separated by about 1/3 or little over 1/3 width of head at vertex. Cheeks about 1/3 height of head. Ptilinal suture terminates below level of eye. Palps have black bristles. Arista just longer than antennal segment 3 and reddish brown. Legs bluish gray with tibiae, tarsi, and tip of femora yellowish orange. Six to 10 frontal bristles. Four humerals; 2 sternopleurals, anterior of pair slightly shorter than posterior.

Family MUSCIDAE

Coenosia filipennis Lamb

SPECIMENS EXAMINED: Beeman Beach, *Hebe*, 31. XII. 1961, 1♂, Rennell. Beeman Camp, 30 m, flowering *Dracophyllum*, 3. VIII. 1962, 1♂, Wise. Beeman Cove, 18 m, 12. IX. 1962, 1♀, Clark. Beeman Hill, swept ex tussock and sedge, 2. II. 1963, 1♀, Wise; 190 m, 11.II. 1963, 1♂, Wise. Courrejolles Penin., tussock above mollymawk colony, 13. II. 1963, 1♀, Rennell. Garden Cove, 12 m, 6. IX. 1962, 3♂♂, 1♀, Clark. Mt. Dumas, W. slopes above Middle Bay, 100 m, *Bulbinella*, 31.VIII.1962, 1♂, Clark. Rocky Bay, slope near, under rocks, 29. XI. 1961, 1♀, 1 pupa(*), Gressitt. Perseverance Harbor, tussock sedge and scrub, 5. VIII. 1962, 1♂, Rennell. Shoal Pt., 0–100 m, tussock, 29. VII. 1962, 1♂, Rennell. Tucker

Cove, 0–100 m, sedge, 7. VIII. 1962, 1♂, 2♀♀, Rennell. 1943, 1♂, 1♀, J. H. Sorensen.

Coenosia fumipennis Lamb

Not represented in the present collection.

Paralimnophora antipoda Harrison

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Poa*, 6–11. XII. 1961, 1♂; 2–50 m, *Poa* by stream, 26–30. XI. 1961, 1♂, 1♀; *Bulbinella*, 26–30. XI. 1961, 2♀♀, Gressitt. Beeman Hill, 100–180 m, sooty albatross nest, 11–16. XII. 1961, 1♀(*), Gressitt. Courrejolles Penin., 200 m, ground rocks, moss, around mollymawk nests, 14.XII.1961, 1♀, Rennell. Lookout Bay, beach, rock and kelp on beach, 16–19. XII. 1961, 1♀, Gressitt. Mt. Lyall, 200–400 m, 3. XII. 1961, 1♂, Gressitt. Rocky Bay, *Anisotome*, 20. XII. 1961, 1♂; under rocks, 20. XII. 1961, 1♀, Gressitt. Shoal Pt., beach, 7. II. 1963, 1♀, Wise; 0–30 m, tussock, 1. XII. 1962, 1♀, Rennell. Tucker Cove: 1–50 m, 21–25. XI. 1961, 2♂♂, 1♀; 6–11. XII. 1961, 3♀♀; 4 m, Malaise trap, 27. XI–1. XII. 1961, 4♂♂; 18–21. XII. 1961, 1♀; 1–50 m, *Poa*, 26–30. XI. 1961, 1♀, Gressitt.

Paralimnophora depressa Lamb

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Bulbinella*, 26–30. XI. 1961, 5♂♂, 2♀♀; sedge, 26–30. XI. 1961, 1♂; *Poa*, 12–17. XII. 1961, 1♂; *Dracophyllum*, 18–21. XII. 1961, 1♀; nr. Camp, 2. XII. 1961, bred ex pupa, 1♀, 1 pupal case, Gressitt. Courrejolles Penin., 200 m, ground. rocks, moss around mollymawk nests, 1♂, 1♀, Gressitt & Rennell; 200 m, gray-headed mollymawk, 14. XII. 1961, 2♀♀, Gressitt. Lookout Bay, beach, rock and kelp, 16–19. XII. 1961, 7♂♂, 11♀♀; *Hebe*, 16–19. XII. 1961, 1♀; on kelp high water level, 30. XII. 1961, 1♀, Rennell; 3. XII. 1961, 2♂♂, 1♀, Gressitt. Mt. Azimuth, 350–450 m, 14.XII.1961, 1♂, 1♀, Rennell. Mt. Eboulé, 150 m, 17. XII. 1961, 1♂, 1♀, Gressitt. Monument Harbor, nr. beach, kelp, 17. XII. 1961, 1♂, 4♀♀, Gressitt; 9. II. 1963, 1♀(*); shore rocks, 9. II. 1963, 1♀, Wise. Northwest Bay, tussock, 30.XII.1962, 2♀♀, Rennell; beach, rocks, 29.XI. 1961, 10♂♂, 7♀♀, Gressitt; sweeping, 5. II. 1963, 1♂, Wise. Rocky Bay, 10 m, penguin rookery, 18. II. 1963, 1♂, Wise; *Anisotome*, 20. XII. 1961, 2♂♂, Gressitt. Shoal Pt., 0–10 m, tussock, 21. X. 1962, 1♂, 1♀, Rennell. Tucker Cove: beach, 4. XII. 1961, 4♂♂, 2♀♀; 1–50 m, *Poa*, 18–21. XII. 1961, 1♂; 1–50 m, 21–25. XI. 1961, 4♂♂, 1–5. XII. 1961, 4♀♀; 6–11. XII. 1961, 4♂♂, 12–17. XII. 1961, 5♂♂, 2♀♀; 4 m, Malaise trap, 27. XI–1. XII. 1961, 10 ♂♂, 7♀♀; 3–5. XII. 1961, 1♀; 16–18. XII. 1961, 1♀, Gressitt. Venus Cove, tussock, 2. II. 1963, 1♂; swept shore, 18. II. 1963, 1♂, Wise.

From this series of specimens the following additional notes on the species are made. Palps normally light yellow but sometimes brown. Four postsutural dorsocentrals normally, one specimen of each sex has 3 such bristles on one side and the normal 4 on the other; several specimens have the 2nd bristle, posterior to suture, weaker than the others.

Limnophora aureifacies (Malloch)

SPECIMENS EXAMINED: Beeman Cove, 4. III. 1962, 17 ex(*), Clark. Beeman Hill, sweeping, 11. II. 1963, 3♀♀, Wise. Garden Cove, beach, 29. XI. 1961, 1♂, Rennell; Lookout Bay, beach, 3. XII. 1961, 1♀, Gressitt. St. Col Ridge, 180–280 m, *Coprosma*, 7. XII. 1961, 1♂, Gressitt. Tucker Cove: 4 m, Malaise trap, 27. XI–1. XII. 1961, 7♂♂, 9♀♀; 1–3. XII.

1961, 11♂♂, 6♀♀; 3–5. XII. 1961, 7♂♂; 5–8. XII. 1961, 3♂♂; 16–18. XII. 1961, 29♂♂, 13♀♀; 18–21. XII. 1961, 16♂♂, 9♀♀; 1–50 m, *Coprosma*, 1–5. XII. 1961, 1♂; on beach, 1–5. XII. 1961, 1♀; 1–5. XII. 1961, 1♂, Gressitt. Tucker Cove—St. Col Ridge, 30.XI.1961, 1♂, Gressitt.

A new record for Campbell I.

Limnophora brunneivittata Harrison

SPECIMENS EXAMINED: Beeman Camp, 2–50 m, *Dracophyllum*, 18–21. XII. 1961, 1♀, Gressitt. Beeman Cove, 20 m, 2. X. 1962, 1♂, Clark. Courrejolles Pen., 19. X. 1962, 1♂, 1♀, Clark. Garden Cove, 25. XI. 1961, 1♂, Gressitt. Lookout Bay, beach, 3. XII. 1961, 2♀♀, Gressitt. Mt. Lyall, 200–400 m, 3. XII. 1961, 1♂, 1♀, Gressitt. Moubray Hill, 200 m, 12. XII. 1961, 1♂; *Coprosma*, 12. XII. 1961, 1♀, Rennell. Northwest Bay, beach, rocks, 29. XI. 1961, 1♀, Gressitt & Rennell. Rocky Bay, 20. XII. 1961, 1♀, Gressitt. Six-foot Lake, 2 m, *Anisotome*, 10. XII. 1961, 1♀, Gressitt. Tucker Cove: beach, 21. XII. 1961, 1♀; 1–50 m, *Bulbinella*, 1–5. XII. 1961, 1♂; 18–21. XII. 1961, 1♀; 1–50 m, 21–25. XII. 1961, 1♂, 2♀♀; 6–11. XII. 1961, 1♂, 1♀; 2–50 m, 26–30. XI. 1961, 3♀♀, *Poa*, 26–30. XI. 1961, 1♂; 1–50 m, beach, 1–5. XII. 1961, 1♀, Gressitt; 6–30 m, fern, 6. VIII. 1962, 1♂, Rennell; 4 m, Malaise trap, 27. XI–1. XII. 1961, 4♂♂; 1–3. XII. 1961, 1♂, 1♀; 16–18.XII.1961, 1♀, Gressitt. 1943, 1♀, J. H. Sorensen.

This series shows a variation in general color and distinctness of vittae which could broaden the original description.

Limnophora brunneinota Harrison

SPECIMENS EXAMINED: Beeman Beach, 2–50 m, *Bulbinella*, 26–30. XI. 1961, 1♂, Gressitt. Beeman Hill, 100–180 m, 11–16. XII. 1961, 1♀, Gressitt. Courrejolles, E. slope, 240 m, 13. II. 1963, 1♂, Wise. Garden Cove, 25. XI. 1961, 2♂♂, elephant seal wallows, 25. XI. 1961, 1♀, Gressitt. Lookout Bay: beach, 3. XII. 1961, 3♂♂; *Bulbinella*, 3. XII. 1961, 2♂♂; elephant seal wallow, 1. XII. 1961, 1♀; kelp on beach, 16. XII. 1961, 1♀, Gressitt; 3. II. 1963, 1♂; 2. III. 1963, 1♂, Wise. Mt. Lyall, 200–400 m, 3.XII.1961, 3♂♂, 2♀♀, Gressitt. Moubray Hill, 200 m, 12. XII. 1961, 2♂♂, 1♀; *Bulbinella*, 12. XII. 1961, 1♂, Gressitt. Northwest Bay, beach, 29. XI. 1961, 1♂, Gressitt & Rennell. Shoal Pt., sedge and tussock about elephant seal wallows, 7. II. 1963, 1♂, Wise. Rocky Bay, 20. XII. 1961, 1♀, Gressitt. Six-foot Lake, 2 m, *Anisotome*, 10. XII. 1961, 3♂♂, 1♀, Gressitt. St. Col Ridge, 180–280 m, moss, 10. XII. 1961, 1♀, Gressitt; 150–200, 10. X. 1962, 1♀, Rennell. Tucker Cove: 1–50 m, grass nr. seal wallow, 21–25. XI. 1961, 1♂, 1♀; *Poa*, 21–25. XI. 1961, 1♀; 26–30.XI.1961, 4♂♂; 1–5. XII. 1961, 3♂♂, 1♀; St. Col Ridge, 30. XI. 1961, 1♀; 0–100 m, sedge, 7. VII. 1962, 3♂♂, 1♀; 4 m, Malaise trap, 1–3. XII. 1961, 1♂; 3–5. XII. 1961, 1♂; 5–8. XII. 1961, 1♂; 16–18. XII. 1961, 1♂, 1♀, Gressitt.

This large series has been tentatively determined as this species. It shows that the variation in the species is very wide and should serve as a most useful basis for any revision of the genus *Limnophora* in New Zealand.

Limnophora minuta Harrison

Not represented in the present collection.

Limnophora sorenseni Harrison

Not represented in the present collection.

Undetermined species:

The following specimens are at present undetermined as to species because they are either damaged or the series is too small.

Limnophora sp. A.

SPECIMENS EXAMINED: Northwest Bay, beach, rocks, 29.XI.1961, 3♂♂, Gressitt & Rennell.

Limnophora sp. B

SPECIMENS EXAMINED: Rock Bay, rockhopper penguin nests, 20. XII. 1961, 1♂, Rennell.

Limnophora sp. C

SPECIMENS EXAMINED: Middle Bay, beach, 29. XI. 1961, 1♀, Gressitt.

Family HIPPOBOSCIDAE

Melophagus ovinus (Linnaeus)

SPECIMENS EXAMINED: Camp Cove, sheep, 25.XI.1961, 13 ex, Gressitt; Monument Harbor, sheep, 10. XII. 1961, 2 ex, Gressitt.

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INSECTS OF CAMPBELL ISLAND.
DIPTERA: EMPIDIDAE

By Kenneth G. V. Smith

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The following 2 new species were collected by Dr. J. L. Gressitt and I am indebted to him and to Dr. R. A. Harrison for the opportunity to study them. No Empididae were previously known from the island, the nearest record being *Hilara smithii* Hutton (1901) from the Auckland Isles (later removed to the genus *Hilarempis* by Collin, 1928).

Subfamily Empidinae

Genus **Empidadelpha** Collin

Empidadelpha Coll. 1928, New Zealand Empididae. London.

Collin (1928: 105) erected this genus to receive *E. propria* Collin from New Zealand. He differentiated the genus from *Empis* mainly on the shorter r1 and the S-shaped recurrent veinlet closing cell Cu. Later, Collin (1933: 225) included a new species from Chile, *E. sobrina* in which r1 is longer and the recurrent veinlet closing Cu not S-shaped, but still more rounded than in *Empis*. The new species here described is more akin to the Chilean species in venation.

Empidadelpha stigmosa Smith, n. sp. Fig. 1 a–c.

♂: *Head* completely grey dusted. Frons short, about 4× as wide as an ocellus. Face about 3× ocellar width. A pair of strong divergent ocellar bristles with several short hairs behind. A pair of distinct vertical bristles with a 2nd weaker outer pair. Occiput with short postocular bristles and some longer bristles behind. Antennae very long and blackish (as in fig. 1b), segment 1 elongate, 2× length of segment 2; segment 3 with a short broad base, but drawn out apically to almost length of segment 1 and with a long thick apical style. Proboscis very short and fleshy. Palpi broad, flattened and rather long with some very short stout bristles at tip. *Thorax* completely brownish grey, but in some lights more greyish on a broad median stripe to point nearly in line with wing bases. Bristles well developed. Acrostichals commencing biserial, but ending uniserial. Dorsocentrals strong, uniserial, 6 bristles in each series with some weaker bristles between. A strong humeral bristle with 1 or 2 small bristles in front; a strong intrahumeral; a strong posthumeral, with a weaker bristle in front; 3 strong notopleurals; 2 supra-alars, posterior one longer; a strong postalar. Scutellum brownish grey with a pair of strong upswept, convergent apical bristles and a weak outer pair of hairs. Pleurae greyish, metapleurae with about 8

slender bristles. *Abdomen* brownish, with short black hairs and a hind marginal series of longer bristles on each tergite. Genitalia (fig. 1c) widely open with blackish appendages. *Legs* brown but coxae more yellowish brown and femora somewhat yellowish beneath. Front femora with distinct antero- and posteroventral bristles and less distinct posterodorsal bristles. Mid femora with antero- and posteroventral bristles and a slender anterior bristle at basal third. Hind femora with anteroventral bristles which become stronger towards tip. Front tibia short, fine haired below, otherwise short haired except for short posterodorsal bristles. Mid tibiae without outstanding bristles. Hind tibiae with 1 or 2 distinct anteroventral bristles distally, strong antero- and posterodoral bristles. All tibiae with apical circlets of small bristles. Tarsi slender, hind metatarsi with tiny anteroventral bristles.

Wing (fig. 1a) grey with brown veins, a brownish stigma about tip of r1. A long costal bristle at base. Tip of r1 a little beyond end of the rather blunt ended 1st M_2. Halteres with knob black and stem pale brownish.

♀ : Similar to ♂ but proboscis (fig. 1b) longer than head is deep, with labrum shining black.

Length : 3.5 mm.

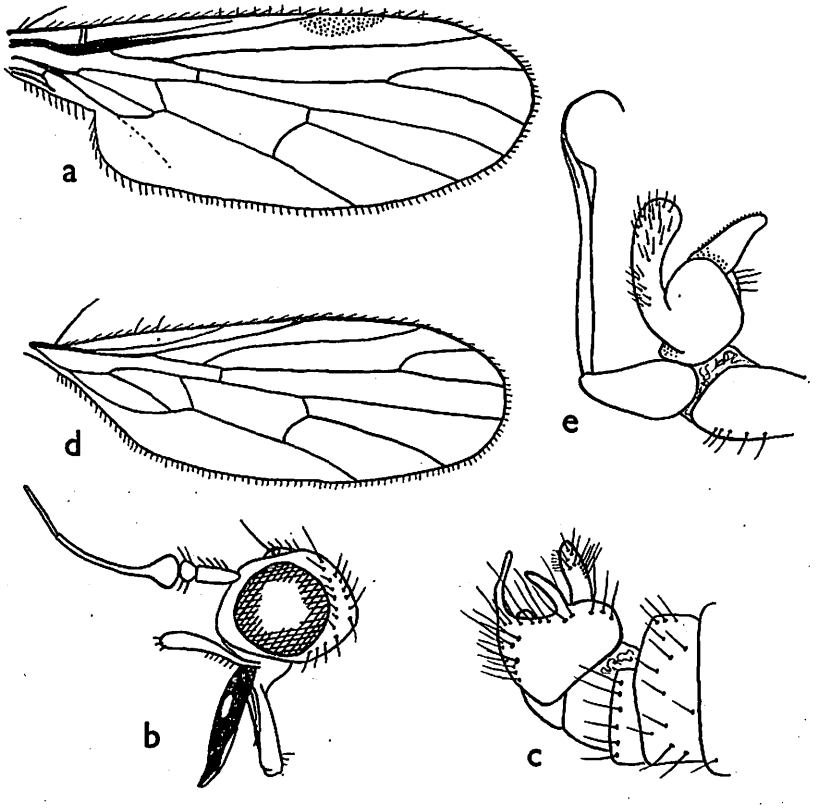

Fig. 1.. a–c. *Empidadelpha stigmosa* Smith, n. sp. a, ♂ wing; b, ♀ head; c, ♂ genitalia. d-e. *Clinocera gressitti* Smith, n. sp. d, ♂ wing; e, ♂ genitalia.

Immediately distinguishable from the 2 described species *E. sobrina* and *E. propria* by the presence of a wing stigma and the short, fleshy proboscis of the ♂.

Holotype ♂ (D.S.I.R., Nelson); paratypes 6♂♂, 10♀♀, Campbell I., Tucker Cove, 4 m, Malaise trap, 18–21.XII.1961, Gressitt. Paratypes 3♂♂, 1♀, Northwest Bay, beach, rocks, 29. XI. 1961, Gressitt and K. Rennell. Paratype ♀, Lookout Bay, beach, 16, 19. XII. 1961, Gressitt. Paratype ♀, St. Col Ridge, 180–280 m, 7.XII.1961, Gressitt. Paratypes in Bishop Mus., and Dominion Mus., except for paratype ♂ and ♀ retained in British Museum (Nat. Hist.), London.

Subfamily Clinocerinae

Genus **Clinocera** Meigen

Clinocera Meig. 1803, Illig. Mag. II, 271.

This genus has not been recorded from the New Zealand region before, the only representative of the subfamily being *Dipsomyia* Bezzi (Collin, 1928: 59). *Clinocera fumosa* Hutton (1900: 31) was shown by Collin (1928: 64) to belong to *Apalocnemis* Philippi. The new species described here is somewhat intermediate between the subgenera *Clinocera* s. s. and *Hydrodromia* Macquart. It lacks the front femoral terminal 'comb' of the latter, but there is a strong humeral bristle, usually present in *Hydrodromia* and absent in *Clinocera.*

Clinocera gressitti Smith, n. sp. Fig. 1 d–e.

♂. *Head* brown with face and lower part of occiput grey. Frons a little wider, face about as wide as antennal segment 3 is deep. Face bare. Ocellar bristles slender and divergent. Two pairs of vertical bristles. A postocular series of small bristles with weaker bristles behind and some fine pale hairs below. Antennae short, black, segment 3 triangular with a thickened apical arista which is nearly as long as 3 antennal segments combined. Mouthparts extremely short and palpi brown. *Thorax* brown with 2 narrow blackish median stripes when viewed in certain lights. No acrostichals, 5 long uniserial dorsocentrals; a humeral; a posthumeral; a notopleural, with a tiny bristle below; a weak supraalar and a strong postalar present. Scutellum brown with a pair of strong apical bristles. Pleurae brown on upper 1/2, light grey below. Hind margin of mesopleuron with a few tiny hairs, metapleura with 8 or 9 bristly hairs. *Abdomen* brown above, light grey below, with very short hairs. Genitalia (fig. 1e) brown. *Legs* slender, with coxae light grey, remainder dark brown. Front femora without a terminal 'comb.' No outstanding bristles except for some slender antero- and posteroventral bristles basally on front femora, otherwise short haired. *Wings* (fig. 1d) brownish tinged, more especially so on dark brown veins and about crossveins. Long costal spine at base and 2 long bristles between it and tip of sc.

♀: Similar to ♂, but with thoracic bristles a little longer, abdomen terminating in 2 anal papillae (about as long as antennal segment 3).

Length: 3 mm.

Holotype ♂ (D.S.I.R., Nelson); paratypes 8♂♂, 6♀♀, Campbell I., Tucker Cove, 4 m, Malaise trap, 26. XI–21. XII. 1961, J. L. Gressitt. Paratypes in Bishop Mus. and Dominion

Mus., except for paratype ♂ and ♀ retained in British Museum (Nat. Hist.), London.

The genitalia of this species bear a remarkable resemblance to the Palaearctic *Clinocera* (*Hydrodromia*) *stagnalis* Haliday, which also resembles this species in other features, notably the less clouded wings compared with other members of the subgenus *Hydrodromia.* However *C.* (*H.*) *stagnalis* has the pleurae entirely light grey and has no bristles beneath the base of the front femora and of course has the tiny anterior 'comb' of bristles characteristic of the subgenus. The nearest to New Zealand that the genus *Clinocera* has previously been recorded is Java (Engel, 1931).

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Pacific Insects Monograph 7: 329 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
DIPTERA: PHORIDAE

By Erwin M. Beyer

BAD GODESBERG, WEST GERMANY

Megaselia (Megaselia) scalaris (Loew)

Phora scalaris Loew, 1866, Cent. 7: 53.

1♀ (BISHOP), Beeman Hill, 100–180 m, Campbell I., sooty albatross nest, 11–16.XII.1961, J. L. Gressitt.

Widely distributed over all tropic and subtropic regions of Africa, Asia and Australia, even in Southern Europe and North America.

Megaselia (Megaselia) insulana (Brues)

Aphiochaeta insulana Brues, 1911, Ann. Mus. Nat. Hung. 9: 542.
Aphiochaeta subfurcata Brunetti, 1912, Rec. Indian Mus. 7: 508. **New Synonomy.**

1♂ (BISHOP), Beeman Hill, 180 m, Campbell I., moss-lichen, low plants, 11. II. 1963, K. A. J. Wise.

Widely spread over World tropics (Africa, Asia, Australia).

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INSECTS OF CAMPBELL ISLAND. SIPHONAPTERA[1]

By F. G. A. M. Smit

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Abstract: Three species of fleas are reported for the first time from Campbell I. The distribution is shown of the species of the *longicornis*-group of *Parapsyllus* and the forms described as subspecies of *longicornis* are given full species status.

There are no published records of fleas from Campbell I. and apparently no specimens were collected there before 1961. The collecting efforts of Dr. J. L. Gressitt and Messrs. K. P. Rennell, P. R. Wilson and K. A. J. Wise resulted in material of 3 species (1 cosmopolitan rat flea and 2 subantarctic fleas of sea-birds). At present 20 species of fleas are known to occur in the New Zealand subregion.

Family CERATOPHYLLIDAE

Nosopsyllus (Nosopsyllus) fasciatus (Bosc, 1800)

1♂, 11♀♀, Beeman Camp, ex rat caught near fowl run, 30. III. 1962, Rennell; 4♂♂, 3 ♀♀, Beeman, ex rat caught in fowl house, 3, 6 & 9.IV.1962, Rennell; 3♀♀, slope of Mt. Dumas, 50 m, ex *Rattus norvegicus*, 14. XII. 1961, Gressitt; without exact locality: 14♂♂, 17♀♀, ex 6 *Rattus norvegicus*, 4–8. I. 1961, Wilson; 1♂, ±250 m, ex dead albatross, 12. II. 1963, Rennell.

This cosmopolitan flea is primarily associated with the brown rat *Rattus norvegicus* and the black rat *Rattus rattus*. Common throughout the New Zealand subregion.

Family PYGIOPSYLLIDAE

Notiopsylla kerguelensis (Taschenberg, 1880)

1♀, Smoothwater Bay, ex leaf mold of *Dracophyllum*, 16.II.1963, Wise; 2♀♀, S of Courrejolles Peninsula, ±220 m, ex burrow of *Puffinus griseus*, 12. II. 1963, Wise.

A common parasite of gulls and petrels. Widely distributed throughout the subantarctic region, being known from Heard I. (ex giant petrel *Macronectes giganteus*), Kerguelen Is. (ex grey petrel *Adamastor cinereus*, blue petrel *Halobaena caerulea* and Kerguelen diving petrel *Pelecanoides urinatrix exsul*), South Georgia (ex Bank's blue petrel *Prion banksi* and the dominican gull *Larus dominicanus*) and in the New Zealand subregion from the Snares Is.

1. Results of field work supported by National Science Foundation grants G-18800 and G-23720 from the U. S. Antarctic Research Program.

(ex sooty shearwater *Puffinus griseus*), Macquarie I. (ex sooty shearwater *Puffinus griseus*, dove prion *Pachyptila desolata* and dominican gull *Larus dominicanus*) and the Auckland Is. (ex white-headed petrel *Pterodroma lessoni* and Kerguelen diving petrel *Pelecanoides urinatrix exsul*).

Family RHOPALOPSYLLIDAE

Parapsyllus longicornis (Enderlein, 1901)

COURREJOLLES PENINSULA: 3♂♂, 2♀♀, ex nest of black-browed mollymawk *Diomedea melanophris impavida*, 29.I.1961, Wilson; 22♂♂, 25♀♀, ex nest of *Diomedea melanophris impavida*, 14.XII.1961, Gressitt; 19♂♂, 33♀♀ ex nest of grey-headed mollymawk *Diomedea chrysostoma*, 14.XII.1961, Gressitt; 2♀♀, ex nest of *Diomedea melanophris impavida*, 13.II.1963, Wise.

Parapsyllus longicornis was described from 5♂♂, 2♀♀ collected in 1899 on St. Paul I. from the rockhopper penguin *Eudyptes chrysocome*. Enderlein's description (Zool. Jb. Syst. **14**: 553, pl. 34, figs. 8, 9, 12) is of little diagnostic value, but fortunately the Rothschild collection of fleas at Tring contains 1♂, 1♀, topotypes collected in 1875. Since the description of the species, no specimens have been recorded which could be determined with any certainty as *P. longicornis* (Enderlein). Meanwhile 4 subspecies of *longicornis* have been described but I have reached the conclusion that *longicornis alginus* Jordan, 1942, is inseparable from *longicornis* Enderlein, 1901 (**New Synonymy**) and that the remaining 3 subspecies might be regarded as full species on structural and geographical considerations. These forms are:

Parapsyllus australiacus Rothschild, 1909, Novit. Zool. **16**: 62.

DISTRIBUTION: Bird I. (type locality; off Perth, Western Australia), Greenly I. and Encounter Bay (South Australia), Lady Julia Percy I. (off coast of Victoria, Australia), Brush Is., Tollgates I., Montague I. and Lion I. (off the coast of New South Wales, Australia), Babel I., Little Green I. and Furneaux I. (in Bass Strait), Huon I. and Bruny I. (off the coast of Tasmania), Tasmania.

HOSTS: Penguins, shearwaters, petrels.

Parapsyllus humboldti Jordan, 1942, Eos, Madr. **18**: 18, figs. 2C, 6, 9C.

DISTRIBUTION: Zapallar (type locality; N of Valparaiso, Chile), Ichabo I., Possession I. and Sinclair's I. (off coast of SW Africa), Jutten I. and Dassen I. (off W. coast of S. Africa).

HOSTS: Penguins.

Parapsyllus dacunhai de Meillon, 1952, Rep. Austr. Nat. Antarct. Exped. (B) **1**: 2, figs. 1–4.

DISTRIBUTION: Nightingale I. (Tristan da Cunha).

HOSTS: Shearwater; thrush (accidental occurrence ?).

P. longicornis is known from Kidney I. (off East Falkland I.; type locality of *P. l. alginus*) and East Falkland I., St. Paul I. and in the New Zealand subregion from Campbell I., North I., Goat I. and South I.

HOSTS: Penguins, albatrosses, cormorants and mollymawks.

The following 2 species also belong to the *longicornis*-group.

Parapsyllu staylori Jordan, 1942, Eos, Madr. **18**: 22, figs. 3A, 10.

DISTRIBUTION: Rottnest I. and Carnac I. (Western Australia), Lady Julia Percy I. (Victoria, Australia), Tollgates I. (New South Wales, Australia), Little Green I., Fisher I., Flinders I. and Babel I. (in the Bass Strait).

HOSTS: Shearwaters, petrels.

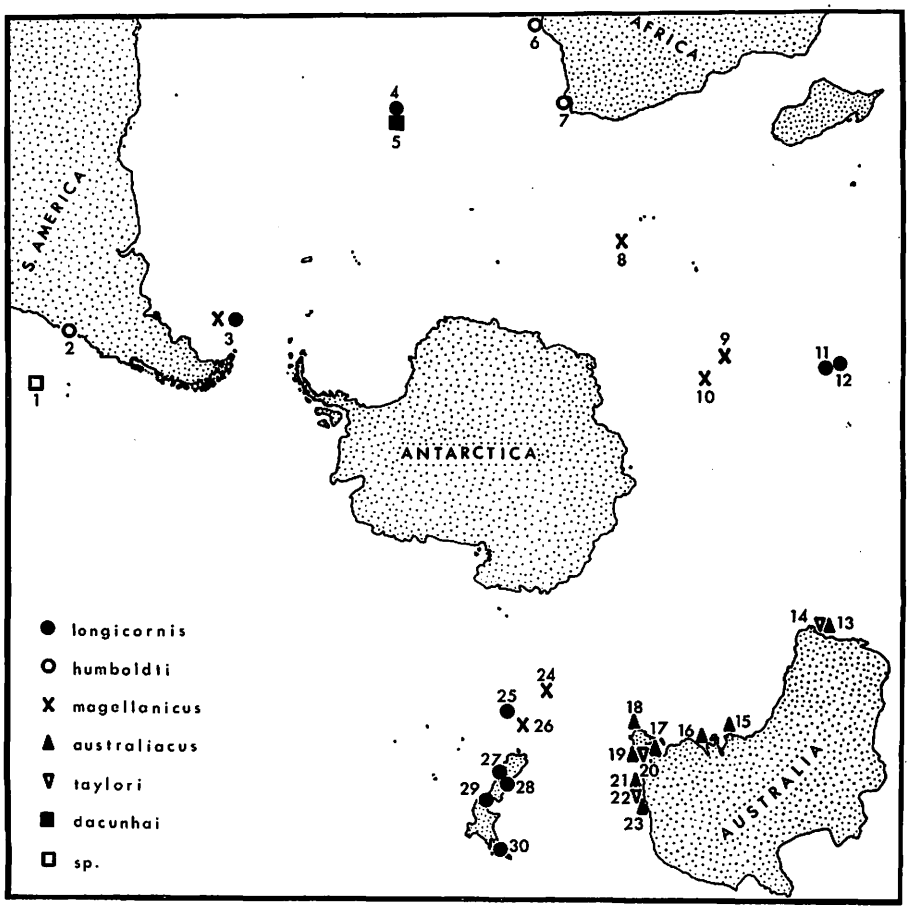

Fig. 1. Map showing the distribution of species of the *longicornis*-group of *Parapsyllus* (del. A. M. Wright). 1, San Ambrosio I.; 2, Zapallar, Chile; 3, Falkland Is.; 4, Tristan da Cunha; 5, Nightingale I.; 6, Ichabo I., Possession I. and Sinclair's I.; 7, Jutten I. and Dassen I.; 8, Marion I.; 9, Kerguelen I.; 10, Heard I.; 11, St. Paul I.; 12, Amsterdam I.; 13, Bird I.; 14, Rottnest I. and Carnac I.; 15, Greenly I.; 16, Encounter Bay; 17, Lady Julia Percy I.; 18, Bruny I. and Huon I.; 19, Flinders I. and Babel I.; 20, Little Green I.; 21, Montague I. and Brush I.; 22, Tollgates I.; 23, Lion I.; 24, Macquarie I.; 25, Campbell I., 26, Auckland Is.; 27, Lake Forsyth, Tokoroa Bay and Lyttelton Harbor; 28, Perpendicular Point; 29, Somes I., Days Bay, Lyall Bay and Petona; 30, Mahurangi Heads.

Parapsyllus magellanicus Jordan, 1938, Novit Zool. **41**: 135, figs. 80–82.

(*Parapsyllus magellanicus heardi* de Meillon, 1952, Rep. Austr. Nat. Antarct. Exped. (B) **1**: 4, figs. 5, 6, appears to be inseparable from *P. magellanicus* Jordan).

DISTRIBUTION: Kidney I. (East Falkland Is.), New Island (West Falkland Is.), Heard I., Kerguelen I., Marion I., Macquarie I. and Enderby I. (Auckland Is.).

HOSTS: Petrels, cormorants, skuas, penguins.

An undescribed species is found on San Ambrosio I. (Pacific Ocean, 1150 km NW of Valparaiso).

The very distinct *cardinis*-group of species of *Parapsyllus* is confined to the New Zealand subregion; as no representatives of this group are known from Campbell Island and as 3 of the 4 species known to me have not yet been described, this group is not dealt with here.

The distribution of the species of the *longicornis*-group is shown in fig. 1. As will be seen, *P. longicornis* and *P. magellanicus* are widely distributed in the subantarctic area (the pygiopsyllid flea of petrels, *Notiopsylla kerguelensis*, has a similar wide distribution). *P. humboldti* occurs on or near the coast of SW South America and SW Africa, *P. dacunhai* is only known from Nightingale I. (Tristan da Cunha) and an undescribed species from San Ambrosio I., while *P. australiacus* and *P. taylori* are found along the southern coastline of Australia and around Tasmania.

Jordan (1942) has pointed out that *Parapsyllus* is of S. American origin (all other members of Rhopalopsyllidae occur in the Neotropical region). It is relevant to note that around the southern tip of S. America populations of 4 of the 7 species of the *longicornis*-group are found; it is possible that *P. dacunhai* may eventually also be discovered in that area. Only *P. australiacus* and *P. taylori* are purely Australian in distribution.

As far as we know, most of the small islands in the subantarctic region are occupied by only one representative of the *longicornis*-group; *taylori* and *australiacus* have been found together on Tollgates I., Lady Julia Percy I., Babel I. and Little Green I., and *magellanicus* and *longicornis* together on Kidney I. (Falklands).

As Dunnet (1964) has suggested, the true and original hosts of the species of *Parapsyllus* are very likely flying sea-birds, not penguins as previously assumed. There are now many more records of species of the *longicornis*-group from petrels, cormorants, shearwaters, mollymawks and skuas than from penguins, although these Parapsylli can be numerous in the nests of penguins which, moreover, were more intensively searched for fleas in the past than the nests of flying sea-birds. A comparison can be made with the Palearctic species *Ceratophyllus gallinae*, which is primarily associated with small Passerine birds; however, the hen is such a suitable secondary host that this flea has become known as the European "hen-flea." *C. gallinae*, like the various species of *Parapsyllus*, is very promiscuous in the choice of hosts and also exhibits fairly considerable individual variation.

There seems to be little doubt that specimens of *Parapsyllus* are regularly carried by flying sea-birds from one island to another, but the number of fleas on one bird will presumably always be small. If one or a few specimens of a certain species of *Parapsyllus* arrive in that manner on a certain island it may well find that all ecological niches there are filled by another species. Moreover, the numbers of the immigrants may be far too low for the establishment of a new population. Where 2 species are found on one island

there seems to be an ecological separation between the two, *e. g. P. taylori* lives in the burrows of shearwaters and *P. australiacus* usually occurs in the exposed nests of penguins (although it is occasionally found in nests of shearwaters; straggling is facilitated on the small islands by the density of the nests of the various birds).

Continued collecting may eventually shed more light on the distribution and true status of the species of the *longicornis*-group of *Parapsyllus.*

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Pacific Insects Monograph 7: 335–339 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLEOPTERA: CARABIDAE[1]

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Abstract: Three species of carabid beetles from Campbell I. are reported upon. Two, *Pseudoopterus marrineri* (Broun) and *Pseudoopterus tarsalis* (Broun), are terrestrial, and *Kenodactylus capito* Broun is inter-tidal.

Only 3 small (about 5–6 mm) species of Carabidae are known from Campbell I. They have all been found repeatedly in series (see Broun 1909; Brookes, 1951; and present report), and it is unlikely that any additional species remain to be discovered. The *absence* on Campbell I. of larger carabids of the subantarctic tribe Migadopini (Jeannel, 1938; Darlington, 1960, page 663) is noteworthy, for the tribe is represented on the Auckland Is. by 3 genera or subgenera and 4 species (Jeannel, 1938; Brookes, 1951).

Of the 3 carabids that occur on Campbell I., 2 are terrestrial. They both belong to the genus *Pseudoopterus* (Csiki 1928), which is otherwise confined to New Zealand and the Auckland Is. The tribe to which this genus belongs, the Merizodini, has a subantarctic distribution which is in general (but not in all details) like that of the Migadopini: different genera of Merizodini occur in southern South America with the Falkland Is., Tasmania with the southeastern corner of Australia, and New Zealand with the Auckland and Campbell Is.

The third carabid on Campbell I., *Kenodactylus capito* Broun, is inter-tidal. This species has been found also on the Auckland Is., and a very closely related species of the same genus occurs on the southern tip of South America. This genus belongs to a special group (tribe Aepini of Jeannel, 1926: 440ff) of inter-tidal genera which are localized north and south of tropics, on the coasts of Europe (and the Canary Is.), southern South America, and islands south of New Zealand. And this group of genera belongs in turn to a chiefly terrestrial tribe, Trechini, which is almost cosmopolitan but bi-zonally dominant, most numerous in the north and south temperate zones. It should be added that what I call the tribe Trechini is equivalent to the whole "subfamily" Trechinae of Jeannel's (1926–1928) classic monograph. The *absence* of terrestrial (as opposed to inter-tidal) Trechini on both the Auckland and Campbell Is. is noteworthy.

All 3 species of Carabidae on Campbell I. are flightless, with atrophied wings. The tribes to which they belong still include winged forms elsewhere and are evidently derived from flying ancestors, which may have dispersed partly by flight. My impression is, however,

1. Results of fiield work supported by the National Science Foundation grants G-18800 and G-23720 from the U. S. Antarctic Research Program.

that although the tribes may originally have dispersed by flight, the genera on Campbell I. probably have not done so. The species of *Pseudoopterus* may have reached the Auckland and Campbell Is. from New Zealand in various ways other than by flight, and *Kenodactylus*, adapted as it is to an inter-tidal habitat, seems especially likely to be carried on drift in the great ocean current that circles the antarctic from west to east. *Kenodactylus* may have occurred on the coast of Antarctica in the past, and on other antarctic and subantarctic islands. The genus may even have been dispersed on the bottoms of ships. The virtual identity of the Auckland–Campbell and southern South American "species" suggests this.

The specimens listed in detail below are all in Bishop Museum, Honolulu, except that some duplicates are now in the Museum of Comparative Zoology. An additional lot of about 125 specimens of Campbell I. Carabidae, of which less than a third are mounted, has been received from the Dominion Museum, New Zealand. These specimens were collected by J. H. Sorensen, J. M. Moreland, C. M. Clark, and P. M. Johns. This is a valuable collection and would by itself be enough to show what Carabidae occur on Campbell I. and, in a general way, how they are distributed there. All 3 species of the family known from the island are represented. However, because of differences in method of citation of localities, it would be impracticable and confusing to incorporate the records of this material with the other records given below, and I have not tried to do so, but shall simply state that the additional material exists and that it confirms my general conclusions about the Campbell I. carabid fauna.

Key to genera and species of Campbell I. Carabidae

1. Head appearing as wide as prothorax (by measurement only .90–.93 as wide), flattened, with 2 deep longitudinal channels parallel on front and curving around behind eyes posteriorly (tribe Trechini); habitat inter-tidal..... 3. **Kenodactylus capito**
   Head relatively narrower, less flattened, with frontal channels much less developed (tribe Merizodini); habitat terrestrial..... 2
2. Elytron with seta-bearing puncture inside apical carina; eyes relatively less and genae more prominent; size averaging larger and form slightly wider (but somewhat variable)..... 1. **Pseudoopterus marrineri**
   Elytron usually without seta-bearing puncture inside apical carina (see comments under this species); other characters opposed to those above (but somewhat variable)..... 2. **Pseudoopterus tarsalis**

1. **Pseudoopterus marrineri** (Broun) Fig. 1a.

Oopterus marrineri Broun, 1909: 88, pl. 5, fig. 3.

Oopterus elongellus Broun, 1909: 80. **New Synonymy.**—Brookes, 1951: 12 (both names listed.)

Known only from Campbell I. (but perhaps occurring on the Auckland Is. under another name). New material before me totals 51 specimens from: Beeman Camp; Beeman to Lyall Saddle; Tucker Cove; Moubray Hill; Mt. Lyall; St. Col Ridge; St. Col; Mt. Azimuth; Courrejolles Peninsula; Venus Cove; Shoal Point; Mt. Honey; Rocky Bay; Northwest Bay; Trib. 15 Cars Harbor; and "Nr. Station." Altitudes 0–10 to 500 m; August 3–January 20; J. L. Gressitt, K. P. Rennell, and (Cars Harbor specimen only) J. H. Sorensen;

under boards, rocks, and debris; in or under tussocks and moss, including moss on rocks; in or under *Poa*, *Pleurophyllum*, and *Colobanthus*; and "in nest of Royal Albatros under dead chick", "ground, rocks, moss around Mollymawk nests", and "under weeds on top of rock among penguins." These records suggest that the beetles hide by day in any convenient cover and hunt or possibly scavenge by night. Three obviously teneral specimens, all from altitudes 100–280 m, are dated 5, 14, & 27 December.

Broun described *marrineri* and *elongellus* in the same paper, *marrineri* having page precedence. The types of both are now in the British Museum. I am indebted to Dr. E. B. Britton for examining and comparing them. Dr. Britton has confirmed the presence of seta-bearing punctures inside the apical elytral carinae in both types, and he gives it as his impression that the 2 represent a single species. This is my conclusion also after examination of the series recorded above. The type of *elongellus*, although an exceptionally large individual, is only 6.1 mm long, not 3 1/8 lines as stated by Broun.

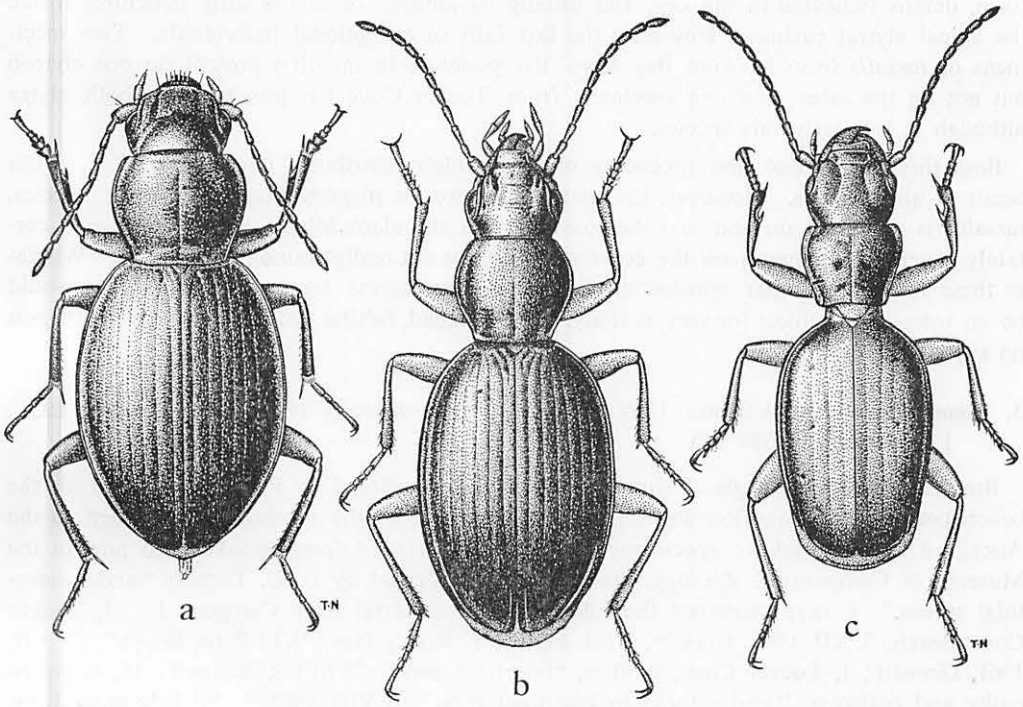

Fig. 1. a, *Pseudoopterus marrineri* (Broun); b, *P. tarsalis* (Broun); c, *Kenodactylus capito* Broun.

2. **Pseudoopterus tarsalis** (Broun) Fig. 1b.

Oopterus tarsalis Broun, **1909**: 89.—Brookes, 1951: 12.

This species too is recorded only from Campbell I. (although it may occur on the Auckland Is. under another name). New material before me totals 176 specimens from: Beeman Beach; Perseverance Harbor; Tucker Cove; Moubray Hill; Mt. Lyall; St. Col: St. Col Ridge; Courrejolles Peninsula; Smoothwater Bay; Lookout Bay Beach; Monument

Harbor; Nr. Beach; South Coast East of Mt. Dumas; Rocky Bay; Davis Pt.; Gordon Cove Beach; Windlass Bay. Altitudes from sea level to 400 m; in Nov., Dec., Jan., Apr., May, & July; chiefly J. L. Gressitt and K. P. Rennell, with odd specimens taken by J. H. Sorensen. Habitats indicated include: under rocks, moss, etc., including moss and herbs on rocks; among turf; (in or under) *Colobanthus*; "KELP on beach"; "Shag nesting place among plants growing in grass"; "stones in penguin rookery"; and "Rockhopper penguin rookery." These habitat records do not suggest any great difference in habits between this and the preceding species (but there is a general difference in distribution of abundance, noted below). Obviously teneral individuals, all from localities at or near sea level, are dated 11–15 & 20. XII, 3 & 26. I., and 6. IV. Two sets of 17 and 18 individuals, from Tucker Cove, 16. V, and Lookout Bay, 25. VII, are each labeled "All together in an area *ca.* 1 sq. inch under weeds on rock", which suggests that the beetles hibernate in aggregations.

This species is clearly distinct from *marrineri* and is easily recognizable by more slender form, details indicated in the key, and usually by absence of seta-bearing punctures inside the apical elytral carinae. However, the last fails in exceptional individuals. Two specimens of *tarsalis* from Lookout Bay have the puncture in question present on one elytron but not on the other, and one specimen from Tucker Cove has punctures on both elytra although it is clearly this species.

Both this species and the preceding one are widely distributed over Campbell I. Both occur at all altitudes. However, the material before me suggests that the present species, *tarsalis*, is abundant on and near the coast and less abundant inland, while *marrineri* is certainly much less common on the coast and perhaps not really abundant anywhere. Whether these two very similar species have different ecological limits or requirements would be an interesting subject for special study. The detailed habitat records listed above suggest no such difference.

3. **Kenodactylus capito** Broun, 1909: 91, pl. 5, fig. 2.—Jeannel, 1937: 225.—Brookes, 1951: 12.—Jeannel, 1962: 540. Fig. 1c.

Broun's type was a single ♂ from Campbell I., "captured by Professor Chilton on the beach between high- and low-water marks." The range of the species was extended to the Auckland Is. by Brookes; specimens from there, received from Brookes and now in the Museum of Comparative Zoology, are labeled as collected by E. G. Turbott "under intertidal stones." I have examined the following new material from Campbell I.: 1, Tucker Cove Beach, 7. XII. 1961, Gressitt, "Int.-tidal"; 1, Rocky Bay, "KELP on Beach", 20. XII. 1961, Gressitt; 1, Tucker Cove, 0–30 m, "intertidal zone" 20.I.1962, Rennell; 16, same locality and collector, "under rocks in intertidal zone", 6. VIII. 1962." Slightly teneral individuals are from Tucker Cove, 6. VIII & 20. I.

This species is surprisingly similar to *Kenodactylus audouini* (Guérin) of southernmost South America and the Falkland Is. I found *audouini* on the south side of the Beagle Channel, west of Puerto Williams on Navarino I., Chile, 31.XII.1961. Fully hardened and teneral individuals and a larva were taken together. The beetles were living in the intertidal zone, on a rock outcrop, between thin slabs of rock that had split apart but were otherwise still in place, like the slightly separated leaves of a book. The cracks between the slabs were only a few millimeters wide and contained a certain amount of mud as well

as minute crustaceans and perhaps other small animals upon which the beetles presumably feed.

Comparison of specimens confirms Jeannel's (1937) statement that *capito* and *audouini* differ only very slightly, chiefly in proportions, if in fact they differ at all. Proportions of a ♂ ♀ *capito* and a ♂♀ *audouini* (listed in this order) are: head/prothorax .92, .90; .93, .93; width/length prothorax 1.36, 1.39; 1.30, 1.32; base/apex prothorax .83, .84; .82, .84; base prothorax/head .75, .74; .74, .74; width elytra/prothorax 1.51, 1.47; 1.57, 1.55. These figures suggest that *capito* has a relatively slightly wider prothorax and narrower elytra than *audouini*, and this is confirmed by direct comparison of the series. However, there is some individual variation: *e.g.* the (♂) *capito* from Rocky Bay has a relatively narrow prothorax (width/length 1.28), although the elytra are narrow too (width elytra/prothorax 1.46).

I find no other definite characters to separate *capito* and *audouini*. Male genitalia do not seem significantly different, as shown by comparison of a ♂ of each form. If the two occurred close together, I should consider them one species. But since in fact they occur more than 6500 km apart, I shall, for the time being, continue to treat them as slightly differentiated species, as earlier authors have done.

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INSECTS OF CAMPBELL ISLAND.
COLEOPTERA: STAPHYLINIDAE

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The present work records 12 species of Staphylinidae from Campbell Island, 7 of them new to science and represents an increase of 8 on the previous list (Brookes, A. E., 1951, Cape Exped. Series, Bull. 5: 13–14). One species, *Atheta amicula* (Gravenhorst), is a European insect which has been recorded from various parts of the world, including New Zealand, and is obviously introduced. Another, *Arpediomimus kronei* (Kiesenwetter), is known also from the Auckland Islands and New Zealand, 2, *Omaliomimus albipenne* (Kiesenwetter) and *O. venator* (Broun), are found also on the Auckland and Macquarie Islands and one of the new species occurs also on the Auckland Islands. The remaining 7 appear to be restricted to Campbell Island. Nine genera are represented, 4 of them new. "*Atheta politula* Broun" which is included in Brookes' list is discussed below under *Colle campbellensis.*

With the exception of the above mentioned introduced *Atheta*, nothing has been published regarding the previously described species since the original descriptions. Full redescriptions of these are therefore given below in addition to the descriptions of the new taxa. Four of the genera contain only one or two species in addition to those from Campbell Island and descriptions of these are included for comparison.

My best thanks are due to Dr. J. L. Gressitt for the opportunity of examining the material collected by himself and his colleagues, to Mr. G. Ordish for the loan of the Campbell, Auckland and Macquarie Islands material in the Dominion Museum, Wellington, New Zealand and to Dr. R. Hertel (Dresden Museum), Dr. H. Freude (Bayerischen Staatssamlung) and M. G. Fagel (Institut Royal des Sciences naturelles de Belgique) for the loan of Kiesenwetter types.

The types of the new species described here are in the D. S. I. R., Nelson; paratypes in Bishop Museum, my own collection and in most cases also in the British Museum (Nat. Hist.).

The Campbell Island Staphylinidae belong to only 2 subfamilies which may be easily separated as follows:

ADULTS

Antennae inserted under the sides of the front of the head, the insertions not visible from above ..... OMALIINAE
Antennae inserted on vertex, the insertions clearly visible from above ..... ALEOCHARINAE

Larvae

Cercus 1-segmented; head with 0 or 5 ocelli on each side..... Omaliinae
Cercus 2-segmented; head with 1 ocellus on each side..... Aleocharinae

Subfamily Omaliinae

Key to genera (adults)

1. Segment 3 of maxillary palpus swollen, as long as and much broader than 4 (fig. 1d). Small yellowish brown species ca 2 mm long..... **Selonomus***
   Segment 3 of maxillary palpus not swollen, distinctly shorter than 4 and not much broader. Larger species..... 2
2. Head rather strongly produced in front of eyes (fig. 7a)..... **Arpediomimus**
   Head not much produced in front of eyes 3
3. Head without a ridge extending backwards from antennal tubercles, eyes more or less a continuation of dorsal surface of head..... **Omaliomimus**
   Head with a ridge extending backwards from antennal tubercles along inner margins of eyes, these by no means a continuation of dorsal surface..... 4
4. Narrower, more convex species, pronotum at most with very superficial impressions ..... **Allodrepa***
   Broader, more depressed species, pronotum with distinct median and lateral impressions ..... **Nesomalium***

Key to genera (larvae)

1. Front of head rounded (fig. 8e)..... 2
   Front of head notched or toothed in middle 4
2. Tarsal claws normal (fig. 11d)..... **Nesomalium***
   Tarsal claws thickened medially (fig. 8c)..... 3
3. Head less elongate (fig. 8a)..... **Arpediomimus**
   Head more elongate (fig. 4a)..... **Omaliomimus**
4. Antennal segment 2 scarcely longer than 1 (fig. 2f), front of head as fig. 2d, no ocelli..... **Selonomus***
   Antennal segment 2, 2× as long as 1 (fig. 16g), front of head as fig. 16e, 5 ocelli ..... **Allodrepa***

Genus **Selonomus** Steel, n. gen.

Eye small, post ocular region well developed, ocelli absent but "anteocellar" foveae distinct; gular sutures separate, closest just behind level of posterior margin of eye. Antenna with segment 2 subspherical, about as broad as 1, distinctly broader than 3, 6–11 with close, short, fine setae in addition to the sparse, rather long setae which are present on all segments. Labrum slightly emarginate in front, dorsal surface with a few rather long setae, front margin with a fringe of close-set short setae. Mandible short and stout, the right with a small tooth internally not far from apex, the left edentate. Maxilla and labium as fig. 1d.

Pronotum transverse, rather strongly margined at sides and base; side margin single (as seen from the side). Mesosternum with a short median longitudinal keel at base, its process sharp and extending between intermediate coxa for about 1/2 their length, not meeting metasternal process. Wings very short.

Tibiae finely setose. Tarsi, excluding claws, about 1/2 as long as respective tibiae, segments 1–4 very short, apparently fused and separated by sutures, 5 almost 2× as long as 1–4 together; segments 1–4 each with 1 or 2 long setae ventrally.

Type species: *Selonomus linearis* n. sp.

RANGE: at present only known from Campbell Island.

Selonomus differs from all described Omaliine genera in the structure of the maxillary palpus and the tarsi. These latter apparently consist of only 2 movable segments; as far as can be seen, segments 1–4 are separated only by sutures.

Selonomus linearis Steel, n. sp.

Rather depressed, the elytron almost flat. Body, legs and antenna pale or dark brownish yellow. Length: about 2 mm, without abdomen 0.8–0.9 mm. General shape as fig. 1a; in the specimens examined, the pronotum varied from 1.20–1.25× as broad as long and the sutural length of elytra from 0.86–0.97× length of pronotum.

Head not very shining, with a distinct ground sculpture which varies in intensity and is in the form of a polygonal network, with scattered punctures which are a little larger than the meshes of the ground sculpture; eyes very small, each consisting of only about 10 facets; antenna with segment 3 lightly transverse, 4 & 5 shorter than 3, distinctly transverse, 6–10 about equal in length but increasing gradually in breadth, 6 about 2×, 10 about 3×, as broad as long, 11 longer than 10, rounded apically. Pronotum about as shining as head and with similar ground sculpture, with scattered punctures which are a little coarser than those on head; median impressions distinct, sometimes connected. Elytron more shining than head and pronotum, with punctures which are distinctly coarser than those on pronotum and separated, on the average, by about 2× their diameter, surface between punctures indistinctly wrinkled. Abdomen about as shining as elytron, with a ground sculpture which in places is of the same type as on head but in the main is very superficial and incomplete; with scattered punctures which are so fine as to be scarcely visible (at a magnification of ×125). Last abdominal sternite of ♂ similar to *Allodrepa* (fig. 17e). Aedeagus as fig. 1 b, c, widened apical portion of each paramere membranous.

Larva: Head, thoracic and abdominal tergites and sternites, mouthparts, cercus and legs pale yellowish brown. Of the same general shape as *Arpediomimus* (fig. 8a) but head and pronotum as fig. 2a with ocelli absent, front of head as fig. 2d, antenna as fig. 2f, mandible as fig. 2 b, c, maxilla as fig. 2g, cercus as fig. 2e, and tarsal claws simple.

CAMPBELL I.: Perseverance Harbor, Lookout Bay, 3.II.1963, leaf mold under tussock (type locality); Monument Harbor, 19. I. 1963, tussock nr. beach; Moubray Hill, 6. II. 1963, low plants nr. summit; Tucker Cove, 26. II. 1963, leaf mold under tussock, 28. II. 1963, under stone; all collected by K. A. J. Wise. St. Col Ridge, 160–280 m, 9.XII.1961, moss on rock; Mt. Azimuth, 30. XI. 1961, moss; Courrejolles Peninsula, 200 m, 14. XII. 1961, *Colobanthus*; all collected by J. L. Gressitt.

This species can easily be recognized by its small size, narrow linear form, small eyes

and the absence of ocelli. The larva is characterised by the lack of ocelli, the structure of the maxilla and the shape of the front of the head.

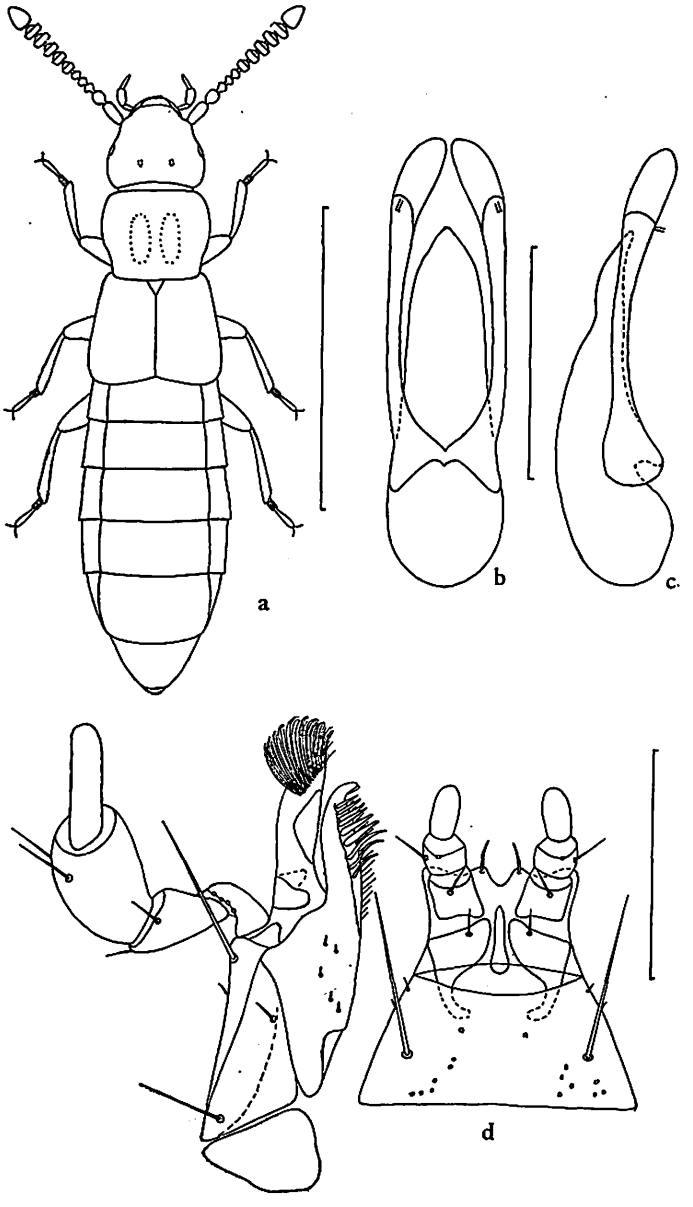

Fig. 1. *Selonomus linearis* n. sp. a, whole insect, scale=1 mm; b, aedeagus, ventral view, scale=0.2 mm; c, aedeagus, lateral view, same scale as b; d, maxilla and labium, scale=0.1 mm.

Genus **Omaliomimus** Jeannel

Omaliomimus Jeannel, 1940, Mém. Mus. Natl. Hist. Nat., Paris **14**: 117.

Head lightly convex between eyes which are more or less a continuation of the dorsal surface, frontal impressions narrow and weak, eyes moderate or rather large, the post ocular region variable, ocelli and anteocellar foveae distinct, antennal tubercles small; gular sutures separate. Antennal segment 2 narrower than 1, shorter than and about as broad as 3, 6–11 with close short fine setae in addition to the sparse rather long setae pre-

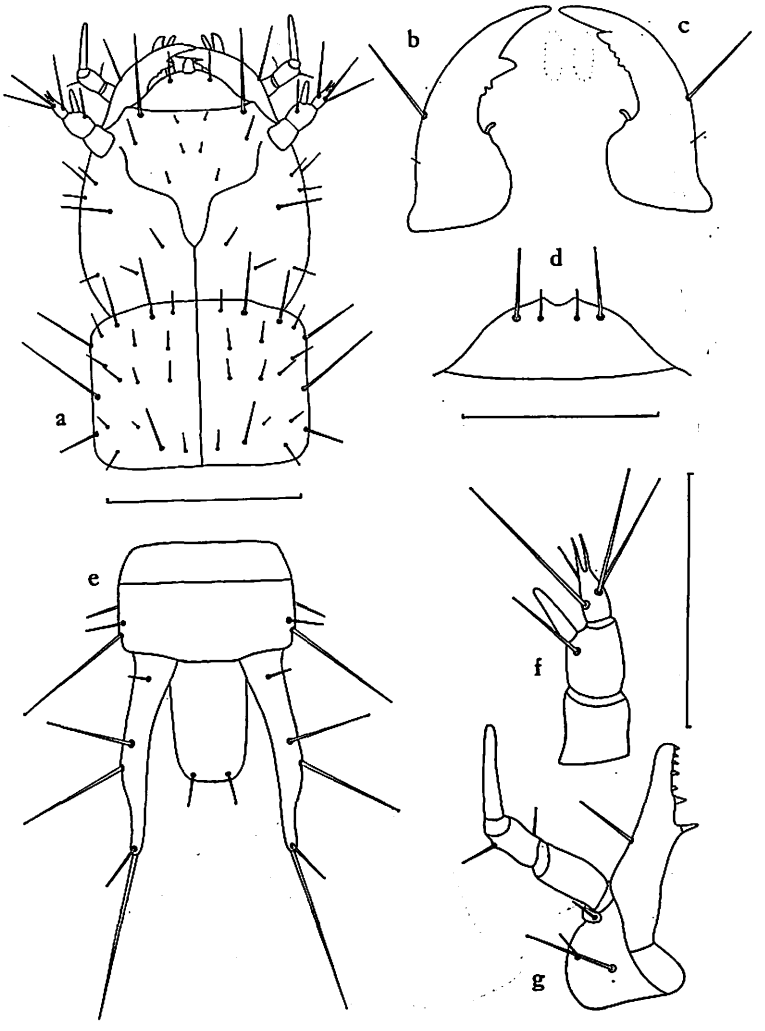

Fig. 2. *Selonomus linearis* n. sp., larva. a, head and pronotum, scale= 0.2 mm; b, left mandible, same scale as d; c, right mandible, same scale as d; d, front of head, scale=0.1 mm; e, apex of abdomen, same scale as a; f, antenna, scale=0.1 mm; g, maxilla, same scale as d.

sent on all segments. Labrum rather strongly emarginate in front, the upper surface with a few rather long setae, the anterior portion membranous and with a close fringe of short fine setae some of which are frayed. Mandible short and stout, the right with a small tooth internally not far from apex, the left edentate. Maxilla and labium as *Arpediomimus* (fig. 7f).

Pronotum transverse, convex or somewhat flattened, median impressions variable, sometimes very superficial, lateral impressions very superficial or absent; sides rounded or slightly emarginate on posterior 1/2. Mesosternum with or without an indistinct median longitudinal keel, its process narrow and pointed, extending backwards between the intermediate coxae for about 2/3 their length where it meets the metasternal process. Elytron and wing variable.

Abdomen with tergites of at least segments 4–6 closely punctured and pubescent, usually with an impunctate longitudinal median line, the pubescence rather long and directed obliquely inwards.

Tarsi somewhat variable in length, excluding claws 1/2 or less than 1/2 as long as the respective tibiae, segments 1, 3, & 4 short and about equal in length, 2 shorter than 1 and apparently partially fused to this, 5 varying from about 1.25 to about 1.5× as long as the 4 preceding together, according to the species; segments 1–4 densely setose beneath.

Type species: *Omalium litoreum* Broun.

RANGE: New Zealand, Campbell, Auckland and Macquarie Islands.

In the original description of this genus, Jeannel (*l. c.*) notes that it differs from *Omalium* Gravenhorst only in the structure of the aedeagus. It is, however, quite distinct from *Omalium* in a number of other characters, such as the absence of ridges on the head, the structure of the maxillary palpus, the not or only weakly carinate mesosternum, the structure and vestiture of the tarsi, the form of the last abdominal sternite of the ♂ and the absence of an accessory sclerite in the ♀. The larva is easily separable from that of *Omalium* by the absence of any teeth on the front of the head.

Omaliomimus is closely allied to *Antarctotachinus* Enderlein from the Crozet Islands but the two genera show minor differences in structure, particularly of the head and tarsi. *Antarctotachinus* also has no trace of the conspicuous abdominal pubescence of *Omaliomimus* and its habits are apparently quite different.

Besides the two species from Campbell Island, *Omaliomimus* contains a further four or five species from New Zealand which are not dealt with here. All the species appear to be associated with the seashore.

KEY TO CAMPBELL I. SPECIES OF OMALIOMIMUS

Eye moderate in size, temples well marked (fig. 3a) ..... **venator**
Eye large, temples virtually absent (fig. 5a) ..... **albipenne**

Omaliomimus venator (Broun)

Omalium venator Broun, 1909, Subantarct. Is. N. Zeal. 1: 98.

Rather depressed, not very shining. Body dark brown to almost black, apex of abdomen and sometimes also elytron lighter. Antennal segments 1–5 yellowish brown, remainder dark brown to black. Legs yellowish brown. Length: about 3 mm, without abdomen 1.9–

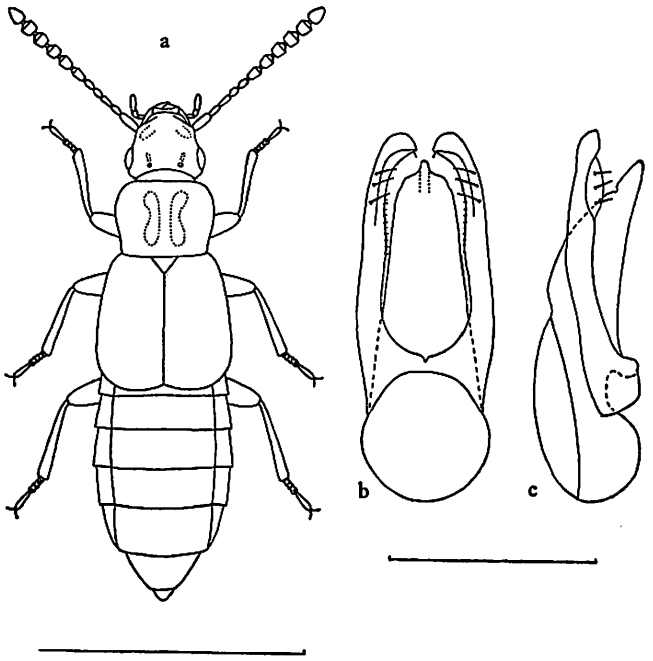

Fig. 3. *Omaliomimus venator* (Broun). a, whole insect, scale = 2 mm; b, aedeagus, ventral view, scale = 0.5 mm; c, aedeagus lateral view, same scale as b.

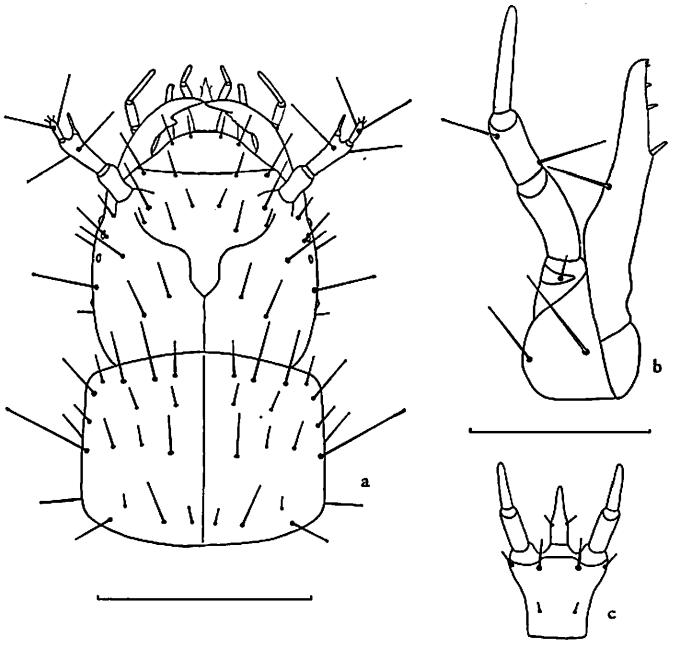

Fig. 4. *Omaliomimus venator* (Broun), larva. a, head and pronotum, scale=0.5 mm; b, maxilla, scale=0.2 mm; c, labium, same scale as b.

2.3 mm. General shape as fig. 3a, in the specimens examined, the pronotum varied from 1.23–1.32× as broad as long and the sutural length of the elytron from 1.42–1.55× length of pronotum.

Head with a well marked ground sculpture which is always in the form of a more or less regular polygonal network and is sometimes weaker between the anteocellar foveae; with a few very fine punctures; antenna similar to those of *albipenne* but with segments 6–10 less transverse, 10 only about 1.5× as broad as long. Pronotum with median impressions well marked and moderately deep, ground sculpture as on head, strong except between impressions where it is weaker or absent; with scattered very fine punctures. Elytron with ground sculpture similar to that on head and pronotum but varying greatly in strength in different examples, sometimes very weak; with fine shallow punctures which vary in density and/or indistinct longitudinal wrinkles. Abdomen with tergites 3–6 as in *albipenne*, 7–8 almost impunctate. Last tarsal segment shorter than in *albipenne*. Aedeagus as fig. 3 b, c.

Larva: Head, thoracic and abdominal tergites and sternites, mouthparts, cercus and legs yellowish brown to dark brown. Very similar to *Arpediomimus* (fig. 8a) but with head more elongate (fig. 4a), maxilla relatively broader (fig. 4b) and the 2 segments of the labial palpus subequal in length (fig. 4c).

Previously known only from Campbell I. but here recorded from the Auckland Is. and Macquarie I. Abundant at times under rotting seaweed on the shore. Specimens have been seen from Rocky Bay, Perseverance Harbor, Lookout Bay, Monument Harbor, Venus Cove, Tucker Cove, Northwest Bay and Shoal Point.

This species differs from all others in the genus in the well developed temples.

Omaliomimus albipenne (Kiesenwetter)

Omalium albipenne Kies., 1877, Dtsch. Ent. Zschr. **21**: 162.
Omalium variipenne Lea, 1920, Sci. Rep. Austral. Antarct. Exped. **8**: 30.
Omaliomimus flavipennis Cameron, 1947, Ann. Mag. Nat. Hist. ser. 11, **14**: 723. **New Synonymy.**

Slightly convex, moderately shining. Head black or almost black, pronotum reddish brown to black, elytron varying from entirely black to entirely yellow, the commonest forms are those with the elytron black with a larger or smaller more or less semicircular yellow patch on each, abdomen varying from entirely reddish brown to black with apex paler. Antenna with segments 1–5 yellowish brown, remainder darker. Legs reddish brown. Length: about 3.5 mm, without abdomen 2–2.5 mm. General shape as fig. 5a, in the specimens examined, the pronotum varied from 1.32–1.43× as broad as long and the sutural length of the elytron from 1.55–1.70× length of pronotum.

Head with ground sculpture very variable in strength, development and extent, usually distinct in the frontal impressions where it forms a more or less regular polygonal network, elsewhere weaker and less developed, sometimes almost completely absent; with a few fine punctures which are weak and indistinct; antenna with the last 6 segments forming a more or less well differentiated club, segment 6 not much broader than long, 10 about 2× as broad as long. Pronotum with median impressions variable, sometimes almost absent and never very deep, lateral impressions absent; ground sculpture very variable, usually distinct and forming a network in median impressions and at sides, elsewhere less developed or absent; on each side of middle with scattered fine punctures of different sizes. Elytral

sculpture very variable, consisting of fine punctures of different sizes which vary in density and are sometimes entirely or partly replaced by irregular, more or less longitudinal, wrinkles. Tergites of abdomen with ground sculpture varying in strength but forming a network over entire surface, those of segments 3–6 closely punctured and pubescent on each side of an impunctate mid line, the punctures coarser and stronger than those on front parts, tergites of segments 7–8 much less closely punctured. Aedeagus as fig. 5 b, c.

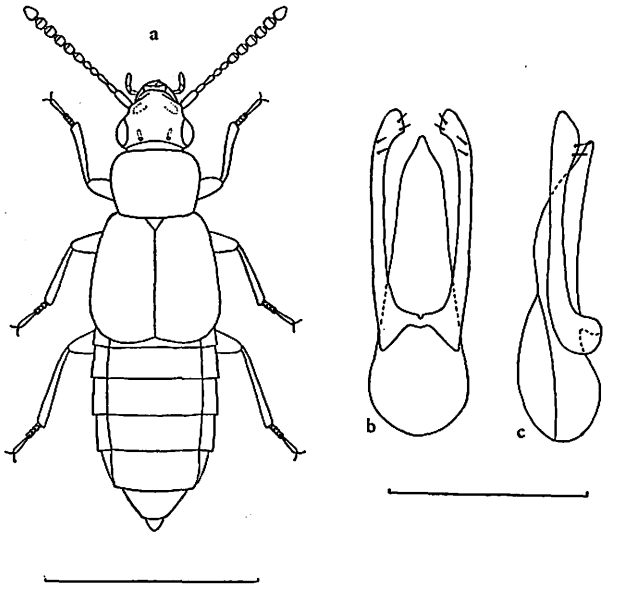

Fig. 5. *Omaliomimus albipenne* (Kiesenwetter). a, whole insect, scale = 2 mm; b, aedeagus, ventral view, scale = 0.5 mm; c, aedeagus, lateral view, same scale as b.

This species was previously known from the Auckland Is. (type locality) and Macquarie I. and is here recorded from Campbell I. It occurs under decaying seaweed etc. on the shore sometimes in numbers, but on Campbell I. appears to be less common than *O. venator* with which it is often found. Specimens have been seen from Monument Harbor, Northwest Bay and Middle Bay.

As can be seen from the description, *O. albipenne* is very variable in color and sculpture. It can, however, be easily separated from the other Campbell I. Omaliinae by the shape of the head and differs from New Zealand *Omaliomimus* spp. with a similarly shaped head by the short elytron and vestigial wings.

No larvae of this species were identified amongst the material examined. Gourlay (1950, Trans. Roy. Soc. N. Zeal. **78**: 183, 184) erroneously quotes *flavipennis* Cameron as a synonym of *Nesomalium pacificum*, and *zealandicum* Cam. as a synonym of *albipenne*.

Genus **Arpediomimus** Cameron

Arpediopsis Cam., 1917, Ent. Mon. Mag. **53**: 124 (*nec* Ganglbauer, 1895).
Arpediomimus Cam., 1917, *op. cit.*, 277.

Structurally similar to *Omaliomimus* but with the head noticeably produced in front of eyes, antennal tubercles extending backwards a short distance beyond antennal fossa in the form of a sharp keel visible from the side; ocelli present or absent. Mesosternum, abdominal puncturation and last sternite of ♂ variable (see species descriptions). Maxilla and labium as fig. 7b, the palpi somewhat variable, cf. fig. 6f. Ground sculpture in the form of a more or less regular polygonal network. Wings vestigial.

Type species: *Arpediopsis falklandicus* Cameron.

RANGE: Falkland Is., South Georgia, Auckland, Macquarie and Campbell Is., New Zealand (S. Island).

Arpediomimus is very close to *Omaliomimus* and the species have similar habits, being associated with seaweed etc. on the seashore. It can, however, be easily recognized by the shape of the head and contains only one species in addition to that occurring on Campbell I. The two species have not previously been compared so both are described below.

In the original description, Cameron stated that the tarsi were only 4-segmented and used this, together with the lack of ocelli in the type species, as the basis for a new tribe, Arpediomimini. Jeannel (1940, Mém. Mus. Natl. Hist. Nat., Paris **14**: 117) pointed out that 5 tarsal segments can, in fact, be recognized and this is confirmed here. The first two, however, may not be separately movable.

KEY TO THE KNOWN SPECIES OF ARPEDIOMIMUS

Ocelli absent..... **falklandicus**
Ocelli distinct..... **kronei**

Arpediomimus falklandicus (Cameron)

Arpediopsis falklandicus Cam., 1917, Ent. Mon. Mag. **53**: 124.

Rather depressed. Body yellowish brown, head and abdomen, except apex, often darker than pronotum and elytron. Legs and antenna yellowish brown, the latter sometimes darker apically. Length: 4.5–5 mm, without abdomen 2–2.5 mm. General shape as fig. 6a; in the specimens examined, the pronotum varied from 1.22–1.31× as broad as long and the sutural length of the elytron from 1.02–1.14× length of pronotum.

Head moderately shining, ocelli absent, on each side with a rounded black fovea in the position of the normal anteocellar fovea; ground sculpture not very strong but distinct except between the foveae and on clypeus; impunctate or with a few weak punctures on each side which are much larger than meshes of ground sculpture; antenna with segment 6 conical, longer than broad, 10 less than 1.5× as broad as long. Pronotum with median impressions distinct, the lateral very superficial; ground sculpture strong except between the impressions where it is sometimes absent so that there are 3 shining longitudinal ridges; impressions with a few weak punctures that are much larger than the meshes of the ground sculpture. Mesosternal and metasternal processes very short (fig. 6d). Elytron with scattered weak punctures similar in size to those on pronotum but still weaker, sometimes scarcely visible, the surface between the punctures varying from smooth and shining to distinctly wrinkled, the wrinkles mainly longitudinal; occasionally with ground sculpture at extreme base. Abdomen with well marked ground sculpture, the tergites impunctate along the midline, on each side with distinct setiferous punctures which are not much finer than those on pronotum, on the tergite of the 3rd segment they are separated by scarcely more than their diameter but become gradually more diffuse on the following tergites. Intermediate trochanters toothed in ♂ (fig. 6d), simple in ♀. Aedeagus as fig. 6 b, c the parameres with a few fine setae and numerous spherical granules apically, last sternite of ♂ as fig. 6e.

FALKLAND IS.: Port Stanley, M. Cameron (type locality). Carcass I., 6. I. 1954, R. Banks.

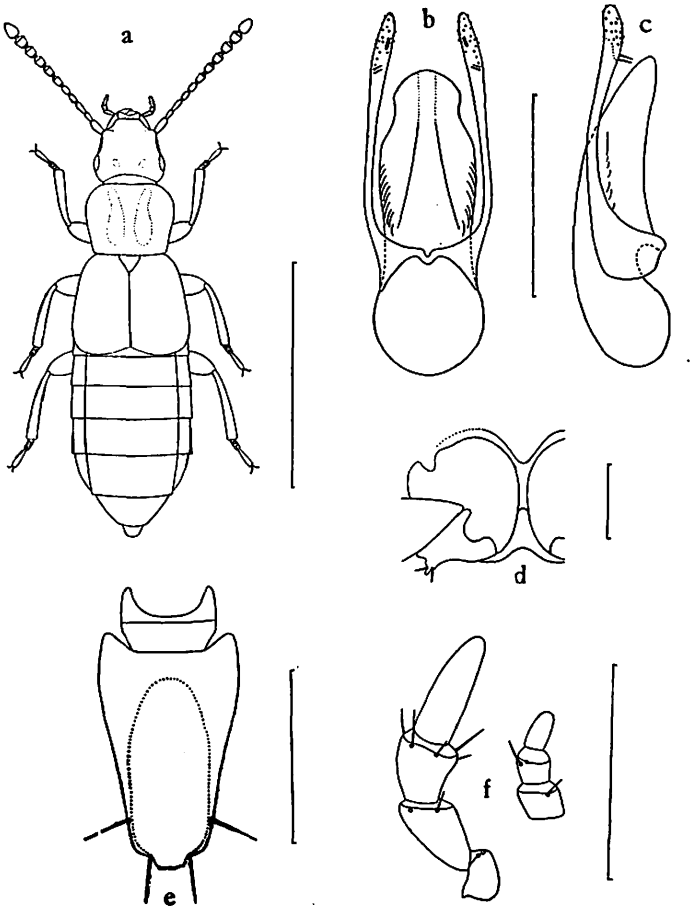

Fig. 6. *Arpediomimus falklandicus* (Cameron). a, whole insect, scale=2 mm; b, aedeagus, ventral view, scale=0.5 mm; c, aedeagus, lateral view, same scale as b; d, intermediate coxae, meso- and metasternal processes of ♂, scale = 0.2 mm; e, last abdominal sternite of ♂, scale=0.5 mm; f, maxillary and labial palpi, scale=0.2 mm.

SOUTH GEORGIA: Bird I., 8. I. 1958, W. N. Bonner.

This species has not previously been recorded from outside the Falkland Is.

Arpediomimus kronei (Kiesenwetter)

Omalium kronei Kies., 1877, Dtsch. Ent. Z. **21**: 161.
Omalium longiceps Broun, 1914, Bull. N. Z. Inst. **1**: 89.

Rather depressed. Body dark brown, apex of elytron and sometimes also head and pronotum paler. Legs and antennal segments 1–5 yellowish brown, remainder of antenna

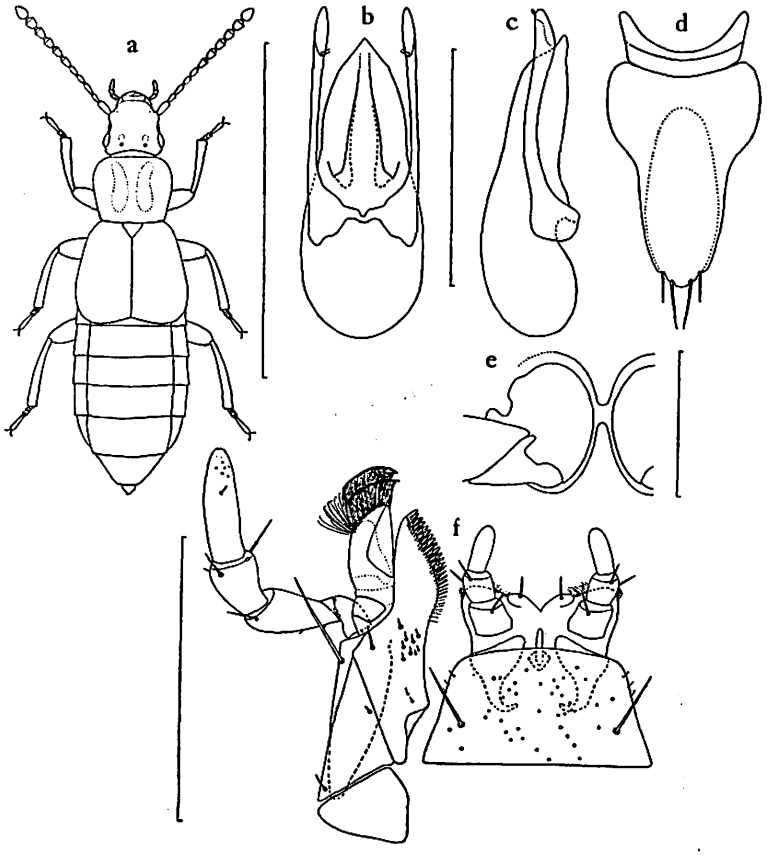

Fig. 7. *Arpediomimus kronei* (Kiesenwetter). a, whole insect, scale=5 mm; b, aedeagus, ventral view, scale=1 mm; c, aedeagus, lateral view, same scale as b; d, last abdominal sternite of ♂, scale=0.5 mm; e, intermediate coxae, meso- and metasternal processes of ♂, scale=0.5 mm; f, maxilla and labium, scale =0.5 mm.

darker. Length: 5–8 mm, without abdomen 3–4 mm. General shape as fig. 7a, in the specimens examined, the pronotum varied from 1.17–1.19× as broad as long and the sutural length of the elytron from 1.18–1.24× length of pronotum.

Head not very shining, ocelli distinct, anteocellar foveae rounded; ground sculpture distinct, sometimes less marked on clypeus and in front of anteocellar foveae; each side of middle with scattered fine punctures which vary in size from scarcely larger than to about 2× width of the meshes of the ground sculpture; antenna with segment 6 conical, longer than broad, 10 about 1.5× as broad as long. Pronotum on each side of middle with a distinct but not very deep longitudinal impression, lateral impressions absent; ground sculpture as on head, much weaker between and external to the median impressions so that the surface there is rather shining; each side of middle with scattered fine punctures similar to those on head. Meso- and metasternal processes as fig. 7e. Elytron rather dull,

the surface longitudinally wrinkled and with a strong ground sculpture which is much less regular than that on pronotum; with not very close punctures similar in size to those on pronotum but often indistinct. Abdomen about as shining as elytron, with a strong ground sculpture of the same type as on pronotum; tergites of segments 3–7 each with 3–4 large setiferous punctures on each side, which form 2 longitudinal rows on abdomen, and with scattered very fine punctures which are at most as large as the meshes of the ground sculpture. Intermediate trochanters simple in both sexes. Aedeagus as fig. 7 b, c, parameres with close, very short pubescence apically (beyond dotted line in fig. 7c), sternite of last abdominal segment of ♂ as fig. 7d.

Larva: Head, thoracic and abdominal tergites and sternites, mouthparts, cercus and legs dark brown. General shape as fig. 8a, front of head as fig. 8e, antenna as fig. 8d, mandible as fig. 9 b, c, position of ocelli as fig. 8b, maxilla and labium as fig. 9a, tarsal claws modified, fig. 8c.

Originally described from the Auckland Is. (*kronei*) and South Island, New Zealand (*longi-*

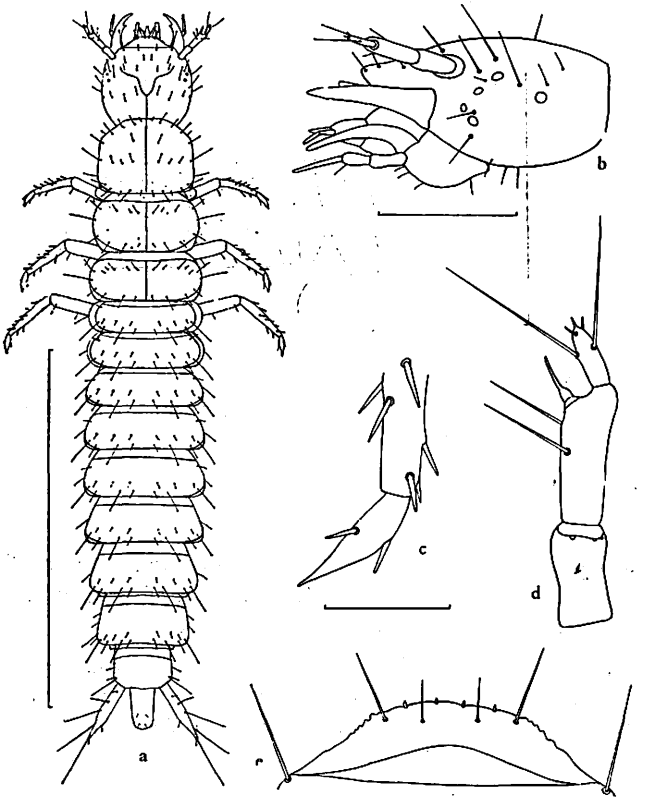

Fig. 8. *Arpediomimus kronei* (Kiesenwetter), larva. a, whole insect, scale=0.5 mm; b, side of head; c, tarsal claw, scale=0.2 mm; d, antenna, same scale as c; e, front of head, same scale as c.

ceps), here recorded for the first time from Campbell I. The original Auckland Is. specimen was collected by Krone away from the coast but would appear to have been a 'straggler'; several further specimens have been seen from the Auckland Is., all from the shore. The New Zealand specimens known up to now were all collected by Philpott and are labelled 'Lake Hakapoua'. It is, however, known (*teste* Gourlay, *l. c.*: 183) that Philpott collected on the sea coast on the way to Lake Hakapoua as well as at the lake itself. The association of these specimens is therefore not known.

A large number of specimens have been seen from Campbell Island, all from the seashore, from Rocky Bay, Beeman Beach, Northwest Bay, Lookout Bay, Monument Harbor and Venus Bay.

A. kronei is easily separated from *falklandicus* by the distinct ocelli, the less transverse pronotum, the longer elytron, the structure of the mesosternum, the puncturation, particularly of the abdomen, the structure of the aedeagus and the shape of the last abdominal sternite of the ♂.

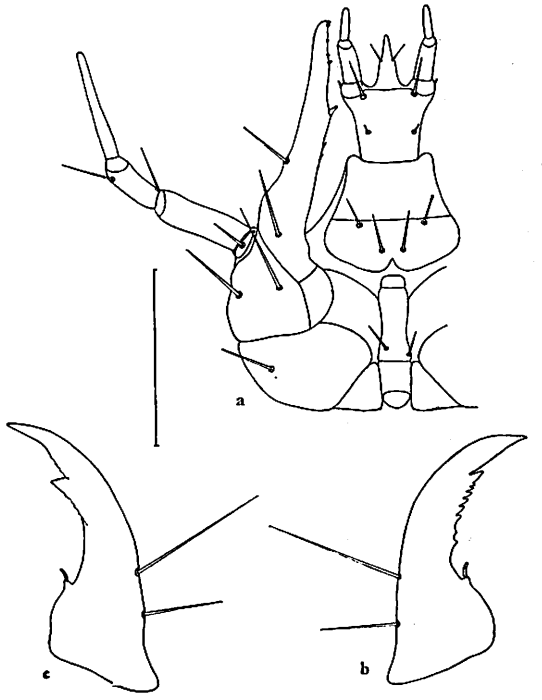

Fig. 9. *Arpediomimus kronei* (Kiesenwetter), larva. a, maxilla and labium, scale=0.3 mm; b, left mandible, same scale as a; c, right mandible, same scale as a.

Genus **Nesomalium** Steel, n. gen.

Structurally similar to *Omaliomimus* but each side of head with a more or less distinct ridge which includes the antennal tubercles and extends from above the base of the mandible at least to the level of the eye and sometimes almost to the base of the head, the sides of the head therefore vertical or almost vertical above the eyes which are in no way a continuation of the dorsal surface; frontal impressions distinct, broad and rather deep, sometimes extending backwards almost as far as ocelli. Antenna with segment 6 distinctly broader than 5, the last 6 segments forming a more or less well differentiated club.

Pronotum transverse, the sides scarcely to strongly emarginate on posterior 1/2, median and lateral impressions distinct, rather deep. Mesosternum with or without a basal keel. Wings variable.

Puncturation of abdominal tergites very fine on each side of an impunctate midline, the pubescence much shorter and finer than in *Omaliomimus*. Last abdominal sternite of ♂ variable. Tarsi variable.

Labium (fig. 13c) and maxillary palpus (fig. 13b) similar to *Omaliomimus*.

Ground sculpture in the form of a more or less regular polygonal network, the network is less developed when the sculpture is very weak.

Type species: *Nesomalium campbellensis* n. sp.

RANGE: At present known only from Campbell I. and the Auckland Is.

Although similar structurally, the species of *Nesomalium* are quite different from *Omaliomimus* in general appearance (cf. *e. g.* figs. 3a, 10a). At present, four species are known which can be separated into two distinct species groups, each of which contains one species from Campbell I. and one from the Auckland Is. These groups differ in the size of the frontal impressions of the head, the shape of the pronotum, the condition of the mesosternum, the structure of the tarsi, the form of the last abdominal sternite of the ♂ and the form of the aedeagus. The four species are all described below.

KEY TO THE KNOWN SPECIES OF NESOMALIUM

1. Sides of pronotum only slightly emarginate on posterior 1/2 (fig. 10a) 2
   Sides of pronotum strongly emarginate on posterior 1/2 (fig. 13a) 3
2. Campbell I. species. Tergite of abdominal segment 4 without a small closely punctulate and pubescent patch on each side of midline..... **campbellensis**
   Auckland Is. species. Tergites of abdominal segment 4 with a closely punctulate and pubescent patch on each side of midline..... **pacificum**
3. Campbell I. species. Elytron shorter, sutural length 1.09–1.20× as long as pronotum. Size smaller, about 3 mm..... **imitator**
   Auckland Is. species. Elytron longer, sutural length 1.22–1.28× as long as pronotum. Size larger, about 4 mm ..... **insulare**

Nesomalium campbellensis Steel, n. sp.

Not very convex, head, pronotum and elytron shining, abdomen less shining. Body dark brown to black, margins of pronotum, sides and apex of elytron narrowly paler, humerus and apex of abdomen also pale. Antenna with segments 1–5 pale or dark brown, the remainder black or almost black. Legs pale or dark yellowish brown. Length: 3–5 mm, without abdomen 1.8–2.6 mm. General shape as fig. 10a, in the specimens examined, the pronotum varied from 1.28–1.43× as broad as long and sutural length of elytron from 1.19–1.38× length of pronotum.

Head with post ocular region broadly or rather sharply rounded to neck, frontal impressions long, often extending backwards as far as ocellus, lateral ridges distinct, usually traceable nearly to base of head; frontal impressions varying from closely, almost rugosely punctured to very sparsely punctured, the punctures fine and strong, area between the impressions always less closely punctured, sometimes almost impunctate; ground sculpture varying from almost absent to distinct, though not very strong, over almost the entire surface; antenna with segment 6 scarcely broader than long, 10 about 1.33× as broad as long. Pronotum with median impressions distinct and rather deep but variable in length, sometimes evanescent on anterior 1/3, lateral impressions distinct; punctures similar to those on head, varying in density, separated in closely punctured specimens by little more than their diameter, in sparsely punctured examples by much more; ground sculpture usually distinct in impressions though sometimes absent, weak or absent elsewhere. Mesosternum

not keeled. Sculpture of elytron very variable, consisting basically of punctures similar to those on pronotum arranged in irregular longitudinal rows; on the disc these punctures tend to form longitudinal wrinkles and are sometimes almost completely obscured; ground sculpture absent or indistinct. Wings vestigial. Abdomen with strong ground sculpture, finely and moderately closely punctured and pubescent, the punctures much finer and weaker than on front parts. Last tarsal segment about 1.5× as long as the preceding 4 together. Aedeagus as fig. 10b–d, last sternite of ♂ as *pacificum*, fig. 12d.

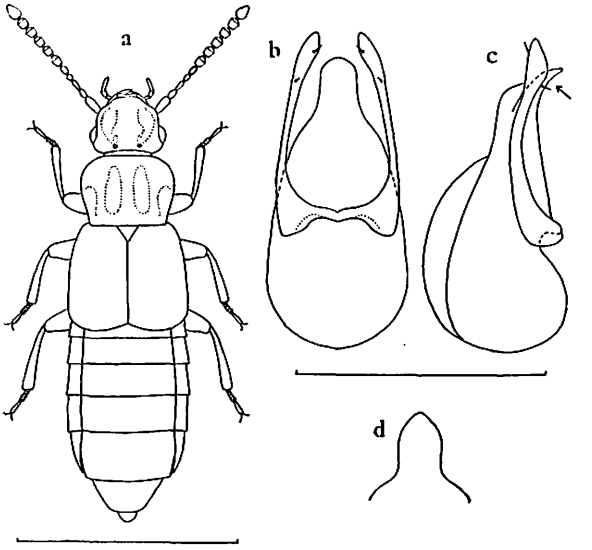

Fig. 10. *Nesomalium campbellensis* n. sp. a, whole insect, scale=2 mm; b, aedeagus, ventral view, scale =1 mm; c, aedeagus, lateral view, same scale as b; d, apex of median lobe of aedeagus viewed from direction of arrow in c, same scale as b.

Larva: Head, thoracic and abdominal tergites and sternites, mouthparts, cercus and legs dark brown. Very similar to *Arpediomimus* (fig. 8a) with the head (fig. 11a) of the same shape. The maxilla is however, rather more curved (fig. 11b), the 2 segments of the labial palpus subequal in length (fig. 11c) and the tarsal claws (fig. 11d) are simple.

CAMPBELL I.: Common and

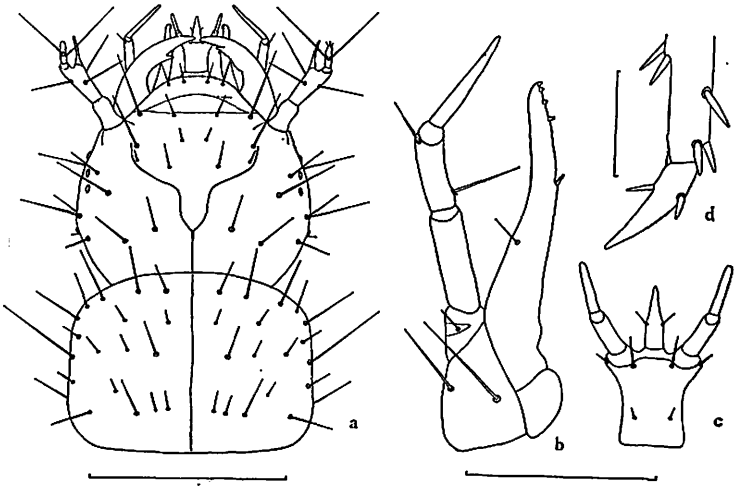

Fig. 11. *Nesomalium campbellensis* n. sp., larva. a, head and pronotum, scale=0.5 mm: b, maxilla, scale=0.2 mm; c, labium, same scale as b; d, tarsal claw, scale=0.1 mm.

widespread in a variety of situations, in carrion, birds' nests, penguin colonies, in litter, under stones and occasionally under seaweed on the shore. The type is from Moubray Hill, 200 m, 3. I. 1963, under dead Royal Albatross, K. Rennell. A large number of specimens were also seen from Rocky Bay, Courrejolles Peninsula, Mt. Lyall Ridge, St. Col, Mt. Azimuth, Beeman Camp, Venus Bay, Lookout Bay, Shoal Point, Northwest Bay and Tucker Cove.

All the examples seen from Courrejolles Peninsula, including one collected by Sorensen in 1947, are very small. Only one or two similar specimens have been seen from other parts of the island and these were associated with larger examples. The smallest specimens

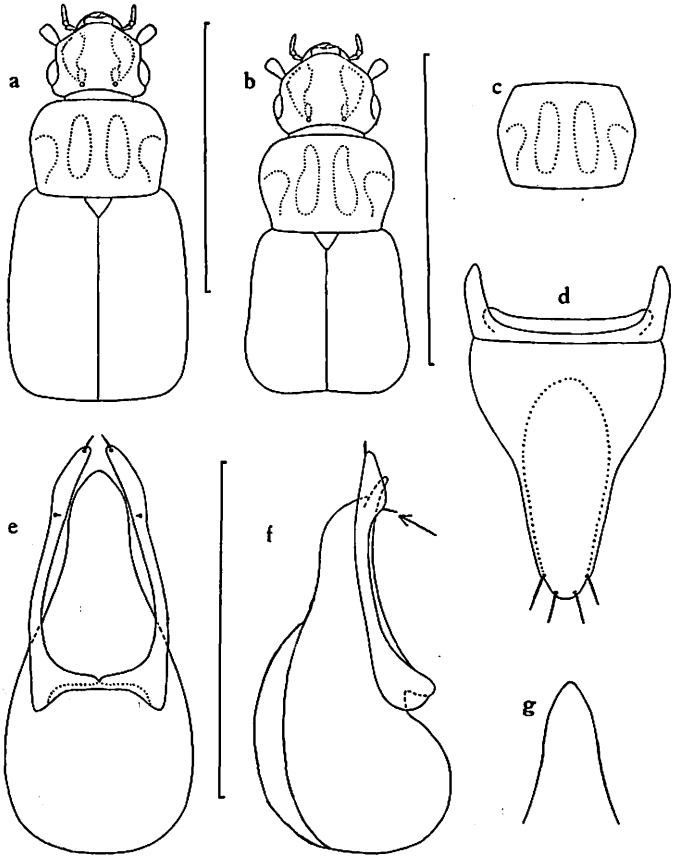

Fig. 12. *Nesomalium pacificum* (Kiesenwetter). a, head, pronotum and elytra of long winged form, scale=2 mm; b, head, pronotum and elytra of short winged form, scale=2 mm; c, pronotum, to show variation in shape, same scale as b; d, last abdominal sternite of ♂, same scale as e; e, aedeagus, ventral view, scale=1 mm; f, aedeagus, lateral view, same scale as e; g, apex of median lobe of aedeagus viewed from direction of arrow in f, same scale as e.

have the front parts very sparsely punctured and virtually no ground sculpture, and the antenna relatively short with segment 3 scarcely longer than 2.

Nesomalium pacificum (Kiesenwetter)

Omalium pacificum Kies., 1877, Dtsch. Ent. Z. **21**: 164.
Omalium zealandicum Cameron, 1947, Ann. Mag. Nat. Hist. ser. 11, **14**: 723. **New Synonymy.**

This species is so close to the preceding that a full description is unnecessary. The color and size range are the same, as is the sculpture except that the punctures on the front parts are, on the average, rather closer and those on the elytron are more distinct. The elytron is, however, longer and the aedeagus different.

There are two distinct forms, a long winged and a short winged, the latter being apparently much the commoner; of the 27 specimens examined only 4 are long winged. The general shape of the two forms is shown in fig. 12 a, b and a variation in the form of the pronotum in fig. 12c. The head varies in both forms between the extremes shown, as does the pronotum. In the examples examined, the pronotum varied from 1.3–1.4× as broad as long in both forms, the sutural length of the elytron varied from 1.86–1.95× length of the pronotum in the long winged form and from 1.43–1.54× this length in the short winged form. In all the specimens, the tergite of abdominal segment 4 has a small grayish, closely punctulate and pubescent patch on each side of middle. Aedeagus as fig. 12e–g, last abdominal sternite of ♂ as fig. 12d.

AUCKLAND IS.: Widespread in similar habitats to the preceding species. Described from main island and Enderby I., specimens have also been seen from Ocean, Ewing and Rose Is.

Gourlay (*loc. cit.*) confused the synonymy of this species and *Omaliomimus albipenne*, see above under *O. albipenne*.

Nesomalium insulare (Kiesenwetter)

Omalium insulare Kies., 1877, Dtsch. Ent. Z. **21**: 163.

Rather depressed, shining. Body pale or dark reddish brown with clypeal area of head darker. Antenna reddish brown, the last 6 segments scarcely darker than the remainder. Legs reddish brown. Length: about 4 mm, without abdomen 2.4–2.5 mm. General shape as fig. 13a; in the specimens examined, the pronotum varied from 1.35–1.38× as broad as long and the sutural length of the elytron from 1.22–1.28× length of pronotum.

Head with frontal impressions rather broad but short, extending only to level of anterior margin of eye, lateral ridges rounded, distinct to about level of middle of eye; rather sparsely punctured along midline, closely punctured elsewhere with punctures moderately fine and rather strong and separated, on the average, by less than their diameter; ground sculpture more or less distinct behind eyes, weak or absent elsewhere; antenna as in *campbellensis*. Pronotum with median impressions distinct and rather deep, sometimes meeting in front and behind, lateral impressions distinct; punctures similar to those on head and normally separated by less than their diameter, sometimes rugose in impressions; ground sculpture absent except along margins. Mesosternum with a distinct median longitudinal keel on basal 1/2. Elytron with punctures which are coarser and somewhat less strong than those on pronotum and arranged in irregular longitudinal rows, the inner 4–5 of which

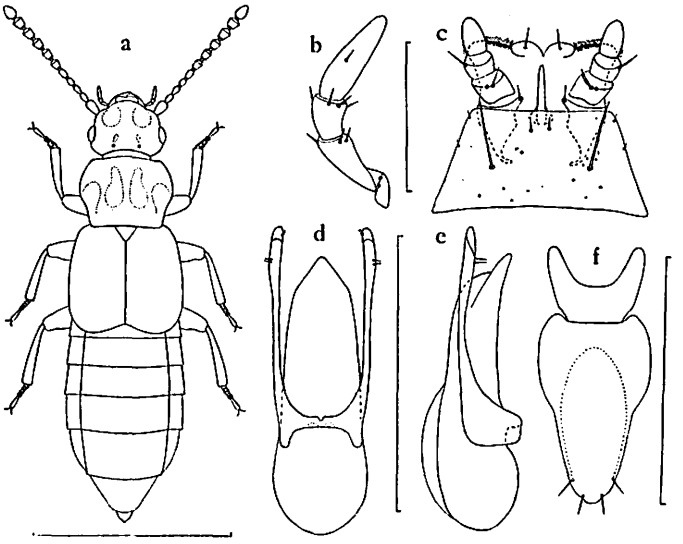

Fig. 13. *Nesomalium insulare* (Kiesenwetter). a, whole insect, scale=2 mm; b, maxillary palpus, scale=0.2 mm; c, labium, same scale as b; d, aedeagus, ventral view, scale=1 mm; e, aedeagus, lateral view, same scale as d; f, last abdominal sternite of ♂, scale=1 mm.

are impressed, the punctures in the rows separated by distinctly less than their diameters; elytron often with an indistinct longitudinal ridge at about middle; ground sculpture absent. Wings vestigial. Abdomen with strong ground sculpture, with moderately close, short, fine pubescence and extremely fine, scarcely visible punctures. Last tarsal segment only very slightly longer than the preceding 4 together. Aedeagus as fig. 13d, e, last abdominal sternite of ♂ as fig. 13f.

Larva unknown.

AUCKLAND IS.: Main island, Hooker Hills, in boggy area, XI. 1874, Krone; Ranui Cove, 27. XII. 1962, J. L. Gressitt. Apparently an uncommon species.

Nesomalium imitator Steel, n. sp.

Moderately shining to rather dull. Body reddish brown with clypeal area and disc of pronotum dark brown to almost black. Antenna pale or dark reddish brown, scarcely darker apically. Legs reddish brown to dark brown. Length: about 3 mm, without abdomen 1.9–2 mm. General shape of front parts as fig. 14a, in the specimens examined the pronotum varied from 1.33–1.39× as broad as long and the sutural length of the elytron from 1.09–1.20× length of pronotum.

So closely allied to *insulare* that a full description is unnecessary. Head as in *insulare* but with the punctures finer and distinctly less close, the ground sculpture distinct at least on basal 1/2, indistinct elsewhere. Pronotum with punctures similar to *insulare*, but weaker, sometimes so superficial as to be almost absent, ground sculpture distinct over most of

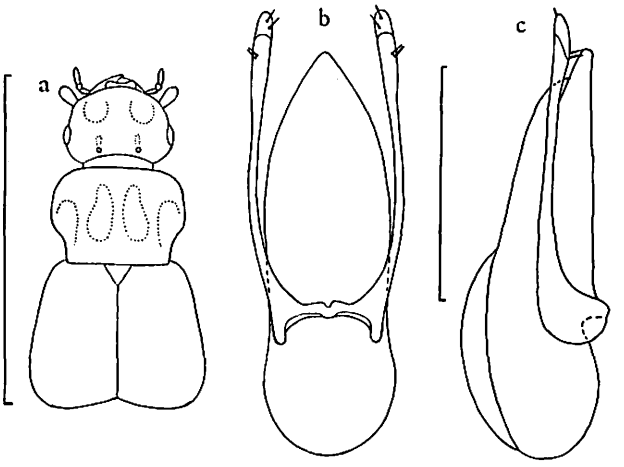

Fig. 14. *Nesomalium imitator* n. sp. a, head, pronotum and elytra, scale=2 mm; b, aedeagus, ventral view, scale =0.5 mm; c, aedeagus, lateral view, same scale as b.

surface. Aedeagus as fig. 14 b, c, last abdominal sternite of ♂ as *insulare*, fig. 13f.

Larva unknown.

CAMPBELL I.: Lookout Bay, leaf mold under *Stilbocarpa*, 3. II. 1963, K. A. J. Wise (type and 1 paratype), 30. XI. 1961, K. P. Rennell (2 paratypes); nr. Station, under debris, 23. X. 1961, Wise (1 paratype).

Like *insulare*, from which it differs in the smaller size, different sculpture of head and pronotum, shorter elytron and the shape of the aedeagus, this species appears to be not very common. No larvae were found amongst the material examined.

Genus **Allodrepa** Steel, n. gen.

Moderately convex species. Head on each side with a ridge which includes antennal tubercles and extends from above the base of the mandible to the eye, eye rather small and in no way a continuation of the dorsal surface of head, temples well developed; frontal impressions distinct though rather short; ocelli and anteocellar foveae distinct. Antenna with segment 2 ovoid, narrower than 1, broader than and not much shorter than 3. Labrum emarginate in front, upper surface with a few rather long setae, anterior portion not membranous and with a fringe of close set fine short setae. Mandible short and stout, the right with a small tooth internally not far from apex, the left edentate. Maxilla as *Arpediomimus* (fig. 7f), maxillary palpus as fig. 15c.

Pronotum convex, lightly transverse, at most with faint traces of median impressions, the lateral sometimes more marked but still very weak; sides straight or emarginate on posterior 1/2. Mesosternum with an indistinct median keel on about anterior 1/2, its process extending backwards between the intermediate coxa for about 1/3 of their length, not meeting the metasternal process. Wings vestigial.

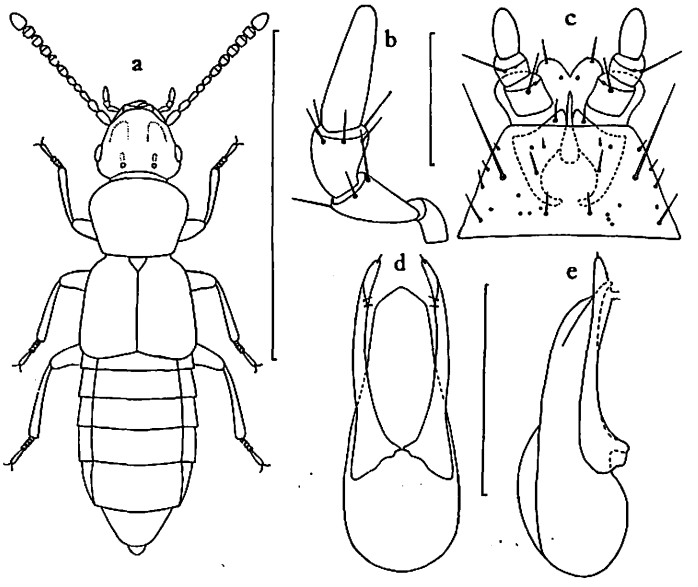

Fig. 15. *Allodrepa decipiens* n. sp. a, whole insect, scale=2 mm; b, maxillary palpus, scale=0.1 mm; c, labium, same scale as b; d, aedeagus, ventral view, scale=0.5 mm; e, aedeagus, lateral view, same scale as d.

Tibiae finely setose; tarsi with segments 1–4 short, 1–2 apparently fused and separated by sutures, 5 about 1.25× as long as the 4 preceding together; segments 1–4 densely setose below.

Last abdominal sternite of ♂ as fig. 17e.

Type species: *Allodrepa decipiens* n. sp.

RANGE: At present known only from Campbell Island and the Auckland Islands.

This genus differs from the other Campbell I. genera in the more convex form, the lightly transverse pronotum with at most traces of impressions and the structure of the ligula. It contains two closely allied species, one from Campbell I. and one from the Auckland Is., both of which are described below.

KEY TO KNOWN SPECIES OF ALLODREPA

Sides of pronotum more or less straight posteriorly (fig. 15a), the puncturation finer.
Campbell I. ..... **decipiens***
Sides of pronotum distinctly emarginate posteriorly (fig. 17a), the puncturation coarser.
Auckland Is. ..... **subcylindricum**

Allodrepa decipiens Steel, n. sp.

Head and pronotum greasy lustrous, elytron and abdomen more shining. Body dark yellowish brown to almost black. Antenna with segments 1–5 yellowish brown, the remainder

darker, sometimes almost black. Legs yellow. Length: about 3 mm, without abdomen 1.5–1.7 mm. General shape as fig. 15a, in the specimens examined, the pronotum varied from 1.19–1.25× as broad as long and the sutural length of the elytron from 1.08 to 1.12× length of pronotum.

Head with ground sculpture distinct and rather strong throughout; with fine, not very strong punctures which vary, in different specimens, from about 1.5× to rather more than 2× as wide as meshes of ground sculpture and are separated, on the average, by about 2× their diameter; antenna with segment 6 about as long as broad, 10 a little more than 1.5× as broad as long. Pronotum with strong ground sculpture, the punctures similar to those on head, separated by 2× their diameter or a little less, sometimes with an impunctate median space. Elytron with ground sculpture very weak and indistinct, with somewhat obliquely impressed punctures which are about as close as those on pronotum but rather coarser. Abdomen with ground sculpture distinct but less strong than on head and pronotum; moder-

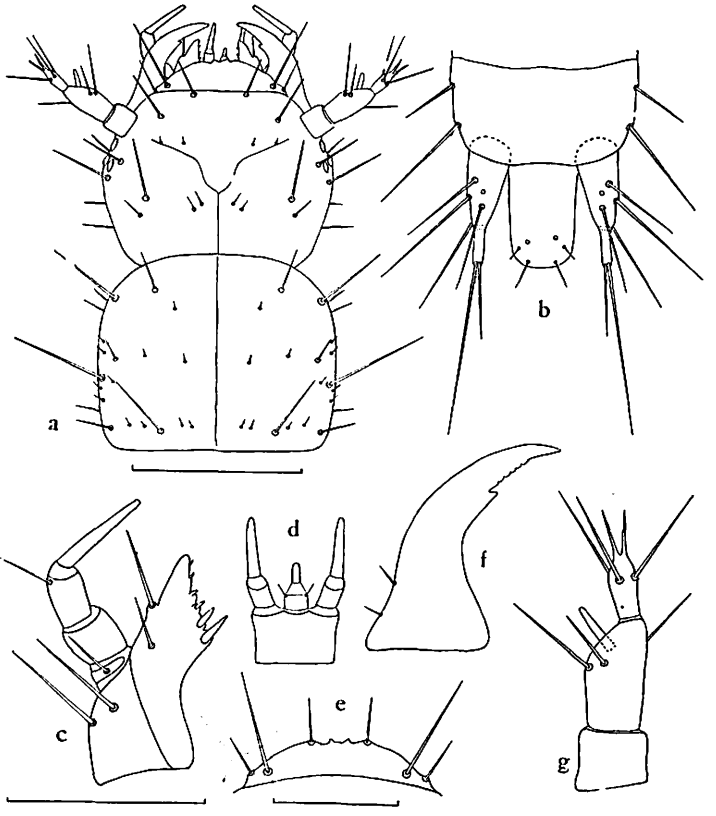

Fig. 16. *Allodrepa decipiens* n. sp., larva. a, head and pronotum, scale=0.2 mm; b, apex of abdomen, same scale as a; c, maxilla, scale=0.1 mm; d, labium, same scale as c; e, front of head, scale=0.1 mm; f, mandible, same scale as c; g, antenna, same scale as c.

ately closely punctured and pubescent, punctures as coarse as those on elytron but very weak and sometimes indistinct. Aedeagus as fig. 15 d, e.

Larva: Similar in general form to *Arpediomimus* (fig. 8a), but with head as fig. 16 a, e, antenna as fig. 16g, maxilla and labium as fig. 16 c, d, mandible (fig. 16f) without a prostheca, cercus as fig. 16b each with a lightly sclerotized area about 1/3 from apex which gives the appearance of 2 segments, tarsal claws simple, ocelli closer, arranged almost in a circle. Head, thoracic and abdominal tergites and sternites, antenna, mouthparts and legs yellowish brown.

CAMPBELL I.: Shoal Point (type locality), Monument Harbor, Beeman Hill, Tucker

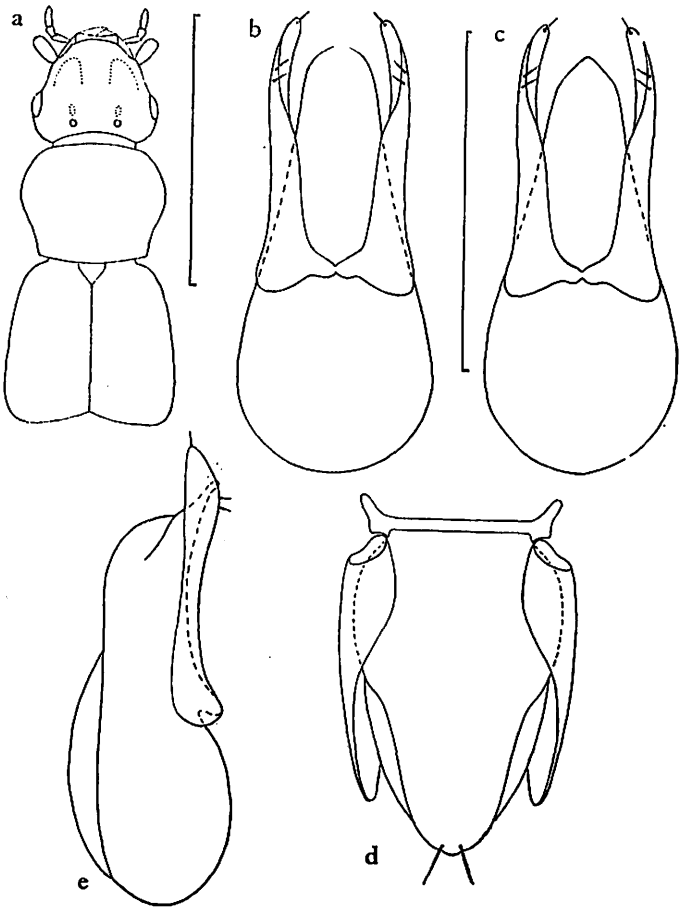

Fig. 17. *Allodrepa subcylindricum* (Kiesenwetter). a, head, pronotum and elytra, scale=1 mm; b, aedeagus, ventral view, scale=0.5 mm; c, aedeagus, ventral view, same scale as b; d, aedeagus, lateral view, same scale as b; e, last abdominal sternite of ♂.

Cove, Venus Cove, Lookout Bay, Northwest Bay, 33 specimens, mostly collected from tussocks but 1 or 2 beaten from *Anisotome* flower heads.

Allodrepa subcylindricum (Kiesenwetter)

Omalium subcylindricum Kies., 1877, Dtsch. Ent. Z. **21**: 164.

Very similar in size, color and general facies to *decipiens* but more shining with ground sculpture less strong on head, pronotum and abdomen, and virtually absent on elytron, punctures on head, pronotum and abdomen stronger and coarser and sides of pronotum emarginate on posterior 1/2. Aedeagus also differs.

General shape of front parts as fig. 17a; in the specimens examined, the pronotum varied from 1.19–1.27× as broad as long and the sutural length of the elytron from 1.08–1.15× length of pronotum. Aedeagus as fig. 17b–d, apex of median lobe somewhat variable in shape.

Larva unknown.

AUCKLAND IS.: Described from specimens collected by Krone nr. Venus Valley in 1875 by sweeping *Olearia lyalli*. Specimens also seen from Bivouac Hill and Crozier Point on main island, French I. and Ewing I., all collected from tussocks and low vegetation.

Subfamily Aleocharinae

Key to genera (adults)

1. Tarsal formula 4–4–5 2
   Tarsal formula otherwise..... 3
2. Scutellum large, not concealed by pronotum, head at least as broad as pronotum ... . **Baeostethus**
   Scutellum small, hidden by pronotum, head distinctly narrower than pronotum...**Halmaeusa**
3. Tarsal formula 4–5–5 (small black species 1.5–2 mm long) ..... **Atheta**
   Tarsal formula 5–5–5 (larger, brown species, about 5 mm long) ..... **Colle***

Key to genera (larvae)

1. Gland on abdominal segment 8 very large, segment strongly sclerotized and produced backwards and slightly upwards in middle (fig. 21a) 2
   Abdominal segment 8 normal 3
2. Antenna long (fig. 19c), front of head as fig. 19f ..... **Baeostethus**
   Antenna shorter (fig. 21e), front of head as fig. 21b ..... **Halmaeusa**
3. Antenna very short (fig. 25c), front of head as fig. 25b ..... **Atheta**
   Antenna longer (fig. 27c), front of head as fig. 27b..... **Colle***

Genus **Baeostethus** Broun

Baeostethus Broun, 1909, Subantarct. Is. N. Zeal. **1**: 96.

Head prominent, eye small, setose between the facets, temples bordered behind and partially bordered below. Labrum transverse, finely membranous in front, the anterior angles rounded, front margin rounded. Mandible with several teeth, fig. 18g. Maxilla and labium

as fig. 18b, segments 1 & 2 of the labial palpus fused, with traces of a separation on inner side only, palpus therefore appearing 2-segmented.

Prosternum carinate, pronotal epipleuron not visible from side. Mesosternal process very short, rounded apically, scarcely extending backwards at all between coxae which are almost contiguous. Scutellum normal, not concealed by pronotum. Metasternum very short. Elytron very short, scarcely emarginate inside posterior angles. Wings vestigial.

Abdomen broadest about middle, narrowed in front and behind, anterior tergites scarcely transversely impressed behind basal ridge, segment 7 about as long as 6, its tergite with-

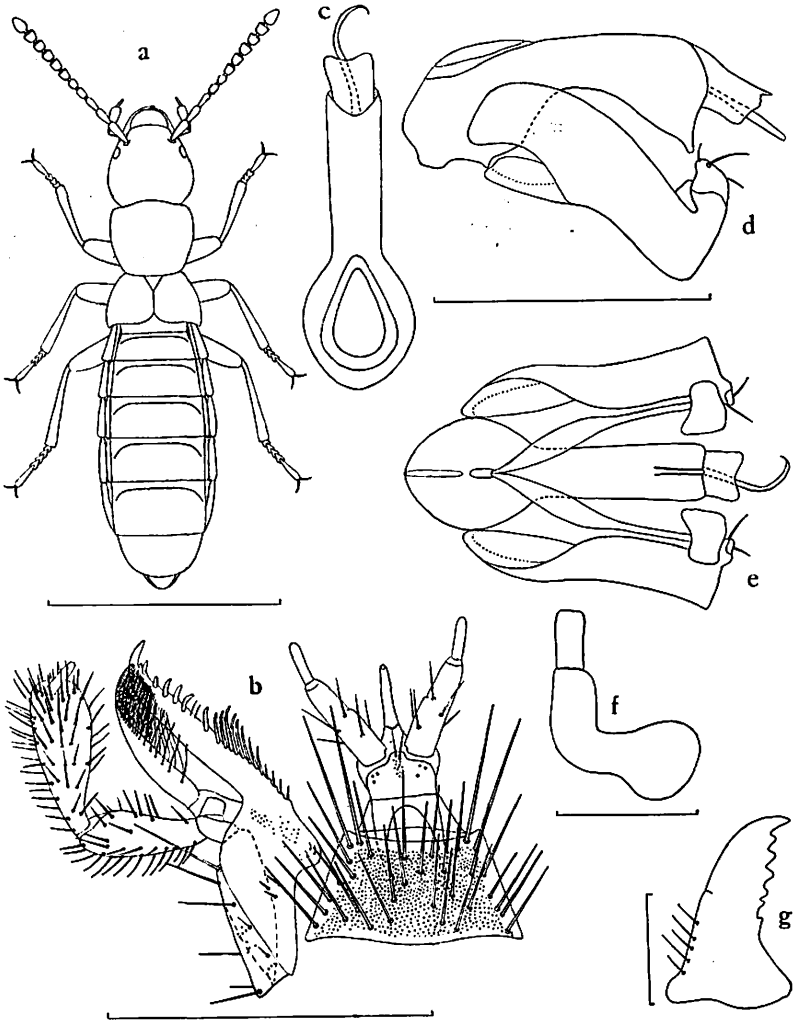

Fig. 18. *Baeostethus chiltoni* Broun. a, whole insect, scale=2 mm; b, maxilla and labium, scale=0.5 mm; c, median lobe of aedeagus, dorsal view, same scale as d; d, aedeagus, lateral view, scale=0.5 mm; e, aedeagus, ventral view, same scale as d; f, spermatheca, scale=0.1 mm; g, mandible. scale=0 2 mm.

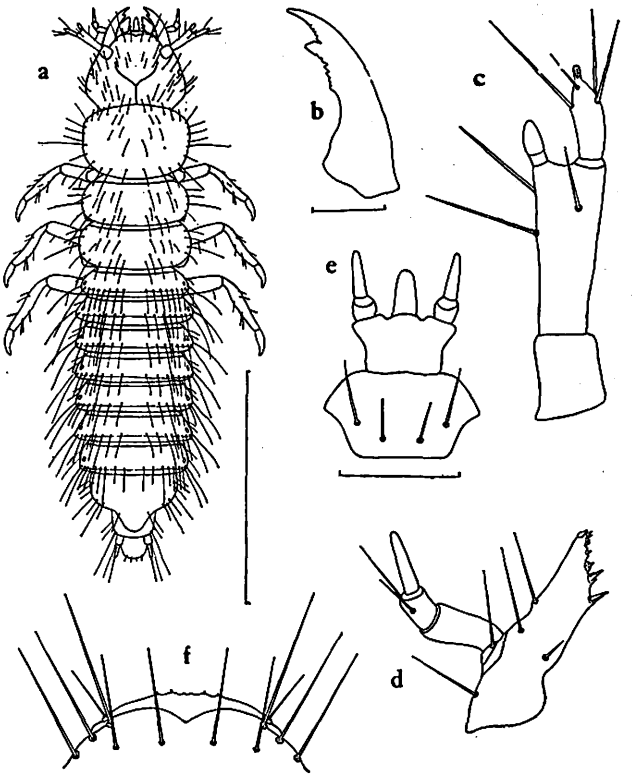

Fig. 19. *Baeostethus chiltoni* Broun, larva. a, whole insect, scale=2 mm; b, mandible, scale=0.2 mm; c, antenna, same scale as e; d, maxilla, same scale as e; e, labium, scale=0.2 mm; f, front of head, same scale as e.

out a membranous fringe on posterior margin.

Legs moderately long and slender, tarsal formula 4–4–5, anterior and intermediate tarsi with segments 1–3 short and subequal in length, 4 about as long as the preceding 3 together, posterior tarsi with segments 1–4 short and more or less equal in length, 5 not quite as long as 2–4 together.

Type species: *Baeostethus chiltoni* Broun.

RANGE: at present known only from Campbell I.

This genus would appear to be closest to *Liparocephalus* Mäklin from the west coast of North America, which it resembles in general facies. It differs, however, in the form of the labrum, mandible, maxilla and ligula, the hairy eyes, the less bordered temples and the mesosternal process. The larva (described below) is also similar to *Liparocephalus* but differs in the shape of the head and the structure of the maxillary palpus.

The one species known so far is found on the seashore below high water mark. It cannot be confused with any other staphylinid from the New Zealand area.

Baeostethus chiltoni Broun

Baeostethus chiltoni Br., 1909, Subantarct. Is. N. Zeal. **1**: 97.

Rather dull. Head, pronotum, elytron, antenna and legs pale or dark yellowish brown, abdomen dark brown. Length: about 5 mm, without abdomen 1.75–2 mm. General shape as fig. 18a, in the specimens examined, the pronotum varied from 1.10–1.16× as broad as long and the sutural length of the elytron from 0.36 to 0.4× length of pronotum.

Head with an irregular impression on disc, eyes small and flat, with relatively coarse facets; very closely punctured and pubescent behind level of antennal insertions, punctures rather superficial and much finer than facets of eyes, separated by about their diameter towards front and by only about 1/2 their diameter posteriorly; surface between punctures with an indistinct ground sculpture in the form of an irregular polygonal network; antenna with segment 6 about as long as broad, 10 rather more than 1.25× as broad as long. Pronotum with a rather broad longitudinal median impression at least on posterior 1/2, very closely punctured and pubescent, the punctures a little weaker and finer than those on head, ground sculpture as on head. Elytron very closely punctured and pubescent, the punctures similar in size to those on pronotum but a little stronger and obliquely impressed so that the surface appears granulate, ground sculpture as on head. Abdomen with puncturation and pubescence similar to that on elytron. Aedeagus as fig. 18 d, e, spermatheca as fig. 18f.

Larva: Head, thoracic and abdominal tergites and sternites, antenna, mouthparts and legs dark brown. General shape as fig. 19a, front of head as fig. 19f, antenna as fig. 19c, maxilla and labium as fig. 19 d, e, mandible as 19b, apical abdominal segments as *Halmaeusa*, fig. 21a, but segment 8 a little shorter, tarsal claws as *Arpediomimus* (fig. 8c).

CAMPBELL I.: described from Perseverance Harbor, specimens also seen from Tucker Cove, Beeman Beach and Venus Cove.

Genus **Halmaeusa** Kiesenwetter

Halmaeusa Kies., 1877, Dtsch. Ent. Z. **21**: 161.
Antarctophytosus Enderlein, 1909, Dtsch. Südpol. Exp. **10**: 377. **New Synonymy.**
Paraphytosus Cameron, 1917, Ent. Mon. Mag. **53**: 125. **New Synonymy.**
Austromalota Brèthes, 1925, Comun. Mus. Nac. B. Rivadavia **2**: 170. **New Synonymy.**

Head prominent, temples bordered behind and below. Labrum transverse, very finely membranous in front, anterior angles rounded, anterior margin almost straight. Mandible short and stout, the right with a very small tooth at about middle internally, the left edentate. Maxilla similar to *Colle* (fig. 26g), labium as fig. 20b, segments 1 & 2 of labial palpus fused and with traces of a separation on inner side only, palpus thus appearing 2-segmented.

Prosternum carinate, pronotal epipleura visible from side. Mesosternal process narrow and pointed, extending between intermediate coxa for more than 1/2 their length and meeting metasternal process. Scutellum rather short, rounded apically, normally completely hidden by pronotum. Metasternum and elytron short, the latter distinctly emarginate inside posterior angles. Wings vestigial.

Abdomen slightly widened from base to about middle, slightly narrowed posteriorly, tergites of segments 3–5 rather strongly transversely impressed behind basal ridges, that of

segment 6 much less strongly impressed. Segment 7 about as long as 6, its tergite without a membranous fringe apically. Spermatheca as fig. 20f.

Legs moderately long and slender, tibiae setose, tarsal formula 4–4–5. Anterior and intermediate tarsi with segments 1–3 short, 1 slightly longer than the other 2, 4 a little longer than the 3 preceding together; the posterior with segments 1–4 short, 1 a little longer than the other 3, 5 about as long as 2–4 together.

Type species: *Halmaeusa antarctica* Kiesenwetter.

RANGE: Subantarctic Islands (Auckland, Campbell and Macquarie Is., Falkland Is., South Georgia, Prince Edward Is., Crozet Is., Kerguelen I.).

This genus is very close to *Leptusa* Kraatz with which (as *Sipalia* Mulsant & Rey) it was synonymized by Fauvel (1877, Ann. Mus. Civ. Genova **10**: 125) but differs in the much longer, differently formed ligula. In the past it has (as *Antarctophytosus*) been compared with *Phytosus* Curtis from which it differs markedly in the form of the labial palpus and tibiae as well as in habits. *Phytosus* is restricted to the seashore, where it burrows in the sand, whilst *Halmaeusa* occurs in a variety of habitats, in litter, amongst vegetation, under stones, etc. and only occasionally on the shore.

In addition to the 3 species from the Auckland and Campbell Is., there is a further species, **H. atriceps** (Waterhouse) n. comb. from the Falkland Is. and other S. Atlantic islands, which is not included here. This species was described in detail by Jeannel (1940, Mem. Mus. Hist. Nat., Paris **14**: 106–14) who separated it into 3 subspecies. It is larger than the Campbell and Auckland Is. species (length 3.5–4.5 mm) and differently colored, with head and abdomen, except apex, dark brown and the pronotum, elytron and abdominal apex reddish. The relatively large head and only moderately convex pronotum are similar to *nesiotes*, whilst the fine and rather indistinct puncturation is like that of *sparsepunctata*. The aedeagus is of the same type but the parameres are differently shaped.

KEY TO THE CAMPBELL AND AUCKLAND IS. SPECIES OF HALMAEUSA

1. Head, pronotum and elytron closely and rather strongly punctured; size larger (2.5–3 mm) 2
   Head, pronotum and elytron less closely, weakly and rather indistinctly punctured; size smaller (2–2.5 mm) ..... **sparsepunctata***
2. Head much narrower than pronotum (fig. 20a) ..... **antarctica**
   Head broader in relation to pronotum (fig. 22a) ..... **nesiotes***

Halmaeusa antarctica Kiesenwetter

Halmaeusa antarctica Kies., 1877, Dtsch. Ent. Z. **21**: 161.
Antarctophytosus macquariensis Womersley 1937, Rep. Brit. Austr. N. Z. Antarct. Res. Exp. (B) **4**: 27. **New Synonymy.**

Moderately shining to rather dull. Body reddish brown to dark brown, head sometimes darker than remainder, the entire upper surface with fine, yellowish setae which arise from punctures or granules. Antenna with 1st 4 or 5 segments and sometimes also the last, reddish, remainder dark brown. Legs reddish brown. Length: about 3 mm, without abdomen 1.3–1.5 mm. General shape as fig. 20a; in the specimens examined, the pronotum varied from 1.14–1.29× as broad as long.

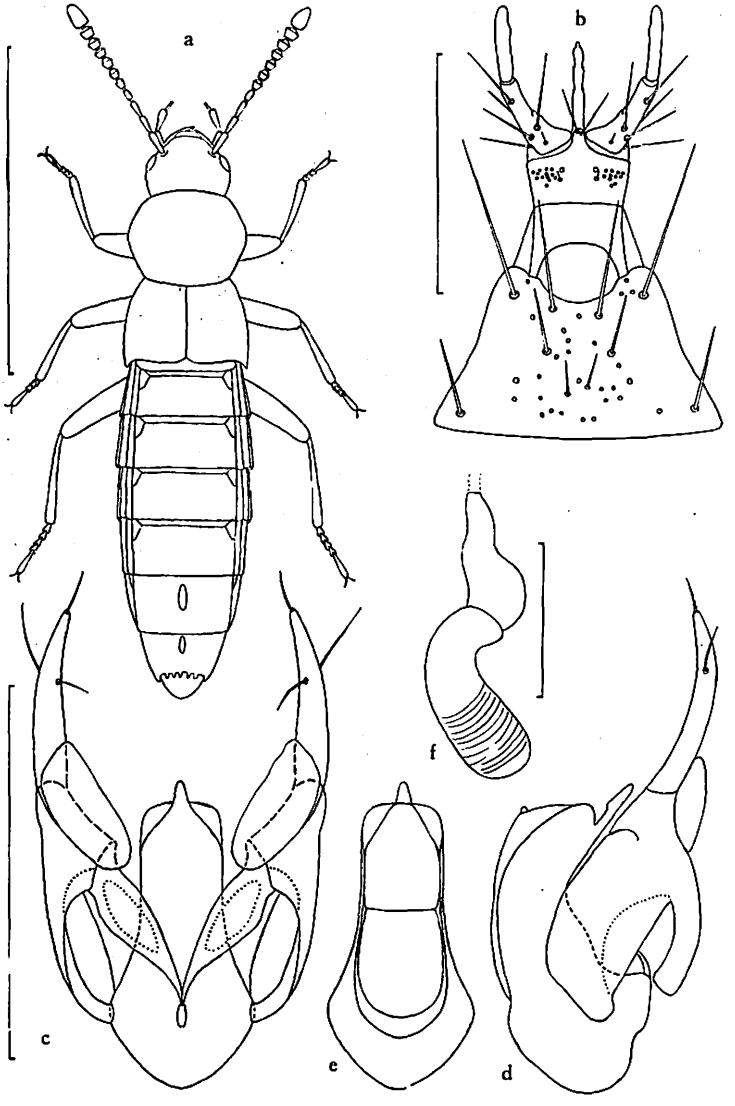

Fig. 20. *Halmaeusa antarctica* (Kiesenwetter). a, whole insect, scale= 2 mm; b, labium, scale=0.2 mm; c, aedeagus, ventral view, scale=0.5 mm; d, aedeagus, lateral view, same scale as c; e, aedeagus, median lobe, dorsal view, same scale as c; f, spermatheca, scale=0.1 mm.

Head with close punctures which are a little larger than the facets of the eyes and separated, except in front, by less than their diameter, ground sculpture variable; antenna with segment 6 less than 1.5× as broad as long, 10 rather less than 2× as broad as long. Pronotum rather convex, with puncturation and ground sculpture as on head, punctures separated on the average by about their diameter. Elytron with punctures which are stronger and a little coarser than those on pronotum and obliquely impressed, separated by about

their diameters, ground sculpture variable. Tergites of abdomen closely and rather strongly granulate, the granules about as large as elytral punctures, ground sculpture variable.

♂. Elytron raised on each side of suture to form a distinct but not sharp longitudinal ridge, the surface granulate rather than punctate between these ridges. Tergite of abdominal segment 7 with granules elongate and with a flat median longitudinal tubercle just behind middle; that of segment 8 with similar granules and a shorter flat tubercle, the apical margin emarginate over its entire width and with several fine teeth. Aedeagus as fig. 20 c–e.

♀. Elytron and abdominal tergites not modified.

Larva: Head, thoracic and abdominal tergites and sternites, antenna, mouthparts and legs yellowish brown. General shape as *Baeostethus* (fig. 19a) but segment 8 longer, fig. 21a, front of head as fig. 21b, antenna as fig. 21e, maxilla and labium as fig. 21 c, d, mandibles each with a tooth internally as in *Baeostethus* (fig. 19b) but less crenulate, tarsal claws simple, rather long.

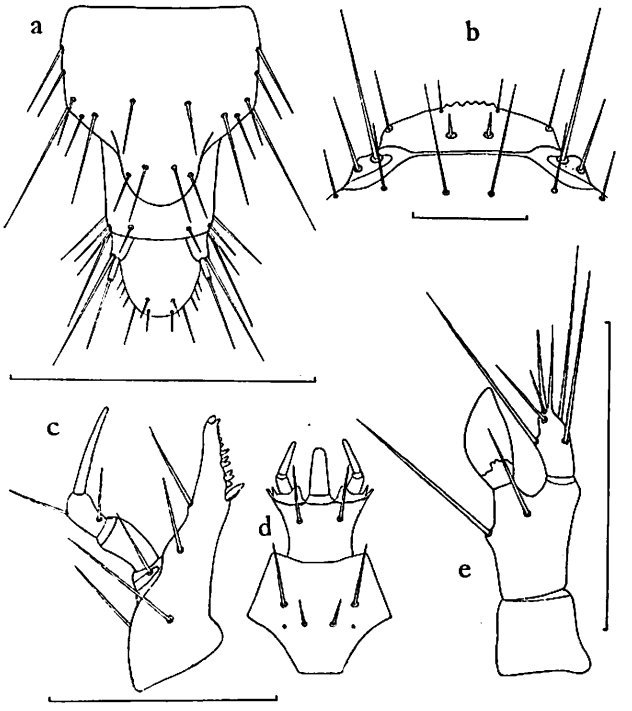

Fig. 21. *Halmaeusa antarctica* (Kiesenwetter), larva. a, apex of abdomen, scale=0.5 mm; b, front of head, scale=0.1 mm; c, maxilla, scale=0.2 mm; d, labium, same scale as c; e, antenna, scale=0.2 mm.

Auckland & Macquarie Is. No specimens seen from Campbell I.

The ground sculpture of this species varies considerably in strength in different specimens. At one extreme, it is very distinct over the entire upper surface, giving a dull appearance; at the other, it is moderately distinct on the head and pronotum, less distinct on the elytron and absent from the tergites except for traces on those of segments 7 & 8.

Halmaeusa nesiotes Steel, n. sp.

Moderately shining. Head, pronotum and abdomen black or almost black, elytron reddish brown to dark brown, apex of abdomen reddish brown, the entire upper surface with fine, yellowish setae which arise from the punctures or granules. Antenna with the first 3–4 and the last segments reddish, the remainder dark brown. Legs pale or dark reddish brown. Length: about 3 mm, without abdomen 1.2–1.4 mm. General shape as fig. 22a; in

the specimens examined, the pronotum varied from 1.14–1.19× as broad as long.

Head with punctures which are a little larger than eye facets and separated, except in front, by at most their diameter, ground sculpture distinct; antenna with segment 6 about 1.5× as broad as long, 10 about 2× as broad as long. Pronotum moderately convex, ground sculpture and puncturation as on head. Elytron lightly impressed along suture, ground sculpture not very distinct, the punctures similar in size and density to those on pronotum but obliquely impressed and appearing more or less granulate. Abdominal tergites moderately closely granulate, the granules a little smaller than punctures of elytron, ground sculpture absent or very indistinct except on those of segments 7 & 8.

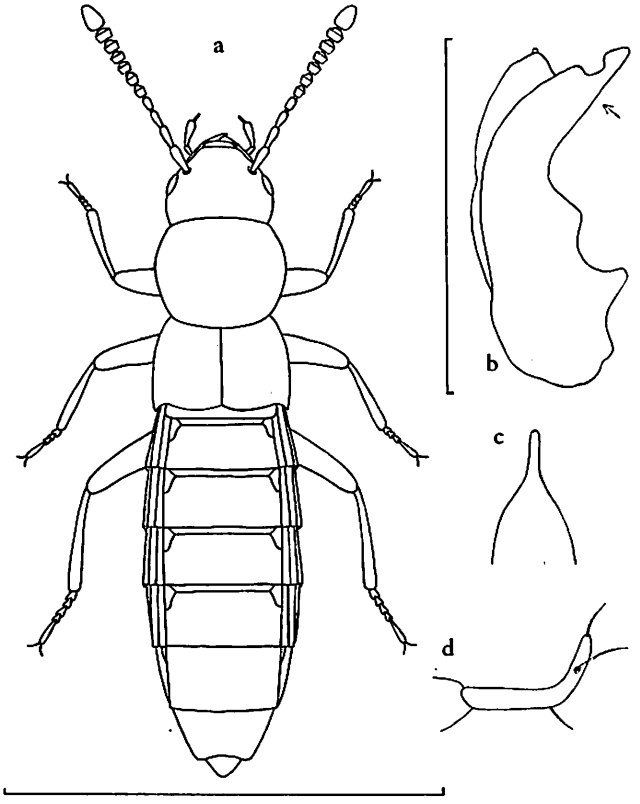

Fig. 22. *Halmaeusa nesiotes* n. sp. a, whole insect, scale =2 mm; b, median lobe of aedeagus, lateral view, scale= 0.5 mm; c, apex of median lobe of aedeagus viewed from direction of arrow in b, same scale as b; d, apex of paramere, lateral view, same scale as b.

♂. Elytron more distinctly granulate in sutural area. Tergites of abdominal segments 7 & 8 much more coarsely granulate, that of segment 8 emarginate apically over its entire width. Aedeagus as fig. 22 b–d.

♀. Apical margin of tergite of segment 8 very slightly emarginate in middle.

Larva: unknown.

CAMPBELL I.: Courrejolles Penin., 200 m, low plants in mollymawk colony, 13.II.1963, K. A. J. Wise (type), 14.XII.1961 J. L. Gressitt; Rocky Bay, under stone in penguin rookery and amongst *Colobanthus*, 20. XII. 1961, Gressitt; Beeman Beach, amongst *Colobanthus* etc., Wise, 19.XII.1961, Smooth Water Bay, under moss on rocks, 3.I.1963, K. Rennell.

AUCKLAND IS.: Ewing I., in dried kelp, 1.I.1963, Enderby I., Port Ross, swept from grass, 2.I.1963, amongst *Tillaea moschata*, 31. XII. 1962; all K. A. J. Wise.

In puncturation this species resembles *H. antarctica* but is easily separated by the relatively larger head and the less convex pronotum. The punctures on the head, pronotum and elytron are a little finer and closer, as are the granules on the abdomen, and the aedeagus and ♂ secondary sexual characters are different. Although widespread, *H. nesiotes* does not appear to be at all common and only 9 specimens were collected.

Halmaeusa sparsepunctata Steel n. sp.

Head and pronotum rather dull, elytron and abdomen sometimes more shining. Body dark brown, apex of abdomen, and sometimes also pronotum, paler. Antenna with the first 3 or 4 segments yellowish brown or reddish brown, the remainder dark brown. Legs reddish brown. Length: about 2.5 mm, without abdomen 0.9–1.1 mm. General shape as fig. 23a; in the specimens examined, the pronotum varied from 1.16–1.25× as broad as long.

Head with a strong ground sculpture and weak, indistinct punctures which are about as large as facets of eyes and separated by rather more than their diameter; antenna with segment 6 a little more than 1.5× as broad as long, 10 rather more than 2× as broad as long. Pronotum rather convex, with strong ground sculpture, the punctures similar in size to those on head, very weak and indistinct and separated, on the average, by about 2× their diameter. Elytron with ground sculpture varying from as strong as on head and pronotum to much weaker, punctures similar in size and density to those on pronotum but obliquely impressed. Abdominal tergites with ground sculpture moderate, with distinct but not very strong granules which are of about the same size as elytral punctures, separated by about 2× their diameter on those of segments 3 & 4, gradually becoming sparser on those of 5–8.

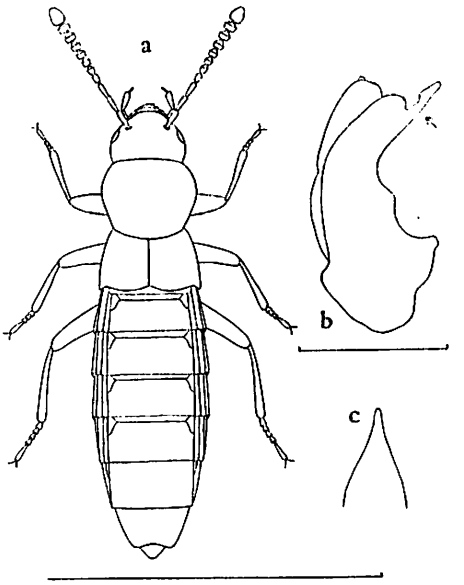

Fig. 23. *Halmaeusa sparsepunctata* n. sp. a, whole insect, scale=2 mm; b, median lobe of aedeagus, lateral view, scale =0.2 mm; c, apex of median lobe of aedeagus viewed from direction of arrow in b, same scale as b.

♂. Tergite of abdominal segment 8 emarginate apically over its entire width, the emargination sometimes very lightly crenulate. Aedeagus as fig. 23 b, c, the parameres as in *antarctica*.

♀. Posterior margin of tergite of abdominal segment 8 at most very slightly emarginate in middle.

Larva: apparently not separable from that of *H. antarctica*.

CAMPBELL I.: The commonest Aleocharinae on the island, found amongst vegetation, in litter, in penguin and mollymawk colonies and Albatross nests and, one specimen only, amongst seaweed on the shore. Specimens seen from: Rocky Bay (type locality), Courrejolles Peninsula, Beeman Hill, Mt. Azimuth, Mt. Lyall, Lookout Bay, Tucker Cove, Shoal Point, Monument Harbor and Smooth Water Bay.

Easily separated from the other Campbell I. species by the sparser, very weak puncturation of the front parts.

Genus **Atheta** Thomson

Atheta Thoms., 1858, Skand. Col. **1**: 39.

This cosmopolitan genus is so well known that a full description is unnecessary here. It can easily be separated from the other genera dealt with by the tarsal formula. The single species concerned belongs to the subgenus *Amidobia* Thomson (=*Microdota* Mulsant and Rey).

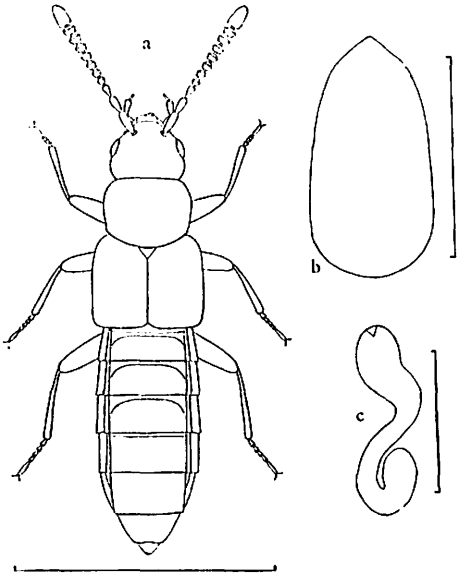

Fig. 24. *Atheta amicula* (Stephens). a, whole insect, scale=1 mm; b, outline of median lobe of aedeagus, ventral view, scale=0.2 mm; c, spermatheca, scale=0.2 mm.

Atheta amicula (Stephens)

Homalota amicula Steph., 1832, Ill. Brit. Ent. Mandib. 5: 132.

Body black, legs and antenna dark brown. Length: 1.5–2 mm. General shape as fig. 24a.

♂. Tergite of abdominal segment 8 broadly truncate and more or less distinctly emarginate, very finely crenulate, the posterior angles toothed. Aedeagus with median lobe broad (fig. 24b).

♀. Tergite of segment 8 more or less distinctly emarginate in middle, posterior angles rather sharply rounded. Spermatheca characteristic (fig. 24c).

Larva: Head, thoracic and abdominal tergites and sternites, mouthparts, cercus and legs pale yellowish brown. General shape as *Baeostethus* (fig. 19a) but abdominal segment 8 simple as in *Colle* (fig. 27d), head rounded, clypeal region as fig. 25b, antenna as fig. 25c, maxilla as fig. 25a.

This common European species has been described several times so is only briefly charac-

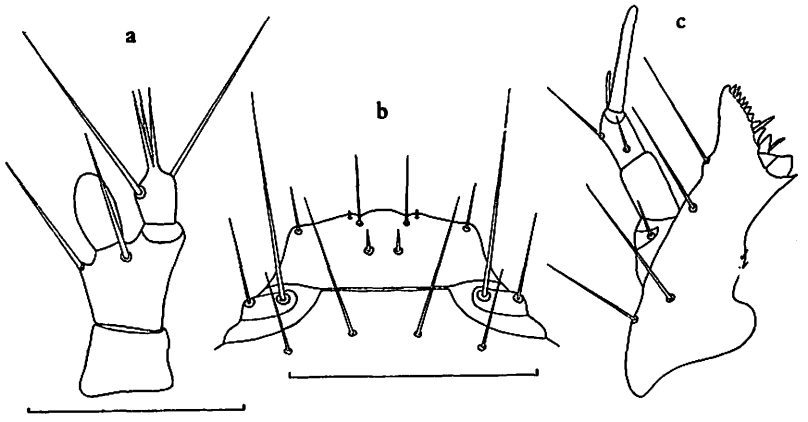

Fig. 25. *Atheta amicula* (Stephens), larva. a, maxilla, scale=0.1 mm; b, front of head, scale=0.1 mm; c, antenna, same scale as b.

terized here. The larva, however, does not appear to have been described before. In addition to Europe, *A. amicula* has been recorded from various other parts of the World, including New Zealand, and has obviously been artificially introduced into Campbell Island. A number of specimens, adults and larvae, were collected at Beeman Camp, in chicken yard debris in Dec. 1961.

Genus **Colle** Steel, n. gen.

Head prominent, temples finely bordered behind but not below. Labrum transverse, very finely membranous in front, anterior angles rounded, front margin almost straight. Mandible stout, curved and pointed apically, the right with a very small tooth at about middle internally, the left edentate. Remainder of mouthparts as fig. 26g, segments 1 & 2 of labial palpus fused, with traces of a separation on the inner side only, so that the palpus appears 2-segmented.

Prosternum carinate, the pronotal epipleura not visible from side. Mesosternal process narrow and pointed, extending between intermediate coxae for about 1/2 their length and meeting intercoxal process of metasternum; the intermediate coxae almost touching. Scutellum normal. Hind margin of elytron slightly emarginate inside posterior angles. Wings rudimentary.

Abdomen more or less parallel-sided for most of its length, tergites of segments 3–5 with a transverse impression behind basal ridge, segment 7 about as long as 6, posterior margin of its tergite with a fine whitish membranous fringe.

Legs moderately long and slender, tibia setose, tarsal formula 5–5–5, tarsal segments 2–4 subequal in length, a little shorter than 1, 5 about as long as 3+4.

Type species: *Colle campbellensis* n. sp.

RANGE: at present known only from Campbell I.

This genus differs in the structure of the labial palpus from all others known to me which have the tarsal formula 5–5–5, 4-segmented maxillary palpus and head not produced in front.

Colle campbellensis Steel, n. sp.

Head, pronotum and elytron rather dull, the abdomen more shining. Body dark reddish brown to dark brown, the head and abdomen, except apex, darker than remainder; the entire dorsal surface with fine, light colored recumbent pubescence which arises from punctures or granules. Antenna and legs reddish brown. Length: about 3 mm, without abdomen 1.3–1.6 mm. General shape as fig. 26a; in the specimens examined, the pronotum varied from 1.06–1.12× as broad as long and the sutural length of the elytron from 0.78–0.89× length of pronotum.

Head evenly convex with a strong ground sculpture in the form of a polygonal network, the meshes of which are about as long as broad, with moderately close punctures which are about as large as the meshes of the ground sculpture but so weak as to be very difficult to see. Antenna with segment 6 about 1.5× as broad as long, 10 about 2× as broad as long. Pronotum evenly convex in front, sometimes with a superficial median impression on apical 1/2, with ground sculpture and puncturation as on head, the pubescence directed outwards on each side of middle, obliquely backwards at sides. Elytron with

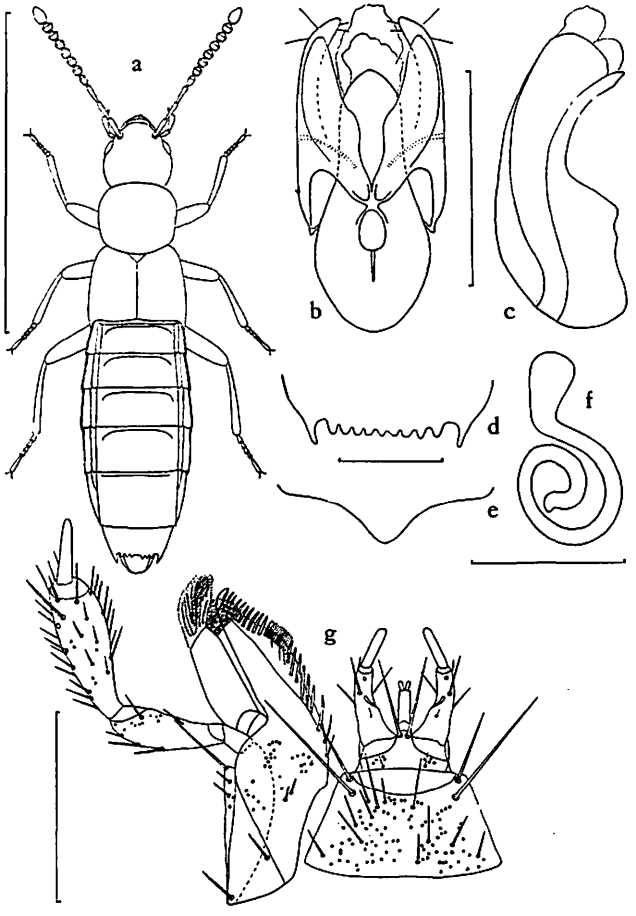

Fig. 26. *Colle campbellensis* n. sp. a, whole insect, scale =2 mm; b, aedeagus, ventral view, scale=0.5 mm; c, aedeagus, lateral view, same scale as b; d, apex of tergite of abdominal segment 8 of ♂, scale=0.2 mm; e, apex of sternite of abdominal segment 8 of ♂, same scale as d; f, spermatheca, scale=0.2mm; g, maxilla and labium, scale=0.2 mm.

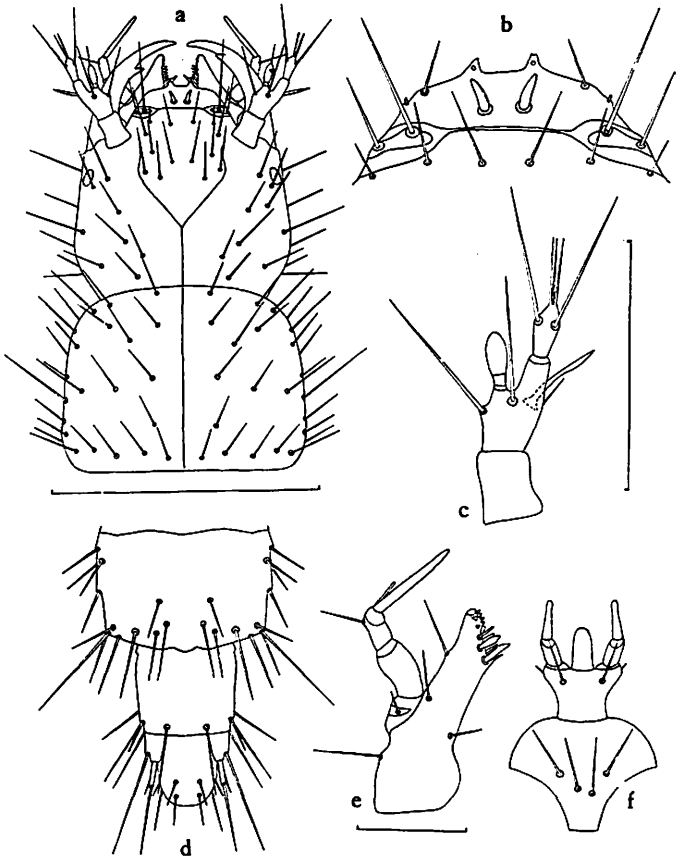

Fig. 27. *Colle campbellensis* n. sp., larva. a, head and pronotum, scale=0.5 mm; b, front of head, same scale as c; c, antenna, scale=0.2 mm; d, apex of abdomen, same scale as a; e, maxilla, scale=0.1 mm; f, labium, same scale as e.

ground sculpture rather weaker than on head and pronotum, punctures obliquely impressed and appearing as granules. Abdominal tergites with ground sculpture much weaker and less regular than on front parts, the meshes strongly transverse; those of segments 3–6 moderately closely, those of 7–8 less closely, granulate.

♂. Tergite of abdominal segment 8 as fig. 26d, the sternite produced backwards in middle (fig. 26e), aedeagus as fig. 26 b, c.

♀. Tergite of abdominal segment 8 with posterior angles rounded and posterior margin almost straight, the sternite emarginate in middle posteriorly, spermatheca characteristic (fig. 26).

Larva: Head, thoracic and abdominal tergites and sternites, antenna, mouthparts, cercus and legs yellowish brown. General shape as *Baeostethus* (fig. 19a), but with abdominal segment 8 simple (fig. 27d), head and pronotum as fig. 27a, front of head as fig. 27b, antenna as fig. 27c, maxilla and labium as fig. 27 e, f.

CAMPBELL I.: Mt. Honey, 550 m, amongst low vegetation nr. summit, 24. II. 1962, K. A. J. Wise (type locality); Perseverance Harbor, Berlese funnel; St. Col Peak, ca 250 m, base of tussock, 23.II.1963; Tucker Cove, in leaf mold, 6.IX.1947 and 3.III.1963; Beeman Point, 5 m, amongst *Dracophyllum*, 19.XII.1961 and in leaf mold, 28.II.1963, 18 specimens in all.

The insect included by Brookes (*l. c.*: 29) under the name "*Atheta politula* Broun" probably represents this species. The record was based on one specimen collected in leaf-mold in 1942 and determined by Dr. Cameron. *A. politula* was never described by Broun and the few examples standing under this name in his collection, although they consist of more than one species, are superficially not unlike *C. campbellensis*. The references given by Brookes for *politula* refer to quite a different insect, *Ischnoderus politulus* (Broun), which does not occur on Campbell I.

Pacific Insects Monograph 7: 376-390 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLEOPTERA: HYDRAENIDAE, PTILIIDAE, LEPTODIRIDAE, BYRRHIDAE, LATHRIDIIDAE, MELANDRYIDAE[1]

By J. L. Gressitt and G. A. Samuelson

BISHOP MUSEUM, HONOLULU

Abstract: The families Hydraenidae, Ptiliidae, Leptodiridae, Byrrhidae and Melandryidae are each represented on Campbell I. by 1 known species, and the Lathridiidae is represented by 2 or 3 species. One species of each of the 6 families is reported upon here, and 2 of them, *Acrotrichis subantarctica* (Ptiliidae) and *Orchesia rennelli* (Melandryidae) are here described as new.

This paper concerns 6 families of Coleoptera: Hydraenidae (Limnebiidae), Ptiliidae, Leptodiridae (Anisotomidae, Catopinae), Byrrhidae, Lathridiidae, and Melandryidae. These families belong to several different superfamilies. Thus grouping them together in this article prevents a proper systematic arrangement of the families in this volume. A probable additional species of the family Lathridiidae appears to have been lost during the period of study. The above 6 families are each represented by 1(5) or 2(1) species in this paper.

We are indebted to T. Nagatani, Charles Chang and Carol Nakashige for preparing most of the illustrations for this paper.

Family HYDRAENIDAE (Limnebiidae)

This group was earlier considered a tribe of the subfamily Helophorinae of the family Hydrophilidae. It has also been considered as 1 or 2 subfamilies of the Hydrophilidae. The group is found in all regions, but is less well represented in the tropics.

Genus **Meropathus** Enderlein

Meropathus End., 1901, Zool. Anz. **24**: 121 (type: *M. chuni* End.; Kerguelen); 1903, Wiss. Ergebn. Deutsch. Tiefsee-Exped. **3**: 206; 1909, Deutsche Südpolar-Expedition **10** (Zool. 2): 411.—Orchymont, 1938, Rev. Franc. d'Ent. **5**: 78.—Jeannel, 1940, Mem. Mus. Natl. Hist. Nat. Paris, ser. 2, **14**: 129.

This is a rather distinct genus and its known range is limited to a few subantarctic islands (Kerguelen, Marion, Campbell). The species are characterized by rather broad rough elytra with grooves and irregularities, as well as pubescence.

Meropathus chuni Enderlein, the type, was referred to *Ochthebius* by Kidder (1876), Water-

1. Result of work supported by National Science Foundation grants G-18800 and GB-518.

house (1879) and Studer (1889) before it was described as new genus and species by Enderlein. According to Jeannel (1940, p. 135) the larva of *M. chuni* is very closely related to those of *Ochthebius*, and the Hydraenidae belong to the Staphylinoidea.

KEY TO SPECIES OF MEROPATHUS

1. Pronotum fairly smooth, feebly pubescent or pubescent with median glabrous area; head with a weak swelling in middle between eyes.....2
   Pronotum strongly ridged; ridges with strong hairs; head with a distinct tubercle in middle between eyes; elytron with long hairs on ridges; costa 1 in 2 short parts: pre- and postmedian; long hairs also on suture basally (Campbell) .... **campbellensis** Br.
2. Pronotum weakly hairy; elytron with thin rows of hairs; elytron widest at end of basal 1/3 (Kerguelen).....**chuni** End.
   Pronotum densely pubescent except for glabrous median area which is widest antemedially and with a few punctures, and a glabrous spot on each side of base; elytron with distinct rows of hairs; elytron widest at end of basal 1/8 (Marion I.) ..... **randi** Jeannel

Meropathus campbellensis Brookes, new status Fig. 1.

Meropathus chuni campbellensis Br., 1951, Cape Exped. Ser. Bull 5: 28 (Campbell I.; DOMINION MUS.)

♂. Dorsum and upper parts of head covered by a thin, pale testaceous, granulate, wax-like substance, with occasional groupings of stout, curved, reddish hairs generally arranged longitudinally and marginally; with wax removed surfaces piceous with texture granulate to tuberculate; labrum piceous, subglabrous, not generally covered with wax; maxillary palpus shiny piceous, glabrous; antenna with segments 1–3 reddish testaceous, subglabrous; 4–8 darker, sparsely clothed with fine setae. Ventral surfaces usually lacking wax, clothed with fine, reddish, subadpressed hairs. Legs pitchy orange, sparsely to moderately clothed; tibia darker than femur, usually covered with wax and stout hairs on external surface; tarsus dark, shiny pitchy brown, with infrequent long, slender setae.

Head almost as long as broad, widest at eyes; occiput tuberculate-granulate, elevated medially and swollen sublaterally near eye; eye small, strongly projecting and coarsely facetted; lateral ocellus distinct, placed submedially near eye; frontoclypeus transverse, granulate; labrum with paired strongly developed, horn-like projections directed subdorsally; each projection triangularly elongate, fairly stout and briefly rounded at apex; gena excavated, depth about equal to breadth of eye; maxillary palpus with segment 1 slightly longer than broad; 2 longer than 1; 3 swollen, slightly shorter than 1+2 together; last slender, conical, acute apically, about 3/4 as long as 3. *Antenna* short, not reaching base of prothorax; segment 1 very long and slender, gradually swollen apically, 3/7 as long as entire length of antenna; 2 short, globular; 3 minute, dilated apically, about as long as broad; remaining segments thickened, each somewhat broader than long, forming a loose club with 4 slightly longer than 5, 6 longer than 4, 7 subequal to 6, last slightly longer than 7 and broadly rounded apically. *Prothorax* 3/4 as long as broad, widest before middle, breadth exceeding that of head, constricted basally and narrower than breadth of elytra at basal margin; disc with a large median, longitudinal channel, flanked laterally by a longitu-

dinal carina and with postlateral area of explanate margin broadly swollen. *Scutellum* obsolete. *Elytra* fused, each 3/8 as broad as long, convex; strongly tuberculate, humerus carinate, basal 1/4 broadly depressed mesad of humerus, suture feebly raised; disc with about 3 longitudinal, uneven series of broad, discontinuous swellings. *Ventral surfaces* granulate; abdomen with sternites 1–5 subequal in length; 6 longer than 5, apical margin subtruncate and entire; last usually hidden and bordered behind by apex of pygidium; pygidium when exserted broadly triangular, with apex evenly rounded. *Legs* similar; metafemur subflattened; metatibia straight, gradually thickened to apex, almost as long as femur and armed apically with 1 spur; metatarsus with segments 1–3 small, slightly increasing in length, last longer than combined lengths of others, claw large and simple. Length 2.2–2.6 mm; breadth 0.8–1.0.

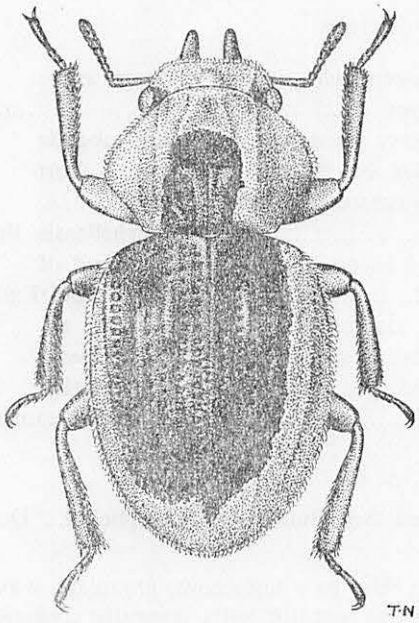

Fig. 1. *Meropathus campbellensis* ♂, dorsal view.

♀. Resembling ♂, but lacking conspicuous projections of labrum; abdomen with sternite 6 briefly notched medially at apical margin, last usually hidden. Length 1.9–2.5 mm; breadth 1.0–1.1.

This was described by Brookes as a subspecies of the type species, *chuni* from Kerguelen. However, upon direct comparison with *chuni* and *randi* Jeannel, it proves to be a distinct species.

DISTRIBUTION: Campbell I.

CAMPBELL I.: 2, Courrejolles Pt., 13.IX.1947, Sorensen (Dom. Mus.); many, Courrejolles Pen., 220 m, mollymawk rookery, 14. XII. 1961, Gressitt; many, Courrejolles Pen., 220–230 m, under stones, 12.II.1963, Wise; same, 12, 13. II.1963, Rennell; 1, St. Col–Mt. Azimuth, 250 m, albatross carrion, 12. II. 1963, Rennell; 7, Rocky Bay, rockhopper penguin rookery, Berlese, and in moss on shore rocks, 18.II.1963, Rennell, Wise; Beeman Hill, 100 m, sooty albatross nest, 11. XII. 1961, Gressitt (Bishop).

Family PTILIIDAE

This family, the feather-wing beetles, includes the smallest known Coleoptera. Their wings, very slender with feather-like setae, are characteristic. The following appears to be the first record from a subantarctic island. We are indebted to H. S. Dybas for helping us to place this species.

Genus **Acrotrichis** Motschulsky

Trichopteryx Kirby & Spence, 1818, Intr. Ent. **3**: 40 (part).
Acrotrichis Mots., 1850, Bull. Soc. Nat. Moscou **23**, 1: 236 (*Acratichis*); 1868, *op. cit.* **41**

(2): 172, 173.—Reitter, 1909, Fauna Germ. 2: 266, 273.
Acrotrichis Wollaston, 1853, Ins. Mad., 108; 1857, Cat. Col. Mad., 35.

This genus occurs in most regions, but most of the known species are Holarctic. Many of the species have been included in *Trichopteryx* in earlier works.

Acrotrichis subantarctica Gressitt and Samuelson, n. sp. Fig. 2.

♀. Brownish black to pitchy reddish: head dark pitchy with a reddish tinge, paler on most of mouthparts with labium and maxillae testaceous brown; antenna dull testaceous; pronotum pitchy black, somewhat reddish near hind angle; scutellum and elytron blackish brown; elytron more brownish along median portion, particularly near base and apex; ventral surfaces largely dark reddish brown, more pitchy on meso- and metasterna; legs dull testaceous, somewhat more reddish on coxae. Dorsum moderately clothed with fairly long subrecumbent auburn hairs; ventral surfaces similarly clothed, with hairs paler on abdomen and legs.

Head 5/8 as broad as prothorax and just over 1/2 as long as pronotum at median line; frons and occiput evenly and weakly convex, rather finely and somewhat closely punctured; labrum rounded-triangular, obtusely rounded apically, somewhat more sparsely punctured than frons; eyes subrounded and strongly convex; gena 1/2 as deep as eye. *Antenna* with segments 1 & 2 subequal, each fairly stout but longer than broad; segments 3–7 slender, not differing greatly in length; 8 slightly stouter; 9 much stouter, oval; 10 stouter and more flattened, broad apically; 11 somewhat similar in size and shape to 10, suddenly narrow-

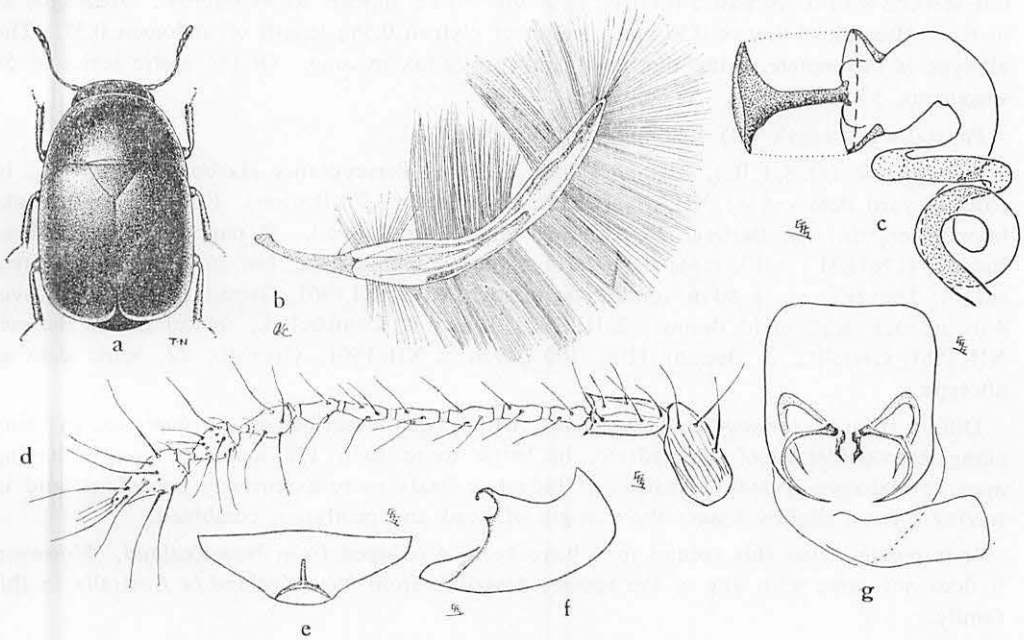

Fig. 2. *Acrotrichis subantarctica*, n. sp. a, dorsal view, ♀; b, right wing; c, spermatheca, ♀; d, right antenna, holotype ♀; e, last sternite, chaetotaxy omitted, allotype ♂; f, sclerotized portion of aedeagus, lateral view, allotype ♂; g, aedeagus, ventral view, allotype ♂.

ed apically; all segments with fairly long oblique hairs. *Prothorax* not quite 3/5 as long as broad, as broad as elytra; anterior margin weakly convex; lateral margin evenly and weakly rounded with hind corner directed somewhat backwards and subacute; posterior margin concave, again separately somewhat concave in central portion opposite scutellum; disc evenly convex, finely and subregularly punctured. *Scutellum* weakly convex, subequilaterally triangular, finely punctured. *Elytron* .56× as broad as long, suboblong, narrowed and broadly rounded-truncate apically; disc moderately and subevenly convex, rather finely and subevenly punctured. *Abdomen* extending about 1/6 elytral length beyond apex of elytron. Prosternum fairly smooth and shiny, obtuse anterior to adjacent procoxae. Mesosternum with a median hairy ridge separating coxae by about 1/5 their diameters. Metasternum nearly as long as abdomen, rather smooth and weakly convex, finely and not very closely punctured. Metathoracic wing slender, when extended, reaching well beyond apex of abdomen; fringing hairs very long, regular and rather evenly spaced. *Abdomen* with segments 1 & 6 each about 3× as long as 5; all rather smooth, finely and sparsely punctured; last sternite broadly rounded apically. Spermatheca as in fig. 2c. *Legs* flat and strongly tapering; metacoxa very large, subtriangular, flat, nearly as wide as 1/2 of posterior margin of metasternum; metafemur partly hidden by metacoxa, subparallel-sided; metatibia much more slender, fairly straight; metatarsus extremely slender with claws relatively large. Length 1.36 mm; breadth 0.55; length of elytron 0.58; length of abdomen 0.45.

♂. Abdominal sternites with minute hairs, but with longer ones at side of sternites 3 and following, and forming a fairly dense row on apical margin of penultimate segment; last sternite with a median 3-pronged structure which appears to be internal. Aedeagus as in figs. Breadth of thorax 0.58 mm; length of elytron 0.58; length of abdomen 0.35. The allotype is incomplete, with the head and prothorax missing. Of the entire series of 54 specimens, 53 are ♀♀.

Paratypes: Length 1.05–1.40 mm; breadth 0.55–0.62.

Holotype ♀ (D. S. I. R.), Beeman Camp, 2–50 m, Perseverance Harbor, Campbell I., in chicken yard debris, 6–11. XII. 1961, Gressitt; allotype ♂ (BISHOP), Rocky Bay, in rockhopper penguin nest Berlese, 28. XI. 1961, Gressitt & Rennell. ♀ paratypes (DOM. MUS., BISHOP, C.N.H.M.): 17, same data as holotype; 5, same data, but 26–30. XI. 1961. Gressitt; 1, Tucker Cove, 1–50 m, under *Poa* tussock, 21–25.XI.1961, Gressitt; 1, Tucker Cove, 4 m, tussock leaf mold Berlese, 3. III. 1963, Wise; 4, Campbell I., miscellaneous Berlese, XII. 1961, Gressitt; 2, Beeman Hill, 100–200 m, 2. XII. 1961, Gressitt; 22, same data as allotype.

Differs from *A. inconspicua* (Matthews), which was described in *Trichopteryx*, in being elongate oval instead of subquadrate, in being more than 1/2 again as long, in having apex of abdomen tridentate instead of bidentate, body more extensively pubescent, and in having elytron slightly longer than length of head and prothorax combined.

It is possible that this species may have been introduced from New Zealand. However, it does not agree with any of the species described from New Zealand or Australia in this family.

Family LEPTODIRIDAE (Anistomidae, Catopinae)

Brookes described the Campbell species as a new genus and new species, *Austrocatops*

campbellicus. He based his new genus on 3 differences from *Paracatops*: femur with a small tooth on middle of underside; antenna more slender; maxillary palpus more robust. These differences appear to be too weak and too vague to stand. Therefore, we agree with the conclusion of Szymczakowski who recently placed *Austrocatops* in synonymy with *Paracatops*.

Genus **Paracatops** Portevin

Choleva Latreille, 1796, Char. Gen. Ins., p. 4 (part) (type: *Luperus cisteloides* Fröl.).—Broun, 1893, Manual N. Zealand Col. **6**: 1339.

Paracatops Portevin, 1907, Ann. Soc. Ent. France **76**: 69 (type: *Choleva antipoda* Kirsch).—Jeannel, 1922, Arch. Zool. Exp. Gen. **61**: 40.

Austrocatops Brookes, 1951, Cape Exped. Ser. Bull. **5**: 26 (type: *A. campbellicus* Brookes).

The genus is known from New Zealand and the Auckland Is. as well as Campbell.

Paracatops campbellicus (Brookes) Fig. 3.

Austrocatops campbellicus Brookes, 1951, Cape Exped., Ser. Bull. **5**: 27, fig. 3, textfig. 1 (Campbell I.; DOMINION MUS.).

Paracatops campbellicus: Szymczakowski, 1963, Bull. Ent. Pologne **33** (4): 107, figs. 1, 2 (Campbell I.).

♂. Dorsum dark reddish brown, with silky auburn, mostly adpressed pubescence; head darker, with auburn pubescence; frons, gena and mandibles paler; clypeus and labrum orange-testaceous; eye bearing short, erect hairs; maxillary palpus reddish brown, finely clothed; antenna reddish brown, with pale, suberect pubescence; segments 7, 9–11 slightly darker with pale apices and bearing sparse, long, slender setae. Ventral surfaces dark reddish brown and clothed like dorsum. Legs reddish brown with pro- and mesotarsus paler; moderately clothed.

Head deflexed, subrounded, 6/7 as long as broad, widest at eyes and barely exceeding breadth of prothorax at anterior angles; occiput convex, punctate-granulate, with punctures about as large as interspaces; eye oval, subcoarsely facetted; frons transverse, punctate; clypeus transverse; labrum with anterior margin concave; gena about as deep as breadth of eye, excavated; maxillary palpus with segment 1 gradually thickened apically; 2 stout, subequal to 1; 3 stout, conical, apically acute, 3/7 as long as 2. *Antenna* 1/2 as long as body; segment 1 about 2× as long as broad; 2 slender, 2/3 as long as 1; 3 nearly as long as scape; 4–5 subequal, about as long as pedicel; 6 shorter than 5; 7 nearly as broad as long, subequal to 5; 8 usually much shorter and narrower than 7 and 9; 9–10 subequal, similar to 7; last longer than 10, with apex acutely produced. *Prothorax* about 3/5 as long as broad, widest at middle, narrowed anteriorly, with sides well rounded, basal margin sinuate and equal to breadth of elytra at basal margin; disc confusedly punctate-granulate. *Elytron* 2/7 as broad as long, with apex subtruncate and exposing 1 or 2 tergites; submedial area near sutural margin with a fine, impressed, longitudinal line extending from scutellum to apical 1/5; disc finely seriate in close, transversely sinuate rows; epipleuron gradually narrowing and ending at apical 1/5. *Ventral surfaces* mostly punctulate-granulate; metasternum somewhat elevated apically; abdomen with sternites 1–4 subequal in length; 5 longer; last 2× as long as 4, fairly broad apically, weakly concave at extremity.

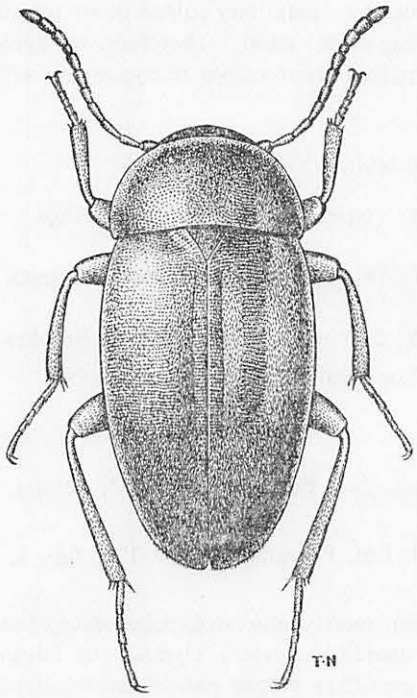

Fig. 3. *Paracatops campbellicus*, dorsal view.

Legs increasing in length posteriorly; profemur with inner margin concave basally and bearing a tooth beyond middle; tibiae shorter than femora, armed apically; mesotibia arched; pro- and mesotarsus with basal segment dilated; metatarsus slender, with segment 1 nearly as long as 2+3 together, 2–4 decreasing in length, last 5/6 as long as 1; claw slender and simple. Length 3.1–3.5 mm; breadth 1.3–1.5.

♀. Differing from ♂ as follows: abdomen with sternites 1–3 subequal; 4 shorter; 5=3; last subequal to 5, triangular, with apex acute and briefly rounded; profemur lacking tooth; tarsi not dilated. Length 2.9–3.4 mm; breadth 1.3–1.5.

There is variation in size of antennal segment 8. This segment is relatively smaller in this species than in Auckland Is. material of *Catops avivorus* Broun, which is probably a synonym of *Paracatops antipoda* (Kirsch). The synonymy was indicated by Brookes, 1951. The species is also smaller and darker, as well as smoother and shinier than Aucklands material. The Auckland species is differentiated by the following: prothorax more convex and more angulate at hind angle, elytron more evenly narrowed and slender apically with extreme apex rounded and usually attaining apex of abdomen, and antennal segment 8 larger.

DISTRIBUTION: Campbell I.

MATERIAL EXAMINED: 2, Courrejolles, 13. IX. 1947, Sorensen (DOM. MUS.); 1, Courrejolles Pen., 200 m, under *Colobanthus*, 14. XII. 1961, Gressitt; 8, Courrejolles Pen., 220–230 m (5 in nest of *Puffinus griseus*), 12. II. 1963, Rennell, Wise (BISHOP); 3, Mt. Azimuth, S. side, 250 m, 12.II.1963, Wise; 1, St. Col–Mt. Azimuth, 250 m, 12.II.1963, Rennell; 31, St. Col, 180 m, 12. VIII. 1962, Rennell; 3, Mt. Lyall ridge, 21. II. 1963, Wise; 20, Moubray Hill, 29. IV. 1962, 3.I.1963, Rennell; 2, Lookout Bay, Perseverance Harbor, 3.II.1963, Rennell; 1, Lookout Bay beach, 19.XII.1961, Gressitt; 1, Tucker Cove, 0–100 m, 7. VIII. 1962, Rennell; 14, Rocky Bay, in penguin nests, 28.XI.1961, 20. XII. 1961, Gressitt; 5, Rocky Bay, 18. II. 1963, Rennell, Wise; Smoothwater Bay, 2. III. 1963, Wise; 1, 6′ Lake, 1.8 m, 9. II. 1963, Rennell (BISHOP).

Family BYRRHIDAE

The following genus is not a very characteristic byrrhid in its appearance, although its characters seem to indicate its placement here. According to some authorities to whom material has been submitted, it should belong to the Dascillidae. The characters indicating its placement in the Byrrhidae are as follows: small transverse clypeus placed under strong-

ly inflexed anterior margin of frons, procoxae transverse, prosternum with apex of broad intercoxal piece fitting into a small excavation of mesosternum, and mesocoxae well separated.

Genus **Liochoria** Pascoe

Liochoria Pasc., 1875, Ann. Mag. Nat. Hist. ser. 4, **16**: 212 (type: *L. Huttoni* Pasc.). The genus *Epichorius* Kirsch, 1877 (Dtsch. Ent. Zschr. **21**: 155, 165; type: *E. aucklandiae* Krsch.) will probably have to be synonymized with *Liochoria*. It was placed in the Dascillidae.

This genus is known from New Zealand, Auckland Is. and Campbell I.

Liochoria sorensoni Brookes Fig. 4.

Liochoria sorensoni Br., 1951; Cape Exped. Ser. Bull. **5**: 32, fig. 4 (Campbell I.: Tucker Cove & St. Col Peak; Dom. Mus.).

Dorsum black with a dark metallic luster ranging from green or blue to reddish bronze, with very short, pale, erect hairs; labrum and mandible piceous; maxillary palpus dark reddish brown to piceous, sparsely clothed; antenna with basal segments pitchy reddish brown with sparse, short, suberect hairs, 5–11 darker with pale margins and bearing a fine, suberect pubescence. Ventral surfaces reddish orange to piceous, with a rather short, pale, subadpressed pubescence. Legs reddish brown to piceous, tarsi paler than tibiae; pubescent.

Head subrounded, about as long as broad, widest at eyes; occiput fused with frons, confusedly punctate; eyes subrounded, finely facetted; clypeus transverse, placed in a deep transverse channel between inflexed anterior margin of front and elevated labrum; labrum subrounded, elevation of surface equal to that of front, punctured; gena about 1/2 as deep as eye, deeply channeled; maxillary palpus flattened with lengths of segments 1–2 subequal, dilated apically, last with apex rounded, almost 2× as long as 2. *Antenna* about 1/3 as long as body; segment 1 robust, 2× as long as broad, punctate-granulate; 2 slender, 5/9 as long as 1; 3 slender, 2/3 as long as 1; 4=2; 5 longer than 4, dilated apically; 5–10 subequal, shorter than 4, subflattened and about as broad as long; last longer than 10, with apex broadly rounded. *Prothorax* 4/7 as long as broad, widest basally and equalling breadth of elytra at basal margin, gradually narrowed to anterior angles where breadth barely exceeds that of head; disc convex, confusedly punctate, with punctures mostly larger than interspaces. *Elytron* nearly 3× as long as broad, highly convex; disc with about 8 impunctate, longitudinal, impressed lines extending from base to apical 1/4 or more, punctation confused, with interspaces granulate and mostly larger than punctures; epipleuron ending near basal 1/4, impunctate, feebly concave basally. *Ventral surfaces* punctate; prosternum produced between and beyond procoxae, with apex rounded and fitting into a triangular depression of transverse mesosternum; metasternum bearing a short, median, impression posteriorly; abdomen more finely puntured; sternites 1–3 subequal in length; 4 slightly shorter than 3; last 2× as long as 4, with apex of ♂ subtruncate and emarginate at extremity, and with apex of ♀ entire and more evenly rounded. *Legs* flattened, punctate with femora grooved internally, tibiae armed apically with 2 spurs, tarsi with segment 3 bearing a membraneous, spatulate lobe beneath, claws simple; pro- and mesotibiae nearly equaling femora; metatibia barely exceeding femur; metatarsus with segment 1 almost as long as 2+3 together, discounting lobe of 3, 4 small, last as long as 2+3+4. Length 7.2–

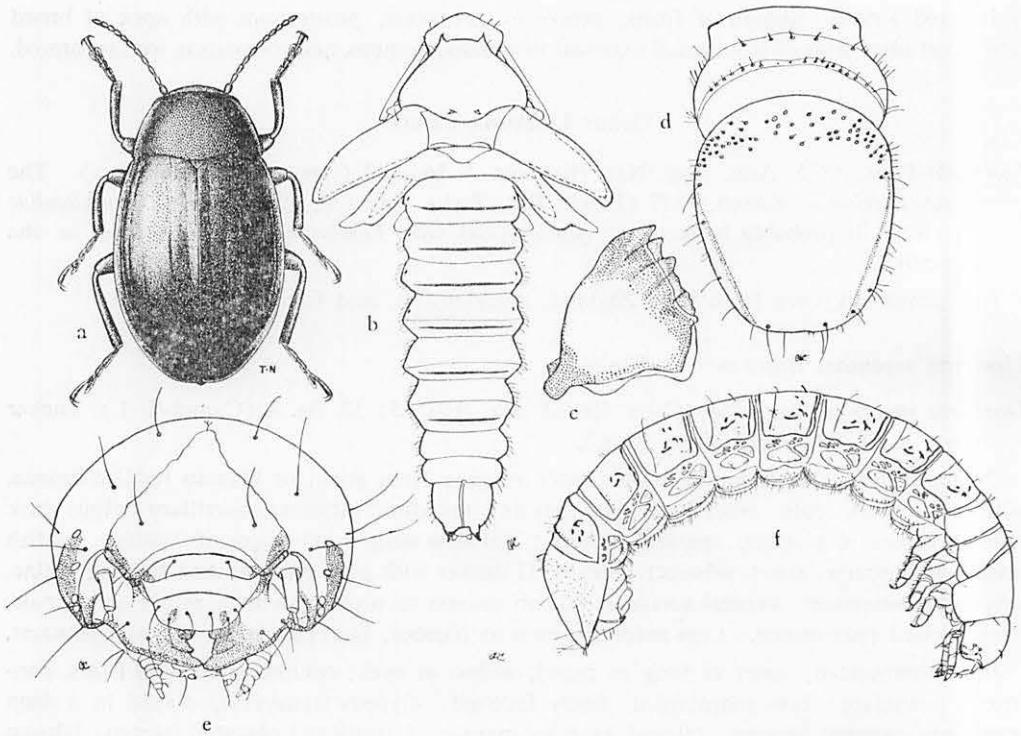

Fig. 4. *Liochoria sorensoni*. a, dorsal view; b, pupa, dorsal view; c, right mandible of larva, inner surface; d, apical segments of larva, dorsal view; e, head of larva, frontal view; f, larva, lateral view.

8.6 mm; breadth 4.0–4.6.

DISTRIBUTION: Campbell I.

MATERIAL EXAMINED: 2, Mt. Azimuth, 310–410 m, 17. I. 1961, Johns (CANTERBURY); 5, St. Col Ridge, 180–280 m, 7, 27. XII. 1961, Gressitt, Rennell (D. S. I. R., DOM. MUS.); 1, St. Col Peak, 260 m, 30. VIII. 1962, Rennell; 9, Mt. Lyall, 100–400 m, 5. XII. 1961, Gressitt, 390 m, 19. II. 1963, Rennell; 2, Mt. Lyall Ridge, 27. II. 1947, Sorensen; 1, same data, but 300 m, XII. 1962, Rennell; 5, Smoothwater Bay, 5 m, 3. I. 1963, Rennell; 1, Moubray Hill summit, 240 m, 16. II. 1963, Wise; 2, Beeman Camp, 2–50 m, 12–17. XII. 1961, Gressitt, 14. II. 1963, Wise; 2, Shoal Pt., 0–10 m, 21. X. 1962, Rennell; 2, Mt. Dumas, N. slopes, 200–300 m, 5, 6. II. 1963, Wise; 3, Mt. Filhol, 200 m, 9. II. 1963, Rennell; 4, Rocky Bay, 28. XI, 20. XII. 1961, Gressitt; 1, Mt. Puiseux, 400 m, 17. XII. 1961, Gressitt (BISHOP).

Larva: Slender, elongate, subcylindrical; body evenly arched dorso-ventrally in repose. Dull testaceous, in part somewhat darker: head ochraceous brown with lateral margin, ocellar area, edges of mandibles and parts of anterior margin of head-capsule pitchy black; ocelli pale externally and black in inner portions; antenna and anterior 1/2 of clypeus very pale; maxilla and labium largely pale; pronotum ochraceous brown, narrowly paler anteriorly and more broadly pale posteriorly and laterally; remainder of tergites testaceous with a slightly reddish tinge, less reddish (but appearing darker) on posterior portions,

with a few narrow irregular dark reddish marks not far from side of each tergite; sides pale; sternites pale testaceous; legs pale with ends of some segments narrowly darkened. Body, including head, clothed with widely spaced long erect pale hairs; some shorter, denser and darker hairs on pleura. *Head* about as broad as long; capsule slightly broader than long, subevenly rounded except for anterior portion, evenly convex above; frontal suture somewhat sinuate, forming a triangle which is somewhat longer than broad, and narrow at apex; antenna slender, fully 1/2 as long as mandible, with segment 1 short, 2 & 3 each much longer than broad; ocelli 6, subequal, arranged irregularly around a vertically elliptical dark area: 4 in front and 2 behind; clypeus transverse, anterior margin straight; labrum convex in anterior margin; mandible slightly longer than broad, subtriangular, with 3 short teeth on cutting edge; palpi with segments subequal in length; maxillary palpus fairly long, about 2× as long as labial palpus. *Thorax* barely broader than head and nearly 3× as long; prothorax as long as meso- and metathorax combined, their surface rather smooth, very finely wrinkled transversely, and with a shallow transverse groove at end of apical 1/3 of pronotum and another near anterior border of mesonotum; thoracic spiracle not obvious. *Legs* equal, fairly short, strongly tapering, with acute claws, and numerous short dark hairs beneath. *Abdomen* of approximately same width as thorax; tergites (except last) similar, fairly smooth, minutely wrinkled; spiracles weakly pigmented, not distinctly margined; last tergite nearly as long as 2 preceding combined, relatively flat above, slightly longer than broad, broadly ovate, wider near base, smooth and slightly convex along median portion, with irregular rows of punctures along side; anal pore ventral, in center of last sternite; rest of sternites uniform, each with 5 swollen areas: large pentagonal anterocentral piece, 2 posterior triangular pieces and 2 narrow lateral pieces. Length 17.6 mm; breadth 2.1.

Pupa: Whitish testaceous on head, thorax, elytral pads and legs, pinkish testaceous on abdomen; pitchy black on distal portions of caudal spines; slightly pitchy on tips of pronotal spines and on edges of carinae of abdominal tergites. Body with rather few erect pale hairs, mostly on pleura and at sides of tergites, with a few on top of head and one on elytron. Head with posterior portion semicircular, mouthparts projecting, with maxillary palp particularly long; antenna reaching slightly beyond hind angle of pronotum; pronotum much broader than long, much broader posteriorly, convex above, with a pair of widely spaced spinous tubercles on anterior margin, and a pair of slightly closer and more slender ones near middle of basal margin; elytron strongly convex, ridged, suddenly narrowed preapically; hind wing more sinuate on hind margin and more acute; abdominal tergites with central portion of each raised, smooth and bordered behind by a sharp edge; last tergite ridged medially, with a pair of long acuminate spines on apex; spiracles small, distinctly raised; pleura rather evenly convex; sternites rather even and smooth; last sternite with a pair of fairly large papilli just before anal pore which projects downward and slightly backward, reaching about as far backward as end of tergite. Length 13.6 mm; breadth of pronotum 3.8, abdomen 3.9.

Family LATHRIDIIDAE

Three species of this family were taken on Campbell, but 1 appears to have been lost.

Genus **Lathridius** Herbst

Latridius Herbst, 1793, *In* Jablonsky, Nat. Ins. Käfer **5**: 3, 10.—Latreille, 1810, Cons. Gen. Ord. Nat. Crust., Arach., Ins. p. 431 (incl. *Latridius porcatus* Herbst).
Lathridius Illiger, 1801, Mag. für Ins. **1**: 140. Emendation.—Walkley, 1948, Proc. Ent. Soc. Wash. **50** (6): 149 (fixed type as *L. porcatus=Tenebrio minutus* L.); *op. cit.* **54** (5): 223.
Cornithassa Thomson, 1859, Skand. Coleop. **1**: 93.

Lathridius minutus (Linnaeus)

Tenebrio minutus L., 1767, Syst. Nat., ed. 12, p. 675.
Latridius porcatus Herbst, 1793, *In* Jablonsky, Nat. Ins. Käfer **5**: 6.
Enicmus (*Cornithassa*) *minutus*: Fall, 1899, Trans. Amer. Ent. Soc. **26**: 123, 127.
Lathridius minutus: Walkley, 1952, Proc. Ent. Soc. Wash. **54** (5): 226.

We are indebted to W. O. Steel for identifying the species. The generic status of the species follows the nomenclatorial proposal of Walkley (1948), wherein the species indicated by Latreille (1810), *Latridius porcatus* Herbst (actually a synonym of *minutus*), is designated as the type of the genus.

DISTRIBUTION: Cosmopolitan.

MATERIAL EXAMINED: Campbell I.: 2, Beeman Camp, 2–50 m, 6–11.XII.1961, in chicken yard debris, Gressitt; 1, Rocky Bay, penguin nest Berlese, 28.XI.1961, Gressitt and Rennell.

Genus **Melanophthalma** Motschulsky

Melanophthalma Mots., 1866, Bull. Soc. Nat. Moscou **39**, 3: 269.—Fall, 1899, Trans. Amer. Ent. Soc. **26**: 145, 166.—Reitter, 1911, Fauna Germ. **3**: 85, 89.

The genus is widely distributed throughout the world.

Melanophthalma globipennis (Reitter) Fig. 5.

Corticarina globipennis Reitt., 1881, Mitt. Münch. Ent. Ver. **5**: 139 (Auckland Is.).
Melanophthalma globipennis: Hetschko, 1926, Col. Cat. **15** (85): 69.

Dorsum reddish testaceous to pitchy brown, clothed with pale, slender, suberect hairs; frontoclypeus and labrum darker than occiput. Antenna with scape and pedicel pale, segments 3–8 darker; 9–11 piceous; clothed with pale, slender hairs. Ventral surfaces reddish testaceous to pitchy brown, with mostly short, subadpressed hairs. Legs unicolorous, paler than or matching color of abdomen; finely clothed.

Head slightly longer than broad, widest at eyes and barely exceeding breadth of prothorax at anterior margin; occiput punctate; eye subrounded; subcoarsely facetted; frontoclypeus subtriangular, separated from labrum by a fine suture; labrum large, 3/8 as long as broad, weakly bilobed, granulate; gena about 1/2 as deep as diameter of eye, excavated. *Antenna* about 1/3 as long as body; segment 1 swollen, slightly longer than broad; 2 subglobular, 2/3 as long as 1; 3 slender, =2; 4–7 subequal, shorter than 3; 8 shorter than 7; remaining segments swollen, forming a loose club with 9 nearly 2× as long as 8; 10 slightly shorter than 9; last slightly flattened, nearly 2× as long as 10 with apex somewhat acute. *Prothorax* 4/5 as long as broad, widest and slightly angulate before middle, gradually narrowed anteriorly and to base where breadth is subequal to that of elytra at basal

margin; disc confusedly punctate with punctures mostly larger than interspaces; surface broadly and transversely depressed near basal 1/3. Metathoracic wing reduced; club-shaped. *Scutellum* transverse, rounded apically. *Elytron* 3× as long as broad, highly convex, widest near middle where breadth is nearly 2× as broad as widest portion of prothorax; disc confusedly punctate, punctures larger than those of prothorax, interspaces mostly 1/2 as large as punctures; epipleuron narrow, gradually decreasing in breadth and ending at apical 1/4. *Ventral surfaces* punctate; abdomen with sternite 1 as long as following 3 together; last subequal to 4, broadly rounded apically. In ♂ aedeagus short, weakly declivous apically, extremity acuminate; endophallus exerted beyond apex of aedeagus. *Legs* slender; tibia as long as femur; tarsus nearly 2/3 as long as tibia; metatarsus with segment 1 slightly longer than 2, last 1.8× as long as 2, claw slender and simple. Length 1.3–1.6 mm; breadth 0.6–0.8.

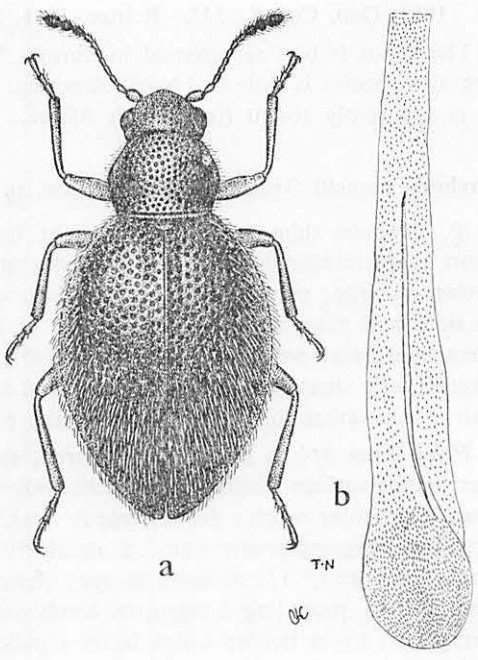

Fig. 5. *Melanophthalma globipennis.* a, dorsal view; b, right wing.

This material compares closely with specimens from the Auckland Is., the type locality of the species.

DISTRIBUTION: Auckland Is., Campbell I.

MATERIAL EXAMINED: 18, Northwest Bay, 5 m, tussock, 30. XII. 1962, Rennell; 1, Smoothwater Bay, leaf mold Berlese, 16. II. 1963, Wise; 7, Lookout Bay, beach, on *Poa*, *Stilbocarpa polaris*, 19, 30. XII. 1961, Gressitt, Rennell; 30, Tucker Cove, 1–50 m, *Poa*, 21–25. XI. 1961, Gressitt; 2, same data, but *Dracophyllum*, grass turf, 1–5, 6–11. XII. 1961; 2, same data, but, *Coprosma*, 6, 7. VIII. 1962, Rennell; 5, Beeman Camp, 2–50 m, *Dracophyllum*, *Poa*, *Pleurophyllum criniferum*, 21–25, 26–30. XI, 6–11. XII. 1961, Gressitt; 4, Beeman Station, 5. III. 1963, Wise; 1, Camp Cove, 5. II. 1963, Rennell; 1, nr. Station, 23. X. 1961, Wise; 2, Perseverance Harbor, base of *Bulbinella* Berlese, 24. II. 1963, Wise; 26, Shoal Pt., 0–10 m, 29. VII. 1962, 0–30 m, 1. XII. 1962, 7. II. 1963, Rennell; 1, Mt. Dumas, N. slope, 80 m, 31. VIII. 1962, Rennell; 1, Campbell I., miscellaneous Berlese, XI–XII. 1961, Gressitt.

Family MELANDRYIDAE

This family occurs in both Northern and Southern Hemispheres. The following species appears to be the first to be recorded from a subantarctic island.

Genus **Orchesia** Latreille

Orchesia Latr., 1807, Crust. et Ins. **2**: 194 (type: *Hallomenus micans* Panz.).—Lacordaire,

1859, Gen. Col. **5**: 542.—Reitter, 1911, Fauna Germ. **3**: 360.

The genus is best represented in Europe, South America, Australia and Tasmania. There are also species is Asia and North America. It seems to be unrecorded from New Zealand. It is apparently absent from South Africa.

Orchesia rennelli Gressitt and Samuelson, n. sp. Fig. 6.

♂. Dorsum shiny black with a slight brownish to bronzy tinge, evenly clothed with short subrecumbent reddish brown hairs; antenna reddish brown basally, becoming duller brown apically; palpi dark reddish brown; ventral surfaces reddish brown, darker anteriorly at sides and paler along middle portion of abdomen; legs reddish brown, paler reddish on coxae and basal portions of femora; tibial spurs pale reddish brown. Antenna moderately clothed with short pale pubescence; ventral surfaces thinly clothed with short fine pale thorny hairs; legs rather thinly clothed with fine pale hairs.

Head about 3/4 as broad as prothorax, subrounded in anterior view and subevenly convex, entire surface distinctly and subevenly punctured; interantennal width slightly greater than interocular width; frontoclypeus weakly emarginate anteriorly; labrum about 2× as broad as long, subevenly rounded anteriorly and very weakly depressed near middle of apex; gena about 1/6 as deep as eye; maxillary palpus very large, last segment distinctly longer than preceding 2 segments combined, slightly curved on upper border and nearly straight on lower border which bears a pubescent longitudinal groove. *Antenna* not quite 2/5 as long as body; segment 1 about 2× as long as broad, moderately thickened; 2

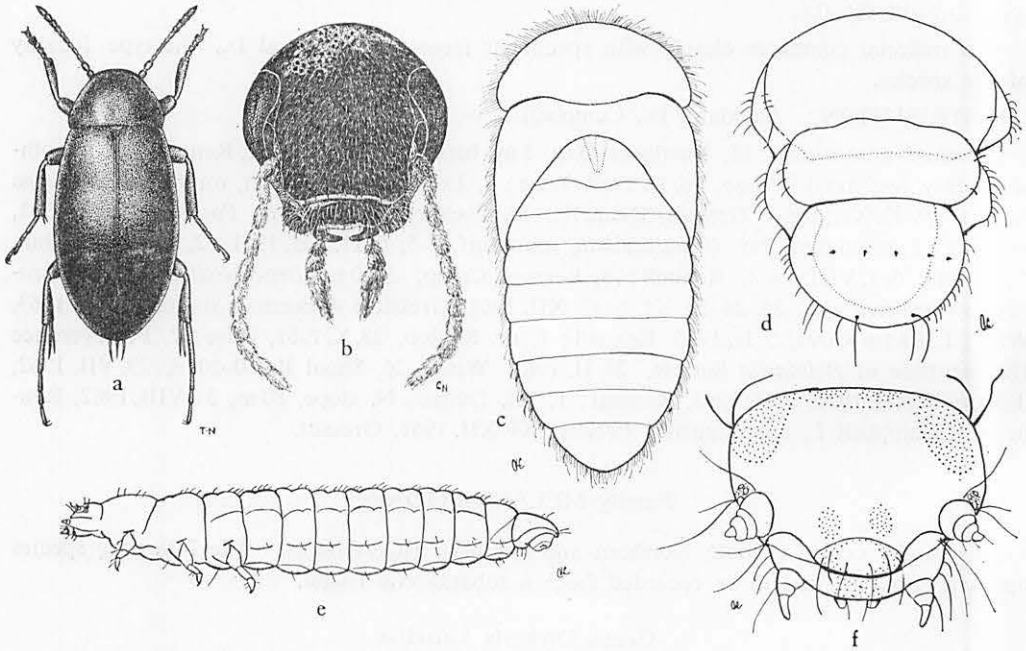

Fig. 6. *Orchesia rennelli*, n. sp. a, dorsal view, ♂; b, head, frontal view; c, pupa, dorsal view; d, apical segments of larva, dorsal view; e, larva, lateral view; f, head of larva, frontal view.

slightly shorter than 1, thickened towards apex; 3 shorter and more slender than 2; 4 slightly shorter and slightly stouter than 3; 4–10 subequal in length but gradually increasing in thickness, 10 about as broad as long; 11 as long as 9+10 and abruptly narrowed apically. *Prothorax* nearly 5/6 as long as broad, weakly convex on anterior margin; lateral margin subevenly convex, widest somewhat behind middle; basal margin weakly sinuate, slightly convex at middle and slightly concave at each side of middle; disc subevenly convex, rather finely and closely punctured. *Scutellum* slightly broader than long, rounded apically and minutely punctured. *Elytron* just over 4× as long as broad, weakly and subevenly convex at side, widest just behind middle, somewhat narrowly rounded apically; epipleuron obliquely ventral anteriorly, becoming vertical behind middle, gradually narrowing posteriorly and less distinctly set off posteriorly; disc subevenly convex, rather closely and minutely punctured throughout. *Ventral surfaces* in large part finely punctured, more heavily and sparsely so on metasternum, more dense on metepisternum and abdomen, and almost impunctate on coxal plate. *Legs* fairly slender and distinctly flattened; metafemur fairly smooth, not greatly widened in middle; metatibia 2/3 as long as metafemur; metatarsus fully 2× as long as metatibia, segment 1 slender, slightly arched, slightly longer than remaining segments combined, segment 2 slightly longer than 3 and shorter than 4; a strong bristle beneath each tarsal claw. Aedeagus with a long acuminate median lobe and slender slightly arched pair of lateral lobes. Length 2.5 mm; breadth 1.1.

♀: Antenna just over 1/3 as long as body. Last abdominal sternite subevenly rounded apically. Length 2.7 mm; breadth 1.2.

Paratypes: Length 2.1–2.7 mm; breadth 0.9–1.3.

Holotype ♂ (DOM. MUS.), Moubray Hill, 200 m, under stone, 12. XII. 1961, Gressitt; allotype ♀ (BISHOP), Courrejolles Peninsula, 200 m, from rocks and moss around mollymawk nests, 14. XII. 1961, Gressitt & Rennell; paratypes (BISHOP, DOM. MUS., D. S. I. R., CANTERBURY): 8, same data as allotype; 44, Courrejolles Penin., 220–230 m, on rock cliffs of mollymawk colony, 13. II. 1963, Rennell, Wise; 1, same data, but on tussock, Rennell; 2, same data, but on cushion plant, Rennell; 5, Mt. Lyall, 200–400 m, 5.XII.1961, Gressitt; 1, Mt. Lyall, S. slopes, 300 m, under stones, 19. II. 1963, Wise; 4, Rocky Bay, penguin colony, on rocks, 18. II. 1963, Rennell, Wise; 2, Monument Harbor, under stones above high water mark and on rock, 9. II. 1963, Rennell, Wise.

Differs from *micans* Panzer in being much shorter and darker, with head more finely punctured and with eyes much more widely separated than their diameters. Also in the new species the pronotum is more transverse anteriorly, relatively longer, broadest well anterior to base, with basal angles obtuse; elytron shorter, slightly broadened behind middle and less narrowed apically; mesotibia more slender.

Larva: Pale testaceous, very slightly ochraceous on posterior portion of head capsule and lateral portion of pronotal disc, and slightly darker brown on central portions of last 2 abdominal tergites; ventral surfaces quite pale, slightly testaceous posteriorly. Body largely clothed with short suberect pale golden hairs, and a few longer setae at sides of pronotum and on anterior portion of head. Body fairly slender, subparallel-sided, slightly narrowed anteriorly and posteriorly; moderately dorso-ventrally compressed. Head capsule fairly flat above, widest just behind eyes, slightly narrowed posteriorly, subtrapeziform anteriorly, dorsal surface rather smooth and finely punctured; clypeus and labrum somewhat short and deflexed downward, a depression on each side anterior to antenna; antenna rather stout basal-

ly and strongly tapered, of 3 segments. Eye spots black, in 2 nearly separated portions on each side. Pronotum rather flat, slightly grooved medially and each side with several fairly large foveae. Mesonotum with a sinuate oblique groove, followed by a general smooth area with some punctures; metanotum with a more regular and more transverse groove. Abdominal tergites 1–7 each with a nearly straight transverse groove near middle and with weak callosities anteriorly and posteriorly; tergite 8 narrower, with a less distinct groove and more distinct callosities; last tergite almost semicircular, narrowed at base with a rather broad depression following a transverse series of 4 small tubercles just anterior to middle; a fairly distinct tubercle on upper edge of apical margin on each side of middle. Abdominal sternites fairly smooth, with a few scattered bristles. Legs fairly slender, each shorter than width of body. Length 5.7 mm; breadth 1.4.

Pupa: Testaceous, more whitish on abdomen. Body clothed with fairly long whitish suberect hairs, sparser on ventral surface of abdomen. Head fairly flat in front; antenna fairly stout, just exceeding apex of profemur; segments mostly broader than long. Pronotum rather plain, slightly depressed medially; remainder of dorsum fairly smooth, largely impunctate. Abdominal sternites fairly even; last sternite with a fairly stout and subacute process on each side and intervening apical margin truncate. Length 3.5 mm; breadth 1.4.

Larva and pupa, Northwest Bay, Campbell I., in tussock, 20. XII. 1962, Rennell.

Pacific Insects Monograph 7: 391-394 July 15, 1964

INSECTS OF CAMPBELL ISLAND.

COLEOPTERA: PSELAPHIDAE

By Orlando Park
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Abstract: The ♂ (holotype) and ♀ (allotype) of *Pselaphotheseus hippolytae*, n. gen. n. sp. from Campbell I. collected under *Tillaea*, in earth of Penguin colony, 18. II. 1963 is described and illustrated for the first time.

Introduction: The following description of a new genus of pselaphid beetles from Campbell I., New Zealand is based on material sent to me for examination by Dr. J. Linsley Gressitt of the B. P. Bishop Museum, Honolulu. I am indebted to Mr. T. Nagatani for preparation of a dorsal view of the type of this new genus.

Genus **Pselaphotheseus** Park, n. gen.

Pselaphid beetles of the tribe Pselaphini which have in common the following combination of critical structural characters: 1) Dorsal surface of head with a median, longitudinal, entire sulcus from frontal margin to cervicum. 2) Antennae 11-segmented, of which the last 3 segments form a club. 3) Maxillary palpi 4-segmented. Distal segment 4 smooth, shining, beset with a few very short, stiff setae; segment slightly narrower at base, sessile on segment 3 and slightly subfusiform for distal 2/3, the latter slightly wider than the short, subpedunculate base and ending in a slightly arcuate, rounded apex; distal 1/3 bearing a longitudinal sulcus on dorsal face, this shallow sulcus broadest distally, rapidly narrowing and becoming difficult to discern; the segment bearing a short, truncate palpal cone. 4) Pronotum with a pair of lateral, antebasal foveae and a median foveoid impression, these 3 free. 5) Pronotum with posterior margin not bearing a setose fringe. 6) Elytra with obsolete humeri; each elytron with a pair of antebasal foveae; sutural stria entire; flank lacking a subhumeral fovea; a short, broad discal impression from the discal fovea, this sulcoid impression not extending beyond basal 2/5 of elytron. 7) Elytra with posterior margins not bearing a setose fringe. 8) Both sexes with 5 visible tergites and 6 visible sternites; tergites 1–3 with broad lateral margins; tergite 1 conspicuously longer than any other tergite.

Type species: *Pselaphotheseus hippolytae*, n. sp.

This new genus keys out to *Pselaphophus* Raffray in both the generic analysis of pselaphid genera of the world by Raffray (1908), and the revision of genera of the tribe Pselaphini of the world by Jeannel (1951). *Pselaphophus* differs basically from the new genus in many ways, including a pronotum in which the 2 lateral foveae are connected by an antebasal sulcus; the elytra each have an entire discal stria; posterior margins of the ely-

1. Results of field work supported by the National Science Foundation grant (G-23720) from the U. S. Antarctic Research Program.

tra bear a setose fringe. *Pselaphophus* is known only from Tasmania, Australia, and New Guinea.

Pselaphotheseus hippolytae Park, n. sp. Figs. 1–4.

Type ♂: Head 0.63 mm long × 0.51 mm wide; pronotum 0.51×0.49; elytra 0.8 (lateral) or 0.7 (median)×0.98 (apex); abdomen 0.94×1.2 (widest part of body, posterior margin 1st tergite); total length 2.78 mm.

Shining reddish brown, except for disc of tergite 1 which is dark brown, giving a bicolored pattern; pubescence sparse and prostrate; integuments with punctation sparse to absent.

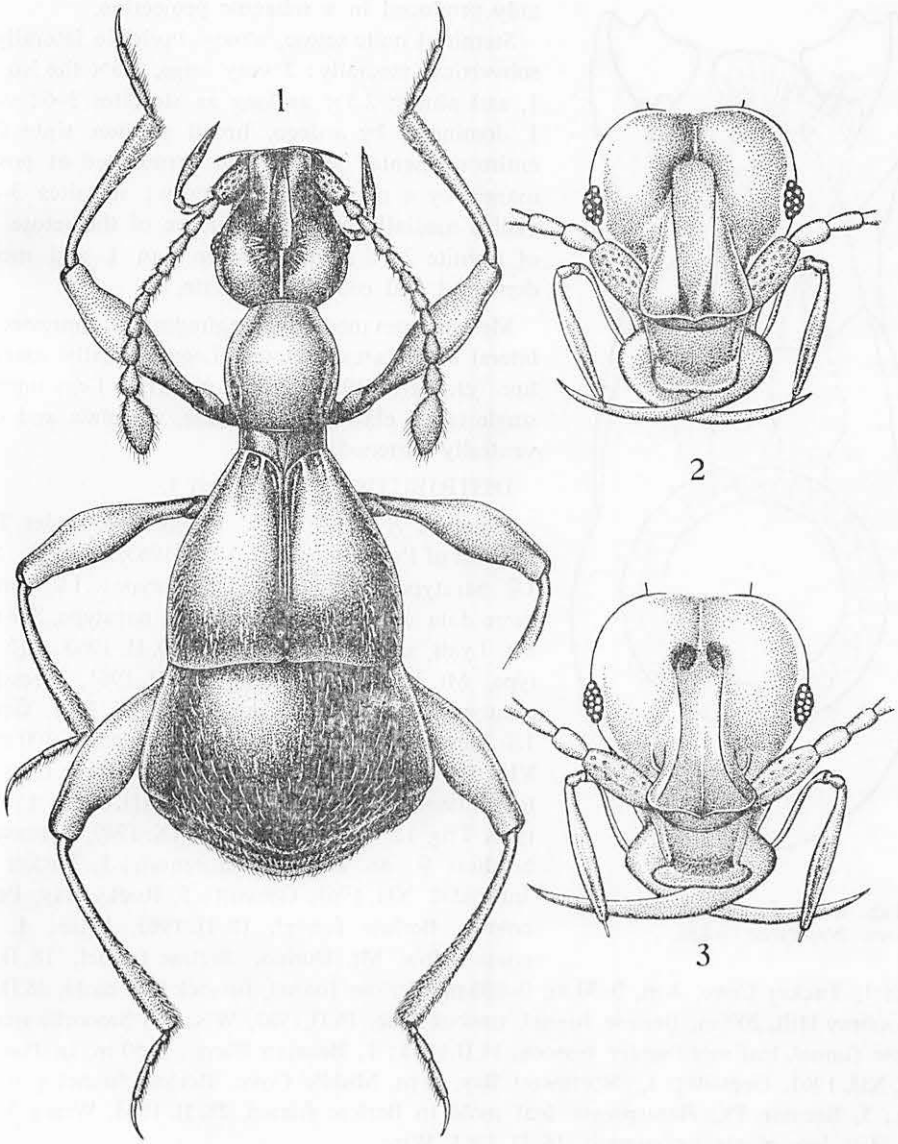
Head with a pair of obliquely ovoidal, inconspicuous compound eyes of 14 flattened corneal facets; frontal rostrum obvious; dorsal surface of head bisected by a cephalic sulcus which extends from frontal margin posteriorly, over vertex, to end on cervicum; this sulcus glabrous and in 2 steps, *viz.*, an anterior portion which is sharply limited, ending in a pair of vertexal foveae (these foveae not visible from a dorsal view), and a posterior portion which continues over occiput; anterior portion of sulcus widest at vertexal foveae and posterior portion of sulcus widest on cervicum; vertexal foveae with oblique, pubescent orifices placed on a hypothetical line which passes through posterior eye margins, and these foveae seen only when examined from anterior viewpoint; occiput with pair of short longitudinal carinae which bound cephalic sulcus. Frontal margin produced slightly in a median, ventrally-directed cusp; front simple, bisected subvertically by short carinoid extension of the median frontal cusp; clypeus simple, with carinoid clypeo-frontal margin; labrum unusual in that it has 3 teeth which project from its anteroventral surface, and so are invisible from above (usually, if labral teeth are present in pselaphids, they extend from its anterodorsal margin, and are obvious from above); labral teeth acute, with median longer than laterals; mandibles conspicuous, left crossed dorsal to right, with very slender rami which are acute and arcuate; inner margin of ramus of left mandible with 7 teeth which decrease gradually in size toward base, and with 1st tooth bicuspoid; inner margin of right madible with 9 or 10 teeth similarly formed to those of left mandible, and also with 1st tooth bifid.

Maxillary palpi 4-segmented; segment 1 long, subcylindrical; 2 as long as 1 but swollen distally to about 3× its basal width; 3 rounded-triangular, but irregularly so, about as wide as distal swelling of 2; sessile segment 4 largest, and as described in the generic diagnosis.

Antennae 11-segmented; segment 1 large, elongate, dorsoventrally flattened, and bearing a few coarse punctures; 2 shorter and narrower; 3–8 narrower than 2, subequal, elongate; club of last 3 segments, 9 & 10 obviously larger than 8, subequal, elongate, tapering at both ends; 11 largest antennal segment, about as long as preceding 2 united, and slightly more than 2× as long as wide, with truncate base and rounded-acute apex.

Pronotum almost glabrous, with a pair of lateral antebasal foveae and a median impression; this median impression connected to basal margin by a carina; foveae and median impression not connected with each other by antebasal sulcus; posterior margin not bearing a setose fringe.

Elytra bifoveate, as noted in generic diagnosis; elytral flank simple, glabrous, lacking subhumeral fovea or sulcus or carina; humeri obsolete; elytral disc with an interesting



Figs. 1–3. *Pselaphotheseus hippolytae*. 1, dorsal aspect; 2, frontal aspect of head of ♂; 3, frontal aspect of head of ♀.

pubescence, *viz.*, each elytron with 3 longitudinal bands of setae, a lateral band from near humeral area to near apex, a median band just lateral of discal antebasal fovea to near apex, and an inner band from between the 2 antebasal foveae to near apex; the 2 outer bands each have 2 setal rows, and the inner band has 3 setal rows.

Abdomen with wide lateral margins on tergites 1–3; the 5 tergites in median length ratio of 10.0/1.8/1.4/2.0/2.2 with the very large 1st tergite having its posterior margin medi-

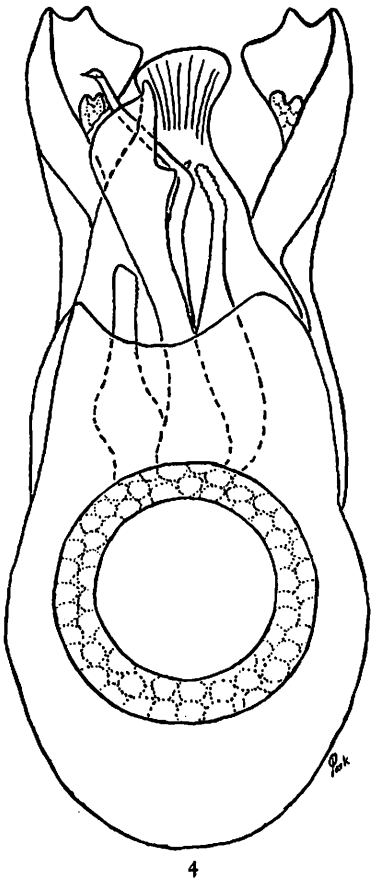


Fig. 4. Aedeagus of *Pselaphotheseus hippolytae*, ×430.

anly produced in a subacute projection.

Sternite 1 quite setose, almost invisible laterally and subvertical medially; 2 very large, 2.5× the length of 1, and almost 2.5× as long as sternites 3–6; sternite 1 dominated by a deep, broad median sinus for its entire segmental length, and terminated at posterior margin by a pair of setose cusps; sternites 3–5 invisible medially as a consequence of the setose cusps of sternite 2; 6 a little longer than 1 and medially depressed and coarsely punctate.

Metasternum medially, longitudinally impressed with lateral tumid areas setose. Legs typically macrosceline (cf. Park, 1953, p. 301, pl. III). Legs unarmed; single tarsal claw large, arcuate, aciculate and dorsoventrally flattened.

DISTRIBUTION: Campbell I.

Holotype ♂ (D.S.I.R.), Rocky Bay, under *Tillaea* in earth of Penguin colony, 18.II.1963, Rennell; 8♂♂, 1♀ paratypes same data as holotype; 1♀ paratype, same data as holotype, Wise; 1♂ paratype, SW slopes Mt. Lyall, under stone, 280 m, 19.II.1960; 1♂ paratype, Mt. Lyall, 200–400 m, 5.XII.1961, Gressitt; 1 paratype, Tucker Cove, intertidal, XII.1961, Gressitt; 1♂ paratype, St. Col Peak, under moss, 300 m, 30.VIII.1962, Rennell; 1♂ paratype, Tucker Cove, berlese, tussock leaf mold, 0–30m, 3.III.1963; 1♀ paratype, Trig 15, Cars Harbor, 6.IX.1949, Sorensen; 1 headless ♀, no. add. data, Sorensen; 1, Tucker Cove, intertidal, XII.1961, Gressitt; 5, Rocky Bay, Penguin colony, Berlese funnel, 18.II.1963, Wise; 1, south coast below Mt. Dumas, Berlese funnel, 18.II.1963, Wise; 1, Tucker Cove, 4 m, 0–30 m, 0–100 m, Berlese funnel, tussock leaf mold, 26.II.1963; 1, Moubray Hill, 200 m, Berlese funnel, tussock base, 16.II.1963, Wise; 1, Smoothwater Bay, Berlese funnel, leaf mold under tussock, 16.II.1963; 1, Beeman Camp, 2–50 m, in *Poa* roots, 6–11.XII.1961, Gressitt; 1, Northwest Bay, 5 m, Middle Cove, Berlese funnel (no date), Wise; 5, Beeman Pt., *Pittosporum* leaf mold in Berlese funnel, 28.II.1963, Wise; 3, Moubray Hill, low plants nr. summit, 16.II.1963, Wise.

Paratypes in Bishop Mus., Dominion Mus., D.S.I.R., Chicago N. H. Mus. and Park coll.

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Pacific Insects Monograph 7: 395–396 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLEOPTERA: PTINIDAE[1]

By K. A. J. Wise
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Abstract: Only 1 introduced ptinid beetle, *Ptinus tectus* Boieldieu, is known from Campbell I. and the Auckland Is.

The family Ptinidae (spider beetles) has not previously been recorded from the subantarctic Campbell and Auckland Is. It is now recorded only in association with imported foodstuffs.

Ptinus tectus Boieldieu, 1856

CAMPBELL I.: 1, Beeman Camp, 2–50 m, in food stores, 2.XII.1961, J. L. Gressitt; 1, in bread baked at camp, 6–11.XII.1961, Gressitt; 1, ex packet of food from camp kitchen, 5.III.1963, K. A. J. Wise. AUCKLAND I.: 3, Ranui Cove, camp, bred ex old dried peas, XII. 1962, Wise.

The Auckland I. specimens were bred from dried peas in an old open tin found in December 1962 in the Cape Expedition camp which was used during World War II (1941–1945). A sample of the peas, seen to be infested by moth larvae and psocids, was brought back to New Zealand in a sealed jar which was opened in March 1963. One live and 2 dead specimens of *Ptinus tectus* were found in the jar. Both the camp at Auckland I. and the permanent meteorological station on Campbell I. have always been serviced by ship direct from New Zealand thus the introduction of stored products pests is to be expected.

In recent years, Howe (1959) and Wise (1956, 1961) have discussed the species *Ptinus tectus* which is a cosmopolitan stored products pest. It is the common spider beetle infesting stored food products in New Zealand and has been recorded once from the Chatham Is. In a paper previously unnoticed by me, Broun (1911) recorded *Ptinus fur* as an introduced species at Chatham Is. but this also probably refers to *Ptinus tectus* as all New Zealand specimens determined by Broun, as *fur* have since been identified as *tectus*.

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1. Results of field work supported by National Science Foundation grant G-18800 from the U. S. Antarctic Research Program.

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Pacific Insects Monograph 7: 397–400 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLEOPTERA: TENEBRIONIDAE[1]

Von Zoltán Kaszab[2]

Abstract: Three species have been reported for Campbell I. in this family. However, 1 of them, *Antarcticodomus fallai* Brookes, actually belongs to the Salpingidae (see Spilman 1964), and the other 2 are here shown to be a single kind, *Pseudhelops tuberculatus posticalis* Broun. A new species of *Uloma* in the collection is insufficiently represented for description.

Aus der Campbell Insel waren in der Literatur bisher 3 Tenebrioniden-Arten bekannt: *Antarcticodomus fallai* Brookes 1951, *Pseudhelops posticalis* Broun 1909 und *Pseudhelops interruptus* Broun 1909. Die erstere ist jedoch eine Salpingidae (Spilman 1964) und kommt ausser der Campbell Insel noch in Auckland Insel vor, demgegenüber waren die beiden anderen Arten bisher als Endemiten der Campbell Insel betrachtet.

In dem Tenebrioniden-Material, welches im Jahre 1961 von Dr. J. L, Gressitt gesammelt wurde, fand ich nur zwei Arten, und zwar eine *Uloma* sp. mit in einem einzigen Weibchen, eine neue Art, welche jedoch als Weibchen, sich nicht näher bestimmen lässt, und ausserdem eine *Pseudhelops*-Art, welche ich mit der von Broun beschriebenen Art *P. posticalis* Broun 1909 identifizierte; wie ich an Hand der Typen von Broun beschriebenen beiden Arten, sowie der grosse Serie, welche Dr. Gressitt sammelte, festgestellt habe, ist die *Pseudhelops* aus der Campbell Insel eine Subspezies von *Pseudhelops tuberculatus* Guerin, 1841, welche in Auckland Insel vorkommt und in der Campbell Insel kommt nur eine einzige, jedoch sehr veränderliche Form dieser Art vor.

1. **Uloma** sp. ♀.

FUNDORT: Tucker Cove, 4 m, Malaise trap, 5–8. XII. 1961, Coll. Gressitt, 1 Exemplar.

Sie ist eine sicher neue, kleine, nur 6.5 mm lange *Uloma*, mit feinem Rand an der Halsschildbasis, mit spärlicher, grober Halsschildpunktierung, mit sehr fein punktierten, leicht gewölbten Zwischenräume der Flügeldecken und mit bis zum Ende gut entwickelten, eingeschnittenen Flügeldeckenstreifen. Die Art kann ich jedoch ohne Kentnis des ♂ nicht beschreiben. Ob diese Art in Campbell Insel endemisch oder irgendwoher eingeschleppt wurde, ist fraglich. Die nächstverwandte Art kommt in Südost-Australien vor, welche ebenfalls eine neue Art representiert.

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2. Zoologische Abteilung des Ungarischen Naturwissenschaftlichen Museums in Budapest, Ungarn

2. **Pseudhelops tuberculatus posticalis** Broun Fig. 1.

Pseudhelops posticalis Broun, 1909, Subantarctic Isl. N. Z. **1**: 107.—Brookes, 1951, Bull. Cape Exped. Ser. **5**: 43.

Pseudhelops interruptus Broun, 1909, Subantarctic Isl. N. Z. **1**: 108. **New Synonymy.**—Brookes, 1951, Bull. Cape Exped. Ser. **5**: 43.

FUNDORTE: St. Col Ridge, 180–280 m, 24, 26, 30.XI.1961, Berlese funnel collection, moss on rocks, Gressitt, 21 Exemplare; id., 4, 7, 9, 13. XII. 1961, moss of rocks, Gressitt, 3 Ex.; id., 90 m, 17.I.1961, under stones, M. P. Johns, 2 Ex.; Mt. Honey, 500 m, 17.XII.1961, under rock, Gressitt, 2 Ex.; Rocky Bay, 28. XI. 1961, under rocks, Gressitt, 4 Ex.; Beeman Hill, 100–180 m, 2, 6. XII. 1961, *Poa* roots, Gressitt, 2 Ex.; Beeman Camp, 2–50 m, 18–21. XII.1961, reared, Gressitt, 1 Ex.; Moubray Hill, 200 m, 12.XII.1961, moss, Gressitt, 1 Ex.; Mt. Lyall, 100 m, 5.XII.1961, Gressitt, 1 Ex.; St. Col—Lyall, 3–5.XII.1961, Beeman. Mixed moss Berlese, Gressitt, 1 Ex.; St Col Peak, 180–280 m, 4. XII. 1961, under moss, Gressitt, 9 Ex.; Middle Bay Beach, 29.XI.1961, Gressitt, 1 Ex.; Mt. Azimuth, 350–450 m, 14.XII.1961, Gressitt & K. Rennell, 3 Ex.; id., 22.II.1947, under stones, J. H. Sorensen, 2 Ex.; Courrejolles Penin., 200 m, 14.XII.1961, ground, rocks, moss around mollymawk nests, Gressitt & Rennel, 8 Ex.; Tucker Cove Valley, 15. VIII. 1947, Sorensen, 2 Ex.—Fundorte nach Brookes: Mt. Lyall, 19.XI.1944, Sorensen, unter *Ps. posticalis* Broun und *Ps. interruptus* Broun; St. Col Peak, 5. VII. 1942, Sorensen, unter *Ps. posticalis* Broun und *interruptus* Broun; Lyall Ridge, 30.V.1942, Sorensen unter *Ps. interruptus* Broun.

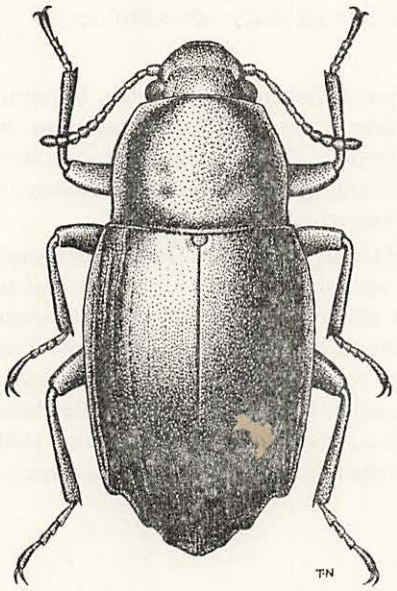

Fig. 1. *Pseudhelops tuberculatus posticalis* Broun.

Pseudhelops tuberculatus Guerin 1841 wurde aus der Auckland Insel beschrieben. Dort ist sie häufig, wie sich aus den Angaben von A. E. Brookes (p. 40) vermuten lässt. Die Exemplare aus der Campbell Insel beschrieb T. Broun als zwei selbständige Arten unter dem Namen *posticalis* und *interruptus*; die Art *interruptus* ist jodoch mit *posticalis* synonym, da die Unterschiede zwischen beiden "Arten" so gering sind (wie ich diese an Hand der Typen feststellen konnte), dass es unmöglich ist, bei einer grösseren Serie zwischen den verschiedenen Formen eine Grenze zu ziehen.

Die Art variiert in grossem Masse. Wenn man nur ausgewählte Einzelstücke hätte, so wäre es möglich eine Anzahl neue "Arten" zu beschreiben. Besonders variieren die Skulptur der Flügeldecken und vor allem die Tuberkeln am Ende der Flügeldecken, sowie auch die Form des Halsschildes. Es gibt Exemplare mit ganz erloschenen Flügeldeckenstreifen und mit schwach entwickelten Tuberkeln am Ende (spp. *posticalis* forma typica), oder die Streifen sind etwas stärker entwickelt und wellenartig, die Zwischenräume sind mehr gewölbt und am Ende der 4. und 6. Zwischenräume sind die Tuberkeln höher (als *interruptus* Broun beschrieben); bei manchen Exemplaren sind die Zwischenräume stärker punktiert, auch die Punktreihen sind gut entwickelt und gerade; bei anderen sind die Tuberkeln

am 2. und 4. Zwischenraum in Längsrichtung verbunden, so entsteht eine stumpfe, schräge Längsfalte vor dem Ende. Halsschild variiert ebenfalls ziemlich beträchtlich: entweder sind die Seiten von der Mitte an bis zur Basis kaum oder nicht verengt, Seiten schwach gebogen (ssp. *posticalis* forma typica), oder mehr gerundet, in seltenen Fällen auch nach der Basis etwas eingeschnürt.

Die Unterschiede zwischen *tuberculatus* Guerin und *posticalis* Broun stelle ich im folgenden nebeneinander:

tuberculatus Guerin	spp. **posticalis** Broun
1. Halsschild etwas vor der Mitte am breitesten, nach vorn und hinten stark gerundet verengt. Vorder- und Hinterwinkel breit abgerundet stumpfwinklig.	1. Halsschild etwa in der Mitte am breitesten, nach hinten gerade, meist parallel oder etwas verengt, nach vorn demgegenüber gerundet stärker verengt. Vorderecken mehr abgerundet stumpfwinkling als die Hinterecken, welche oft sogar fast rechtwinklig sind.
2. Die Punktierung des Kopfes und Halsschildes scharf, spärlich und gut entwickelt, der Grund grob chagriniert und fettglänzend.	2. Die Punktierung des Kopfes und Halsschildes ganz erloschen, äusserst fein, auch mit Mikroskop kaum sichtbar; der Grund fein und netzartig chagriniert, matt.
3. Clypealsutur in der Quere scharf eingeschnitten. Zwischen Wangen und Clypeus befindet sich kein Ausschnitt.	3. Clypealsutur nicht eingeschnitten. Zwischen Clypeus und Wangen meist etwas ausgebuchtet.
4. Flügeldecken mit gut entwickelten Punktreihen, die Punkte in den mittleren Reihen sind spärlich, ziemlich grob und länglich, meist miteinander nicht verbunden. Die Zwischenräume vorn fast ganz flach, erloschen fein punktiert und der Grund grob chagriniert. Die Tuberkeln am Ende (am 2., 4., 6. und 8. Zwischenraum) stumpf.	4. Flügeldecken meistens mit sehr feinen und erloschenen, unregelmässigen Punktreihen. Die Zwischenräume flach oder leicht gewölbt, entweder äusserst fein und spärlich punktiert oder ausnahmsweise ist die Punktierung gröber. Die Tuberkeln sind am Ende meist stumpf, oder oft schärfer, selten sind die beiden inneren miteinander in Längsrichtung verbunden.
5. Prosternum zwischen den Vorderhüften in der Länge leicht eingedrückt.	5. Prosternum zwischen den Vorderhüften waagerecht, nicht eingedrückt, meist in der Quere leicht gewölbt oder flach.

Wie aus dieser Gegeneinanderstellung zu sehen ist, sind die Unterschiede zwischen beiden Formen sehr gering, und erscheinen höchstens für eine Subspezies genügend.

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INSECTS OF CAMPBELL ISLAND.
COLEOPTERA: TENEBRIONIDAE (LARVA)[1]

Von N. G. Skopin

ALMA-ATA

Abstract: The larva of *Pseudhelops tuberculatus posticalis* Broun from Campbell Island is treated in a detailed morphological description. The species is established in the system of the tenebrionid larvae.

Vor kurzem erhielt ich einige Tenebrioniden-Larven für Untersuchung, welche aus der Campbell Insel stammen. Die Larven gehören ohne Zweifel zur *Pseudhelops tuberculatus* Guer. ssp. *posticalis* Broun. Nach den Angaben von Dr. Z. Kaszab (Budapest), kommen in der Campbell Insel 2 Tenebrioniden-Arten vor: *Uloma* sp., und *Pseudhelops tuberculatus* Guer. ssp. *posticalis* Broun.

Die Larven von *Uloma* Latr. sind ziemlich gut bekannt und soweit eigenartig, dass ich diese Gattung samt den nahe verwandten aus anderen primitiven Tenebrioniden als eine abgesonderte Gruppe—Ulomimorpha—beschrieben habe (Skopin, in Druck). Die untersuchten Larven gehören keinerfalls zur Gattung *Uloma* Latr. oder überhaupt zur Ulomimorpha. Die letztgenannte Art ist Adeliini. Die untersuchten Larven auch die 10.6 mm Länge erreichen. So kann man die Larven nur zur häufigsten Art—*Pseudhelops tuberculatus* ssp. *posticalis* Broun—zurechnen.

UNTERSUCHUNGSMATERIAL—4 Larven von Campbell Insel von Herrn J. L. Gressitt im Jahre 1961 gesammelt: 1 Exemplar, 3.4 mm—"St. Col Ridge, 180–280 m, Berlese funnel Collection, moss on rocks, 24, 26, 30. XI"; 1 Exemplar, 4.1 mm—"Courrejolles Penin., 200 m, mollymawk nests, 14. XII"; 1 Exemplar, 7 mm ohne genauen Fundort sowie Datum; 1 Exemplar, 10.6mm—"Tucker Cove, 50 m, *Dracophyllum*, 26. XI".

Beschreibung. Körper länglich, von der Mandibelspitze bis zu den Spitzen der Urogomphen 6–6.5mal so lang wie breit, fast parallelseitig, im Querschnitt halbzylindrisch, fast gerade. Hautdecke dicht aber nicht sehr stark sklerotisiert, mikroskopisch fein genetzt, Oberseite ausserdem fein und spärlich quergerunzelt. Oberseite gleichmässig braun, mit deutlichem Metallschein, nur die etwas einschneidende, über dem ganzen Körper durchgehende Mittellinie hell. Unterseite ist heller wie die Oberseite,—hell braunlich-gelb gefärbt. Chetotaxie des ganzen Körpers sehr arm, nur primär und besteht überall nur aus dünnen Borsten, die aus der ringartigen Poren hervorstehen.

Kopf (Abb. 1) prognathisch, schwach nach unter geneigt. Epikranium um 1.2mal

1. Resuts of field work supported by the National Science Foundation grant (G-18800) from the U. S. Antarctic Research Program.

schmäler als das Halsschild in der breitesten Stelle, um 1/4 im letzten eingezogen, 1.3–1.4mal breiter als lang, an den Seiten schwach abgerundet, oben kaum gewölbt. Vorderrand des Epikraniums um 1.8mal schmäler als die grösste Kopfbreite, flach ausgerandet. Ausserrand über den Antennalgelenkshöhlen fast gerade, verwischt, gar nicht nach aussen vortretend. Antennalgelenkshöhlen klein und nehmen nicht mehr als 1/6 von der ganzen Länge des Seitenrandes des Epikraniums ein, von den Mandibulargelenkshöhlen durch sehr schmale

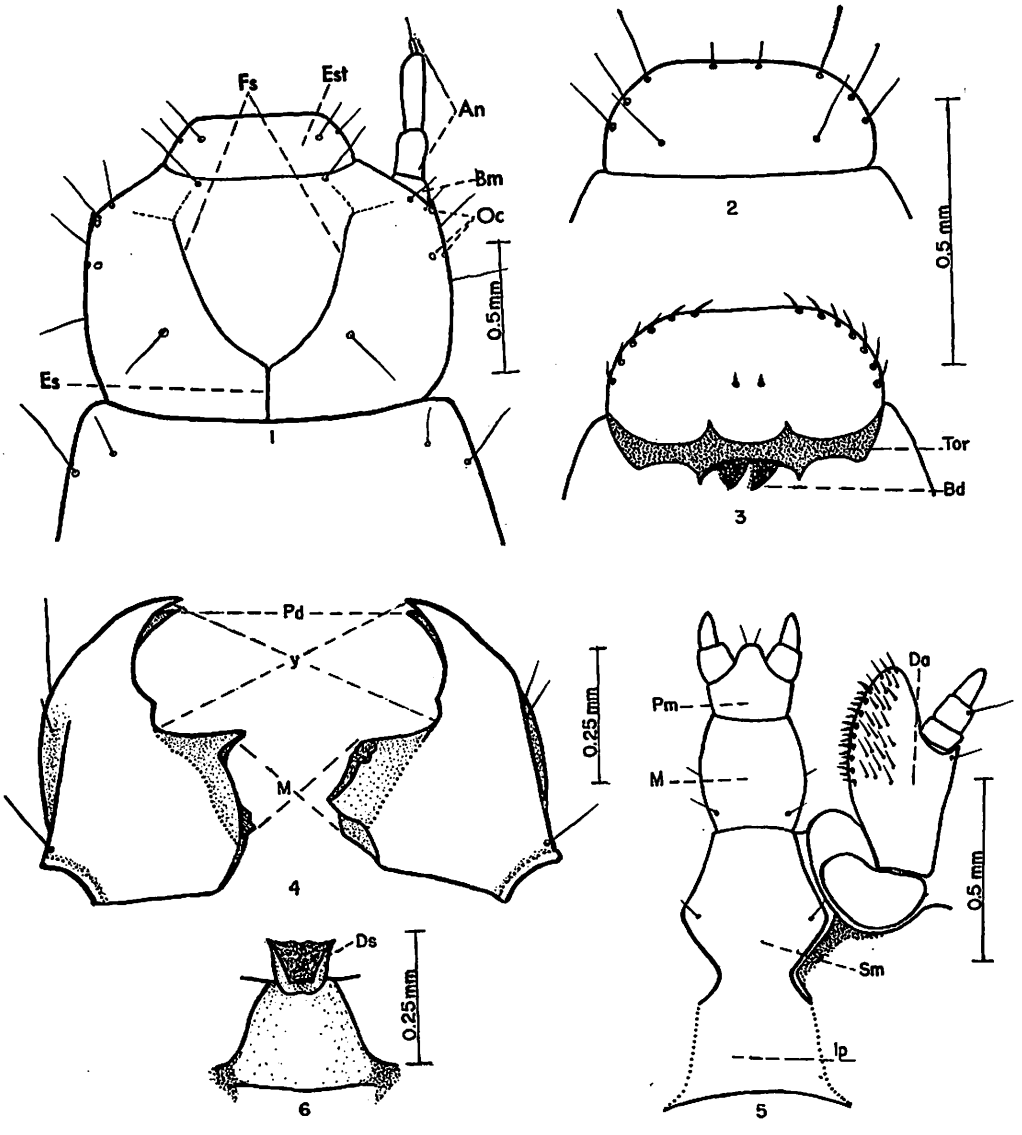

Abb. 1-6. 1, Kopf von oben; 2, Oberlippe; 3, Epipharyngealfläche; 4, Mandibeln von oben; 5, Unterlippe und Unterkiefer von unten; 6, Hypopharynx von oben.

aber von unten gesehen mehr oder weniger deutliche Epikraniumsschwelle getrennt. Epikranialnaht gut eingedrückt und nimmt um 0.35 der ganze Länge des Epikraniums ein. Es sind auch die Frontalnahten gut ausgebildet, jedoch vorn kurz gespaltet und dem Vorderrand des Epikraniums nicht ganz erreichend verschwindet. Frontalsklerit glockenförmig, am Niveau der Distalenden der Frontalnahten so breit wie von der Spitze bis Vorderrand des Epikraniums lang. Es sind beiderseits Ocellen vorhanden, welche als kleine, rundliche, schlecht bemerkbare Hyalintuberkeln gekennzeichnet. Dorsalfläche des Epikraniums nur mit 3 Borstenpaaren, sowie die Genalflächen nur mit je 3–5 Borsten versehen. Fühler so lang wie das Epistom und Oberlippe zusammen. Basalmembrane kurz, hautig. Das 1. Fühlerglied fast zylindrisch in der Mitte etwas abgeschnürt, etwa 1.5mal so lang wie breit. Das 2. Glied 2mal so lang als das 1., etwas dünner und in Distalhälfte kaum gerundet erweitert. Das 3. Glied sehr kurz und dünn, 5mal kürzer als das 2. und symmetrisch, am Ende des 2. Gliedes gelegen.

Epistom quer, trapezförmig, von 1/4 der Länge des Epikraniums, nur mit 2 Borstenpaaren. Oberlippe (Abb. 2) quer-oval, mit vollständig abgerundeten Vorderecken und mit fast geradem Vorderrand, schwach gewölbt. Chetotaxie der Oberlippe besteht nur aus 5 Borstenpaaren, und zwar: ein voneinander breit getrenntes proximales Paar hinter der Mitte, ein genähertes distales Paar nahe dem Vorderrand, noch drei laterale Paaren jederseits am Seitenrand in der vorderen Hälfte. Epipharyngealfläche (Abb. 3) flach, nur mit einem Paar der genäherten Zähnchen hinter der Mitte bewaffnet, sowie entlang der Seitenrand jederseits mit wenigen (5–6) Börstchen bewimpert. Tormen sind quer, schmal, miteinander verbunden, an der Basis mit einem Paar von plattenförmigen Zähnen bewaffnet. Mandibeln asymmetrisch, ziemlich massiv, wenig länger als breit, Schneiderand so lang (bei dem linken Mandibel) oder etwas länger (bei dem rechtem Mandibel) als das Molarteil. Schneidefläche ist längsgerinnt, von unten viel stärker als von oben ausgerandet, an Dorsalrippe nahe der Mitte mit einem kleinen eckigen Vorsprung, an Ventralrippe mit einem starken Preapikalzahn bewaffnet. Mola bei den beiden Mandibeln stark nach innen vortretend, scharf von der Schneidefläche abgegränzt und innen mit typisch oligolophodontischer Kaustruktur bewaffnet. Aussenrand der Oberfläche der Mandibeln nur in der Basalhälfte etwas rippenartig markiert und die Aussenfläche tief abgeflacht, ohne geschmeidige Basalregion. Gegen der Schneidefläche ist der Aussenrand samt der Aussenfläche abgerundet. Chetotaxie der Mandibeln besteht nur aus je einem Börstchen, die auf dem Seitenrand der Oberfläche nahe der Basis gelegen, sowie aus 1–2 Borsten auf der Seitenfläche.

Maxillen haben ein breites, zur Spitze wenig verengtes und einspitzig abgerundetes Distalglied, das an der Spitze, sowie ringsum der schmalen Innenfläche mit undichten zähnchenförmigen Borsten bewaffnet. Maxillartaster dick, kurz, sein 3. Glied aber die Spitze der Maxillen fast ganz überragend. Das 1. Tasterglied stark quer, das 2. etwas breiter als lang, das 3. oval, schmäler als das 2. Nur das 2. Tasterglied trägt eine Borste auf der Aussenseite nahe der Spitze. Gularplatte vom Epikranium nicht scharf abgegrenzt, aber durch etwas anderer Hautstruktur deutlich, kurz, trapezförmig, stark nach vorn verschmälert. Submentum von der Gularplatte mit keiner Naht abgegliedert, massiv, rautenförmig, in dem verbreiterten Teil mit einem tiefen und breiten Quereindrück versehen. Mentum (Abb. 5) ganz frei, vom Submentum mit deutlicher Naht abgegliedert. Prementum beendet mit einem hügelartig vortretendem Zäpfchen, das an der Spitze mit ein Paar den Börstchen versehen. Labialtaster kurz und keinen abgesonderten Sensorplätzchen haben. Innenfläche des Prementums ist etwas gewulstet und sehr fein behaart. Hypopharynx (Abb. 6) bewaffnet mit

ziemlich massiven Distalsklerome, deren Oberfläche eine trapezförmige Kaufläche von oligolophodontischen Typus besitzt. Unterseite der Mundteilen, ausser der kahlen Gularplatte, ist mit einzelnen Börstchen bewimpert.

Pronotum etwas länger als breit, längs der Mitte mehr als 1.5mal so lang wie bei den Seitenränder, nach vorn deutlich verschmälert. Die übrigen Thorax- sowie I. bis VIII. Abdominaltergiten deutlich quer. Alle Thorax- und Abdominaltergiten, ausgenommen das IX. Abdominaltergit, jederseits neben dem Seitenrand mit zwei ziemlich langen Borsten bewimpert. Pronotum ausserdem nahe dem Vorderrande noch mit einem breit gespreizendem Paar von kürzeren Börstchen bewimpert. Prosternum vorne mit einem sehr kurzen, schwach abgesonderten, segmentförmigen Pregularsklerit. Pleuriten aller Körpersegmente gleichmässig, gleich wie Tergiten und Sterniten sklerotisiert, ventral gelegen, mit den Tergiten nur durch eine feine Seitenrandfalte getrennt. Pleurosternalnahten sind gut entwickelt und bis zum Ende des VIII. Abdominalsegment entwickelt. Das 1. Abdominalsternit trägt nahe dem Vorderrande 4 Börstchen, die in einer Querreihe geordnet sind. Die übrigen Abdominalsterniten bis VIII. sind nahe der Basis mit je nur einem Paar von breit gespreizenden Borsten bewimpert. Ausserdem haben die I. bis VIII. Abdominalsterniten vor dem Hinterrande je ein Paar von breit gespreizenden, schräg gestellten Borstengruppen, die je auf I. und II. Sternites aus zwei, auf den übrigen aus drei Borsten bestehen. Vorderrand aller Körpersegmente haben keine deutliche scharf abgegränzte Artikulationfläche.

Alle Beine (Abb. 7) sind gleichlang und dick, sowie gleichartig gebaut und bewaffnet. Hüften lang, kegelförmig, ganz frei liegend, an jedem Paar einander berührend, fein, weitläufig beborstet. Schenkelringen schlank, an der Unterseite mit 2–3 dünnen Börstchen, auf der Unterseite mit noch 2 etwas stärkeren dörnchenartigen Borsten bewaffnet. Schenkel schlank, etwa 1.5mal so lang wie breit, im Querschnitt oval, am Innerrand mit 3–4, auf der Unterseite nur mit einem einzelnen, nahe der Spitze liegenden Börstchen bewaffnet. Schienen mehr als dreimal so lang wie breit, im Querschnitt fast rund, am Innerrand mit 3–4 dünnen, auf der Unterseite mit 2 dörnchenartigen Borsten bewaffnet. Tarsunguis krallenförmig, symmetrisch, gleichmässig sklerotisiert, am Innerrande mit 2 symmetrisch gestellten dünnen Börstchen bewimpert.

Alle Stigmen normal, ringartig, nahe dem Vorderrande der Pleuriten gelegen. Mesosternalstigmen oval, ziemlich gross, etwa von 1/9 des Durchschnittes des Mesosternums. Alle Abdominalstigmen sind rund, fast gleich gross, fast 3mal kleiner als die Mesosternalstigmen.

IX. Abdominaltergit (Abb. 8–10) von oben gesehen, fast 2mal kürzer als das VIII., nach hinten stark verschmälert und vor der Spitze in einer kurzen Strecke parallelseitig, dann in einem Paar von einfachen, spitzigen, parallelen und nach oben gebogenen glatten Urogomphen zulaufend. Urogomphen um 1.5mal kurzer als das Tergit selbst. Ventralfläche des IX. Abdominaltergits nimmt fast 5/6 der ganze Ventralfläche des Segmentes ein und von der Seite gesehen schräg nach hinten gerichtet. IX. Abdominalsternit kurz, nimmt nur um 1/6 der ganzen Ventralfläche des Segmentes ein, einfach segmentförmig, gleich wie das Tergit sklerotisiert, ganz ohne Anstossern. Analmembrane im Ruhelage volkommen versteckt und nicht sichtbar. Chetotaxie des IX. Abdominaltergits besteht aus 8 Paaren von langen Borsten, und zwar: das 1.—auf der Dorsalfläche nahe der Mitte, die 3. und 4. —auf der Ventralfläche an und vor der Basis der Urogomphen, das 5. breit gespreizende Paar nahe der Mitte der Ventralfläche und die 6., 7., 8. Paaren als eine Querreihe hinter dem Analschlitz. Ausserdem gibt es noch auf der Ventralseite eine Querreihe von kürzeren

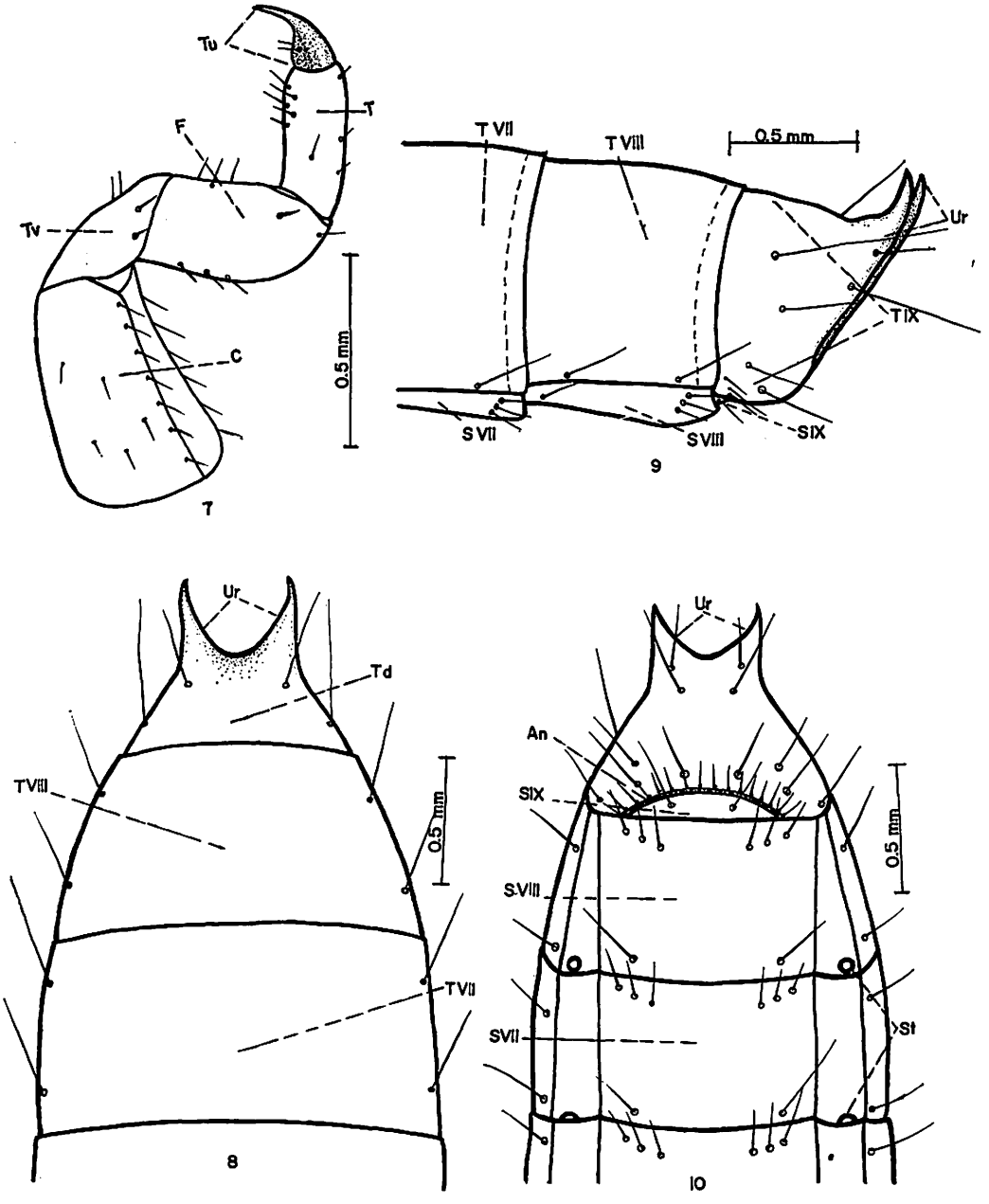

Abb. 7-10. 7, Vorderbein von unten; 8, Hinterleib von oben; 9, Hinterleib von der Seite; 10, Hinterleib von unten.

Börstchen unmittelbar entlang dem Rande des Analschlitzes. Analsternit nur mit 1 Paar von kürzeren Börstchen bewaffnet.

Vergleichendmorphologische Bemerkungen

Aus dem Tribus Adeliini ist bis jetzt in der Literatur nur die Larve von einer südeuropaeischen Art, *Laena starcki* Rtt. beschrieben (Byzova, 1958). Die Beschreibung ist aber ziemlich schematisch und betrifft gar nicht auf einige Besonderheiten der Morphologie. Insbesondere wurde die zur Kenntniss der Larven von Cucujoidea (sensu Böving & Craighead, 1930) so wichtige morphologische Merkmale, sowie die anordnen der Antennal- und Mandibulargelenkshöhlen und die Struktur des Molarteiles der Mandibeln unbeschrieben geblieben. Die Aufbau des Hypopharynx, sowie seine Distalsklerome ebenfalls nicht erwähnt. Die Larve von *Laena starcki* Rtt. unterscheidet sich von *Pseudhelops tuberculatus* Guer. durch die Chetotaxie, die Anzahl der Ocellen sowie die Bewaffnung der Schneidefläche der Mandibeln. Sie hat, nach der Beschreibung, " einer reichlich behaarte Körper..., eine einzelne grosse quere Ocelle..., Oberlippe... am vorderen Schneiderand mit 2 abgestumpften Zähnen... " Ausserdem nach der Zeichnung hat die Larve von *Laena starcki* Rtt. gut entwickelte Gularnahten.

Nach mehreren morphologischen Merkmalen steht die Larve der *Pseudhelops tuberculatus* Guer. zu den Larven des Typus von Tenebriomorpha (Tenebrionini, Helopini, Amarygmini, Strongyliini) nahe. Sie hat, wie auch die letztgenannten, eine gleichmässig sklerotisierte Hautdecke, primitive Aufbau, sowie Chetotaxie der Beine, nach dem Typus ähnliche Aufbau des IX. Abdominalsegments, Epikraniums, Mundteile, sowie gleiche Anordnung der Abdominal-Stigmen. Sie unterscheidet sich jedoch stark von den typischen Tenebriomorpha-Larven durch zwei wichtige Merkmale, und zwar: durch die reduzierten Gularnahten, sowie durch die Anwesenheit einer schmalen aber deutlichen Epikranialschwelle zwischen den Mandibular- und Antennalgelenkshöhlen. Das letzte Merkmal macht die Larve von *Pseudhelops tuberculatus* Guer. zu den Larven von Lagriidae sowie Pycnocerini und Lupropini der Tenebrioniden nahe. Sie haben auch eine etwas andere, jedoch ähnliche Aufbau der Distalsklerome des Hypopharynx, so dass es ein Übergangstypus zwischen dreizähnigen Distalsklerome der Tenebriomorpha-Larven und schalenförmigen Distalsklerome der Tentyromorpha- sowie Asidomorpha-Larven (Skopin, 1962) ist.

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———— (Im Druck) Die Larven der Tribus Pycnocerini. Musee royal de l'Afrique Central.

Abkurzungen der Abbildungen

A—Antenna
An—Analschlitz
Bd—Basalzähnen der Epipharyngealfläche
Bm—Basalmembrane der Fühler
C—Coxa
Da—Distalglied der Unterkiefer
Ds—Distalsklerome des Hypopharynx
Es—Epikranialnaht
Est—Epistom
F—Femur

Fs—Frontalnahten
Gp—Gularplatte
I—Schneideteil der Mandibeln
M—Molarteil der Mandibeln
Mn—Mentum der Mandibeln
Oc—Ocellen
Pd—Preapikalzahn der Mandibeln
Pm—Prementum
S VII, S VIII, S IX—VII., VIII., IX. Abdominalsterniten
Sm—Submentum
St—Stigmen
T—Tibia
T VII, T VIII, T IX—VII., VIII., IX. Abdominaltergiten
Td—Dorsalfläche des IX. Abdominaltergits
Tor—Tormen
Tr—Trochanter
Tud—Tarsunguis
Tv—Ventralfläche des IX. Abdominaltergits
U—Urogomphen

Pacific Insects Monograph 7: 408-409 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
COLEOPTERA: ORTHOPERIDAE

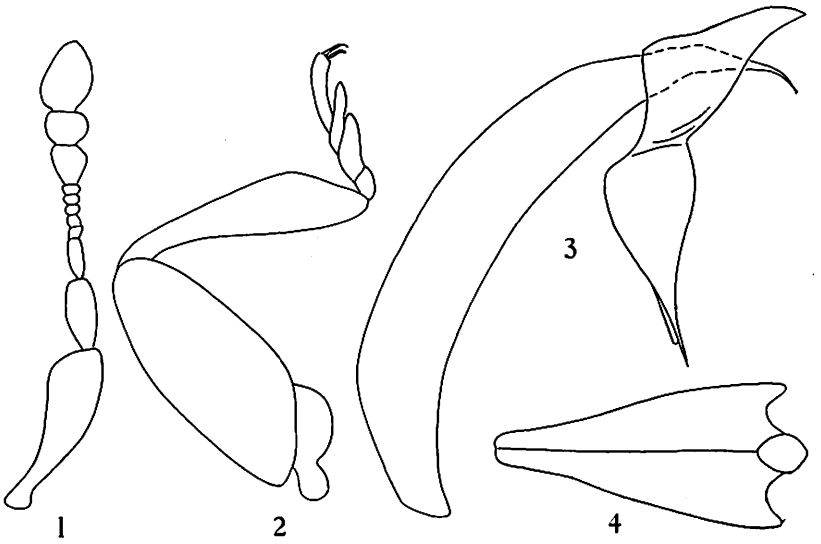
By S. Endrödy-Younga[1]

Holopsis oblongus Endrödy-Younga, n. sp. Abb. 1–4.

Im Vergleich mit den bekannten Arten der Gattung mittelgross, länglichoval, Halsschild und Flügeldecken dunkelbraun mit durchscheinenden Seitenrändern und mit rötlichem Naht. Flügeldecken mehr als doppelt so lang als das Halsschild.

Kopf sehr klein und schmal, durch das Halsschild vollständig bedeckt. Clypeus vorn sehr fein ausgeschweift abgestutzt. Oberlippe kaum kürzer als breit, vorn stark gebogen abgerundet. Augen nicht auffallend gross, aber stark vorgewölbt. Palpus maxillaris stark und kurz, das letztes Glied sehr stark zugespitzt spindelförmig.—Halsschild breit, vorn gleichmässig abgerundet, Seitenrand auch seitlich kaum verflacht. An der Basis gegen das Schildchen leicht vorgezogen, seitlich nur verflacht, nicht ausgeschweift, Hinterecken stumpf abgerundet. Oberfläche glatt und glänzend, kaum punktiert, in der Mitte dunkelbraun, seitlich heller, vorn und an den Seiten breit, hinten schmal gelblich durchscheinend.—Flügeldecken länglich, 2.4mal länger als das Halsschild, die breiteste Stelle liegt etwas vor der Mitte. Schulter scharf rechteckig, Seitenrand von oben gesehen gleichmässig und leicht bis zur Nahtecke gebogen. Nahtecken scharf rechtwinklig, Hinterrand beiderseits sehr fein und kurz ausgeschweift, fast nur abgeflacht. Seitenrand von der Seite betrachtet in der Höhe der Hinterschenkeln deutlich ausgerandet. An der Naht auch hinten kaum, seitlich stark gerandet, die Spitze ungerandet. Oberfläche am Grunde wie poliert glänzend, aber gut sichtbar punktiert. Dunkelbraun, Seitenrand und die Naht schmal rötlich gesäumt, Schildchen und Nahtecke ebenfalls heller rötlich gefärbt. Epipleuren der Flügeldecken hell rötlichgelb.—Prosternum hell rötlichbraun, Meso- und Metasternum dunkelbraun, die Bauchplatten nur hinten heller gefärbt. Metasternum und die erste, sehr breite Bauchplatte glänzend, aber doch fein und verschwommen, ziemlich dicht punktiert. Die Bauchplatte 2–6 viel dichter punktiert, fettglänzend, fein und spährlich gelb behaart.—Fühler besteht aus 11 Glieder (Abb. 1), gelblichbraun, hauptsächlich die Glieder der Keule ziemlich lang gelblich behaart. Erstes Glied sehr lang, fein nach aussen gebogen, gegen die Spitze stark erweitert, am Ende schräg abgestutzt, 2. Glied ebenfalls lang, aber viel schmäler und kürzer als das Basalglied, 3. auch gestreckt, aber kürzer und schmäler als das vorhergehende. Die Glieder 4–8 sehr klein, 4. und 5. fast quadratisch, 6–8 breiter als lang. Die Glieder der Keule gross, 9. und 10. fast quadratisch, 11. länger als breit, zur Spitze konisch verjüngt, am Ende stumpf zugespitzt.—Beine rötlichgelb. Vorderschenkel (Abb. 2) breit, annähernd parallelseitig. Vorderschiene (Abb. 2) am Aussenrand vor der Mitte leicht eckig geknickt,

1. Zoologische Abteilung des Ungarischen Naturwissenschaftlichen Museums in Budapest, Ungarn.



am Ende abgerundet, Innenrand gerade. 1. Tarsenglied sehr klein, schwer zur erkennen, das 2. viel grösser als das 3. Klauenglied gross, die Klauen schwach gebogen.—Männliches Genitalapparat besteht aus 2 stark getrennten Teile. Basalplatte 0.5 mm lang, ziemlich stark bogenförmig nach unten gekrümmt, am Ende zugespitzt (Abb. 3). Die Parameren (Abb. 3, 4) sind 0.25 mm lang, stark nach unten gekrümmt, zur Spitze von oben und auch von der Seite gesehen stark verjüngt.

♀ äusserlich sehr ähnlich wie das Männchen.

Länge: 1.35–1.45 mm, Breite: 0.83–0.88 mm.

Die Art weist einen näheren Zusammenhang mit *C. nigellus* Broun aus Neu Zealand, und mit *C. brevicornis* Matth. aus Queensland auf, aber auch von diesen Arten gut zu trennen. *C. nigellus* Broun ist grösser, 1.5–1.6 mm, die Flügeldecken feiner punktiert und auf den Bauchplatte 2–5 mit je einer queren Punktreihe. *C. brevicornis* Matth. ist viel kleiner, 1.0–1.1 mm und die Fügeldecken laut Diagnose stärker punktiert.

Untersuchtes Material: Holotype ♂, Allotype ♀ in der Sammlung des D.S.I.R. in Nelson, New Zealand, 9 Paratypen in D.S.I.R., Bishop Museum, Honolulu und Dominion Museum, Wellington, und eine Paratype in Naturwissenschaftlichen Museum in Budapest.

Fundortsangaben: 7, Campbell Insel, Venus Cove, 2. II. 1963, zwischen Grasbüscheln gesammelt (Rennell); 1, Lookout Bay Beach, *Poa*, 19. XII. 1961, Gressitt; 1, Perseverance Harbor, unter *Bulbinella*, 24. II. 1963, Wise; 2, Shoal Pt., 0–30 m, Grasbüscheln, 1.XII.1962, Rennell; 1, Venus Cove, Grasbüscheln, 2. II. 1963, Wright.

Pacific Insects Monograph 7: 410-411 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
COLEOPTERA: ORTHOPERIDAE (LARVA)

By J. L. Gressitt and G. A. Samuelson
BISHOP MUSEUM, HONOLULU, HAWAII

Abstract: The larva of *Holopsis oblongus* is described from Campbell I. The species is named in the preceding article.

One species of this family has been taken on Campbell I. The adult is treated by S. Endrödy-Younga in the preceding paper, and we are describing the larva.

We are indebted to Dr. Endrödy-Younga for describing the new species. Also, Dr. E. A. Chapin deserves much credit for having previously determined that the species belonged to the genus *Holopsis*, which had been mistakenly assigned to the family Coccinellidae. Dr. Chapin also determined that the species was undescribed. The illustrations were pre-prepared in part by Tina Abbott and T. Nagatani.

Holopsis oblongus Endrödy-Younga Fig. 1.

Holopsis oblongus End.-Y., 1964, Pacific Ins. Mon. 7: 408 (Campbell I.).

Larva: Somewhat resembling a mealy-bug in appearance; rather flat. Pale testaceous, slightly duller above, with darker, circular radially spined scale-like structures over most of dorsum and on lateral margin. Head partly hidden in dorsal view, but anterior portion directed forward and prominent. Dorsum ovate, widest anterior to middle and more broadly rounded anteriorly; last tergite shallowly emarginate; preceding 2 tergites more strongly emarginate; lateral borders completely fringed with longer scale-like structures which generally alternate with the shorter ones, with the former about 4× as long as the latter, and with each about 3× as long as broad, ribbed, rather flattened and transversely truncate at apex.

Head rather small, less than 1/7 as wide as body, about 1.5× as long as broad; somewhat projecting downward; dorsal surface rather smooth, weakly sclerotized along middle; some setae laterally and anteriorly; frontoclypeus fairly flat, broad and mostly concealing mouthparts in dorsal view. Mandible arched, long, slender and narrowed to an acute point; extreme base dilated. Maxillary palpus 2-segmented counting small, apical papilla; segment 1 slender and gradually tapering to apex, about 6× as long as breadth at middle; base swollen, slightly broader than long, bearing 2 or 3 slender setae; apex bearing a small, slender papilla that is distinctly longer than broad. Labial palpus 2-segmented; segment 1 about 3/8 as long as maxillary palpus, gradually tapering to rounded apex which bears 1 & 2 minute setae; 2 slightly longer than, and with diameter about 1/3 as great as, segment 1, arched and gradually tapering to a subacute point. Antenna 3-segmented, rather

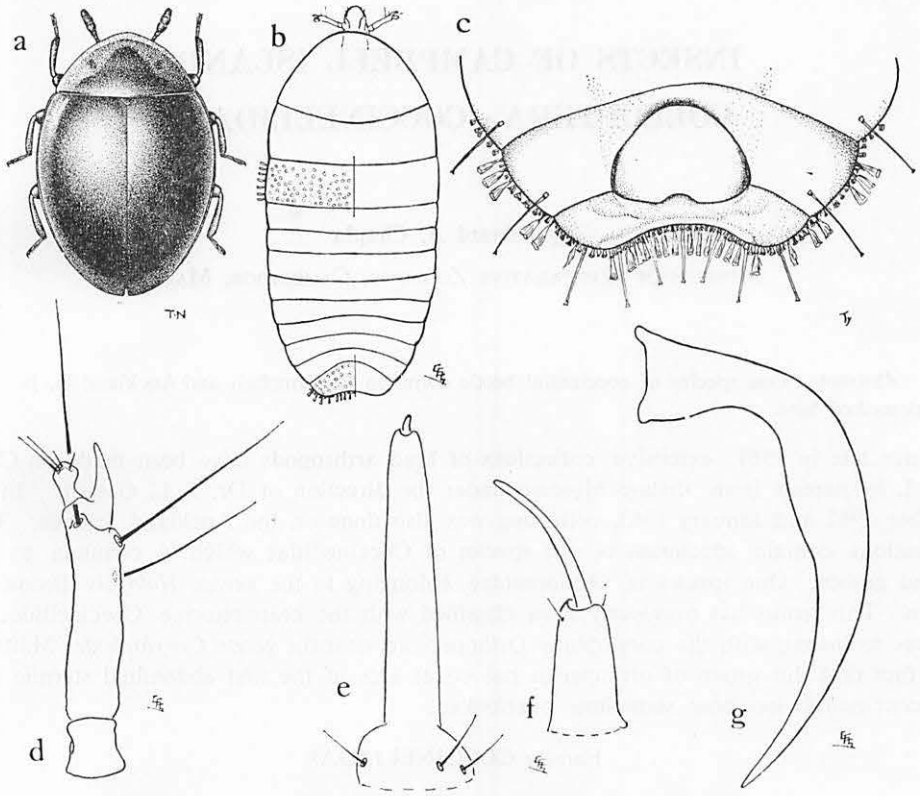


Fig. 1. *Holopsis oblongus* Endrödy-Younga. a, adult; b–g, larva: b, dorsal view showing pattern of scale-like structures on metanotum and last tergite; c, apical abdominal segments, ventral view; d, rt. antenna, ventral view, one seta interrupted to show detail of last segment, and base of subapical seta shown to arise from upper surface; e, rt. maxillary palpus; f, rt. labial palpus; g, rt. mandible, ventral view.

slender, about as long as head, with segment 2 quite long and segments 1 and 3 short; 2 bearing 3 long setae subapically and a strong apical tooth extending beyond apex of last segment; last bearing 4 short setae at apex. Eye-spots divided in 2 portions, located just behind antenna. Pronotum subsemicircular, fairly even. Entire dorsum evenly and weakly convex, with a fairly dense pattern of the smaller scale-like structures which usually become sparser along anterior portions of pronotum and most abdominal tergites. Sternites rather smooth and weakly sclerotized; abdominal sternites each with a swelling on each side of median area; apex of last segment bearing 5 setae, each with the extreme apex dilated. Legs slender and acute apically; each distinctly shorter than width of body behind middle; hind femur about 5× as long as broad, slightly longer than tibia; tarsus short, tapering; claw simple. Anal pore ventral, preapical. Length 1.7 mm; breadth 0.85.

2 larvae, Shoal Point, Campbell I., in tussock, 1. XII. 1962, K. Rennell.

Pacific Insects Monograph 7: 412-415 July 15, 1964

INSECTS OF CAMPBELL ISLAND. COLEOPTERA: COCCINELLIDAE[1]

By Edward A. Chapin

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Abstract: One species of coccinellid beetle common to Campbell and Auckland Is. is redescribed here.

Since late in 1961, extensive collections of land arthropods have been made on Campbell I. by parties from Bishop Museum under the direction of Dr. J. L. Gressitt. In December 1962 and January 1963, collecting was also done on the Auckland Islands. These collections contain specimens of one species of Coccinellidae which is common to both island groups. One species of Orthoperidae belonging to the genus *Holopsis* Broun was taken. This genus has previously been classified with the cranophorine Coccinellidae but proves to belong with the corylophine Orthoperidae, near the genus *Corylophodes* Matthews. The fact that this group of orthoperids has coxal arcs of the first abdominal sternite as in the coccinellids has been sometimes overlooked.

Family COCCINELLIDAE

Genus **Veronicobius** Broun

Veronicobius Broun, 1893: 1393 (Type: *V. hirtus* Broun; New Zealand). Monobasic.
Stenococcus Weise, 1895: 143 (Type: *Rhizobius aucklandiae* Kirsch; Auckland Is.). Monobasic.

Body elongate oval, only slightly convex, pubescent. Antenna 11-segmented, segment 1 stout, about 2× as long as thick, segment 2 shorter and thinner than 1, segment 3 slightly longer than 2 but thinner, segments 4–8 subequal, 5 & 7 each slightly longer than any one of segments 4, 6, or 8, segments 9–11 forming a rather compact club, 11 broadly rounded at apex. Terminal segment of maxillary palp narrowly securiform, apex strongly oblique. Lacinia of maxilla with a single oblique row of 6 spines. Terminal segment of labial palp subcylindrical, slightly tapering apically, about 2× as long as penultimate segment. Ligula squarish. Mandible with subapical tooth only slightly behind apex. Prosternum not produced anteriorly, prosternal lobe broad, without carinae. Abdomen with 6 visible sternites, the 6th very small. Coxal arcs on sternite 1 complete. Legs moderately long, femora somewhat more inflated and shorter in the ♂ than in ♀, tibiae slender, tibial spurs present on legs 2 & 3. Tarsus 4-segmented. Claw with basal tooth. Elytral epi-

1. Results of field work supported by the National Science Foundation grants (G-18800, G-23720) from the U. S. Antarctic Research Program.

pleuron moderately broad at base, narrowing evenly to apical 1/4 where it disappears. Flying wings greatly reduced in size, probably not functional. ♂—aedeagus symmetrical. ♀—receptaculum seminis with neither nodulus nor ramus prominently developed, cornu slender in outer 2/3, infundibulum present, sperm duct moderately long, hemisternites elongate triangular, with thickened apices.

A genus of 2 known species, one from New Zealand, the other from the subantarctic islands.

Veronicobius aucklandiae (Kirsch) Figs. 1–3.

Rhizobius aucklandiae Kirsch, IN Kiesenwetter & Kirsch, 1877: 173.
Stenococcus aucklandiae: Weise, 1895: 143.
Veronicobius subantarcticus Brookes, 1951: 37.

Length: 2.5–3.0 mm. Punctation moderately fine and dense on upper surface, fine and sparse beneath, punctures virtually absent from median, depressed area of metathorax and abdominal sternite 1. Pubescence short and depressed. Pronotum finely margined across base, with lateral margins very narrowly reflexed. Coloration in 2 shades of brown: that of head ranging from pale yellowish brown to uniform deep castaneous, that of pronotum from pale yellowish brown to deep castaneous on disc with lateral margins pale. Elytra usually with an elongate triangular sutural marking which is 1/2 width of pronotum at base and which ends in an obtuse point on suture a short distance behind middle of length, and along either lateral margin there is a dark streak which commences shortly behind the humeral callus and extends backward to about apical 1/4. Under side more shining, varying in color from a pale brown to a deep piceous. In the darker specimens prosternum and terminal abdominal sternites are paler.

♂: Sternite 5 transverse, sternite 6 very short and feebly emarginate. Median lobe of aedeagus and parameres fused together except at extreme tip where parameres present the aspect of 2 semicircular flaps, each bearing a terminal fringe of long setae. Trabes as

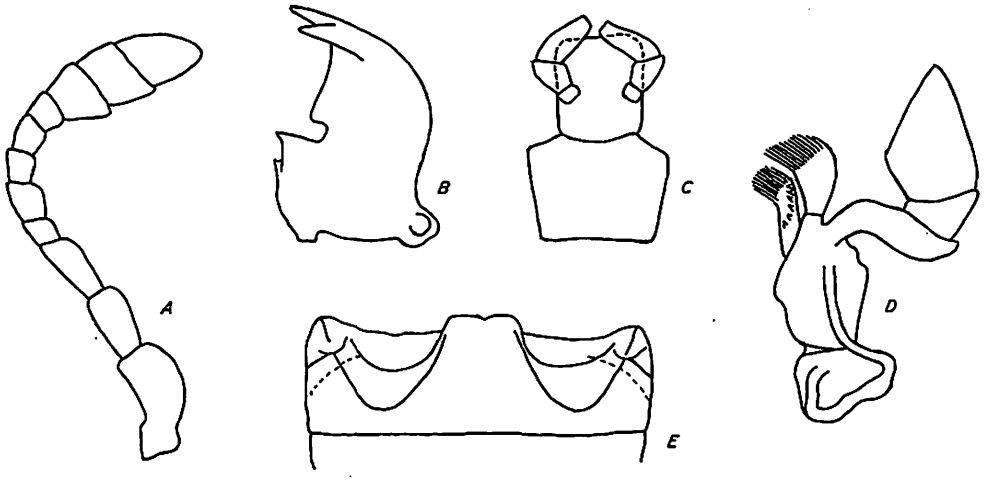

Fig. 1. *Veronicobius aucklandiae* (Kirsch). A, antenna; B, mandible; C, ligula; D, maxilla; E, abdominal sternite 1, showing coxal arcs.

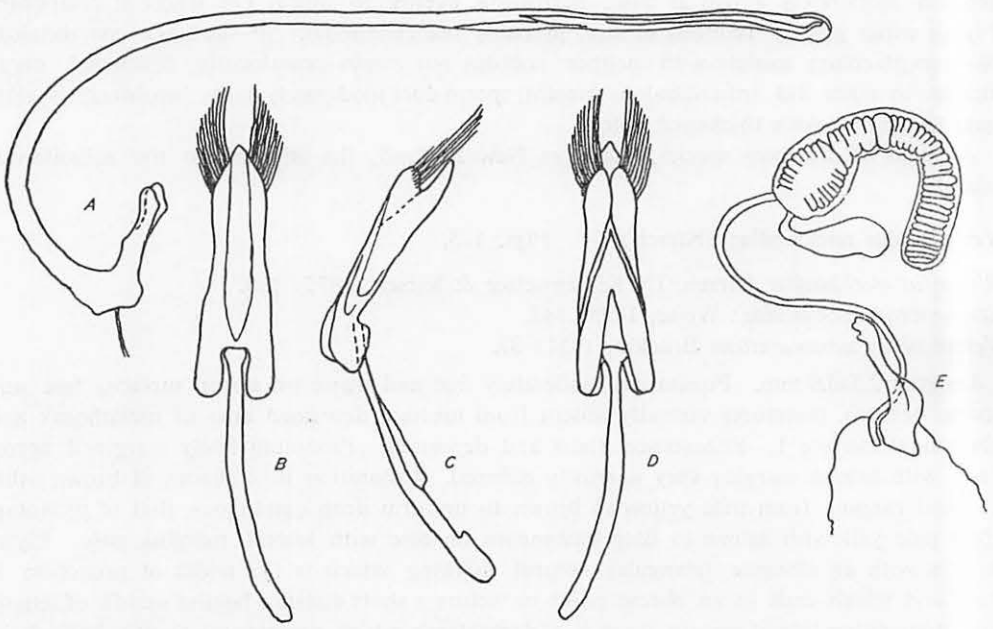

Fig. 2. *Veronicobius aucklandiae* (Kirsch). A–D, ♂ genitalia; A, sipho; B, tegmen, ventral view; C, same, lateral view; D, same, dorsal view; E, ♀ genitalia, showing receptaculum seminis, sperm duct, and infundibulum.

long as median lobe and basal ring, slender. Sipho moderately long, apex somewhat complex.

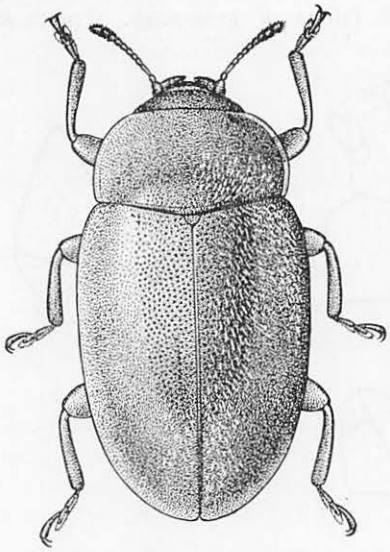

Fig. 3. *Veronicobius aucklandiae* (Kirsch), dorsal view.

♀: Sternite 5 broadly rounded, 6 small, usually not visible. Receptaculum seminis with basal 1/3 rather bulbous, remaining 2/3 curved cylindrical. Sperm duct moderately long, arising at base of irregularly shaped infundibulum.

DISTRIBUTION: Known from the Auckland and Campbell islands.

SPECIMENS SEEN: In addition to material from Bishop Museum, I have, through the kindness of Miss S. Nakata of Bishop Museum and Mr. E. S. Gourlay of the Entomology Div. of Dept. of Scientific and Industrial Research, Nelson, New Zealand, been able to examine the paratype of *Veronicobius subantarcticus* Brookes and to confirm the synonymy as given above. Mr. Gourlay, with the critical specimens available, had already arrived at the same conclusion. A detailed list of the specimens seen follows.

AUCKLAND IS. (N) 38 specimens: Auckland I., Observation Point, on track, on *Poa* sp., 27.XII.1962,

J. L. Gressitt; Crozier Point, 1–20 m, on *Poa* sp., 28–30. XII. 1962, Gressitt; Hooker Hills, 90–300 m, 11. I. 1963, P. James; Bivouac Hill, 540 m, in tussocks, 16. I. 1963, Gressitt; W. coast below Stony Peak, 100–500 m, on *Danthonia* sp., 17. I. 1963, Gressitt; Erebus Cove, Port Ross, under logs & stones, 17. I. 1963, K. A. J. Wise. Ewing I., 1–10 m, on *Polystichum* sp., 6. I. 1963, Gressitt. French I., 1–5 m, on *Poa* sp. and sedge, 2. I. 1963, Gressitt.

CAMPBELL I. 73 specimens: Campbell I., 1942, J. H. Sorensen (paratype, *Veronicobius subantarcticus* Brookes); Garden Cove, elephant seal wallow, 25. XI. 1961, Gressitt; Tucker Cove, 1–50 m, on *Poa* sp., various dates from 21. XI–21.XII.1961, Gressitt; Beeman Camp, 2–50 m, on *Poa* sp., various dates from 26. XI–21. XII. 1961, Gressitt; Mt. Honey, 500 m, 17. XII. 1961, Gressitt; Mt. Honey—Puiseux Saddle, 17. XII. 1961, Gressitt; Lookout Bay, beach, 19. XII. 1961, Gressitt; Tucker Cove, 0–30 m, on fern, 6. VIII. 1962, K. P. Rennell; Northwest Bay, 5 m, in tussock, 30. XII. 1962, Rennell; Lyall—Beeman Saddle, 30 m, on giant *Poa*, 13.XII.1962, Rennell; Venus Cove, in tussock, 2. II. 1963, Rennell & A. Wright; Moubray Hill, 200 m, from tussock with Berlese apparatus, 16. II. 1963, Wise.

The following records have been contributed by Mr. Gourlay, Auckland I., Ranui Cove, 7–12.XI.1954, E. S. Gourlay. Campbell I., Windlass Bay, in turf and from flowers of *Bulbinella rossi*, 22. XI. 1947, Sorensen; Tucker Cove, in turf just above high tide, 10.X.1947, Sorensen; Beeman Hill, 12. X. 1947, Sorensen.

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INSECTS OF CAMPBELL ISLAND. COLEOPTERA: CURCULIONIDAE OF THE SUBANTARCTIC ISLANDS OF NEW ZEALAND[1]

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Abstract: This paper deals with the Curculionidae of Auckland, Campbell, Snares, and Antipodes Is. The native fauna of these islands contains 16 genera and 32 species, 5 genera (32.25%) and 20 species (62.5%) being endemic. It is regarded as a fairly rich and varied fauna for a cold-temperate climate. The 2 largest islands, Auckland and Campbell, share 50% of the genera and 42.3% of the species. The fauna is characterized by a relatively high number of species having ectophytic larvae which comprise 43.75% of the native fauna and 65% of the endemic species. Two species have functional wings (none endemic), and 19 have highly atrophied wings (16 endemic), and 11 have no wings at all (4 endemic). Only 5 species are diurnal (15.6%), 3 of these endemic. The fauna of the islands is very close in its relationships to that of the mainland of New Zealand. The non-endemic species are regarded as a post-glacial element derived from the New Zealand fauna within the last 15000 years. The endemic species are assumed to be the truly insular element which was already there before the beginning of the Ice Ages and survived the glaciations in some ice-free refuges on the islands themselves. A graph on the cumulative frequency curves for mean length of Subantarctic Island species, a table on the approximate distances between the islands, and 4 tables containing information on the composition, distribution, habits and ecology are given. Attention is drawn for the first time to the rectal ring and loop, 2 sclerotized structures of the hind-gut, and their possible significance. The taxonomic section contains keys to genera and species. 274 figures of the ♂ and ♀ genitalia and of a few other structures of the species are given. One new subfamily, 3 new genera, and 10 new species are described. Several new combinations and new synonymies are established.

This report on the Curculionidae of the Subantarctic Islands of New Zealand follows an invitation from Dr. J. L. Gressitt to contribute a paper for a series on the insects of Campbell I. As I had already completed a large part of the faunistic study of the whole area it seemed to me useful to present the results as a unit and I am indebted to Dr. Gressitt for agreeing to publish it in this volume. Because of intensive collecting in recent years the amount of available material totaled almost 3000 specimens, more than ten times the number that previous authors had examined. While it is true that more collecting is needed, especially in the smaller islands, it is unlikely that there will be significant changes in the composition of the fauna as we now know it. In this paper the number of native genera is increased by 60 %, and of the native species by 66.4 %, which represents a sub-

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stantial addition to the fauna of the islands.

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The Subantarctic Islands of New Zealand comprise Bounty Is., Snares Is., Antipodes Is., Auckland Is., and Campbell I., all of which lie S or SE of New Zealand between 167° and 179°W, and between 47°40′ and 52°38′S. Although Macquarie I., approximately 600 km WSW of Campbell I., forms part of this biogeographic unit, it is excluded from this report because of the absence of any material from there.

Table 1. Approximate distances in kilometers between the islands.

	Antipodes	Auckland	Bounty	Campbell	Chatham	Snares	South I.	Stewart
Antipodes	×	880	220	745	700	900	735	830
Auckland	880	×	1030	270	1510	275	480	385
Bounty	220	1030	×	885	515	920	660	810
Campbell	745	270	885	×	1435	505	645	605
Chatham	700	1510	515	1435	×	1360	800	1230
Snares	900	275	920	505	1360	×	190	110
South Island	735	480	660	645	800	190	×	27
Stewart	830	385	810	605	1230	110	27	×

Historical survey of collecting

Dumont-d'Urville called at Auckland Is. during his "Voyage au Pôle Sud et dans l'Océanie sur les Corvettes l'Astrolabe et la Zélée (1837–1840)" in March 1840. He sighted the west coast on 25 February 1840, sailed down the west coast, round the southern end and up the east coast entering Sarah's Bosom (Port Ross) on March 9. He anchored on the 11th near Shoe I. opposite Erebus and Terror Coves and went the following day to the head of Laurie Harbor touring the bay two days later. There is no evidence that the explorers of this expedition did any collecting outside Laurie Harbor or Port Ross; therefore we can quite safely assume that the type localities of *Gromilus insularis* Blanchard and *Oclandius cinereus* Bl., the 2 weevils subsequently described in 1853, were obtained either near Erebus or Terror Coves at the head of Port Ross or at the head of Laurie Harbor. The vessels left Port Ross early on 20 March.

H. Krone, the photographer of the German Expedition to Auckland Is. for the observation of the transit of Venus, spent nearly 5 months, from October 1874 to February 1875, in the areas of Laurie Harbor and Port Ross and did some collecting in the free time. In 1877 Kirsch described the 6 species collected by Krone, *Steriphus veneris*, *S. opacus* (=

Gromilus insularis Blanchard), *Cyttalia depressirostris*, *Peristoreus innocens*, *Acalles planidorsis*, and *A. kronei*, and included in the introduction Krone's notes on the precise localities and ecological observations.

F. W. Hutton visited Auckland Is. in January 1901 and collected the 2 largest weevils which Broun described in 1902 as *Lyperobius laeviusculus* and *Inocatoptes incertus*, the latter being a junior synonym of *Oclandius cinereus* Blanchard. The botanist L. Cockayne went to Auckland Is. in June 1903 and accidentally found amongst the plants he collected a weevil described by Broun in 1905 as *Hycanus cockaynei* which turned out to be a junior synonym of *Gromilus insularis* Blanchard.

The Expedition to the Subantarctic Islands of New Zealand of November 1907 stopped briefly at Snares Is. collecting one species of weevil, *Catodryobius vestitus* Broun, and then continued farther south. The members of the Expedition split into two parties, one landing on Auckland Is., and the other on Campbell I. The latter party did not obtain any weevil on Campbell I., but the former, with G. V. Hudson in charge of entomology, added 4 species to the fauna of Auckland Is. Broun reported the results of the expedition in 1909 describing 10 new species, but 6 of these were previously known. In the same paper he also described the first weevil from Campbell I. which most likely was collected by Chambers and Des Barres during their later trip in 1908.

The Cape Expedition, stationed on Auckland and Campbell Islands from 1942 to 1945, included several biologists who spent part of their time collecting insects. A report on the Coleoptera obtained by the expedition was published by Brookes in 1951, adding 3 species to Auckland Is. and 6 to Campbell I. His paper contained the last additions to the weevil fauna of the Subantarctic Islands.

More recently, all the islands have been visited by parties of biologists, but their collections have remained unstudied. Some collectings were carried out on Snares Is. by Drs. R. A. Falla and C. A. Fleming in Nov.–Dec. 1947, and by Prof. G. A. Knox in Jan.–Feb. 1961; on Antipodes Is. by Drs. R. K. Dell and E. G. Turbott in Nov. 1950; and on Auckland Is. by Dr. R. K. Dell in Mar. 1954, and by Mr. E. S. Gourlay in Nov. 1954.

Intensive collecting on Campbell I. was organized by Dr. J. L. Gressitt since Nov. 1961; and a scientific expedition visited the northern part of Auckland I. between Dec. 1962 and Jan. 1963. These last trips and expedition have increased the number of weevils from fewer than 300 to almost 3000 specimens. All the specimens, except for those deposited in London and Paris, were available for the present study.

Composition of the weevil fauna

Only 2 families of Curculionoidea occur on the Subantarctic Islands of New Zealand, Anthribidae, with 1 species, and Curculionidae. The composition of the native Curculionidae is shown in tables 2–4. Representatives of both Phanerognatha and Adelognatha exist on the islands. Eight subfamilies, 16 genera, and 32 species are represented giving an average of 2 genera per subfamily and 2 species per genus. The diversity of the curculionid fauna is thus remarkable for such isolated cold-temperate islands. The number of genera and species occurring on the islands is given in table 4. To date, Bounty Is. have not yielded a species.

Snares Is., lying between Stewart I. and Auckland Is., are the nearest to New Zealand.

Their close proximity probably accounts for the presence of *Nestrius* and *Platyomida*, 2 New Zealand genera that do not occur on other subantarctic islands. The presence, however, of *Oclandius* and of the *Gromilus insularis*-group of species links them with the other subantarctic islands. Auckland Is. have the largest area and the most rich and varied flora. Also the weevil fauna is best developed there. Campbell I., the second largest and most southern island, has also a relatively rich weevil fauna. Although its distance from Auckland Is. is quite considerable, about 270 km, it shares with Auckland Is. 50 % of the genera, and 42.3 % of the species. Antipodes Is. are about 775 km NNE of Campbell I. The single species known there is a ground weevil with hypogeous ectophytic larvae and is shared by Auckland and Campbell Is. The populations of this species, *Gromilus insularis* Blanchard, differ on the 3 islands and can be regarded as 3 good geographical races. The subspecies from Antipodes Is. is morphologically closer to that from Campbell I. and is as a whole 25 % smaller in the size of the adults.

The endemic element of the curculionid fauna is also shown in tables 2–4. 32.25 % of the genera and 62.5 % of the species are endemic to the islands. It is quite possible that the actual percentage of the endemic genera will decrease a little once the southern por-

Table 2. Composition and distribution of the genera of the Subantarctic Islands. (*=endemic; endemic genera: 32.25 %).

Genera	Distribution: Snares	Auckland	Campbell	Elsewhere
COSSONINAE				
1. *Pentarthrum* Wollaston	−	+	−	N. Z., Chatham, Tasmania, N. Caledonia, Chile, J. Fernandez, Tr. da Cunha
TRYPETINAE				
2. *Exeiratus* Broun	+	+	−	South I., Stewart I., Chatham Is.
CRYPTORHYNCHINAE				
3. *Pachyderris* Broun	−	+	−	N. Z., Stewart I., Chatham Is.
4. *Notacalles* Kuschel	+	+	+	North+South I., Stewart I.
EUGNOMINAE				
5. *Pactolotypus* Broun	−	+	+	North+South I., Chatham Is.
ERIRHININAE				
6. *Baeosomus* Broun	−	−	+	N. Z., Chatham Is., SE Australia
7. *Peristoreus* Kirsch	+	+	+	N. Z.
8. **Notinus* Kuschel	−	+	−	−
RHYPAROSOMINAE				
9. *Gromilus* Blanchard	+	+	+	Antipodes, North+South I., Stewart I.
10. *Nestrius* Broun	+	−	−	North+South I., Stewart I.
PHRYNIXINAE				
11. **Notonesius* Kuschel	−	+	−	−
12. *Phrynixus* Pascoe	+	−	+	North+South I., Stewart I., Chatham Is.
LEPTOPIINAE				
13. *Platyomida* White	+	−	−	North+South I., Stewart I., Chatham Is.
14. **Heterexis* Broun	−	+	+	−
15. **Oclandius* Blanchard	+	+	+	−
16. **Catodryobiolus* Brookes	−	+	+	−
Total	8	12	9	

tions of New Zealand are better known, while we can expect that a few highly specialized species remain undiscovered and will increase the percentage of the endemic species.

The 2 cosmopolitan pests in cereals, *Sitophilus oryzae* (Linné) and *S. granarius* (L.) occasionally found on Auckland Is., have been excluded altogether from this paper. A further 2 species, *Nestrius bifurcus* Kuschel and *Phrynixus thoracicus* (Broun), have been either

Table 3. Composition, distribution, wings, habits.

(*=endemic; endemic species: 62.5 %. Antipodes, Campbell, Auckland, Snares, Stewart, South Island; wings functional, vestigial, or absent; diurnal, nocturnal; in decaying wood)

	Distribution						Wings			Habits		Decay.
Species	Ant.	Cmpb.	Auck.	Snar.	Stew.	S. I.	funct.	vest.	abs.	diurn.	noct.	wood
1. *Pentarthrum spadiceum*	−	−	+	−	+	+	+	−	−	−	+	+
2. **Exeiratus laqueorum*	−	−	−	+	−	−	−	+	−	−	+	?
3. * *turbotti*	−	−	+	−	−	−	−	+	−	−	+	?
4. *Pachyderris punctiventris*	−	−	+	−	+	+	−	+	−	−	+	+
5. *Notacalles planidorsis*	−	+	+	+	+	−	−	−	+	−	+	+
6. *piciventris*	−	+	+	−	+	+	−	−	+	−	+	+
7. *kronei*	−	+	+	−	−	+	−	−	+	−	+	+
8. *latitarsis*	−	−	+	−	+	+	−	−	+	−	+	+
9. *suillus*	−	+	+	−	+	−	−	−	+	−	+	+
10. *multisetosus*	−	+	+	−	−	+	−	−	+	−	+	+
11. **Pactolotypus subantarcticus*	−	+	+	−	−	−	−	−	+	+	−	−
12. *depressirostris*	−	−	+	−	−	+	−	−	+	+	−	−
13. **Baeosomus serripes*	−	+	−	−	−	−	−	−	+	+	−	−
14. *Peristoreus innocens*	−	+	+	+	+	−	+	−	−	+	−	−
15. **Notinus aucklandicus*	−	−	+	−	−	−	−	+	−	+	−	−
16. **Gromilus laqueorum*	−	−	−	+	−	−	−	+	−	−	+	−
17. * *insularis insularis*	−	−	+	−	−	−	−	+	−	−	+	−
i. robustus	−	+	−	−	−	−	−	+	−	−	+	−
i. antipodarum	+	−	−	−	−	−	−	+	−	−	+	−
18. * *exiguus*	−	+	−	−	−	−	−	+	−	−	+	−
19. * *veneris veneris*	−	−	+	−	−	−	−	+	−	−	+	−
v. setarius	−	+	−	−	−	−	−	+	−	−	+	−
20. * *frontalis*	−	−	+	−	−	−	−	+	−	−	+	−
21. * *fallai*	−	−	+	−	−	−	−	+	−	−	+	−
22. **Nestrius laqueorum*	−	−	−	+	−	−	−	+	−	−	+	−
23. **Notonesius aucklandicus*	−	−	+	−	−	−	−	−	+	−	+	−
24. *Phrynixus astutus*-complex	−	+	−	−	+	+	−	+	−	−	+	+
25. * *laqueorum*	−	−	−	+	−	−	−	−	+	−	+	+
26. *Platyomida brevicornis*	−	−	−	+	+	+	−	+	−	−	+	−
27. **Heterexis sculptipennis*	−	−	+	−	−	−	−	+	−	−	+	−
28. * *seticostatus*	−	+	−	−	−	−	−	+	−	−	+	−
29. **Oclandius vestitus*	−	−	−	+	−	−	−	+	−	−	+	−
30. * *cinereus*	−	+	+	−	−	−	−	+	−	−	+	−
31. * *laeviusculus*	−	−	+	−	−	−	−	+	−	−	+	−
32. **Catodryobiolus antipoda*	−	+	+	−	−	−	−	+	−	−	+	−
Total:	1	15	22	8	9	9	2	19	11	5	27	10-12

Table 4. Comparison of the elements of the islands.

	Genera			Species			Shared genera		Shared species	
	total	end.	end. %	total	end.	end. %	total	%	total	%
Snares	8	–	–	8	5	62.5				
Auckland	12	2	16.7	22	7	31.8				
Campbell	9	–	–	15	3	20.0				
Antipodes	1	–	–	1	–	–				
Snares+Auckland	15	2	13.3	28	12	42.8	5	33.3	2	7.1
Snares+Campbell	12	–	–	21	8	38.1	5	41.7	2	9.5
Auckland+Campbell	14	4	28.6	26	14	53.8	7	50.0	11	42.3

Table 5. Information on wings and habits.

	Native species (32)		Endemic species (20)	
	total	%	total	%
Wings functional	2	6.2	–	–
Wings vestigial	19	59.4	16	84.2
Wings absent	11	34.4	4	36.4
Habit diurnal	5	15.6	3	60.0
Habit nocturnal	27	84.4	17	62.9
Adults mainly on vegetation (incl. litter)	19	59.4	7	36.8
Adults mainly on the ground	13	40.6	13	100.0
Larvae endophytic	18	56.2	7	38.9
Larvae ectophytic	14	43.8	13	92.9

recorded or labelled as from Auckland Is., but as both species are restricted to the North Island of New Zealand it is very doubtful whether the specimens have been correctly labelled. As we cannot entirely disregard the possibility that the species have been taken to the islands and have established themselves there, they are included in the taxonomic section of this report, but are excluded from the native fauna and, therefore, from the tables and general considerations on the fauna.

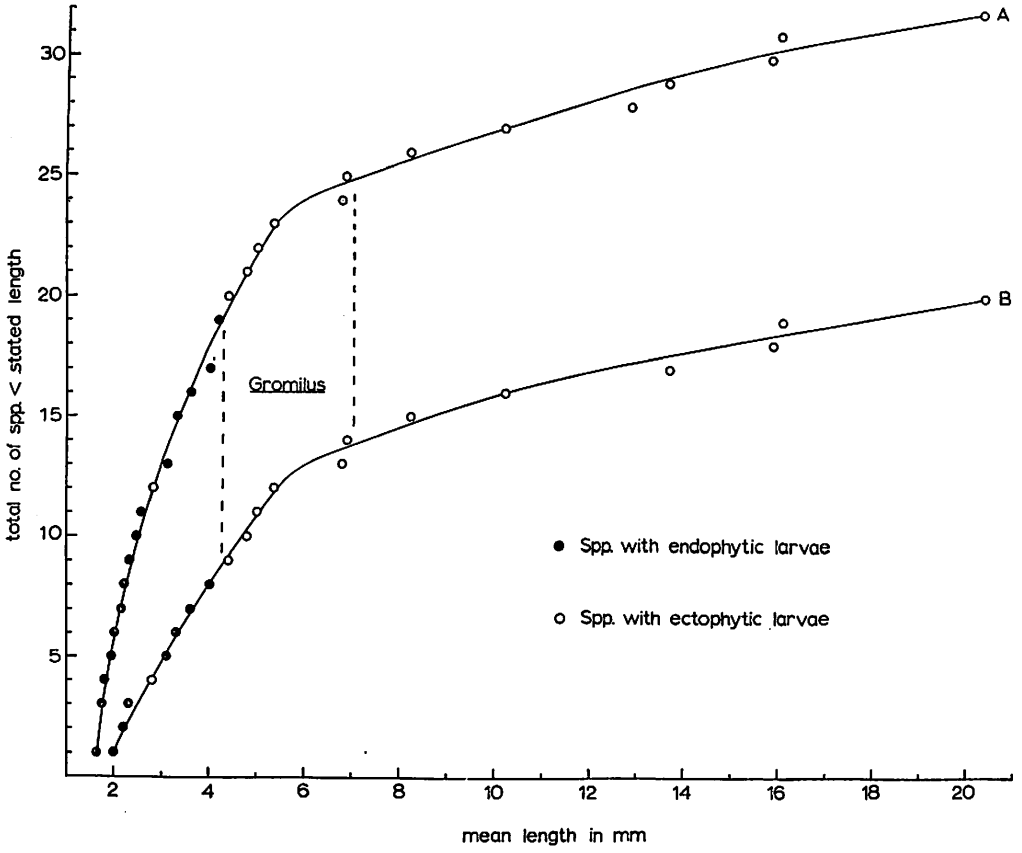
Relationships and origin of the weevil fauna

The study of the subantarctic fauna, including the endemic genera, leaves no doubt about its close affinity with that of New Zealand. This relationship is even more apparent if we compare the subantarctic Curculionidae with those of SE Australia and Tasmania or southern South America. I am not concerned here with the discussion of obvious supra-generic similarities and affinities between the weevil fauna of the Subantarctic Islands and that of other cold-temperate areas of the Southern Hemisphere.

It is in my opinion quite safe to assert that the present-day fauna of the islands has been derived from two main sources of different ages. Those species which are shared with the mainland of New Zealand and form a native but not endemic element on the islands have most likely come from post-glacial colonizers that have reached the islands within the last 15,000 years. This period of time would also be sufficient to allow some subspecies to evolve. The post-glacial element contains 12 species, that is 37.5 % of the native fauna. It is composed of species mainly with endophytic larvae developing in decaying wood. The single species of this element with ectophytic larvae is found on Snares Is. which are

situated only a little more than 100 km south of Stewart I. The only 2 species with functional wings are part of this post-glacial element.

The 20 endemic species, comprising 62.5 % of the native fauna, form an older element. As these are strictly cold-climate species it is difficult to believe that they have migrated to the islands from a warmer climate in the North during the glacial periods and, therefore, we can assume that this element was already established on the islands before the Ice Ages. Climatic conditions during the glaciations must have been very rigorous for the



Cumulative frequency curves for mean length of Subantarctic Island Curculionidae.
Curve A=total native fauna (32 species)
Curve B=endemic species only (20 species)

Explanation of graph: The steeper rise of curve A is due to the relatively great number of small-sized species that are native but not endemic to the islands. The flattening of the curves is due to the usually larger size of the species that have ectophytic larvae. It is a little puzzling that the flexure of the curves occurs within the range of the *Gromilus* species. This flexure would not occur if 1 or 2 species had fallen within the 5.5-6.5 mm range. The flexure still persists if we include the subspecies separately. It must be said that the *Gromilus* species from the Subantarctic Islands form an harmonic group that does not permit a polyphyletic origin. Therefore it seems to me that this flexure within the same genus is most likely attributable to the loss of one or more species during the rigorous conditions of the glaciations.

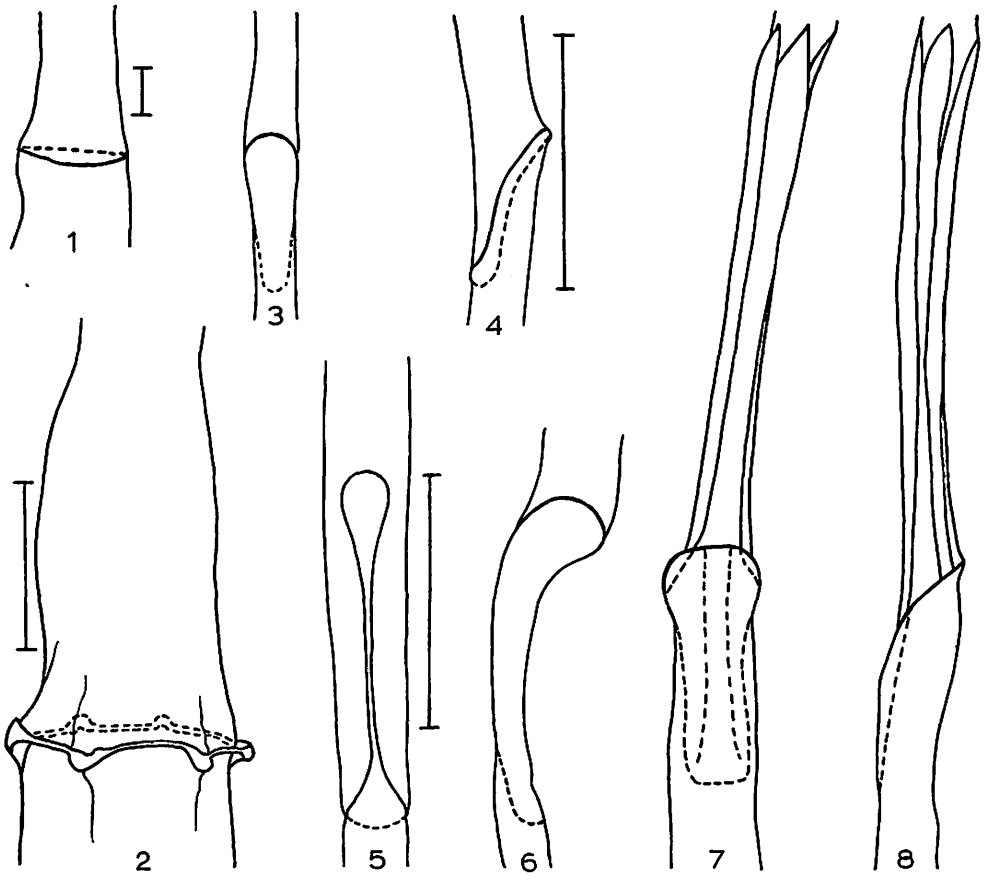
whole fauna, but especially so for those species with endophytic larvae. This probably accounts for the species with endophytic larvae comprising only 35 % of the endemic fauna while they form 56.2 % of the total native fauna. This pre-glacial element pre-supposes that some ice-free refuges remained during the glaciations on the islands.

Certain structures of the rectal valve and their significance

The fold of the proctodaeal wall which separates the intestine from the rectum is called by most authors the rectal valve. When the tissues are removed a sclerotized ring becomes apparent at this place seemingly forming an articulation as with a slight pull the gut is easily broken here. In some Curculionoidea, however, the rectal valve is strongly oblique to the longitudinal axis of the proctodaeum and the ring is then also strongly oblique in lateral aspect while elongate in dorsal or ventral view. It seems that these 2 kinds of structures have a certain significance in detecting relationships of some Curculionoidea of hitherto doubtful systematic position. As these structures are quite obvious in both fresh and old specimens after macerating the abdominal organs in caustic potash for the convenient preparation of genitalia, it would be advisable to mention also those structures in the papers. It is herewith suggested that the name 'rectal ring' be applied to the sclerotized circular feature (figs. 1, 2), and 'rectal loop' to the sclerotized oblique structure (figs. 3–8) of the rectal valve. The rectal ring could be fine and rather difficult to observe, but the rectal loop is always clearly visible at least at its distal (ventral) end even in the most teneral specimens and thus no doubt could arise as to whether a ring or loop were present.

Although only a limited number of species of different families and subfamilies have been examined, a rectal ring seems to be characteristic of the majority of Curculionoidea as well as of the other Phytophaga (Chrysomelidae, Bruchidae, Cerambycidae). A rectal loop is present apparently in Anthribidae and Aglycyderidae only amongst Orthoceri, and has been observed also in Cossoninae, Petalochilinae, and some Rhynchophorinae amongst Gonatoceri. It might be interesting to note that some authors advocate a fusion of Nemonychidae with Anthribidae, and Aglycyderidae with Oxycorynidae, but the ring present in Nemonychidae and Oxycorynidae against a loop in Anthribidae and Aglycyderidae would bring a further point to maintain them as separate families.

The loop is certainly a derivative feature of the ring, and must represent the ancestral character of the superfamily. It would seem most unlikely that such a specialized structure as the loop could have arisen independently on a number of different occasions, yet it occurs in obviously unrelated groups. Thus, the full implications of the presence of a loop or a ring are uncertain although the phylogenetic significance of these structures probably is very great. While most major groups seem to be clearly defined in having consistently either a ring or a loop, a few such as Sitophilini (Rhynchophorinae), Cossoninae, and Petalochilinae pose problems in that some of their genera have rings and others have loops. For instance in Sitophilini, *Sitophilus* and *Myocalandra* have a loop while the otherwise structurally similar *Polytus* and *Diocalandra* have a ring. In Petalochilinae, *Petalochilus*, *Spermologus*, and *Hormops* (*Ctenomyophila*), and most likely their close relatives *Caviaphila*, *Georhynchus*, and *Iphipus* (these genera not available at present) have a loop whilst the other genera that I have included in this subfamily some years ago (Kuschel, 1952) have a ring. In Cossoninae the loop is so widespread that it probably should be regarded as a



Figs. 1–8. Rectal rings and loops in Curculionoidea. 1, *Lyperobius carinatus* Broun, Hylobiinae; 2, *Agathinus tridens* (Fabricius), Belidae; 3 & 4, *Sitophilus oryzae* (Linné), ventral and lateral, Rhynchophorinae; 5, *Novitas dispar* Broun, ventral, Cossoninae; 6, *Stenoscelis hylastoides* Wollaston, ventral, Cossoninae; 7 & 8, *Acanthopygus metallicus* Montrouzier, ventral and lateral, Anthribinae. (Scales beside figs. 1, 2, 4 equal 0.5 mm, beside fig. 5 equals 0.25 mm. Figs. 2, 6, 7, 8 same scale; figs. 3, 4 same scale.)

subfamily character. Most of the relatively few genera which thus would be excluded from Cossoninae were doubtfully placed in this subfamily and could appropriately be transferred either to Trypetinae or Scolytinae when not to other subfamilies. Some genera such as *Arecocryptus*, *Sphinctocephalus*, *Novitas*, and *Cylindrotrypetes* which would come under Trypetinae because of certain morphological characters, have a well-developed loop and should therefore be placed in Cossoninae (see also Trypetinae in the taxonomical part of this paper).

Modifications occur in both ring and loop. For instance, Belidae and Oxycorynidae have a hexagonal ring with a strong knob at each angle (fig. 2). The subfamily Anthribinae has 6 long sclerotized plates extending from the loop to near the anus (figs. 7, 8).

KEY TO GENERA

1 (24). Mandibular appendix and scar absent (Phanerognatha).
2 (9). Tibiae uncinate (tooth at or close to dorsal angle).
3 (6). Metepisternal suture with sclerolepidia (row of modified scales). Without pectoral canal.
4 (5). Funicle 5-segmented ..... 1. **Pentarthrum**
5 (4). Funicle 7-segmented ..... 2. **Exeiratus**
6 (3). Metepisternal suture without sclerolepidia. With pectoral canal for reception of rostrum.
7 (8). Wings vestigial. Scutellum conspicuous. Elytra tufted ..... 3. **Pachyderris**
8 (7). Wings absent. Scutellum very small or invisible. Elytra not tufted...4. **Notacalles**
9 (2). Tibiae mucronate (tooth at lower angle) or unarmed.
10 (11). Tibiae not mucronate. Eyes pilose between ommatidia. Rostrum very short, about as long as head ..... 5. **Pactolotypus**
11 (10). Tibiae mucronate. Eyes bare. Rostrum long, much longer than head.
12 (13). Funicle 6-segmented ..... 6. **Baeosomus**
13 (12). Funicle 7-segmented.
14 (17). Claws appendiculate, with broad expansion at base.
15 (16). Elytra with humeral callus. Wings functional. Femora armed.....7. **Peristoreus**
16 (15). Elytra without humeral callus. Wings vestigial. Femora unarmed ..... 8. **Notinus**
17 (14). Claws simple.
18 (21). Tibiae with mucro and spurs. ♂ : parameres absent. ♀ : styli with long setae.
19 (20). Eyes large. Metepisternal suture visible throughout. Mandibles with a single long seta ..... 9. **Gromilus**
20 (19). Eyes small. Metepisternal suture invisible throughout. Mandibles with 2 or 3 long setae ..... 10. **Nestrius**
21 (18). Tibiae with mucro only. ♂ : parameres present. ♀ : styli with very short setae.
22 (23). Scrobes deep, directed towards gular angle. Body nearly bare, without multifid hairs or scales and without tubercles or tufts ..... 11. **Notonesius**
23 (22). Scrobes shallow, directed towards eyes. Body squamose, with multifid scales and with tufted tubercles or asperities ..... 12. **Phrynixus**
24 (1). Mandibular appendix or scar present (Adelognatha).
25 (28). Prementum bare.
26 (27). Rostrum more than 1.5× as long as wide (length from distal margin of epistome to front margin of eyes). Scrobes parallel, directed towards lower 1/2 of eyes. ♂ : internal sac protruding beyond base of apophyses. ♀ : sternite 8 emarginate or incised at tip ..... 13. **Platyomida**
27 (26). Rostrum very slightly longer than wide. Scrobes strongly widened, directed downwards. ♂ : internal sac contained in main body of aedeagus. ♀ : sternite 8 acute ..... 14. **Heterexis**
28 (25). Prementum with a pair of setae.
29 (30). Tibiae with mucro and spurs. Lateral genal suture visible as a proximal foveiform impression. ♂ : internal sac exposed, without basal sclerite. ♀ : sternite 8 strongly asymmetrical; spermathecal duct inserted near oviduct ....15. **Oclandius**
30 (29). Tibiae with mucro only. Lateral genal suture visible as a long sinuous groove

almost reaching tip of rostrum. ♂: internal sac not exposed, with strong basal sclerite. ♀: sternite 8 symmetrical; spermathecal duct inserted on distal end of bursa copulatrix..... 16. **Catodryobiolus**

Subfamily COSSONINAE

1. Genus **Pentarthrum** Wollaston, 1854

Pentarthrum Woll., 1854, Ann. Mag. Nat. Hist. ser. 2, **14**: 129 (type species: *P. huttoni* Woll.).

Attarus Broun, 1909, Trans. Proc. N. Z. Inst. **41**: 180 (type species: *Pentarthrum vestitum* Brn.). **New Synonymy.**

Belka Brn., 1909, *Ibid.* **41**: 179 (type species: *Pentarthrum spadiceum* Broun). **New Synonymy.**

Gaurocryphus Brn., 1909, *Ibid.* **41**: 185 (type species: *Pentarthrum auricomum* Broun). **New Synonymy.**

Trachyglyphus Brn., 1909, *Ibid.* **41**: 195 (type species: *Pentarthrum rugirostre* Broun). **New Synonymy.**

Head not or very slightly constricted just behind eyes. Sexual dimorphism of rostrum very strong, rostrum of ♂ thick, more than 2× as long as wide at apex (length measured from distal margin of epistome to front margin of eyes), conical, parallel or gradually widened; rostrum of ♀ thin, cylindrical, nearly straight. Secondary scrobe very distinct, primary scrobe directed below lower angle of eyes, its upper margin touching lower angle of eyes. Scape not or very slightly reaching beyond hind margin of eyes; funicle 5-segmented, club segmented. Prothorax widest near base in both sexes, sides above and in front of coxae not compressed. Scutellum visible. Elytra parallel or nearly so, cylindrical. Interstria 9 not carinate, if strongly raised then not continued to latero-apical margin of elytra. Wings functional. Tarsal segment 3 small, with small lobes.

♂. Sternite 9 (*i. e.* spiculum gastrale) very thick. Aedeagus with broad short body, seldom a little longer than wide, distal margin with numerous long hairs.

♀. Sternite 8 roughly as in fig. 11, distal sclerotized margin slightly interrupted in middle; genitalia as in fig. 12.

Relationships: *Pentarthrum* is the type genus of Pentarthrini which are characterized by the presence of a secondary scrobe. This tribe comprises a little more than 30 genera and is best represented in New Zealand where it constitutes the bulk of the cossonine fauna. *Euophryum* Broun and *Torostoma* Broun are 2 close allies differing from *Pentarthrum* by a strongly raised interstria 9 which continues to the latero-apical margin of the elytra, and by long aedeagi.

Ecology: Both larvae and adults of *Pentarthrum* live in soft decaying wood of dicotyledons and also in thick pithy decaying flower stems of some monocotyledons. Most species occur mainly in logs and branches and under bark, and are found occasionally in driftwood and in wooden houses.

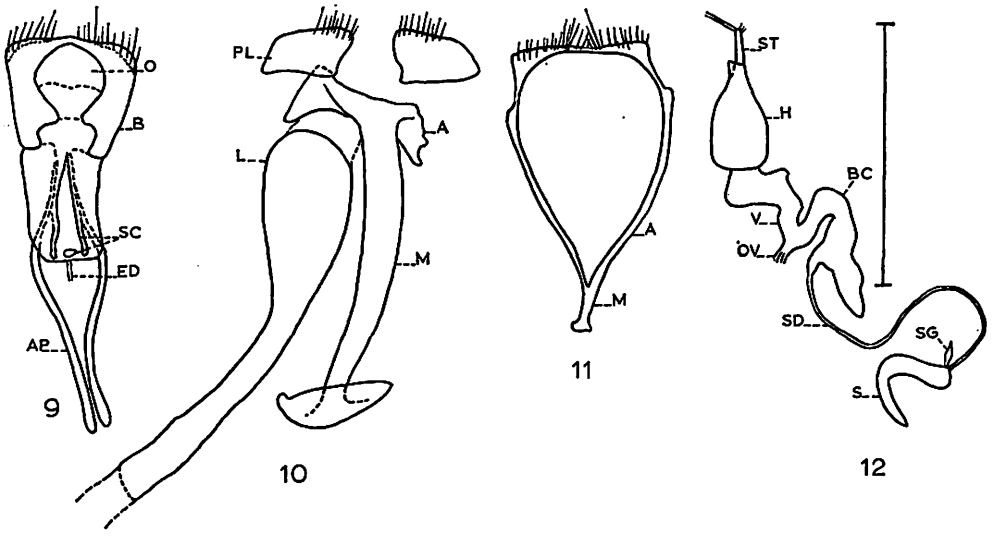
Geographical distribution: *Pentarthrum* is confined mainly to temperate climates of the southern hemisphere having 2 main centers of distribution, one in New Zealand, the other in Chile (including Juan Fernandez and Desventuradas Is.). Isolated species occur also in Tasmania, New Caledonia, Tristan da Cunha and Gough I. It is the southernmost genus of all Cossoninae, and together with its close relative *Euophryum*, occurs south of parallel 47.

Pentarthrum spadiceum Broun Figs. 9–12.

Broun, 1886, Man. N. Zealand Coleopt. **4**: 911 (*Pentarthrum*); 1909, Trans. Proc. N. Z. Inst. **41**: 180 (*Belka*).

Castaneous or piceous, dull, alutaceous on pronotum and also on rostrum of ♂♂, elytra coriaceous. Sparsely covered with fine long yellow hairs. Rostrum of ♂ parallel, alutaceous, with or without a median depression. Pronotum with rather small punctures on central area, intervals distinctly alutaceous under high magnification, many intervals larger than diameter of punctures in central area. Elytra usually 2.0–2.1× as long as wide; striae shallow and fine, their punctures very indistinct; interstriae coriaceous, the yellow hairs longer than interstrial width; interstria 9 slightly convex. Mid and hind tibiae gently widened. Tarsal segment 3 small, with feeble emargination. Claw segment depressed, subparallel in both sexes. ♂: Sternites 8 & 9 as in fig. 10. Aedeagus as in fig. 9; internal sac with a 3-piece basal sclerite, the median piece small, the other 2 with a wider basal portion and converging towards base of main body of aedeagus. ♀: Sternite 8 as in fig. 11; hemisternites undivided, with a long apical stylus. Bursa copulatrix long, expanded at insertion of spermathecal duct which has rather thick walls. Spermatheca with a very short stalk at insertion of spermathecal duct. Spermathecal gland very close to spermathecal duct and very small. Length 2.8–3.8 mm; width 0.95–1.2 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 12 in *Metrosideros umbellata*, Gressitt, Wise; *Neopanax simplex*, Dumbleton; without host plant, Gourlay; Erebus Cove, 2 in the boatshed, Wise; Terror Cove, 1, Wise. ROSE I.: 7 in dead *Metrosideros umbellata*, Johns.



Figs. 9–12. *Pentarthrum spadiceum* Broun, Ranui Cove, Auckland Is.; 9, aedeagus, dorsal; 10, sternites 8 & 9, hind-gut with rectal loop, ventral; 11, sternite 8 of ♀, ventral; 12, ♀ genitalia, lateral. (Scale beside fig. 12 equals 0.5 mm; all figs. same scale). Abbreviations: A, arm; AP, apophysis; B, body of aedeagus; BC, bursa copulatrix; ED, ejaculatory duct; H, hemisternite; L, rectal loop; M, manubrium; O, ostium; OV, oviduct; PL, plates of sternite 8; S, spermatheca; SC, sclerites; SD, spermathecal duct; SG, spermathecal gland; ST, stylus; V, vagina.

EWING I.: 31 in *Olearia lyallii* and *Hebe elliptica*, Johns. ENDERBY I.: 9 in dead branches of *Metrosideros umbellata*, Johns. Total of 62 collected in Nov., Dec., & Jan.

STEWART I.: 21 from Easy Cave, Mokinui I., Big South Cape I., Nelly I. at Port Pegasus, Small Craft Retreat, and Owen I., collected by Dell and Holloway in Jan.

SOUTH ISLAND. Near Dunedin, Otago (holotype only).

TYPE LOCALITY: near Dunedin, Otago. Holotype ♀ in Brit. Mus., Lond.

Ecology. The species of *Pentarthrum* are not host specific. All specimens so far known from Auckland Is. have been obtained in the northern area close to sea level. The great bulk of specimens have been found in dead branches of *Metrosideros umbellata* (Myrtaceae) and *Olearia lyallii* (Compositae).

Remarks: The species was described in 1886 from a single ♀ specimen collected near Dunedin, Otago. No additional specimens have been secured since in the South Island. Subsequently it has been collected in 3 isolated areas, Stewart I., Chatham Is., and Auckland Is. The populations of these 3 major areas are, however, not entirely identical and show sufficient differences to be regarded as good geographical races or subspecies. I am refraining from naming the subantarctic form until specimens of the type subspecies from the South Island are available. The population from Chatham Is. should be known as *Pentarthrum spadiceum auripilum* (Broun).

Subfamily TRYPETINAE

I do not know for certain where to place a few genera of New Zealand Curculionidae that seem to be quite closely inter-related. Authors have referred them to such diverse subfamilies as Cossoninae, Erirhininae, Rhyparosominae, Hylobiinae, and Pissodinae. They all agree in having sclerolepidia, a rectal ring, and parameres. They also agree in being common in leaf litter. As I cannot solve this problem at present I am putting them provisionally in Trypetinae. These genera are *Allaorus* Broun, *Eiratus*[2] Pascoe, *Etheophanus* Broun, *Exeiratus* Broun, *Inososgenes* Broun, *Paedaretus* Pascoe, *Phronira* Broun, and *Stilboderma* Broun.

2. Genus **Exeiratus** Broun, 1914

Exeiratus Broun, 1914, Bull. N. Z. Inst. **1** (2): 128 (type species: *Ex. setarius* Brn.).
Austroinsulus Brookes, 1951, Cape Exp. Ser. Bull. **5**: 92 (type species: *A. turbotti* Brookes).
New Synonymy.

Head globose, densely sculptured. Eyes latero-inferior, transversely ovate, flat, coarsely facetted, with little more than 30 ommatidia. Front between eyes at least as wide as base of rostrum. Rostrum separated from front by a transverse shallow groove, curved, nearly as long as prothorax, tapering from base to insertion of antennae, densely sculptured except near tip; sexual differences mainly in sculpture. Scrobes latero-inferior, invisible in dorsal aspect, upper margin sharp and directed towards upper 1/3 of eyes. Antennae at distal 1/3 or 2/5, scape just reaching front margin of eyes, its distal 1/3 rather strongly thickened and alutaceous; funicle 7-segmented, segment 1 thicker and longer than 2; club

2. *Eiratus* Pascoe, 1877=*Himatiodes* Marshall, 1953. **New Synonymy.**

moderate, 4-segmented, not constricted at sutures, segment 1 almost as long as the rest of club which is uniformly pubescent. Prothorax about as wide as long, truncate at base, proximal angles obtuse, widest beyond middle, distal constriction strong; disc coarsely sculptured, trifoveate; distal portion of prosternum longer than proximal, distal margin emarginate; ocular lobes weak. Scutellum visible, small, round, smooth, bare. Elytra elliptic or ovate, truncate at base up to stria 5, humeral area slightly projected forwards, apex conjointly rounded, dorsum longitudinally and transversely convex, interstriae partly raised, uneven, with obliquely disposed elongate elevations and with a larger tubercle at end of interstria 5. Stria 10 strong only above sterna. Wings vestigial, ovate, wing/elytron ratio about .15, *i. e.* wing 6–7× shorter than elytra. Front coxae narrowly separated, processus meeting and about as wide as funicle. Mid coxae much more widely separated than front coxae. Metasternum short, between mid and hind coxae about as long as diameter of mid coxa; metepisternum very narrow. Hind coxa transverse. Tibiae with strong long uncus arising near dorsal edge; distal comb of mid and hind tibiae short, oblique, distinct. Tarsal segment 3 small, entire, wider than 2; claw segment long, with 2 simple claws.

♂. Tergite 7 without stridulatory files. Tergite 8 half free beyond 8. Sternite 8 with 2 broad triangular plates. Sternite 9 shortly bifurcate, manubrium moderately upcurved. Tegmen with long manubrium, ring complete, parameres long. Aedeagus with short body, dorsal surface sclerotized, ventral surface membranous; apophyses very long, several times longer than main body, their insertion latero-ventral. Internal sac very long, longer than the main body and apophyses taken together, with an enormously long flagellum reaching from base of internal sac to or beyond ostium of main body, and with an elongate ventral ampulla well beyond base of main body of aedeagus.

♀. Sternite 8 with 2 rather weakly sclerotized arms. Hemisternites long, subparallel, without setae, with microtrichia. Styli apical. Bursa copulatrix without sclerites, without invagination at base of oviduct. Spermatheca falciform, spermathecal duct thick throughout, inserted on dorsal surface of bursa copulatrix as shown in figs. 22, 25; spermathecal gland close to spermathecal duct, about as long as proximal 1/2 of spermatheca.

Relationships: *Exeiratus* Broun is quite closely related to other Neozelandic genera found in leaf litter such as *Eiratus* Pascoe and *Paedaretus* Pascoe.

Ecology: The species seem to occur mostly in coastal scrub leaf litter; a few isolated specimens have also been collected under bark of dead trees. No host plants of either larvae or adults have been recorded. The larvae are quite likely to be found in decaying wood.

Geographical distribution: It seems certain that *Exeiratus* is restricted to the extreme south of South Island, Stewart I., Snares Is., Auckland Is., and Chatham Is. It is the most southern genus of the subfamily in the whole hemisphere. Four species are, so far, known to me, 1 from Stewart I. and its adjacent islands and islets, 1 from Chatham Is., 1 from Snares, and 1 from Auckland Is., the latter wrongly recorded also from Stewart I. by Brookes. The type species *E. setarius* Broun was described from SW South Island (Hakapoua); as it is a lowland species it is likely to be the same as that occurring in Stewart I.

Key to species of Exeiratus

Castaneo-rufous, usually with dark markings. Abdomen finely punctate. Segment 2 of funicle less than 2× as long as wide. 3.0–3.2 mm. Snares..... **laqueorum**

Piceous. Abdomen coarsely punctate. Segment 2 of funicle more than 2× as long as wide. 3.60–3.65 mm. Auckland Is. ..... **turbotti**

Exeiratus laqueorum Kuschel, n. sp. Figs. 13, 15–23.

Castaneo-rufous, with or without piceous markings; femora without pale ring.

Head densely and shallowly punctate, alutaceous, hairs very short. Rostrum, from distal margin of epistome to front margin of eyes, about 1.28× shorter than prothorax, and 3.68 (♂) or 4.0 (♀)× longer than its own distal width, moderately curved, densely punctate-striolate, with fine longitudinal ridges mainly in ♂; setae short and thick, semierect, curved, directed towards base of rostrum; distal portion almost smooth, bare; ventral surface in ♂ with a few setae in a furrow contiguous to lower edge of scrobe below antenna. Antennae as in fig. 13. Prothorax as wide as long to 1.07× wider than long, sides strongly rounded, gradually narrowed between maximal width and apical constriction; median fovea at base deep, sometimes continued as a groove, lateral foveae shallow; usually a median abbreviated carina present; disc coarsely punctate, with almost appressed thick setae, intervals shiny. Elytra about 1.33× wider than prothorax, about 1.43–1.45× as long as their maximal width. Striae sulcate, deep, bare. Interstriae slightly wider than striae, shiny, transversely rugose, with one or more rows of irregularly distributed setae, with strong preapical callus on 5, elsewhere a little uneven. Ventral surface finely punctate.

♂. Sternites 8 & 9 as in fig. 20. Tegmen and aedeagus as in figs. 17–19.

♀. Sternite 8 as in fig. 21. Genitalia as in fig. 22; hemisternites entirely sclerotized, fig. 23; spermathecal duct not widened near insertion on bursa copulatrix.

Length 3.0–3.2 mm; width 1.45–1.50 mm.

SNARES IS.: 2♂♂ from tussock grass roots and debris, R. A. Falla; 1 ♂, 2♀♀, 16. XII. 1947, in leaf litter of *Olearia lyallii*, C. A. Fleming.

TYPES: Holotype ♂, 3.1×1.5 mm, XI. 1947, Falla, allotype ♀ and 1 paratype in Dominion Mus., Wellington, 2 paratypes in Entomology Div., D. S. I. R., Nelson.

Ecology: Found in daytime on the ground in litter of tussock grass and *Olearia lyallii*.

Remarks: Separable from the other 3 species of the genus by weakly raised interstriae, finely punctate ventral surface, and lack of a pale ring on femora and characters of genitalia.

Exeiratus turbotti (Brookes) n. comb. Figs. 14, 24–26.

Brookes, 1951, Cape Exp. Ser. Bull. **5**: 62, f. 21 (*Austroinsulus*).

Piceous, swollen part of mid and hind femora except dorsal edge paler. Head and rostrum as in *laqueorum*, rostrum 1.18–1.21× shorter than prothorax, and 3.8–4.0× longer than its own distal width. Antennae as in fig. 14, segment 2 of funicle more than 2× as long as wide. Prothorax 1.02× wider than long, apical constriction abrupt, otherwise similar to *laqueorum*. Elytra 1.38–1.42× wider than prothorax, and 1.52–1.54× longer than the maximal width. Striae sulcate, much finer than interstriae. Dorsum with a deep oblique impression behind proximal 1/3, elevations on interstriae higher than in *laqueorum*. Ventral surface very coarsely punctate. ♂: Unknown. ♀: Sternite 8 as in fig. 24; genitalia as in fig. 25; hemisternites divided by an oblique line, fig. 26, distal portion sclerotized, proximal portion membranous; styli shorter than in *laqueorum*; spermatheca without a little

sclerotized appendix at tip; spermathecal duct gradually widening before joining bursa copulatrix. Length 3.60–3.65 mm; width 1.62–1.67 mm.

AUCKLAND IS. AUCKLAND I.: North Arm, Carnley Harbor, 2♀♀, 26. X. 1944, E. G. Turbott.

TYPE LOCALITY: North Arm, Carnley Harbor, Auckland Is. Holotype ♀ (not ♂ as stated by Brookes!), 3.65×1.67 mm, and paratype ♀ (allotype of Brookes) in Dominion Mus., Wellington.

Ecology: The only 2 specimens so far obtained were 'taken from a dead tree stump' (Turbott).

Remarks. Readily identified by its very dark color, longer segment 2 of the funicle and abrupt constriction of the prothorax. Brookes has mentioned a 3rd specimen of this species from Stewart I., but that specimen belongs to *E. setarius* Broun.

Subfamily CRYPTORHYNCHINAE

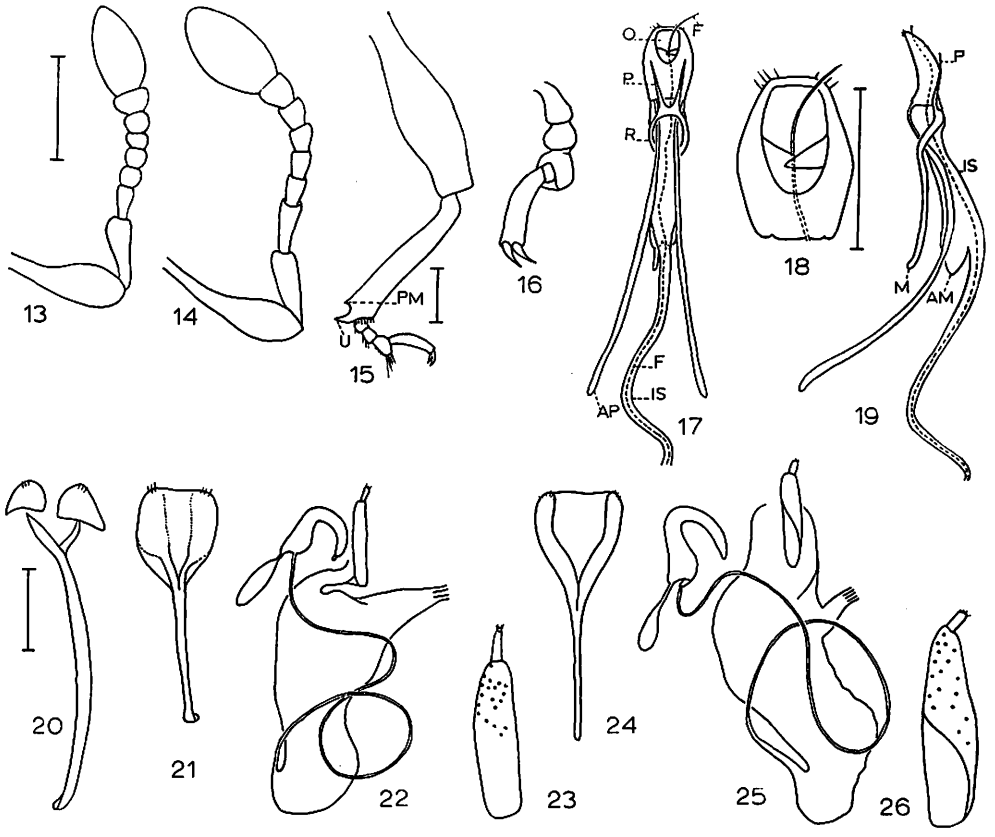
3. Genus **Pachyderris** Broun, 1909

Pachyderris Broun, 1909, Subantarct. Is. N. Z. **1**: 121 (type species: *P. punctiventris* Brn.).
Xenacalles Brn., 1911, Trans. Proc. N. Z. Inst. **43**: 108 (type species: *X. squamiventris* Brn.); 1913, *ibid.* **45**: 146. **New Synonymy.**

Head and rostrum almost continuous. Head in repose exposed beyond prothorax. Eyes lateral, triangular, convex, coarse, with posterior furrow, more than 1/2 covered by ocular lobes. Rostrum slightly shorter than prothorax, moderately curved, slightly depressed. Antennae inserted slightly beyond middle; segment 2 of funicle shorter than 1; segment 1 of club shorter than rest of club. Prothorax shorter or longer than wide, widest at base or at proximal 1/3, distal constriction obsolete. Scutellum round, convex, squamose, as high as or higher than elytra. Elytra triangular in outline, without humeral callus, humeral area, however, rapidly widening and rounded, widest near proximal 1/3. Striae fine, stria 10 complete. Wings vestigial, wing/elytron ratio .10–.33. Femora unarmed, not sulcate. Tibiae not costate, distal comb oblique, uncus dorsal, premucro very small or obsolete in ♂♂, well developed in ♀♀. Tarsi long. Pectoral canal deep throughout, bare, hind wall slightly overhanging. Metasternum between coxae very short, about 1/2 as long as diameter of a mid coxa, without tubercle between mid and hind coxa, but with vertical or slightly overhanging posterior declivity. Metepisternum narrow, squamose, suture distinct. Ventrite 2 much longer than 3.

♂. Plates of sternite 8 large. Sternite 9 strong, with broad irregular arms. Tegmen with short manubrium and incomplete ring; parameres vestigial. Aedeagus depressed, dorsally membranous, setose near tip; apophyses not articulate, joined to latero-ventral angle of main body. Internal sac with heavily chitinized basal sclerite and with additional armature.

♀. Tergite 8 elongate, distal margin broadly rounded and shortly denticulate (fig. 33). Sternite 8 as in fig. 32. Hemisternites undivided, with microtrichia and sometimes with 1 seta; stylus long, apical. Bursa copulatrix with a deep elliptical depression and with internal folds in the depression, the folds forming a weakly chitinized sclerite. Spermathecal duct inserted at base of bursa copulatrix, shorter or longer than bursa copulatrix. Spermatheca falciform, usually with thin appendix at tip. Spermathecal gland small, oval in



Figs. 13–26. *Exeiratus* spp. *E. laqueorum* n. sp. Snares: 13, antenna; 15, left hind leg; 16, hind tarsus; 17, aedeagus, dorsal; 18, main body of aedeagus, dorsal; 19, aedeagus, lateral; 20, sternites 8 & 9 of ♂, ventral; 21, sternite 8 of ♀, ventral; 22, ♀ genitalia, lateral; 23, hemisternite, lateral. *E. turbotti* (Brookes) Auckland Is.: 14, antenna; 24, sternite 8 of ♀, ventral; 25, ♀ genitalia, lateral; 26, hemisternite, lateral. (Scales beside figures equal 0.25 mm. Figures 13, 14, 16 same scale; figs. 15, 17, 19 same scale; figs. 18, 23, 26 same scale; figs. 20–22, 24, 25 same scale.) Abbreviations: AM, ampulla; AP, apophysis; F, flagellum; IS, internal sac; M, manubrium; O, ostium; P, paramere; PM, premucro; R, ring of tegmen; U, uncus.

outline, distant from spermathecal duct.

Relationships: Nothing can be said before the whole cryptorhynchine fauna of New Zealand has been revised. All the 4 species so far known to me are densely squamose, variegated, with large imbricate scales covering the derm except tip of rostrum, antennae, pectoral canal, and tarsi. The sutural interstria has a tuft of long, erect squamiform setae on top of the declivity where this interstria is slightly raised and usually strongly widened; also interstriae 3 & 5 on 1st and 2nd 1/3 of dorsum usually with smaller tufts of similar setae.

Ecology: The flightless adults are nocturnal and are found mainly on dead branches of different trees and shrubs and also in leaf litter of the forest floor.

Geographical distribution. 3 species occur in the South Island, 1 of these extending from

East Otago to Wellington in the North Island, 1 occurring in the Southern Alps from Canterbury to Fiordland, and the 3rd species being found in Westland, Fiordland, Southland, as well as Stewart I., and Auckland Is. The 4th species is endemic to Chatham Is.

Pachyderris punctiventris Broun Figs. 27–35.

Brn., 1909, Subantarct. Is. N. Z. **1**: 121.—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 198.—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 66.

This belongs to the group of species with slightly rounded, not conical prothorax. It differs externally from *squamiventris* Broun (*Xenacalles*) from Chatham Is., by larger size, from *nigricans* Brn. (*Xenacalles*), from the Southern Alps, by finer punctation on rostrum and by a lower vertical posterior wall of the metasternum opposite the hind coxae. All 3 species are similar externally but their genitalia, however, are very distinct, more so in the ♂♂ than in the ♀♀. Wing/elytron ratio about .30, fig. 35. ♂: Sternites 8 & 9 as in fig. 27. Tegmen as in fig. 31. Aedeagus as in figs. 28–30; basal sclerite of internal sac with a ventral distal tooth on each side and without a recurved hook on its dorsal distal end. ♀: Tergite 8 as in fig. 33. Sternite 8 as in fig. 32. Genitalia as in fig. 34; hemisternites with 1 seta; spermathecal duct shorter than bursa copulatrix. Length 3.3–5.1 mm; width 1.4–2.4 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 45 on *Neopanax simplex*, *Metrosideros umbellata* at night, *Myrsine divaricata*, and *Polystichum vestitum*, Johns; *Dracophyllum*, Dumbleton; in Malaise trap, Gressitt; without host plants, Gourlay; Port Ross, 1, Fleming; Carnley Harbor, 1, holotype, Hudson; Musgrave Peninsula, 1, no collector. ROSE I.: 10 on *Metrosideros umbellata*, Johns and *Myrsine divaricata*, Gressitt. EWING I.: 1, Gressitt. ENDERBY I.: 1 on *Metrosideros umbellata*, Johns. Total, 60 specimens collected in Nov., Dec., and Jan.

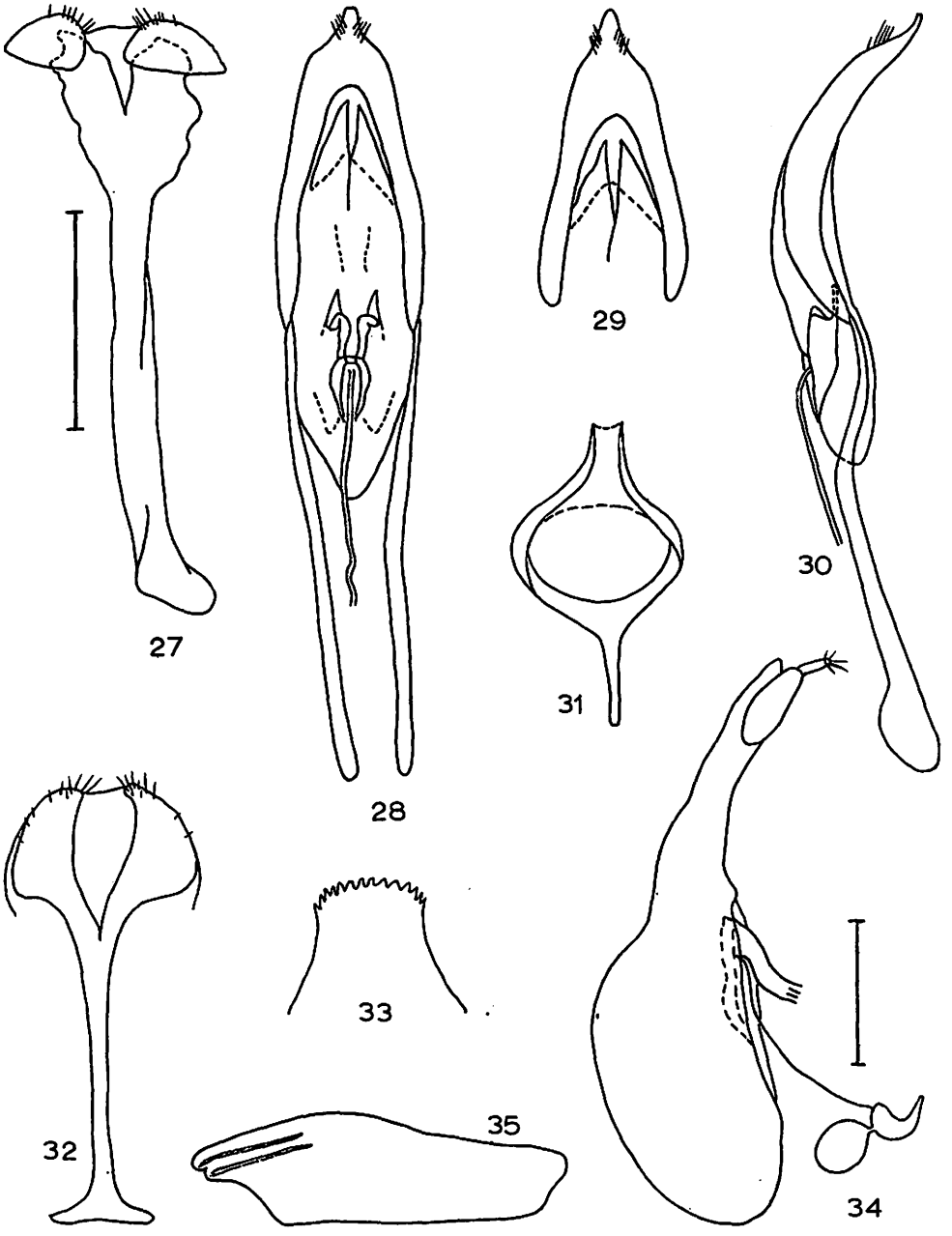
STEWART I. Halfmoon Bay, 3, Fairburn. Christmas Village, foot of Mt. Anglem, 3, Kuschel, Jan. and Mar.

SOUTH ISLAND. Waiho River, Westland, 1. Greenhills, Bluff, 2, Gourlay; Owaka, 2, Gourlay, Jan.

TYPE LOCALITY: Carnley Harbor, Auckland Is. Holotype ♀, 4.6×2.15 mm, XI. 1907, Hudson, in Dominion Mus., Wellington.

Ecology: Most specimens have been beaten off dead branches of *Neopanax simplex* (Araliaceae) and *Metrosideros umbellata* (Myrtaceae).

Remarks: *Xenacalles simplex* Broun, 1914, from SW South Island (Hakapoua) is probably a junior synonym of *punctiventris*, as *nodifer* (Broun) probably is of *triangulatus* (Broun) judging by their descriptions only. Although it is quite difficult to separate *punctiventris* from *nigricans* and *squamiventris* on external characters, the general shape of the aedeagus and the armature of the internal sac are very different in these 3 species. It is interesting to note that the longest wings occur in *punctiventris* with a wing/elytron ratio of .28–.33 and *squamiventris* (Chatham Is.) with .26, while *nigricans* (South Island) has .23 and *triangulatus* (North and South Islands) only .10. As all the species have strongly atrophied wings, their condition of flightlessness must be regarded as a fairly old feature of the group. Furthermore, there seems to be no significant difference in the ratios between the populations of the main islands of New Zealand and those of Auckland Is.



Figs. 27–35. *Pachyderris punctiventris* Broun, Ranui Cove, Auckland Is. 27, sternites 8 & 9 of ♂, ventral; 28, aedeagus, dorsal; 29, apex of aedeagus, dorsal; 30, aedeagus, lateral; 31, tegmen, dorsal; 32, sternite 8 of ♀, ventral; 33, tergite 8 of ♀, distal portion; 34, ♀ genitalia, lateral; 35, right wing of ♂. (Scales besides figs. equal 0.5 mm. Figures 27–33, 35, same scale)

4. Genus **Notacalles** Kuschel, n. gen.

Head and rostrum continuous. Eyes transverse, convex, without a posterior edge or rim, only very slightly covered by ocular lobes when rostrum retracted in pectoral canal. Rostrum curved or almost straight, slightly depressed. Antennae inserted near middle, funicle 7-segmented, segment 1 longer than 2. Prothorax covering head. Scutellum visible or invisible. Elytra without humeral callus, elliptic, stria 10 present near base only; suture with 1 or 2 pairs of granules at base. Wings absent. Pectoral canal deep throughout, bare, mesosternal receptacle open or cavernous, side walls high, hind wall sloping backwards, vertical or overhanging. Metasternum very short, with or without tubercle between mid and hind coxae. Metepisternum visible throughout, very narrow. Suture of 1st 2 ventrites obsolete in middle, ventrites 3 & 4 very short. Femora unarmed, not canaliculate. Tibiae not carinate, with small, simple and oblique distal comb; uncus on or near outer angle, premucro absent. Tarsi short, segment 3 emarginate, much wider than 2; claw segment moderately long.

Sexual dimorphism; rostrum usually thicker, rougher and more setose in ♂♂, sometimes humeral area more setose in ♂♂, no ventral impression in ♂♂.

♂. Sternite 8 with 2 transverse sclerotized plates having 1 or more setae. Sternite 9 Y-shaped, manubrium not upcurved. Tegmen with short thin manubrium, ring incomplete on dorsum, parameres distinct, vestigial or absent. Main body of aedeagus short compared with length of apophyses, ventral surface sclerotized, dorsal surface membranous. Apophysis entirely lateral, articulate, joined by a very fine stalk to the lateroventral angle of aedeagus. Internal sac short with a complex basal sclerite that has bars or laminae and some irregular tubes reaching ostium.

♀. Tergite 8 trapezoidal or triangular, distal margin entire or denticulate. Sternite 8 Y-shaped, manubrium usually with a nodiform apophysis on each side, seldom with a longer transverse apophysis. Hemisternites undivided, entirely sclerotized, with microtrichia, usually without setae. Stylus short, apical. Bursa copulatrix shorter or longer than vagina, without basal sclerite. Spermatheca falciform; spermathecal gland small, globular, distant from spermathecal duct; spermathecal duct inserted on ventral surface in a depression at base of bursa copulatrix.

Type species: *Acalles planidorsis* Kirsch.

Relationships: *Notacalles* belongs to the *Miocalles-Microcryptorhynchus*-complex sensu Zimmerman (1957). Some of the species have actually been included by Zimmerman in *Miocalles* Pascoe. I am not sure whether the external morphological similarity of hundreds of species occurring in the Australasian and Pacific area is the expression of close phylogenetic relationship or rather of a convergent evolution. I have examined members of *Miocalles* Pascoe, as understood by Zimmerman, from Lord Howe, Norfolk and New Caledonia as well as the New Zealand species. The differences that I have encountered in the structures of genitalia seem to be so big that I prefer to group them into smaller units to show what species are in fact closely related instead of bringing together a great number of elements that are only superficially allied. Such a treatment, even if it has to be based mainly on internal structures, would probably serve its usefulness for more accurate biogeographical thoughts. Thus, the dozen or so species of *Notacalles*, all restricted to the Neozelandic fauna, area easily separable by almost entirely exposed eyes, by the presence

of granules at the scutellar area of the elytra, by the presence in the ♂ of a complex basal sclerite in the internal sac and by clearly articulate apophyses, and in the ♀ by the absence of very long transverse apophyses at the end of the manubrium of sternite 8 and by lacking a long spermathecal gland. The described species known to me and to be transferred to *Notacalles* are: *Acalles kronei* Kirsch, *A. multisetosus* Broun, *A. planidorsis* Kirsch, *A. vafer* Broun, *Miocalles piciventris* (Broun) and *M. setifer* (Broun).

Ecology: These small weevils are of nocturnal habits and occur in daytime under logs, stones, under plants, in litter, among mosses and lichens, under loose bark and on dead branches of shrubs and trees. The larvae live in dead twigs and in petioles and main veins of larger leaves. Adults are found on many different Dicotyledons without specific host. They are probably polyphagous. They are often found also on ferns, but it seems doubtful that the larvae would feed in dead fronds.

Geographical distribution. The genus is restricted to the main islands of New Zealand and Subantarctic Islands. None of the 6 subantarctic species is endemic, though *kronei* (Kirsch) and *multisetosus* (Broun) could easily represent good subspecies.

Key to species of Notacalles

1 (8). Base of suture with a single pair of granules. Sides of metasternum with a narrow white line. Pronotum on each side of base without a stripe of dense pale scales. Hind wall of pectoral canal not or very slightly overhanging. ♂♂: Aedeagus bare or with fine hairs, without a strong short seta on middle near tip. ♀♀: Tergite 8 with denticulate distal margin.

2 (5). Sides of metasternum in front of hind coxae without tubercle. Scaling on suture and/or base of interstria 3 & 4 denser than elsewhere. ♂♂: Plates of sternite 8 with a single seta; tip of aedeagus narrow; basal sclerite of internal sac with 2 longitudinal bars. ♀♀: bursa copulatrix much shorter than vagina ..... **planidorsis**-group

3 (4). Scaling on suture not denser than elsewhere. Scutellum usually visible. Derm of elytra bicolored, usually reddish brown with a transverse dark middle area on each elytron, if elytra darkened as a whole then at least suture and base paler. Sexual dimorphism in shape and setae of elytra strong, elytra of ♂ flatter and wider and setae on sides of humeral area much more conspicuous. ♂ and ♀ genitalia as in figs. 36–40, 44–46. 1.55–2.70 mm. Auckland Is., Campbell I., Snares Is., Stewart I. ..... **planidorsis**

4 (3). Scaling on suture very dense. Scutellum usually invisible. Derm of elytra uniformly piceous. No sexual dimorphism apparent in shape or setae of elytra. ♂ and ♀ genitalia as in figs. 41–43, 47–49. 1.35–2.15 mm. Aucklands Is., Campbell I., Stewart I., southern South Island..... **piciventris**

5 (2). Sides of metasternum in front of hind coxae with tubercle (fig. 64). Scaling on suture and base of interstria 3 & 4 not denser than elsewhere. ♂♂: Plates of sternite 8 with 2 setae; tip of aedeagus broad; basal sclerite of internal sac with a transverse plate. ♀♀: bursa copulatrix longer than vagina... **kronei**-group

6 (7). Piceous. Setae on elytra erect. Tarsal segment 3 of front tarsi much narrower than distal width of rostrum. ♂: Aedeagus bare, lateral margins narrow (fig. 51–53). ♀: Tergite 8 trapezoidal with subtruncate distal margin (fig. 58).

1.25–2.05 mm. Auckland Is., Campbell I., South Island..... **kronei**

7 (6). Rufo-castaneous. Setae on elytra decumbent or nearly so. Segment 3 of front tarsi as wide as rostrum at apex. ♂: Aedeagus with fine hairs near tip, lateral margins broad, figs. 56–57. ♀: Tergite 8 triangular, with rounded tip (fig. 61). 1.50–2.10 mm. Auckland Is., Stewart I., South Island..... **latitarsis**

8 (1). Base of suture with 2 pairs of granules. Sides of metasternum with a broad white line. Pronotum with a stripe of dense pale scales on base opposite interstriae 3 & 4. Hind wall of pectoral canal strongly overhanging. ♂♂: Aedeagus with a strong short seta on middle near tip. ♀♀: Tergite 8 with entire distal margin ..... **multisetosus**-group

9 (10). Stripes of pale scales on base of pronotum short, about 1/5 the length of prothorax. All interstriae similarly setose. ♂: Plates of sternite 8 with 1 or 2 setae, lateral margins of aedeagus wider (figs. 67, 68). ♀: spermathecal duct thin, longer than bursa copulatrix (fig. 78). 1.65–2.25 mm. Auckland Is., Campbell I., Stewart I. ..... **suillus**

10 (9). Stripes of pale scales on base of pronotum longer, at least 1/3 of length of prothorax. Even interstriae usually with fewer setae than the uneven ones. ♂: Plates of sternite 8 with 4 or 5 setae; lateral margins of aedeagus narrower, figs. 71, 72. ♀: spermathecal duct thick, shorter than bursa copulatrix (fig. 81). 1.40–2.10 mm. Auckland Is., Campbell I., North and South Island..... **multisetosus**

planidorsis-group

Notacalles planidorsis (Kirsch), n. comb. Figs. 36–40, 44–46.

Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 172 (*Acalles*).—Krone, *l. c.*, 156 (*Acalles*).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Zealand **78**: 199 (*Acalles planidorsus*, sic!).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 65 (*Acalles*).

All interstriae with short yellow uniformly spread subsquamiform setae with oval tip. Scaling on base of interstria 3 & 4 always denser, a similar patch usually present just opposite on base of prothorax. Other characters mentioned in the key or shown in the figs. 36–40, 44–46. Length 1.55–2.70 mm; width 0.68–1.27 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 89 in forest litter, Gourlay, on *Hebe elliptica*, *Dracophyllum longifolium*, and *Polystichum vestitum*, Gressitt, Johns; Crozier Point, 52 on *Hebe*, *Neopanax simplex*, *Coprosma* and *Poa*, Gressitt, Wise; ex Coelopidae pupa in dried *Durvillea* roots, Gressitt; Tucker Point, 10 on *Hebe*, Gressitt, Wise; high plateau between Krone's Creek and Port Ross, 1 sweeping tussock grass, Krone; west coast opposite Mt. Stoney, 2 on *Cassinia vauvilliersii* and *Hebe*, Gressitt. FRENCH I.: 26 on *Hebe* and *Carex*, Gressitt; without host plants, Gourlay. ROSE I.: 14 on *Hebe elliptica*, Dumbleton. EWING I.: 212 on *Hebe elliptica*, *Olearia lyallii*, *Stilbocarpa polaris* and *Coprosma*, Gressitt, Johns, Wise. ENDERBY I.: 2 on *Cassinia vauvilliersii*, Gressitt, and under log, Wise. Total, 408 specimens collected in Nov., Dec. and Jan.

CAMPBELL I.: Shoal Point, 19 on *Hebe elliptica*, Rennell. Lookout Bay, 21 on *Hebe elliptica*, Gressitt. Beeman Beach and Beeman-Lookout, 2 on *Hebe elliptica*, Gressitt. 42 specimens collected in Dec. and Feb.

SNARES IS.: 86 on *Hebe elliptica*, *Olearia lyallii*, and *Senecio stewartiae* Knox, in Jan. and Feb.

STEWART I. Hidden I. (SW Stewart I.), 1, Dell, Holloway. Owen I. (SE Stewart I.), 5, Dell, Holloway. 6 specimens collected in Jan.

TYPE LOCALITY: high country between Krone's Creek and Port Ross, Auckland Is. Holotype ♀, 2.25×1.05 mm, mounted on card, in good condition, with 6 labels attached to pin: (1) a small gold label for type; (2) Auckland I., Dresden Mus.; (3) *planidorsis* Kirsch; (4) *Acalles planidorsis* Kirsch; (5) a red label 'Type'; (6) *Acalles planidorsis* Kirsch, holotype ♀, added by myself. In Staatliches Museum für Tierkunde, Dresden.

Ecology: No larvae have been found. Adults occur on the ground under logs, stones and even under dry kelp, but are particularly abundant in forest litter and on perennial mostly woody plants. Most specimens have been beaten off *Hebe elliptica* (Scrophulariaceae) and *Olearia lyallii* (Compositae).

Remarks: The *planidorsis*-group of species seems to be confined to the extreme south of New Zealand, hence the presence of 2 species of the group in the Subantarctic Islands is not surprising. *Acalles planidorsis* Kirsch, 1877 was pre-occupied by *Acalles planidorsis* Blanchard, 1851 from Chile. As no author to my knowledge has proposed a new name, no change is now necessary.

Notacalles piciventris (Broun), n. comb. (*Miocalles*) Figs. 41–43, 47–49.

Broun, 1909, Subantarct. Is. N. Z. **1**: 120 (*Acalles*).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Zealand **87**: 199 (*Acalles*, as synonym of *A. kronei* Kirsch).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 64 (*Acalles*, as synonym of *A. kronei* Kirsch).—Zimmerman, 1957, Coleopt. Bull. N. York **11**: 86 (*Miocalles*).

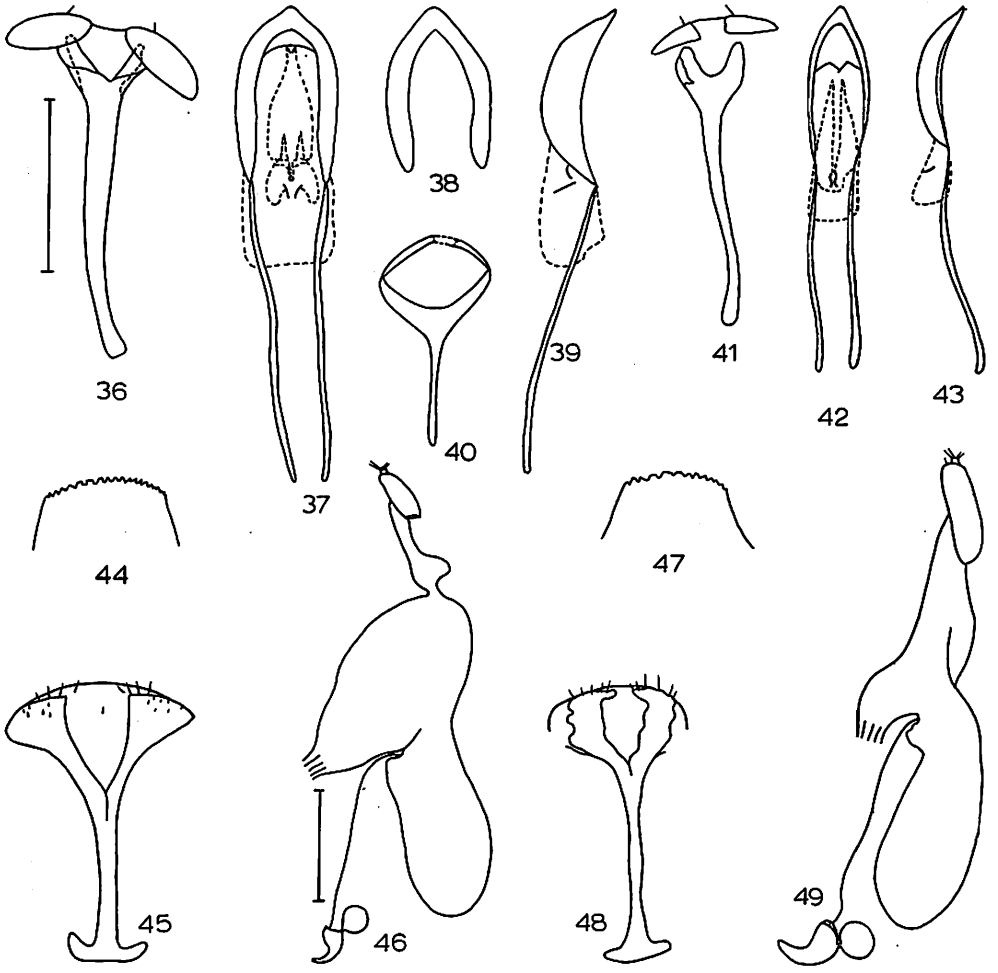
campbellicus Brookes, 1951, Cape Exp. Ser. Bull. **5**: 64, f 22 (*Acalles*). **New Synonymy.**

furvus Broun, 1915, Bull. N. Z. Inst. **1** (4): 339 (*Acalles*). **New Synonymy.**

Derm of elytra piceous throughout. All interstriae with short subsquamiform setae. Scaling always dense on suture, on base of interstria 3 & 4, and on base of prothorax opposite interstria 3 & 4. Internal structures as in figs. 41–43, 47–49. Length 1.35–2.15 mm; width 0.65–0.95 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 79 in forest litter, Gourlay, on *Polystichum vestitum*, *Myrsine divaricata*, *Dracophyllum longifolium*, *Hebe elliptica*, *Neopanax simplex*, *Metrosideros umbellata*, and *Coprosma*, Gressitt, Johns, and in Malaise trap, Gressitt. Crozier Point, 12 on *Polystichum vestitum* (Wise), *Neopanax*, *Hebe* and *Coprosma*, Gressitt; Observation Point, 4 on *Neopanax simplex* and *Myrsine divaricata*, Gressitt; Tucker Point, 4 on *Coprosma* and under stones, Gressitt; west coast opposite Mt. Stoney, 1 on *Cassinia vauvilliersii*, Gressitt; Bivouac, Mt. Eden, 200–400 m, on *Chionochloa*, Gressitt. ROSE I.: 5 on Carex, Gressitt; *Dracophyllum longifolium* and *Metrosideros umbellata*, Johns. ENDERBY I.: 2 on *Cassinia vauvilliersii*, Gressitt. 108 specimens collected in Nov., Dec., & Jan.

CAMPBELL I.: Beeman Camp, 13 on *Dracophyllum scoparium*, *Coprosma*, and *Carex*, Gressitt, Rennell; Beeman Hill, 5 on *Dracophyllum*, Sorensen and *Coprosma*, Gressitt, and swept, Wise; Lookout Bay, 6 on *Coprosma*, Gressitt and sweeping, Rennell; Tucker Cove, 3 on *Dracophyllum*, Gressitt, Wise; without specified locality, 1 (holotype of *A. campbellicus* Brookes). Total, 28 specimens collected in Aug., Nov., Dec. & Feb.



Figs. 36–49. *Notacalles* spp. *N. planidorsis* (Kirsch), Ranui Cove, Auckland Is.: 36, sternites 8 & 9 of ♂ ventral; 37, aedeagus, dorsal; 38, apex of aedeagus, dorsal; 39, aedeagus, lateral; 40, tegmen, dorsal; 44, tergite 8 of ♀; 45, sternite 8 ventral; 46, ♀ genitalia, lateral. *N. piciventris* (Broun), Ranui Cove, Auckland Is.: 41, sternites 8 & 9 of ♂, ventral; 42, aedeagus, dorsal; 43, aedeagus, lateral; 47, tergite 8 of ♀; 48, sternite 8, ventral; 49, ♀ genitalia. (Scales beside figs. equal 0.25 mm. Figs. 36–45, 47–49 same scale).

STEWART I.: Mt. Anglem, 900 m, 4 on *Dracophyllum longifolium*, Kuschel in Jan.

SOUTH ISLAND: Longwood Range, Southland, 3. I. 1913, Philpott.

TYPE LOCALITIES: (1) *piciventris* Broun, Auckland Is.; (2) *campbellicus* Brookes, Campbell I.; (3) *furvus* Broun, Longwood Range, South Island. Types. (1) *Acalles piciventris* Broun in British Museum, London. (2) *Acalles campbellicus* Brookes, holotype ♂, 1.60× 0.75 mm, Campbell I., 1942, Sorensen, in Dominion Mus., Wellington. (3) *Acalles furvus* Broun, lectotype ♀, 1.95×0.87 mm, Longwood Range, I.1913, Philpott, in Entomology Div., D.S.I.R., Nelson.

Ecology: No larvae have been obtained. Adults occur, as in the previous species, on a great variety of plants, in forest litter, and under stones at low levels; some have been found as high as 180 m above sea level on Campbell I. Most specimens have been beaten off *Dracophyllum* (Epacridaceae), *Polystichum vestitum* (Dryopteridaceae), *Myrsine divaricata* (Myrsinaceae), and *Coprosma* (Rubiaceae).

Remarks: The type specimen of *Acalles piciventris* Broun has been checked by Mr. R. T. Thompson of the British Museum with specimens sent for comparison and with the characters contained in the key. I am particularly thankful to Mr. Thompson for his assistance that was all the more desirable as Broun's description was entirely inadequate. The previous published synonymy of *piciventris* Broun by Gourlay (1950) and Brookes (1951) as a junior synonym of *kronei* Kirsch had no possible justification because neither author knew either *kronei* or *piciventris.*

kronei-group

Notacalles kronei (Kirsch), n. comb. Figs. 50–54, 58–60.

Kirsch, Dtsch. Ent. Zschr. Berlin 1877, **21**: 172 (*Acalles Kronii*).—Krone, *l. c.*, 1877, **21**: 156 (*Acalles*).—Hustache, 1936, IN Junk Coleopt. Cat. pars **151**: 122 (*Acalles Kroni*).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 199 (*Acalles*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 64 (*Acalles kroneii*).

Derm piceous or black, lacking areas of dense scales on elytra, with a small patch of loose white scales at base of pronotum opposite interstria 2 & 3, these patches only narrowly separated in middle. All interstriae with erect subsquamiform setae. Metasternal tubercle small but distinct. Genitalia as in figs. 50–54, 58–60.

Length 1.25–2.05 mm; width 0.65–0.90 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 62 in forest litter, Gourlay, on *Myrsine divaricata, Metrosideros umbellata, Neopanax simplex, Dracophyllum longifolium, Polystichum vestitum*, Johns, and *Coprosma* Gressitt, and in Malaise trap, Gressitt; Ranui Track, 24 on *Cassinia vauvilliersii* and *Dracophyllum longifolium*, Johns; Crozier Point, 1 on *Myrsine divaricata*, Gressitt; Observation Point, 7 on *Cassinia vauvilliersii* and *Myrsine divaricata*, Gressitt; Tucker Point, 3 on *Myrsine divaricata*, Gressitt; Venus Valley, 1 on *Cassinia* ('aus weissbluehendem Compositen-Gestraeuch', Krone); west coast opposite Mt. Stoney, 50-300 m, 2 on *Cassinia vauvilliersii* and *Chionochloa*, Gressitt. FRENCH I.: 7 on *Hebe* and *Myrsine divaricata*, Gressitt and under kelp, Gourlay. OCEAN I.: 20 on *Cassinia vauvilliersii*, Johns. ROSE I.: 3 on *Cassinia vauvilliersii*, Gressitt, *Dracophyllum longifolium*, and *Metrosideros umbellata*, Johns. EWING I.: 3 on *Stilbocarpa polaris, Neopanax simplex*, and *Urtica*, Gressitt. ENDERBY I.: 12 on *Cassinia vauvilliersii* and *Myrsine divaricata* Gressitt, and without host plant (Dell). Total, 145 collected in Nov., Dec., Jan. & Mar.

CAMPBELL I.: Beeman Camp, 2 on *Coprosma*, Gressitt. Beeman Hill, 1 on *Coprosma*, Gressitt. Lookout Bay, 1 on *Coprosma*, Gressitt. Tucker Cove, 3 on *Coprosma* and in Malaise trap, Gressitt. Without specified locality, 1, Sorensen, (paratype ♂, of *Acalles campbellicus* Brookes!) Total, 8 collected in Nov. & Dec.

SOUTH ISLAND. (see remarks below).

TYPE LOCALITY: Venus Valley, Auckland Is. Lectotype ♀, 1.50×0.73 mm, labels attach-

ed to specimen: (1) small gold plate for type; (2) Auckland, Kirsch; (3) *Kronii* Kirsch; (4) *Acalles Kronii* Kirsch; (5) red 'Type' label. As Krone and Kirsch have mentioned more than one specimen I have selected the specimen forwarded by Dr. R. Hertel as lectotype. No date is attached to the type which was collected either towards the end of Dec. 1874 or in the beginning of Jan. 1875. Lectotype in Staatliches Museum für Tierkunde, Dresden.

Ecology: Same as in the 2 previous species. Most specimens obtained on *Cassinia vauvilliersii* (Compositae) and *Myrsine divaricata* (Myrsinaceae).

Remarks: The *kronei*-group has several species in the main islands of New Zealand. I have not studied them in detail yet, but I can, however, say that *Notacalles kronei* is also present at least in the South Island and that *Acalles rafer* Broun and *Miocalles setifer* (Broun) are 2 close relatives of *kronei*. The species described from Auckland Is. had been discovered by the photographer H. Krone and was named after him. Thus the original spelling of the species had to be conformed to the international rules of nomenclature changing it from *Kronii* to *kronei*.

Notacalles latitarsis Kuschel, n. sp. Figs. 55–57, 61–66.

Derm castaneo-rufous, seldom darker, underside often partly or as a whole darker, piceous. All setae of prothorax directed towards front margin, they form weak longitudinal lines of narrower and wider subsquamiform setae; a very narrow transverse band of loose scales on base of prothorax being a little wider in middle. Elytra with decumbent subsquamiform setae on all interstriae, on the uneven interstriae usually more abundant. Outer proximal angle of tibiae with longer and denser setae.

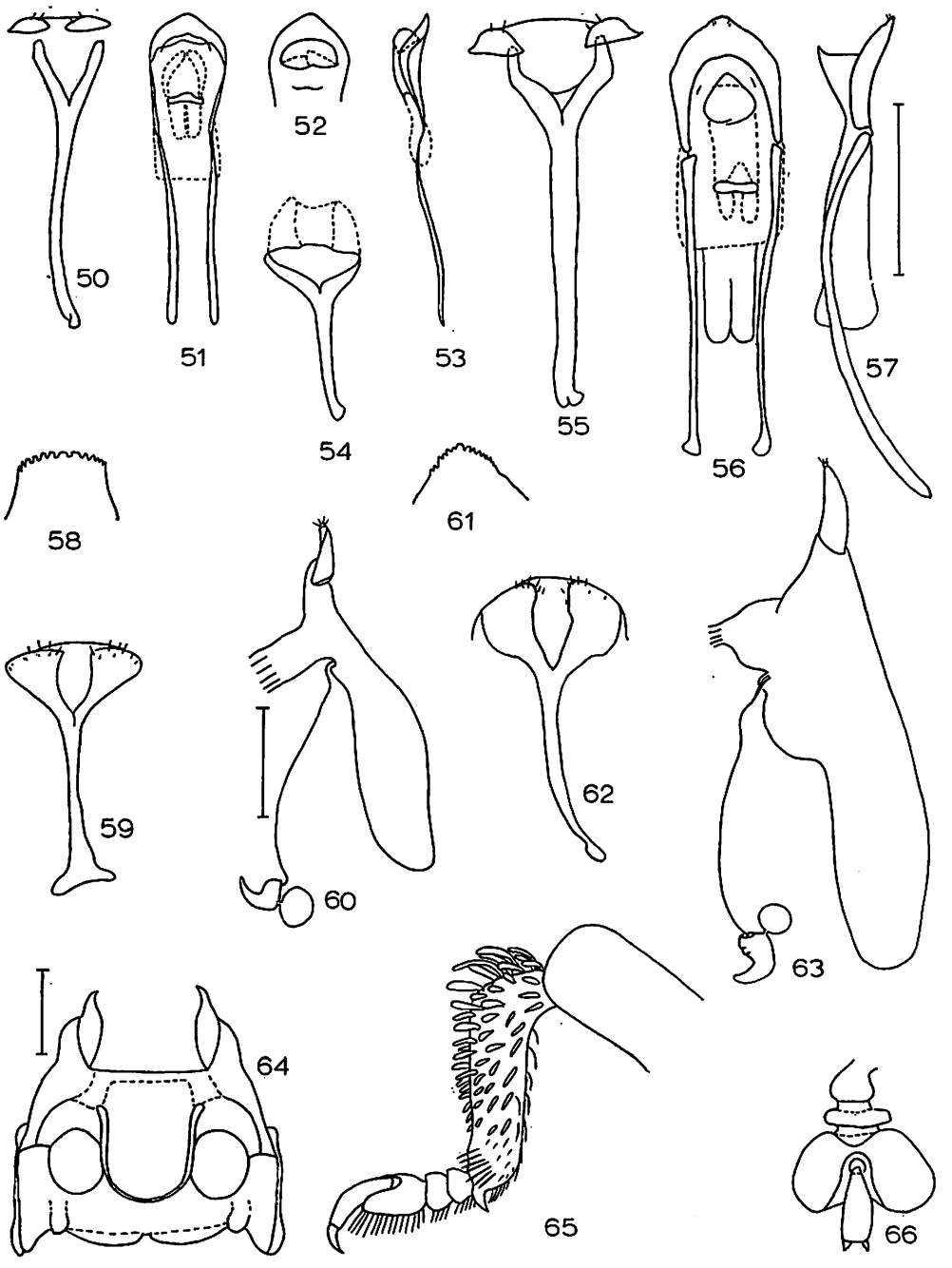
Head nearly dull, somewhat alutaceous, scaling almost covering derm, scales broadly lanceolate. Rostrum slightly curved. Prothorax 1.03–1.08× longer than wide, densely punctate. Scutellum visible, small, deeper than base of elytra, with 2 or 3 white scales. Elytra oblong-ovate, 1.37–1.45× wider than prothorax and 1.34–1.43× longer than their maximal width, sulcate, punctures in the striae fine; interstriae convex, without scales or hairs besides the setae; base of suture with a conical granule on each side of scutellum. Pectoral canal deep throughout, reaching hind margin of mid coxae, hind wall of mesosternal receptacle vertical. Metasternum with a strong tubercle in front of hind coxae (fig. 64). Tibiae short, angulate on dorsal edge near base. Tarsi strongly widened (figs. 65, 66).

♂. Tergite 8 almost entirely covered by 7. Sternite 8 as in fig. 55, with 2 setae. Sternite 9 as in fig. 55, strong. Tegmen without parameres. Body of aedeagus short, with broad lateral margin, apical portion sinuous, with 2 short hairs on each side near tip; apophyses wide at base, about 3× longer than main body. Internal sac with a strong transverse sclerotized plate (figs. 56, 57).

♀. Tergite 8 triangular with narrowly rounded denticulate tip (fig. 61). Sternite 8 as in fig. 62. Bursa copulatrix longer than vagina. Spermatheca as in fig. 63, spermathecal duct slightly shorter than bursa copulatrix.

Length 1.50–2.10 mm; width 0.75–1.00 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 12 in *Metrosideros umbellata* forest litter, Gourlay, Gressitt, Johns, and on *Polystichum vestitum*, Johns; Observation Hill, 1 in tus-



Figs. 50-66. *Notacalles* spp. *N. kronei* (Kirsch), Ranui Cove, Auckland Is.: 50, sternites 8 & 9 of ♂, ventral; 51, aedeagus, dorsal; 52, apex of aedeagus; 53, aedeagus, lateral; 54, tegmen, dorsal; 58, tergite 8 of ♀; 59, sternite 8, ventral; 60, ♀ genitalia, lateral. *N. latitarsis* n. sp., Ranui Cove, Auckland Is.: 55, sternites 8 & 9 of ♂, ventral; 56, aedeagus, dorsal; 57, aedeagus, lateral; 61, tergite 8 of ♀; 62, sternite 8, ventral; 63, ♀ genitalia, lateral; 64, meso- and metasternum, ventral; 65, right hind leg; 66, right front tarsus. (Scales beside figs. equal 0.25 mm. Figs. 50–59, 61, 62, 65, 66 same scale; figs. 60, 63 same scale).

sock, Dumbleton; Observation Point, 1 on *Poa*, Gressitt; Tucker Point, 1 on *Myrsine divaricata*, Gressitt. Total, 15 collected in Nov., Dec., & Jan.

STEWART I.: Crooked Reach, Port Pegasus, 1 in moss, Dell, Holloway. Halfmoon Bay, 1, Brookes, Jan. & Feb.

SOUTH ISLAND.: Kaherekoau Mt., South of Lake Monowai, 760 m, 1 in litter, Townsend in Jan.

TYPE LOCALITY: Ranui Cove, Auckland Is.

Holotype ♂, 1.90 × 0.87 mm, Ranui Cove, 18 m above sea level, in *Metrosideros umbellata* forest floor litter taken at the Lookout, 10. XI. 1954, Gourlay, in Entomology Div., D. S.I.R., Nelson. Allotype ♀ and some paratypes in the same Entomology Div., other paratypes in Dominion Mus., Wellington, in Canterbury Mus., Christchurch, and in Bishop Mus., Honolulu.

Ecology: Most specimens have been found on the ground, particularly in forest litter.

Remarks. Readily separable from all *Notacalles* species by the peculiar tibiae and broad tarsi. The structures of both ♂ and ♀ genitalia place it in the *kronei*-group.

multisetosus-group

Notacalles suillus Kuschel, n. sp. Figs. 67–70, 76–78, 275a.

Derm piceous, tibiae and tarsi castaneous, funicle and club testaceous or rufo-castaneous, club never darker than funicle. All setae subsquamiform and erect, except on abdomen. All interstriae with a row of setae. Base of pronotum opposite interstria 3 with a short stripe of usually erect and very pale scales; this stripe less than 1/4 of total length of prothorax. Sides of metasternum with a broad stripe of dense pale scales, the stripe widening at both ends.

Head with narrow and wide setae. Eyes strongly convex. Rostrum short, thick, curved in ♂, nearly straight in ♀. Prothorax 1.10–1.11× longer than wide, densely punctate. Scutellum visible or invisible, without scales. Elytra oblong-oval, 1.48–1.50× wider than prothorax, 1.35–1.37× longer than their maximal width. Striae usually sulcate, intervals between punctures often as high as the slightly convex interstriae. Base of suture with 2 conical granules on each elytron, one placed at or near the base itself without projecting forwards, the other at an interval usually smaller than diameter of a granule.

♂. Plates of sternite 8 with 1 or 2 setae. Sternite 9 as in fig. 67. Tegmen without distinct parameres. Aedeagus as in fig. 68–70, lateral margins wide.

♀. Tergite 8 truncate, with entire distal margin, fig. 77. Sternite 8 as in fig. 76. Genitalia as in fig. 78, spermathecal duct thin, longer than bursa copulatrix.

Length 1.65–2.25 mm; width 0.85–1.10 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 23 in forest litter, Gourlay, on *Neopanax simplex*, Dumbleton, Gressitt, Johns, *Metrosideros umbellata*, *Myrsine divaricata*, *Dracophyllum longifolium*, *Hebe elliptica*, *Polystichum vestitum*, Johns, and *Coprosma*, and in dried kelp Gressitt; Crozier Point, 8 on *Polystichum vestitum*, *Neopanax simplex* and *Coprosma*, Gressitt; Tucker Point, 3 on *Neopanax*, *Hebe*, and *Coprosma*, Gressitt; Webling Bay, 2 in litter and sweeping, Wise; Hooker Hills, 90-300 m, 1 sweeping, Wise; Grey Duck Creek,

Laurie Harbour, 1, Wise. OCEAN I.: 3 on *Histiopteris incisa*, Johns, *Metrosideros umbellata*, Gressitt, and *Olearia lyallii*, Wise. ROSE I.: 12 on dead *Metrosideros umbellata*, Johns. EWING I.: 6 on *Olearia lyallii*, Johns and under log, Wise. Total, 59 collected in Nov., Dec. & Jan.

CAMPBELL I.: Beeman Camp, 1 on *Coprosma*, Gressitt. Beeman Hill, 2 on *Dracophyllum*, Sorensen. Total of 3 collected in Aug. & Dec.

STEWART I.: Crooked Reach, Port Pegasus, 9 in litter, Dell, Holloway, in Jan.

TYPE LOCALITY: Ranui Cove, Auckland Is.

Holotype ♂, 2.20×1.07 mm, Ranui Cove, 7–12. XI. 1954, Gourlay, allotype ♀ and paratypes in Entomology Div., D.S.I.R., Nelson; other paratypes in Dominion Mus., Wellington, Canterbury Mus., Christchurch, and in Bishop Mus. Honolulu.

Ecology: Same conditions as in the first 3 species of the genus. Most adults have been found on dead branches of *Metrosideros umbellata* (Myrtaceae) and *Neopanax simplex* (Araliaceae).

Remarks: There are several species belonging to the *multisetosus*-group in the New Zealand fauna. They are very similar in external morphological characters whilst the genitalia provide good features for their separation. The present species appears to be undescribed as its occurrence seems to be limited to Stewart I. and Subantarctic Islands. *Acalles albistrigalis* Broun, from Broken River, and *A. praesetosus* Broun, from Invercargill, being probably very close to if not identical with *multisetosus* Broun, are still unknown to me.

Notacalles multisetosus (Broun), n. comb. Figs. 71–75, 79–81.

Broun, 1907, Ann. Mag. Nat. Hist. ser. 7, **19**: 61 (*Acalles*).

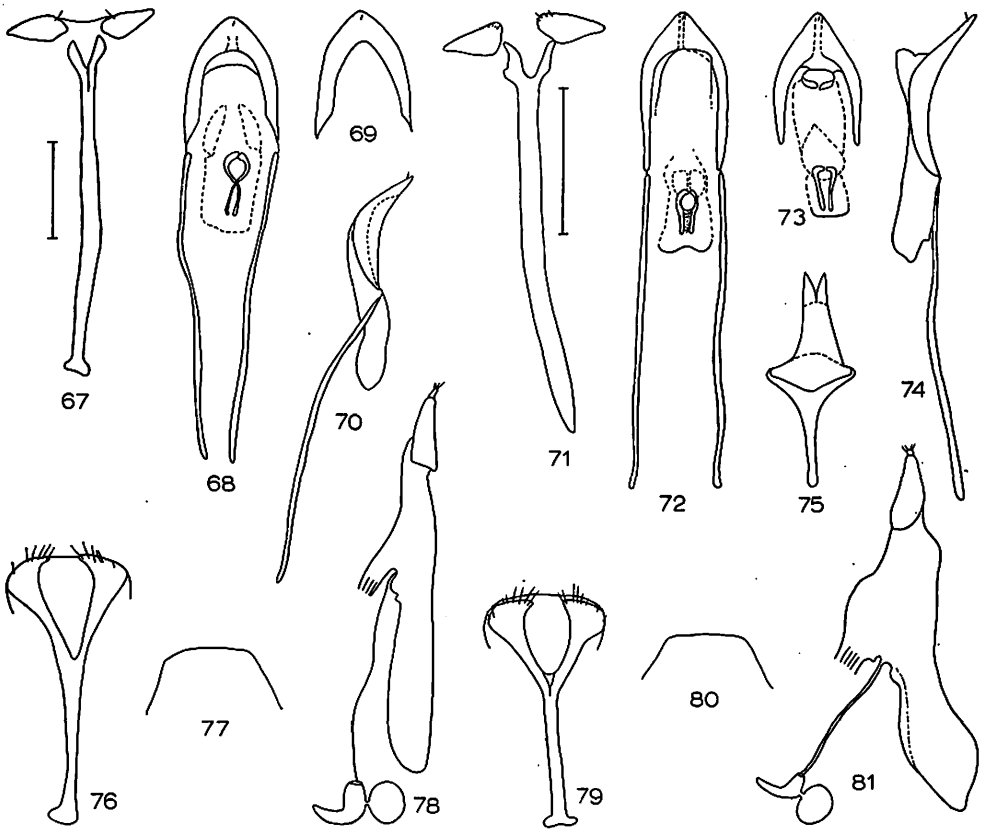
Very similar to *suillus*, the pale pronotal stripes longer, at least 1/3 of length of prothorax, even interstriae with fewer setae than the uneven ones. ♂. Plates of sternite 8 with 4 or 5 setae. Tegmen with distinct parameres. Aedeagus with narrow lateral margins. Fig. 71–75. ♀. Spermathecal duct thick, shorter than bursa copulatrix. Fig. 79–81.

Length 1.40–2.10 mm; width 0.72–1.10 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 43 in forest litter, Gourlay, on *Metrosideros umbellata*, *Myrsine divaricata*, *Neopanax simplex*, *Dracophyllum longifolium*, and *Polystichum vestitum* Johns, and sweeping and in Malaise trap, Gressitt; Ranui Track, 2 on *Dracophyllum longifolium*, Johns; Crozier Point, 3 on *Myrsine divaricata* and in dried kelp Gressitt; Observation Point, 1 on *Myrsine divaricata*, Gressitt; Tucker Point, 2 under stones, Gressitt; Musgrave Penin., Carnley Harbor, 1 in litter, Sorensen. FRENCH I.: 2 on *Myrsine divaricata*, Gressitt. OCEAN I.: 2 on *Histiopteris incisa*, Johns. ROSE I.: 26 on *Metrosideros umbellata* and *Dracophyllum longifolium*, Johns, and *Cassinia vauvilliersii*, Gressitt. ENDERBY I.: 3 on *Myrsine divaricata*, Gressitt, and on the ground, Dell. Total, 85 collected in Nov., Dec., Jan., Mar. & May.

CAMPBELL I. Beeman Camp, 2 on *Carex*, Gressitt and in hut, Wise. Beeman Hill, 2 on *Dracophyllum*, Sorensen, and *Coprosma*, Gressitt. Tucker Cove, 3 on *Coprosma* and *Poa*, Gressitt. Total, 7 collected in Aug., Nov., Dec. & Feb.

TYPE LOCALITY: Invercargill, South Island. Lectotype ♀, 1.90×1.00 mm, Invercargill, in Entomology Div., D.S.I.R., Nelson. North and South Island.



Figs. 67–81. *Notacalles* spp. *N. suillus* n. sp., Ranui Cove, Auckland Is.: 67, sternites 8 & 9 of ♂, ventral; 68, aedeagus, dorsal; 69, apex of aedeagus; 70, aedeagus, lateral; 76, sternite 8 of ♀, ventral; 77, tergite 8; 78, ♀ genitalia, lateral. *N. multisetosus* (Broun), Rose I., Auckland Is.: 71, sternites 8 & 9 of ♂, ventral; 72, aedeagus, dorsal; 73, apex of aedeagus; 74, aedeagus, lateral; 75, tegmen, dorsal; 79, sternite 8 of ♀, ventral; 80, tergite 8; 81, ♀ genitalia, lateral. (Scales beside figs. equal 0.25 mm. Figs. 67, 78, 81 same scale; figs. 68–77, 79, 80 same scale)

Ecology: As in previous species. According to the collected material the most favored plants are *Metrosideros umbellata* (Myrtaceae), *Myrsine divaricata* (Myrsinaceae), *Neopanax simplex* (Araliaceae), and *Dracophyllum* (Epacridaceae).

Remarks: There are obvious variations in this species that need further study. The specimens from the Subantarctic Islands have much shorter setae (the longest setae on elytra about 0.15 mm) than those of the North and South Island (the longest setae on elytra about 0.27 mm). The scales forming the pronotal stripes are erect in the lectotype and in the subantarctic specimens, whilst appressed in North Island individuals. There seems to be no significant difference in genitalia in the populations, therefore I have placed them in *multisetosus* until a detailed study of the whole complex can be undertaken.

Sulfamily EUGNOMINAE

5. Genus **Pactolotypus** Broun, 1909

Pactolotypus Broun, 1909, Subantarct. Is. N. Z. **1**: 119 (type species: *P. striatus* Broun). —Voss, 1937, Arb. Morph. Taxon. Ent. Berlin **4**: 40.—Marshall, 1938, Trans. Proc. Roy. Soc. N. Z. **67**: 328.

Parapactola Voss, 1936, Arb. Morph. Taxon. Ent. Berlin **3**: 121 (type species: *Pactola demissa* Pascoe sec. Voss, non Pascoe,=*P. humeralis* Broun); 1937, *ibid.* **4**: 40 (as syn. of *Pactolotypus*).—Marshall, 1938, Trans. Proc. Roy. Soc. N. Z. **67**: 336 (as syn. of *Stenopactola*).

Stenopactola Broun, 1914, Bull. N.Z. Inst. **1** (3): 236 (type species: *St. prolixa* Broun).—Marshall, 1938, Trans. Proc. Roy. Soc. N. Z. **67**: 328, 336. **New synonymy.**

Head elongate, not constricted near base. Eyes convex, with convex ommatidia, with fine hairs or squamiform setae between ommatidia. Rostrum about as long as head, straight; distal margin of epistome with a transverse row of hairs. Maxillary palpi short. Scape variable in length, usually passing well beyond hind margin of eyes, exceptionally reaching only front margin of eyes. Funicle 7- or 6-segmented. Elytra without humeral callus. Wings entirely absent. Hind femora armed or inermous; hind tibiae curved, all tibiae without mucro. Claws appendiculate.

♂. Tergite 8 unmodified. Sternite 8 with 2 hairy plates separated by a median membrane. Tergite 9 with 2 plates and an articulate manubrium. Tegmen with complete ring and with long and free or partly fused parameres. Aedeagus depressed, dorsal surface weakly sclerotized; apophyses long, joined directly to latero-ventral angle of main body, thin from base to insertion of tegminal membrane. Internal sac without basal sclerite, with very fine armature, ejaculatory duct inserted on ventral surface far beyond base.

♀. Tergite 8 normal, submembranous. Sternite 8 with broad arms and very long manubrium. Hemisternites hidden in a long pouch, delicate, weakly sclerotized, partly subdivided in a proximal and a distal portion; stylus apical, long, cylindrical or slightly tapering. Vagina much longer than bursa copulatrix, no bursal sclerites. Spermatheca blunt at both ends, spermathecal duct short, inserted ventrally at a certain distance from oviduct, spermathecal gland very large, ranunculiform (tadpole-shaped).

Relationships: *Pactolotypus* is the only genus of Eugnominae without a trace of wings. Its closest relative is *Pactola*[3] Pascoe which includes about 12 fully winged species from New Zealand and New Caledonia.

Ecology: No larvae of *Pactolotypus* have been collected. If the habits are similar to those of *Pactola* observed by myself in New Caledonia, the larvae should develop in quite succulent dying shoots such as those provided by Araliaceae and some Scrophulariaceae (Hebe). The adults of all Eugnominae are diurnal and feed on all sorts of pollen. The gut contents of *Pactola* and particularly of *Pactolotypus* show that these 2 genera can also feed on leaves. 12 out of 14 dissected specimens from the Subantarctic Islands had only leaf

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3. *Pactola* Pascoe, 1876=*Macropoda* Montrouzier, 1861 (non Solier, 1835). **New Synonymy.** *Macropoda* Montrouzier is a junior homonym of *Macropoda* Solier. *Macropoda* Montrouzier was established for a group of species from New Caledonia which are congeneric with the New Zealand species of *Pactola* Pascoe.

tissues in their gut-contents while the other two had pollen and leaf tissues as well. The adults are not host specific.

Geographical distribution: The 7 species of *Pactolotypus* so far known to me are restricted to the Neozelandic fauna. Two species occur in the Subantarctic Islands of New Zealand, one is so far endemic, the other is also in the South Island. One species is endemic to Chatham Is., one is restricted to northern North Island, all others are known from the South Island.

KEY TO SPECIES OF PACTOLOTYPUS

Funicle 7-segmented. 1.85–2.80 mm. Auckland Is., Campbell I..... **subantarcticus**
Funicle 6-segmented. 1.90–3.00 mm. Auckland Is., South Island ..... **depressirostris**

Pactolotypus subantarcticus Kuschel, n. sp. Figs. 89–93, 98–101, 275b.

Very variable in color as are all the other species belonging in the same *depressirostris*-group. The diagnostic characters are: Eyes between ommatidia with very fine and very short hairs (fig. 83). Front between eyes about as wide as rostrum at apex. Scape reaching well beyond hind margin of eyes. Funicle 7-segmented (fig. 85). Prothorax longitudinally flat. Elytra more than 1.6× longer than wide. Hind legs as in fig. 87.

♂. Distal margin of ventrite 5 rounded, not emarginate. Sternite 8 as in fig. 92. Sternite 9 as in figs. 92, 93, distal end of manubrium very slightly upcurved. Tegmen as in fig. 89, ring with deep notch due to proximally protruding knobs as shown in figure, this notch, however, wider and the knobs less protruding in Campbell I. specimens; parameres entirely free or partly fused. Aedeagus as in figs. 89–91, pointed, in lateral view rather strongly curved at apex. Internal sac with very fine armature near ostium and arranged as shown in fig. 89.

♀. Tergite 8 very weakly sclerorized except for a very narrow margin (fig. 99). Sternite 8 as in fig. 98 with a broad oval membranous area between the sclerotized arms. Genitalia as in fig. 100, spermathecal gland large, inserted near middle of dorsum of spermatheca.

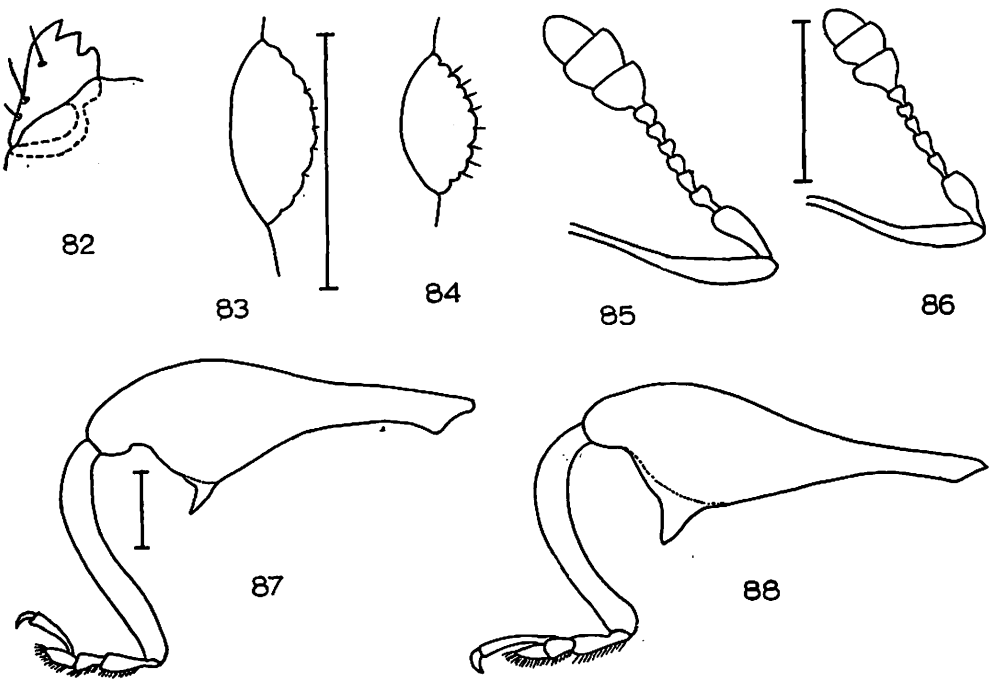
Length 1.85–2.80 mm; width 0.85–1.27 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 10 on *Coprosma*, Gressitt, without host plant, Gourlay, Gressitt; Crozier Point, 13 on *Coprosma*, Gressitt and under dry kelp, Gressitt, Wise; Tucker Point, 2 on *Coprosma*, Gressitt; Bivouac Hill, 420 m, 3 on *Chionochloa* and moss, Gressitt, Musgrave Penin., Carnley Harbor, 1 Fleming; without definite locality, 1, Turbott. ROSE I.: 1 in a rabbit burrow, Gressitt. Total, 31 collected in Nov., Dec. & Jan.

CAMPBELL I.: Beeman Camp, 2–150 m, 34 on *Coprosma*, Gressitt & Rennell, *Dracophyllum*, Rennell, and *Carex*, Gressitt. Beeman Hill, 100–180 m, 6 on *Coprosma*, Gressitt. Lyall-Beeman Saddle, 70 m, 1 on *Dracophyllum*, Gressitt. Lookout Bay, Beach, 2 on *Coprosma*, Gressitt. Tucker Cove, 0–100 m, 12 on *Coprosma*, Rennell, Wise and *Dracophyllum*, Rennell. Total, 55 collected in Feb., May, July, Aug., Nov. & Dec.

TYPE LOCALITY: Ranui Cove, Auckland Is.

Holotype ♂, 2.5×0.87 mm, Ranui Cove, 7–12. XI. 1954, Gourlay, allotype ♀ and paratypes in Entomology Div., D. S. I. R., Nelson, other paratypes in Dominion Mus., Welling-



Figs. 82-88. *Pactolotypus* spp. *P. subantarcticus* n. sp., Musgrave Peninsula, Auckland Is.: 83, right eye; 85, antenna; 87, left hind leg. *P. depressirostris* (Kirsch), French I., Auckland Is.: 82, left mandible, dorsal; 84, right eye; 86, antenna; 88, left hind leg. (Scales beside figs. equal 0.25 mm. Figs. 82-84 same scale; figs. 85, 86 same scale; figs. 87, 88 same scale).

ton, Canterbury Mus., Christchurch, Bishop Mus., Hononolu, and Staatliches Museum für Tierkunde, Dresden.

Ecology: The great majority of the specimens were collected on *Coprosma* (Rubiaceae). It is interesting to note that this species seems to be fairly rare in places where *depressirostris* also occurs whilst it is common on Campbell I.

Remarks: The closest relative of this species is not *depressirostris* (Kirsch) but an undescribed species occurring in North and South Islands on *Hebe* (Scrophulariaceae). As relatively little collecting has been done in the far South of New Zealand it would be premature to state that *P. subantarcticus* will stay as endemic to the Subantarctic Islands. Brookes has mentioned in his paper under *P. depressirostris* a single specimen that actually belongs to this new species.

Pactolotypus depressirostris (Kirsch) Figs. 94–97, 102–104.

Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 169 (*Cyttalia*).—Krone, 1877, *l.c.* **21**: 156 (*Cyttalia*).—Voss, 1937, Arb. Morph. Taxon. Ent. Berlin **4**: 41.—Marshall, 1938, Trans. Proc. Roy Soc. N. Z. **67**: 336.—Gourlay, 1950, *l. c.*, **78**: 198.

striatus Broun, 1909, Subantarct. Is. N. Z. **1**: 119, pl 5: 5.

As this is very similar to *subantarcticus* I am giving only the main differences. Eyes smaller and more convex, with fine long hairs between ommatidia (fig. 84). Funicle 6-

segmented (fig. 86). Hind legs as in fig. 88 with stronger tooth and more strongly curved tibiae. ♂. Distal margin of ventrite 5 broadly emarginate. Sternite 8 as in fig. 96; sternite 9 as in figs. 96, 97, distal end of manubrium strongly upcurved. Tegmen as in fig. 94, ring with a shallow notch and without knobs. Aedeagus as in figs. 94, 95, with broad tip, in lateral aspect only weakly curved. Armature of internal sac much more extensive and arranged as shown in fig. 94. ♀. Tergite 8 as in fig. 103, more generally sclerotized. Sternite 8 with broader sclerotized arms leaving only a narrow membranous triangle between the arms, fig. 102. Genitalia as in fig. 104, spermathecal gland considerably longer, inserted closer to spermathecal duct. Length 1.90–3.00 mm; width 0.75–1.30 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 48 on *Hebe elliptica*, *Neopanax simplex*, *Myrsine divaricata*, and *Polystichum vestitum*, Johns, and without host plants, Gourlay, Wise; Observation Point, 4 on *Neopanax simplex*, Gressitt; Tucker Point, 3 on *Neopanax simplex*, *Coprosma*, Gressitt, and *Hebe*, Wise; Crozier Point, 22 on *Neopanax simplex*, *Polystichum vestitum*, *Hebe*, and *Dracophyllum*, Gressitt; Venus Valley, 1 beaten off *Hebe* and *Coprosma* scrub, Krone; Grey Duck Creek, Laurie Harbor, 1, sweeping, Wise; without definite locality, 2, Hudson, Turbott. FRENCH I.: 20 on *Hebe*, *Anisotome*, and *Poa*, Gressitt, and without host, Goulay. OCEAN I.: 1 in feathers of a giant petrel, Gressitt. EWING I.: 27 on *Hebe elliptica*, Gressitt, Johns, *Neopanax* and *Polystichum*, Gressitt. Total, 123 collected in Nov., Dec. & Jan.

SOUTH ISLAND: Mt. Hutt, 2, Hall.

TYPE LOCALITY: (1) *depressirostris* Kirsch, Venus Valley, Auckland Is.; (2) *striatus* Broun, Auckland Is., no definite locality. Types. (1) *Cyttalia depressirostris* Kirsch. Lectotype ♀, 3.0×1.3 mm, left tarsi and entire left hind leg lacking; labels attached to specimen: (a) Auckland, Krone; (b) 1855; (c) *Pactolotypus* (Broun) *depressirostris* (Kirsch), D.E.T. 1877, p. 169, Det. G.A.K. Marshall; (4) Typus. As Kirsch has had more than one specimen I have selected the specimen kindly forwarded by Dr. R. Hertel as lectotype. In Staatliches Museum für Tierkunde, Dresden. (2) *Pactolotypus striatus* Broun, in Brit. Mus. Lon.

Ecology: Most of the specimens have been beaten off *Neopanax simplex* (Araliaceae) and *Hebe elliptica* (Scrophulariaceae.)

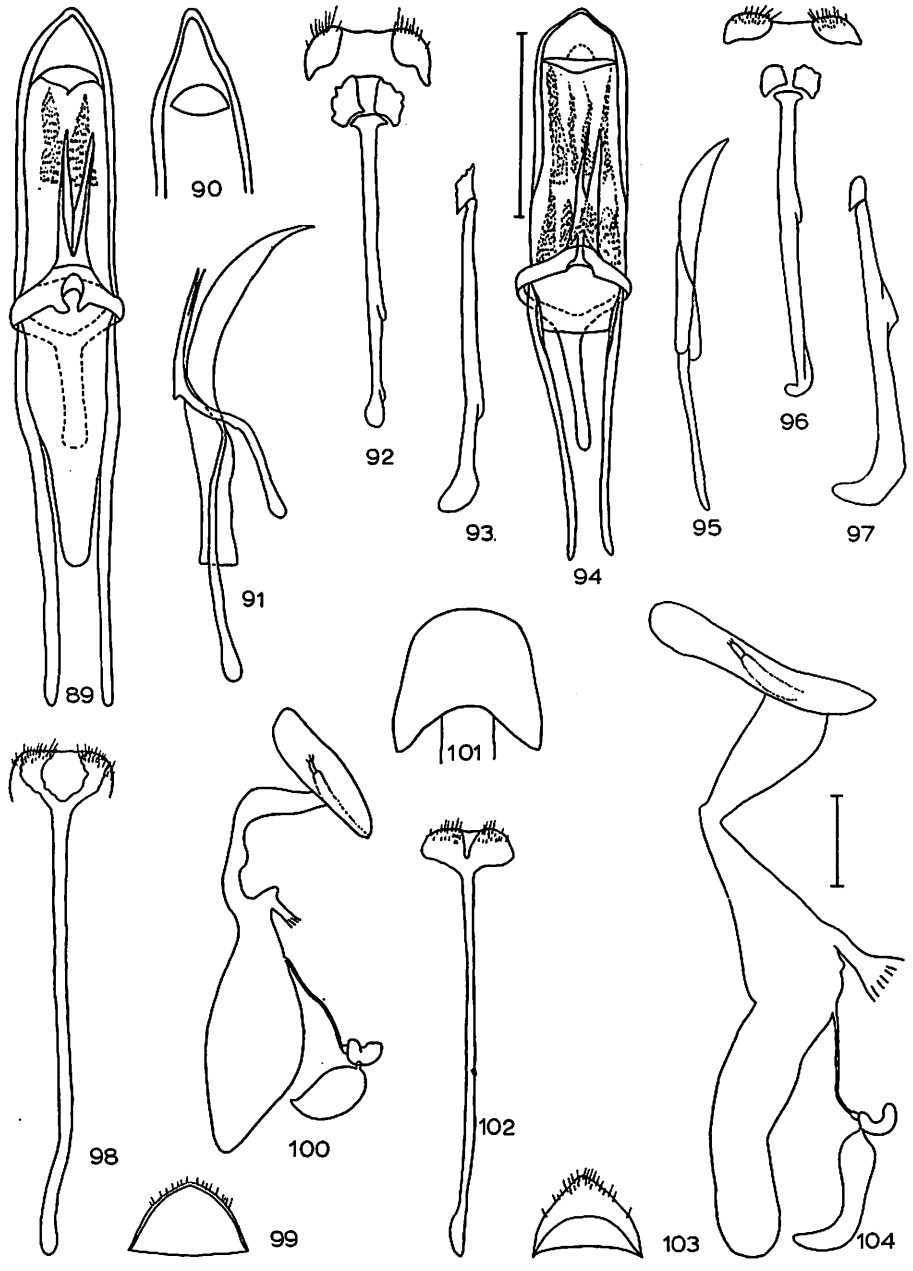
Remarks: *Pactolotypus depressirostris* (Kirsch) is so far the only species having 6 segments to the funicle. The 6-segmented funicle is a quite common feature in Eugnominae. The reduction of segments in this subfamily is due to a fusion of the 3rd & 4th segments and does not necessarily mean a generic character. In order to make sure that the 2 specimens from Mt. Hutt (Canterbury, South Island) were co-specific with those from Auckland Is. I have checked the internal features of the ♀♀ of all *Pactolotypus* species; they provide quite useful specific structures, though less striking than those found in the ♂♂.

Subfamily ERIRHININAE

6. Genus **Baeosomus** Broun, 1904

Baeosomus Broun, 1904, Ann. Mag. Nat. Hist. ser. 7, **14**: 118 (type species: *B. tacitus* Broun).

Bryocatus Broun, 1914, Bull. N. Z. Inst. **1** (3): 218 (type species: *Br. alternans* Broun). **New synonymy.**



Figs. 89-104. *Pactolotypus* spp. *P. subantarcticus* n. sp., Ranui Cove, Auckland Is.: 89, aedeagus, dorsal; 90, apex of aedeagus; 91, aedeagus, lateral; 92, sternites 8 & 9 of ♂, ventral; 93, sternite 9, lateral; 98, sternite 8 of ♀, ventral; 99, tergite 8; 100, ♀ genitalia; 101, pouch of hemisternites, ventral. *P. depressirostris* (Kirsch), ♂ from French I., ♀ from Ranui Cove, Auckland Is.: 94, aedeagus, dorsal; 95, aedeagus, lateral; 96, sternites 8 & 9 of ♂, ventral; 97, sternite 9, lateral; 102, sternite 8 of ♀, ventral; 103, tergite 8 of ♀; 104, ♀ genitalia, lateral. (Scales beside figs. equal 0.25 mm. Figs. 89, 90, 94 same scale; figs. 91-93, 95-104 same scale).

Daylesfordia Oke, 1931, Proc. Roy. Soc. Victoria **43**: 195 (type species: *D. uvida* Oke). **New synonymy.**

Eyes lateral, transverse, not protruding. Secondary scrobe present or absent. Scape just reaching front margin of eyes; funicle with 6 segments, segment 1 much longer than 2; actual segment 7 of funicle very large and tightly joined to club thus forming part of the 5-segmented club (fig. 105). Ocular lobes present or absent. Scutellum invisible. Elytra without humeral callus, humeral width not greater than maximal width of prothorax. Wings absent. Legs short; tarsal segment 3 usually wide; claws simple. Scaling, when present, agglutinated as in most Bagoinae.

♂. Tergite 8 free, not covered by 7. Sternite 9 not articular, Y-shaped, with rather long, thin arms that are thickened at tip, manubrium straight, not upcurved. Tegmen about as long as aedeagus, ring complete on dorsum, laterally not articulate; parameres well developed. Aedeagus depressed, symmetrical, ventral surface sclerotized, dorsal surface membranous; apophyses not forming an angle with main body of aedeagus, distinctly articulate, with a latero-inferior arm articulating with lateral angles of aedeagus and with a dorso-interior arm forming an arched bridge with corresponding arm of opposite apophysis. Internal sac long, usually reaching or passing tip of apophyses, with a basal sclerite that usually becomes flagelliform and with a slightly sclerotized tube at proximal 1/2 of main body; no other armature present. Insertion of ejaculatory duct ventral near base of internal sac.

♀. Tergite 7 variable. Tergite 8 entire, crenulate or strongly denticulate at distal margin. Sternite 8 with 2 widely open sclerotized arms and with short manubrium. Hemisternites long, undivided; styli apical. Bursa copulatrix unarmed, wide. Spermatheca falcate, specifically very different; spermathecal duct usually very long, its insertion on bursa copulatrix at specifically different points, but never at base of oviduct; spermathecal gland very small, usually 1/3 the size of spermatheca.

Relationships: *Baeosomus* and its synonym *Daylesfordia* have been placed by Broun and Oke in Rhyparosominae whilst the other synonym *Bryocatus* Broun in Hylobiinae. *Baeosomus* belongs to a group of 4 genera which look very much like Bagoinae and yet their internal structures are so utterly different from those of the true water-weevils that the similar appearances must be regarded as the result of convergent evolution due to similar habits. Two of the New Zealand genera, *Athor* Broun and an undescribed genus, have functional wings, and the other 2 have no trace of wings. *Baeosomus* and its allies should be placed in Erirhininae.

Ecology: The agglutinated scales (as in Bagoinae) and the roughly surfaced scales of the underside of the body suggest aquatic habits. So far, no species has actually been observed in or on water. What actually has been observed is that they occur in quite damp and mossy sites and thus could frequently be subjected to flooding. They are of diurnal habits feeding on leaves, according to the gut contents, but no plant could be identified. Mr. E. S. Gourlay informed me that he once found a specimen actually chewing on a cushion plant of the genus *Raoulia* (Compositae). Most species are restricted to alpine and subalpine zones.

Geographical distribution: *Baeosomus* has many species in New Zealand, most of them confined to the South Island. One occurs in Chatham Is., one in Campbell I., and one is known from Victoria (SE Australia). The discovery of 1 species on Campbell I. is not

at all surprising.

Remarks: The synonymy of *Daylesfordia* Oke is certain as I have been able to examine 2 specimens of the original series of *D. uvida* Oke and these did not show the slightest generic difference in either external or internal characters.

Baeosomus serripes Kuschel, n. sp. Figs. 105–114.

Derm black throughout, including antennae and legs, covered with a dense coating of agglutinated aeneous scales, except on coxae and middle of metasternum where the scales are free and gray; no pale markings on prothorax or elytra.

Head densely squamose. Front flat, slightly narrower than distal width of rostrum. Eyes transversely ovate, slightly convex. Rostrum, from distal margin of epistome to front margin of eyes, about 3.6× longer than its distal width and about 1.25× shorter than prothorax, gently curved, cylindrical, squamose at base, without scales beyond insertion of antennae, with more or less confluent punctures, some punctures coarse, others fine; no secondary scrobe. Postmentum not protruding ventrally. Prothorax scarcely shorter or longer than wide, moderately rounded on the sides; base arched towards elytra, lateral angles rounded. Disc with dense shallow punctures concealed under scaling, a little irregularly convex, on each side with a rather deep fovea. Ocular lobes absent. Elytra ovate, about 1.3× longer than wide, convex, without nodules, the setae very indistinct. Interstriae 1, 3, 5 & 7 wider and higher at proximal 1/2. Femora thick, tibiae thin, externally straight, internally sinuous and denticulate. Tarsal segment 3 distinctly wider than 2; claw segment moderately long (figs. 106, 107).

♂. Ventrite 5 flat, with very shallow median impression. Tegmen with long manubrium, parameres long, fused at proximal 1/2. Aedeagus parallel, slightly apiculate with short blunt tip. Internal sac reaching beyond tip of apophyses, with long flagellum (figs. 108–111).

♀. Ventrite 5 as in ♂, only less setose. Tergite 7 very slightly emarginate. Tergite 8 with entire distal margin (fig. 112). Genitalia as in fig. 114, insertion of spermathecal duct at upper end of bursa copulatrix.

Length 2.15–2.25 mm; width 1.07–1.10 mm.

CAMPBELL I.: St. Col Ridge, 180–280 m, 1♂, 1♀, XII. 1961, Gressitt; St. Col Peak, 280 m, 1♂, 23. II. 1963, Wise.

TYPE LOCALITY: St. Col Ridge, Campbell I.

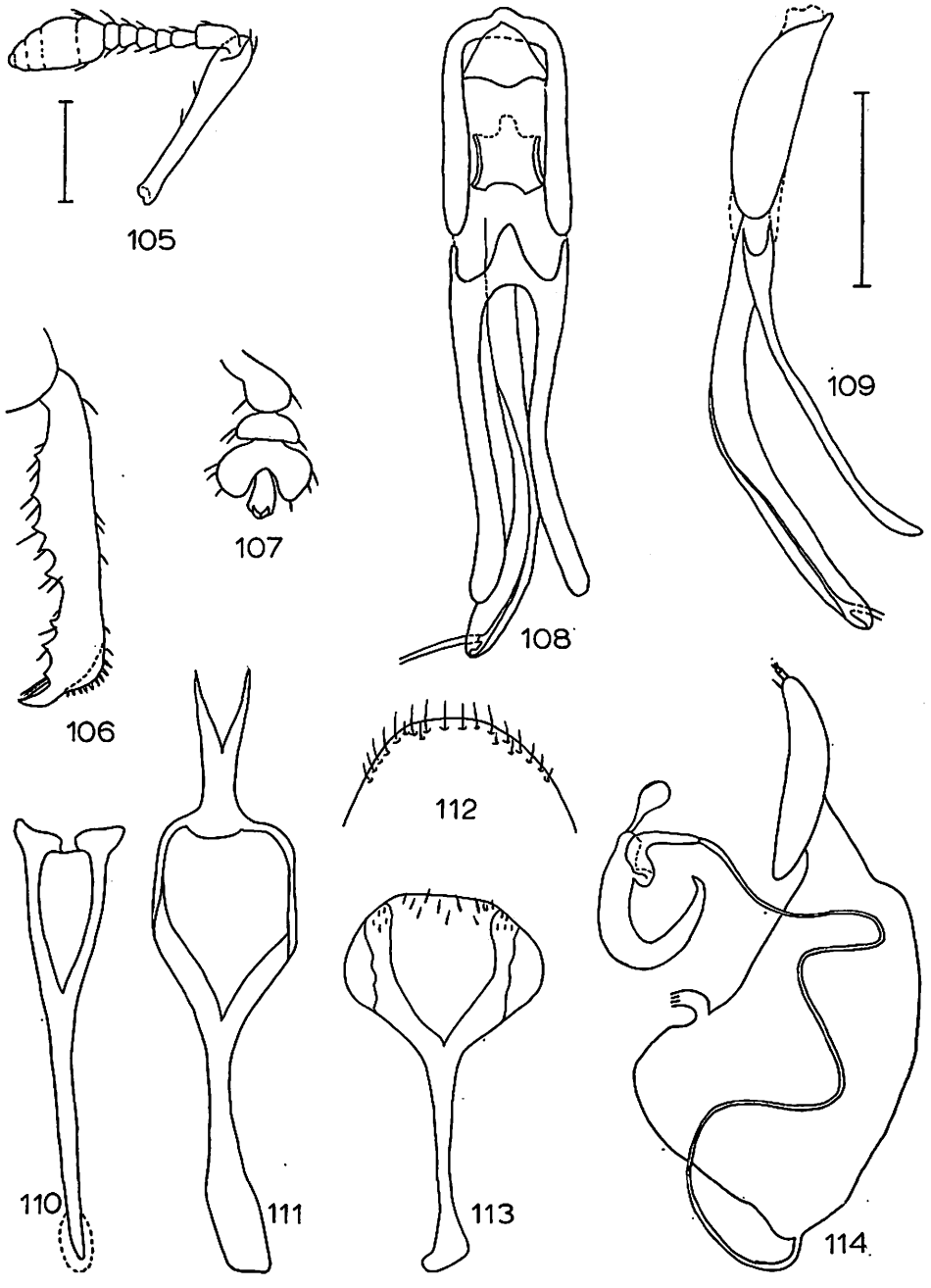
Holotype ♂, 2.15×1.07 mm, St. Col Ridge, 180–280 m, XII.1961, Gressitt, in Entomology Div., D.S.I.R., Nelson. Allotype ♀ and 1 paratype in Bishop Museum. Honolulu.

Ecology: All 3 specimens obtained in Berlese funnel out of moss samples.

Remarks: Many species are hard to separate on external morphological characters, but the present species is unique in having denticulate tibiae.

7. Genus **Peristoreus** Kirsch, 1877

Peristoreus Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 170 (type species: *P. innocens* Kirsch). —Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 197.



Figs. 105–114. *Baeosomus serripes* n. sp., Campbell I.: 105, antenna; 106, left front tibia; 107, right front tarsus, ventral; 108, aedeagus, dorsal; 109, aedeagus, lateral; 110, sternite 9 of ♂, ventral; 111, tegmen, dorsal; 112, tergite 8 of ♀; 113, sternite 8, ventral; 114, ♀ genitalia. (Scales beside figs. equal 0.25 mm. Figs. 105–107 same scale; figs. 108–114 same scale.)

Dorytomodes Marshall, 1926, Ann. Mag. Nat. Hist. ser. 9, **18**: 9 (type species: *Dorytomus aciphyllae* Broun).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 197 (synonymy established).

It it not possible to give a description of this genus without studying all the species and those of several closely related genera.

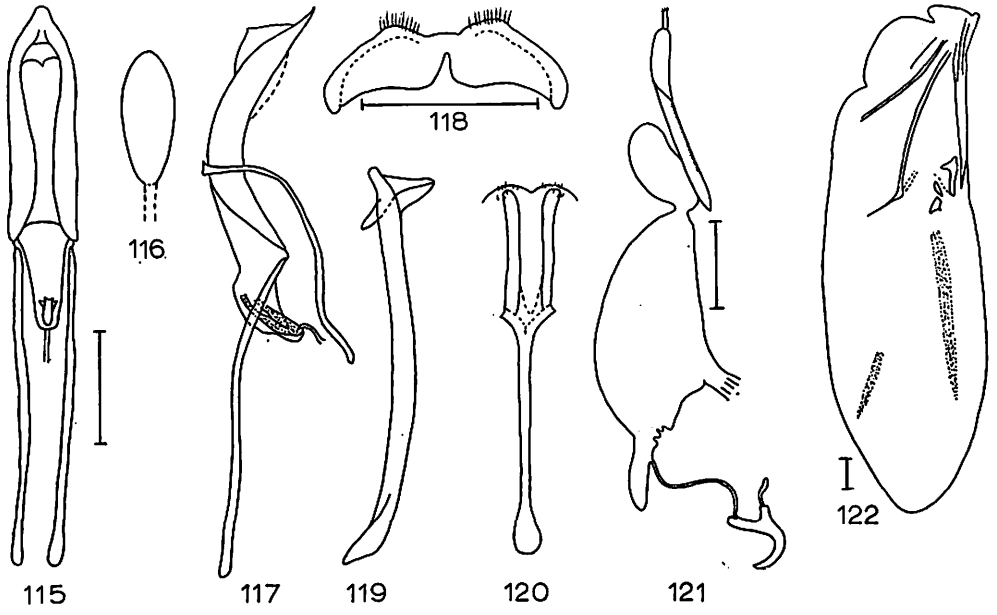
Ecology: The representatives of the genus are host specific being usually confined to a species or group of species within a genus of plants. Most larvae seem to live either in the main rhachides of the inflorescences or in fruits. The range of host plants is extremely varied as species occur in Dicotyledons and monocotyledons as well. The adults are diurnal and feed on leaves, flowers, and also pollen of the same plants as the larvae.

Geographical distribution: *Peristoreus* is restricted to New Zealand. The only species present in the Subantarctic Islands was thought to be endemic but lately has been discovered also in Stewart I.

Peristoreus innocens Kirsch Figs. 115–121, 275c.

Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 171.—Krone, 1877, *Ibid.*, **21**: 156.—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 197.—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 63.

dracophyllae Broun, 1909, Subantarct. Is. N. Z. **1**: 118, pl. 3 : 6 (*Erirhinus*).—Hudson, 1909, *Ibid.* **1**: 61 (*Erirhinus*).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **87**: 197 (synonymy stated).



Figs. 115–122. *Peristoreus innocens* Kirsch, Rose I., Auckland Is.: 115, aedeagus, dorsal; 116, membranous 'window' on ventral surface of aedeagus; 117, aedeagus, lateral; 118, sternite 8 of ♂, ventral; 119, sternite 9 of ♂; 120, sternite 8 of ♀, ventral; 121, ♀ genitalia, lateral; 122, right wing. (Scales beside figs. equal 0.25 mm. Figs. 115–117, 119, 120 same scale).

♂. Sternite 8 as in fig. 118, plates fused at their distal portion. Sternite 9 as in fig. 119, strongly upcurved in lateral aspect. Tegmen not articulate, without parameres. Aedeagus as in figs. 115, 117, dorsal surface submembranous along the median line, ventral surface with a large membranous area as in fig. 116; tip apiculate; apophyses long, slender, clearly articulate to the main body. Internal sac with a very strong sclerite, with a dorsal and a ventral portion, the latter divergent distally and showing in dorsal aspect of the sclerite as lateral wings. ♀. Sternite 8 as in fig. 120, the 2 sclerotized arms long and parallel. Hemisternites long, with a distal sclerotized area and with a ventral rod at proximal portion when seen in lateral view; with a strong seta at apex on inner margin (hidden by stylus on the figure); stylus apical, long, with a few short setae. Bursa copulatrix with a narrow apical portion. Spermatheca as in fig. 121, spermathecal duct short, inserted ventrally near base of narrowed portion of bursa. Length 2.0–3.1 mm; width 0.85–1.30 mm.

AUCKLAND IS. AUCKLAND I: Venus Valley, 1 on *Dracophyllum longifolium*, Krone; Ranui Cove, 166 on *Dracophyllum longifolium*, Gourlay, *Hebe elliptica* and *Metrosideros umbellata*, Johns; and in Malaise trap Gressitt; Ranui Track, 3 on *Dracophyllum longifolium*, Johns; Observation Point, 4 on *Dracophyllum* and *Poa*, Gressitt, and sweeping Wise; Hooker Hills, 400 m, 1 on *Dracophyllum longifolium*, Wise; Bivouac, Mt. Eden, 400 m, 2 on *Chionochloa*, Gressitt; Summit Mt. Eden, 1, Tames; Port Ross, 4 on *Dracophyllum*, Hudson; Carnley Harbor, 5 on *Dracophyllum*, Hudson; Musgrave Peninsula Carnley Harbor, 1 Wenham. OCEAN I.: 4 on *Dracophyllum longifolium*, Gressitt, Wise. ROSE I.: 16 on *Dracophyllum longifolium*, Johns. ENDERBY I.: 2 among moss, Dell. ADAMS I.: 3, Turbott. Total, 213 collected in Sept. Nov., Dec., Jan. & Mar.

CAMPBELL I.: Beeman Camp, 2–50, 60 on *Dracophyllum*, Gressitt & Rennell; Beeman Pt., 5 on *Dracophyllum scoparium*, Wise. Total, 65 in Dec. and Feb.

SNARES IS.: 2 without further details.

STEWART I.: Mt. Anglem, 800–900 m, 8 on *Dracophyllum longifolium*, Kuschel in Jan.

TYPE LOCALITIES: (1) *innocens* Kirsch, Venus Valley, Auckland Is. (2) *dracophyllae* Broun, Carnley Harbour, Auckland Is. Types. (1) *Peristoreus innocens* Kirsch: Lectotype ♀, 3.1×1.30 mm, Venus Valley, in Staatliches Museum für Tierkunde, Dresden. (2) *Erirhinus dracophyllae* Broun: Lectotype ♀, 2.7×1.15 mm, Carnley Harbor, in Dominion Mus., Wellington.

Ecology: This species, like several others of New Zealand, is associated with *Dracophyllum* of the *longifolium*-complex. *Dracophyllum longifolium* occurs in NW Stewart I. from sea level to the top of the mountains but the weevil was found only at the highest levels of Mt. Anglem. The adults are particularly abundant on flowering shrubs of *Dracophyllum* and seem to feed primarily on pollen according to the gut contents of the dissected specimens. The larvae will most likely be found in the main flower stem.

Remarks: The species was previously known from Auckland Is. only.

8. Genus **Notinus** Kuschel, n. gen.

Head small, globose. Front between eyes as wide as rostrum. Eyes lateral, transverse, oval, slightly protruding. Rostrum subcylindric. Scrobes lateral, with sharp dorsal edge, directed towards lower 1/2 of eyes; no secondary scrobe. Antennae a little beyond middle; scape reaching front margin of eyes; funicle 7-segmented, segment 1 longer than 2; club

4-segmented. Prothorax rounded, widest near middle, laterally constricted in front, without ocular lobes. Scutellum visible, very small, punctiform. Elytra elongate-ovate, without humeral callus, with 10 complete striae, interstriae without knobs or tubercles. Wings much atrophied, obovate, without veins, wing/elytron ratio about .13 (fig. 139). Prosternum without canal, its distal portion very short, not longer than proximal portion. Metasternum very short, much shorter between mid and hind coxae than diameter of a mid coxa. Femora unarmed. Tibiae with very small mucro. Tarsal segment 3 wide, deeply bilobed; claw segment rather short, claws with laminiform expansion at base.

♂. Sternite 8 with 2 free plates. Tegmen without parameres. Apophyses articulate. Basal sclerite strong, ejaculatory duct inserted at the base.

♀. Sternite 8 with 2 short and widely open sclerotized arms. Spermatheca very thick.

Type species: *Notinus aucklandicus* n. sp.

Relationships: This belongs to the *Peristoreus—Neomycta* group of New Zealand Erirhininae, but it is hard to say more about the relationships without a monographic study of the whole group. The other known genera of this group with flightless species are *Abantiadinus* Schenkling (*Abantiades* Broun, non Schaeffer) and *Stilbopsis* Broun, the former with tuberculate elytra, with long lineal wings and a wing/elytron ratio of about .5, whilst the latter entirely lacks wings and is very smooth and very convex. Externally *Notinus* resembles a flightless *Peristoreus* Kirsch and internally it seems to be closer to *Neomycta* Pascoe.

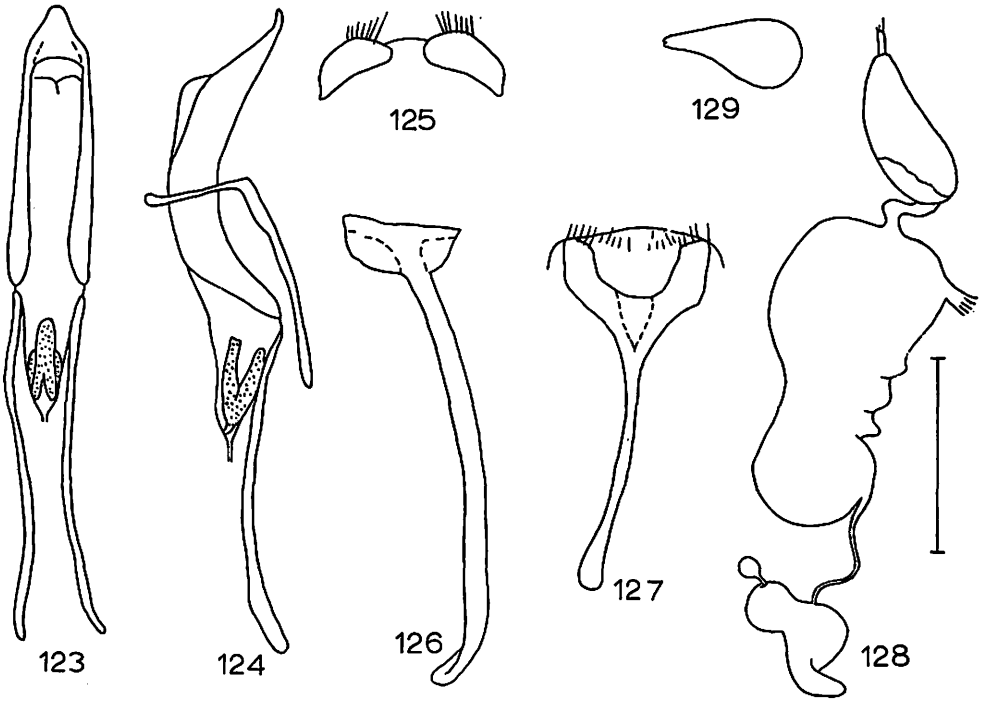
Ecology: The habits of this little flightless weevil are unknown, but they should be similar to those of the other members of the group. The adult should be diurnal occurring on the same plant as the larvae and feeding on soft leaves, flowers and pollen. The gut content of 2 dissected specimens was leaf tissue.

Geographical distribution: This genus is so far endemic to Auckland Is., but it is highly probable that it will be found also in the main islands of New Zealand once thorough collecting is undertaken in the southern portion of the country.

Notinus aucklandicus Kuschel, n. sp. Figs. 123–129.

Color of derm variable, dorsal surface paler than ventral surface, head, pronotum, elytra and legs testaceous, pronotum and elytra often with some dark markings, at least tip of rostrum and sterna piceous. Vestiture scanty, elytra with short erect subsquamiform setae.

Head dull, alutaceous, with fine and scarce shallow punctures each bearing a lineal scale. Front between eyes 1.28× wider than distal width of rostrum. Eyes slightly more convex than head. Rostrum in ♂ usually a little shorter than prothorax, in ♀ a little longer than prothorax, about 3.33–3.46× longer than the distal width, very gently curved, alutaceous and very shallowly striolate from base to a little beyond insertion of antennae, the apex shiny with a few coarser punctures towards lateral margins. Scape very strongly curved at tip; last segments of funicle strongly transverse. Prothorax 1.12–1.19× wider than long, more transverse in ♂ than in ♀, sides rounded, widest at or beyond middle. Pronotum longitudinally flat, transversely convex, alutaceous, coarsely punctate, with scanty lineal scales. Scutellum black, bare, punctiform, as high as or lower than elytra. Elytra 1.39–1.44× wider than prothorax and 1.39–1.46× longer than their maximal width. Striae sulciform. Suture usually raised and cariniform at scutellar area. Interstriae convex, with



Figs. 123–129. *Notinus aucklandicus* n. sp., Ranui Cove, Auckland Is.: 123, aedeagus, dorsal; 124, aedeagus, lateral; 125, sternite 8 of ♂; 126, sternite 9 of ♂, ventral; 127, sternite 8 of ♀, ventral; 128, ♀ genitalia, lateral; 129, right wing. (Scale beside fig. 128 equals 0.25 mm. All figs. same scale).

a single row of very short erect subsquamiform setae and with a few hairs or lineal scales between some setae. Femora short, thick, slightly swollen, without trace of tooth.

♂. Sternite 8 as in fig. 125, the 2 plates widely separated by a median membrane. Sternite 9 as in fig. 126, rather thin, with upcurved manubrium. Aedeagus as in figs. 123, 124. Basal sclerite strongly chitinous, with a dorsal tube and a ventral bar having lateral expansions.

♀. Sternite 8 as in fig. 127. Hemisternites broad, with a small dorso-basal membranous portion, without setae; stylus apical, long, cylindrical. Spermatheca usually thick (fig. 128), with short thin tip and with a very thick appendix holding a very small spermathecal gland. Spermathecal duct short, expanded before insertion on bursa copulatrix at its ventral surface near tip.

Length 1.80–2.25 mm; width 0.90–1.10 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, 8 in forest litter, Gourlay, on *Coprosma*, Gressitt, *Myrsine divaricata* and *Polystichum vestitum*, Johns; Crozier Point, 5 on *Coprosma* and *Hebe*, Gressitt; Observation Point, 1, no host plant, Gressitt; Tucker Point, 10 on *Coprosma* and *Neopanax* and under stones, Gressitt; Bivouac – Mt. Eden, 200–400 m, 1 on *Chionochloa*, Gressitt. EWING I.: 2 on *Metrosideros umbellata* and sweeping *Bulbinella* and *Carex*, Gressitt. Total, 27 collected in Nov., Dec. & Jan.

TYPE LOCALITY: Ranui Cove, Auckland Is.

Holotype ♂, 1.90×0.98 mm, Ranui Cove, 7–12. XI. 1954, Gourlay, allotype ♀ and paratypes in Entomology Div., D. S. I. R., Nelson, other paratypes in Dominion Mus., Wellington, Canterbury Mus., Christchurch, Bishop Mus., Honolulu, and British Museum, Lond.

Ecology: This species has been found in the bush and on the ground near the coast. Although most specimens were beaten from *Coprosma* (Rubiaceae) some have occurred on several quite unrelated plants, so nothing definite can be said about the true host plant.

Remarks: The presence of *Notinus aucklandicus* as an endemic genus and species in the Subantarctic Islands is an unsolved problem at present because we do not know the exact host plant of this weevil. If the host plant were an endemic genus, like *Stilbocarpa* (Araliaceae) or *Pleurophyllum* (Compositae) or in a genus with endemic species, like *Coprosma* (Rubiaceae) or *Celmisia* (Compositae), then probably the weevil could have survived the rigorous conditions of the glaciations.

Subfamily RHYPAROSOMINAE

As many genera of New Zealand Curculionidae have been placed in Rhyparosominae, I have examined a ♂ and a ♀ of *Rhyparosomus mashunus* Marshall, from S. Rhodesia, kindly forwarded by Mr. R. T. Thompson. I am hopeful that I am correctly interpreting the subfamily characters, but I would not like to venture a re-definition of the whole subfamily on such scanty material inasmuch as other closely related subfamilies, particularly Rhytirhininae, also ought to be examined on their external and internal structures. I would like to mention in this connection that Listroderini, hitherto put in Cylydrorhininae, agree very well with the characters of Rhyparosominae and should, therefore, be transferred to this subfamily while Cylydrorhininae, though still listed as Phanerognatha, are in fact true Adelognatha according to their adult and larval characters. The examined Australian and New Zealand genera which will stay in or should be transferred to Rhyparosominae are:

Genera	Position in Junk Coleopt. Catalogus
Anorthorhinus Blackburn	Erirhininae
Aphela Pascoe	Amalactinae, Cossoninae
Cisolea Oke	Rhyparosominae
Desiantha Pascoe	Erirhininae
Dryopais Broun	Erirhininae
Gromilus Blanchard	Cylydrorhininae
Liparogetus Broun	Cylydrorhininae
Mandalotina Oke	Leptopiinae
Neosyagrius Lea	Rhyparosominae
Nestrius Broun	Rhyparosominae
Notiomimetes Wollaston	Cossoninae
Psaldus Pascoe	Cossoninae
Wollastonicis Lea	Cossoninae
Xerostygnus Broun	Erirhininae

For further information on other 'Rhyparosominae' see next subfamily Phrynixinae.

9. Genus **Gromilus** Blanchard, 1853

Gromilus Bld., 1853, Voy. Pôle Sud **4**: 208 (type species: *Gr. insularis* Bld.).
Clypeorhynchus Sharp, 1883, Ent. Mon. Mag. **20**: 26 (type species: *Cl. gracilipes* Sh.).— Broun, 1893, Man. N. Z. Coleopt. **1893** (5): 1210. **New Synonymy.**
Dacnophylla Broun, 1893, *Ibid.* **1893** (7): 1471 (type species: *D. setosa* Broun). **New Synonymy.**
Hycanus Br., 1905, Ann. Mag. Nat. Hist. ser. 7, **15**: 545 (type species: *H. cockaynei* Br.); 1909, Subantarct. Is. N. Zealand **1**: 115. **New Synonymy.**
Phygothalpus Broun, 1913, Trans. Proc. N. Z. Inst. **45**: 117 (type species: *P. sulcicollis* Br.). **New Synonymy.**
Pseudohycanus Brookes, 1951, Cape Exp. Ser. Bull. **5**: 57 (type species: *Ps. fallai* Br.). **New Synonymy.**
Stilbodiscus Broun, 1909, Subantarct. Is. N. Zealand **1**: 117 (type species: *St. setarius* Broun). **New Synonymy.**

Eyes large, transverse, coarsely facetted, seldom more convex than head, with or without surrounding groove. Front with distinct or obsolete median fovea. Rostrum moderately long. Scrobes lateral, directed towards middle of eyes, deep for more than 1/2 the length, obsolete in front of eyes, invisible in dorsal aspect except for a short portion at insertion of antennae. Pterygia usually well developed and protruding. Epistome flat to strongly convex, without sharp basal edges or margins. Furrow of genal suture deep and long, usually continued under pterygia. Mandibles with a single long seta. Scape scarcely reaching to or extending beyond hind margin of eyes; segment 1 of funicle distinctly longer than 2; club elongate, pointed, well separated from last segment of funicle, with 2 deep and 1 very faint suture. Prothorax widest near distal 1/3, with median furrow or depression; base slightly rounded, high above mesothoracic peduncle, its upper edge overlapping the sloping base of elytra; ocular lobes broad, slightly or strongly protruding. Scutellum visible or invisible. Elytra without humeral callus. Wings strongly reduced, broadly ovate or obovate, in general outline roughly as in fig. 158, wing/elytron ratio below .2, thus wings at least 5× shorter than elytra. Metasternum between mid and hind coxae shorter than diameter of mid coxa. Metepisternum very narrow, metepisternal suture distinct throughout. Mucro and 1 spur present in fore and mid tibiae.

♂. Sternite 8 divided into 2 triangular plates. Sternite 9 very strong, irregular. Parameres absent. Aedeagus symmetrical. Internal sac entirely lying inside main body of aedeagus, with a strong and diversified basal sclerite apart from other armature.

♀. Sternite 8 with 2 sclerotized arms. Hemisternites usually long, roughly of triangular outline; styli present, usually with 4 long setae. Bursa copulatrix with a pair of big and complex sclerites at insertion of spermathecal duct, additional sclerites sometimes present.

Relationships: The abundant material of more than 40 species of the *Gromilus-Clypeorhynchus* complex of genera available to me shows that no clear-cut distinction can be made between the previously erected genera as the morphological and anatomical features are gradually changing from one end of the complex to the other. *Gromilus* is most closely related to 2 other genera of Rhyparosominae of New Zealand. One is *Liparogetus* Broun which has about 10 species, all confined to the southern half of South Island and mainly to the alpine zone. Apart from a different habitus it shows a quite different evolutionary

line in the reduction of the wings which are very narrow, and of lineal order. The other genus is *Nestrius* Broun which is more remotely related to *Gromilus.*

Ecology: *Gromilus*, like all Rhyparosominae, has nocturnal habits. The adults hide in daytime under stones, logs, leaf litter and at the base of low growing plants. No food plants have been identified in the field for either larvae or adults of the subantarctic species, but the gut contents of a certain number of adults have shown remains of some Dicotyledons, such as *Tillaea* (Crassulaceae), *Colobanthus* (Caryophyllaceae), and other genera of plants that could not be identified any further. It seems certain that the species of *Gromilus* of the Subantarctic Islands of New Zealand do not feed on ferns. It might be said in this connection that *Gromilus* is one of those rare cases in the Curculionidae that have some species that are attached to dicotyledons and others to ferns. Larvae of *Gromilus* have been collected in Auckland and Campbell Is.; they are hypogeous living upon roots of some unidentified herbs.

Geographical distribution: *Gromilus* is an endemic genus to the Neozelandic fauna. There are 44 species amongst the nearly 2000 specimens so far examined of this genus. Four species are restricted to North Island, 30 to South Island and Stewart I., a further 4 occur on both North and South Islands, and 6 species are confined to the Subantarctic Islands of New Zealand. Snares and Campbell Is. each have 1 endemic species, Auckland Is. have 2 endemic species, 2 species occur on Auckland Is. as well as on Campbell I., but their populations are distinct at a subspecific level, and 1 of these species is also present on Antipodes with a subspecies of its own. All the species of the Subantarctic Islands seem to occur from the supralittoral zone up to the top of the ranges and mountains without showing significant differences between the populations of lowland and high country. *Gromilus fallai* and *G. veneris veneris* from Auckland Is. appear to be an exception because they are known from the lowlands only, but this is most likely due to the lack of better exploration of the other areas of the islands.

Key to species of Gromilus

1 (14). Dorsal surface of rostrum transversely convex, close behind insertion of antennae. Mucro of hind tibiae of ♂♂ usually longer and stronger than spur.

2 (3). Pterygia feebly protruding (fig. 159). Setae on elytra thick, squamiform, slightly raised and strongly curved. Vestiture mostly of lineal scales. 4.3–5.3 mm. Snares Is. ..... **laqueorum**

3 (2). Pterygia strongly protruding (fig. 160). Setae on elytra bristle-like, erect or semierect. Vestiture mainly or entirely of fine hairs.

4 (9). Emargination of tarsal segment 3 weak, lobes not longer than 1/3 of length of whole segment in ventral aspect. Pronotum usually with very obsolete punctures. Elytra shorter, very rarely a little more than 1.7× longer than wide (mainly in Antipodes specimens).

5 (6). Furrow of genal suture of rostrum extending at least as far as distal end of pterygia. ♂: basal sclerite of internal sac distinctly tapering. ♀: lateral lobes of bursal sclerite more exposed beyond median fold. 3.9–5.7 mm. Auckland Is. ..... **insularis insularis**

6 (5). Furrow of genal suture of rostrum not extending as far as distal end of pterygia. ♂: basal sclerite of internal sac not or very slightly tapering.

♀ : lateral lobes of bursal sclerite less exposed beyond median fold.

7 (8). Elytral hairs distinct and more abundant. Larger race. 4.5–6.0 mm. Campbell I. ..... **insularis robustus**

8 (7). Elytral hairs indistinct and scanty. Smaller race. 3.5–4.5 mm. Antipodes. ... . **insularis antipodarum**

9 (4). Emargination of tarsal segment 3 deep, lobes 1/2 length of whole segment in ventral aspect. Pronotum always with distinct punctures. Elytra more elongate, very rarely a little less than 1.8× longer than wide.

10 (11). Only distal part of rostrum shiny, proximal part of rostrum and front dull, alutaceous, with or without very obsolete punctures. Tarsal segment 3 small, with short lobes. ♂ : aedeagus in lateral aspect with short tip (fig. 144), basal sclerite of internal sac with distal arm arched (fig. 142). ♀ : sternite 8 with long manubrium; bursal sclerite roughly as in fig. 176. 4.2–6.5 mm. Campbell I. ..... **exiguus**

11 (10). Entire rostrum and front shiny, strongly punctate. Tarsal segment 3 large, with long lobes. ♂ : aedeagus in lateral aspect with long tip (fig. 147); basal sclerite of internal sac with distal arms not arched. ♀ : sternite 8 with short manubrium (fig. 182).

12 (13). Pronotum with a complete or interrupted median furrow, dull, only median furrow partly shiny. 5.8–7.3 mm. Auckland Is. ..... **veneris veneris**

13 (12). Pronotum with a broad shiny median depression. 6.1–8.0 mm. Campbell I. ... . **veneris setarius**

14 (1). Dorsal surface of rostrum transversely concave due to a median depression close behind insertion of antennae. Mucro of hind tibiae of ♂♂ smaller than spur.

15 (16). Scape thin except thickened distal portion. Tarsal segment 3 small. ♂ : ostium of aedeagus with a bicuspid dorsal plate; internal sac without armature between basal sclerite and ostium (fig. 151). ♀ : bursal sclerite oval in outline (fig. 184). 3.75–5.10 mm. Auckland Is. ..... **frontalis**

16 (15). Scape thick, cylindrical from near base. Tarsal segment 3 large. ♂ : ostium of aedeagus without a bicuspid dorsal plate; internal sac with additional armature between basal sclerite and ostium (fig. 154). ♀ : bursal sclerite rhomboidal in outline (fig. 187). 6.4–7.4 mm. Auckland Is. ..... **fallai**

Gromilus laqueorum Kuschel, n. sp. Figs. 130–132, 159, 162–164.

Piceous, dull, legs and antennae castaneous. Rostrum, prothorax and elytra with appressed yellow hairs or lineal scales, these more condensate on humeral area and in some small rather indistinct spots particularly on distal 1/2 of elytra. Setae of interstriae short, clavate, strongly curved.

Head punctate, slightly granulo-verrucose, intervals alutaceous. Proximal part of rostrum dull, distal part rugoso-punctate. Pterygia very weakly protruding beyond lateral margins of rostrum (fig. 195). Furrow of genal suture extending as far as distal end of pterygia. Scape sinuous, thin and shiny at its proximal 1/2, then thickened and alutaceous, reaching or just passing hind margin of eyes. Prothorax very slightly wider than long to a very little longer than wide, longitudinally and transversely convex, with a broad unin-

terrupted median furrow; vestiture nearly uniform, sparse; punctures obsolete, with an incomplete rim; derm completely dull. Scutellum very small in the bottom of a rather deep scutellar depression of the elytra, its tip rounded. Elytra 1.5–1.55× wider than prothorax, 1.35–1.53× longer than their maximal width; basal slope high, vertical. Striae fine, usually stronger near base than on or beyond middle. Interstriae broad, dorsal ones with about 3 or 4 rows of hairs or scales, each hair or scale on distal side of a granule; derm dull, alutaceous. Wing/elytron ratio .19. Ventral surface moderately shiny, almost smooth and nearly bare. Hind tibiae of ♂ with mucro stronger and longer than spur.

♂. Aedeagus as in figs. 130–132.

♀♀. Sternite 8 as in fig. 164, hemisternites and sclerite of bursa copulatrix as in figs. 162, 163.

Length 4.3–5.3 mm; width 1.95–2.40 mm.

SNARES IS.: 1♂, 8♀♀, XI./XII. 1947, R. A. Falla; 2♀♀, 1. XII. 1947, Fleming.

TYPE LOCALITY: Snares Is.

Holotype ♂, 4.5×2.15 mm, 1. XII. 1947, Fleming, allotype and paratypes in Dominion Mus., Wellington, other paratypes in Entomology Div., D.S.I.R., Nelson, and Bishop Museum, Honolulu.

Ecology: All specimens obtained in leaf litter samples taken at the base of tussock.

Remarks: This species, though quite distinct because of the weak pterygia and the decumbent setae, still belongs to the *insularis*-group of species of *Gromilus* according to the ♂ and ♀ genitalia. The closest known relative is *Gromilus insularis* Blanchard, but there is another very close species from Stewart I. which is still undescribed.

Gromilus insularis Blanchard

This is one of the 2 species which occur on both Auckland and Campbell Islands showing clear differences between the populations. A 3rd geographical race of this species is on the Antipodes Is.

Gromilus insularis insularis Blanchard Figs. 133–135, 157, 160, 165–167.

Bld., 1853, Voy. Pôle Sud **4**: 208, pl. 14: 11.—1950, Gourlay, Trans. Proc. Roy. Soc. N. Z. **78**: 196 (*Steriphus*).

cockaynei Broun, 1905, Ann. Mag. Nat. Hist. ser. 7, **15**: 546 (*Hycanus*); 1909, Subantarct Is. N. Z. **1**: 116 (*Hycanus*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 56 (*Hycanus*).

opacus Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 169 (*Steriphus*).—Krone, 1877, *Ibid.* **21**: 156 (*Steriphus*).

Apart from the differences already given in the key there is little else to separate this subspecies from that of Campbell I. Wing/elytron ratio .14–.16 (figs. 133–135, 157, 160, 165–167). Length 3.9–5.7 mm; width 1.70–2.35 mm.

AUCKLAND IS. Apparently generally distributed, found so far on Auckland I., French I., Rose I., Ocean I., Ewing I., Enderby I., Dundas I., and Adams I. Total, 126 specimens collected during all four seasons.

TYPE LOCALITY: (1) *insularis* Blanchard, Port Ross, Auckland Is. (2) *cockaynei* Broun, without definite locality, Auckland Is. (3) *opacus* Kirsch, Rose I., Auckland Is. Types. (1)

Gromilus insularis Blanchard, probably in the Laboratoire d'Entomologie, Paris. (2) *Hycanus cockaynei* Broun, in Brit. Mus., Lond. (3) *Steriphus opacus* Kirsch, lectotype ♂, 4.7×1.95, 21. I. 1875, Rose I., Auckland Is., Krone, in Staatliches Museum für Tierkunde, Dresden. This specimen was generously forwarded for examination by Dr. R. Hertel. A lectotype label was added by me. Genitalia and abdomen kept in glycerine in a small vial attached to the pin.

Ecology: Nocturnal weevil found in daytime hiding under stones, logs, and particularly under herbs (*Anisotome*, *Stilbocarpa*, *Acaena*, *Urtica*).

Remarks: The identification of this species as *insularis* Blanchard remains doubtful until the type has been examined. I have followed Gourlay who has considered *cockaynei* Broun and *opacus* Kirsch as synonyms of *insularis* Blanchard. The original description, however, is so vague that Blanchard could just as well have had *frontalis* Broun or *veneris* Kirsch. Mr. R. T. Thompson was kind enough to examine the type of *Hycanus cockaynei* Broun.

Gromilus insularis robustus (Brookes), n. comb. Figs. 136–138, 168–170.

Brookes, 1951, Cape Exp. Ser. Bull. **5**: 56, f 17(*Hycanus*, as species).

Furrow of genal suture distinctly shorter than in *insularis* s. str. otherwise just as variable in size, color, vestiture, sculpture. Genitalia as in figs. 136–138, 168–170. Wing/elytron ratio .14–.16. Length 4.5–6.0 mm; width 1.80–2.45 mm.

CAMPBELL I.: found so far in Courrejolles, Windlass Bay, Beeman Hill, Tucker Cove, Lookout Bay, Rocky Bay, Shoal Point, but probably all over the island. Total, 70 specimens collected throughout the year.

TYPE LOCALITY: Campbell I., no further details. Holotype ♂, 4.7×2.0 mm, 1943, Campbell I., Sorensen, in Dominion Mus., Wellington.

Ecology: As in the previous subspecies, very common on the ground, probably spread all over the island, usually found under *Tillaea moschata*, at the base of *Stilbocarpa polaris*, and also in the cushions of *Colobanthus*. Larvae have been secured around the roots of *Tillaea moschata* (Crassulaceae).

Remarks: Brookes has mentioned a single specimen only, the holotype, from Campbell I., although he had actually a dozen specimens. Six of these he placed as paratypes in his *Stilbodiscus exiguus*, and the other 5 he left unidentified.

Gromilus insularis antipodarum Kuschel, n. subsp. Figs. 139–141, 171–173.

A geographical form of small specimens, their average size being about 1 mm below the average of the other 2 races. The integument is apparently paler as a whole, the sculpture more obsolete particularly on prothorax and interstriae. Elytra more elongate, usually between 1.65 and 1.75× longer than wide, their appressed hairs very sparse and very fine. Wing/elytron ratio .14. Genitalia as in figs. 139–141, 171–173.

Length 3.5–4.5 mm; width 1.5–2.0 mm.

Antipodes Is. Plateau above Ringdove Bay, 12, 8. XI. 1950, Dell, from *Pleurophyllum* and tussock; same place, 19, 9. XI. 1950, Turbott, in leaf litter taken amongst *Pleurophyllum*. Top of slopes above Ringdove Bay, 14, 9–10. XI. 1950, Turbott, in leaf litter under *Poa litorosa* and *Polystichum vestitum*. Total, 45 specimens.

TYPE LOCALITY: top of slopes above Ringdove Bay, Antipodes Is.

Holotype ♂, 4.3×1.75 mm, top of slopes above Ringdove Bay, ex leaf litter from under *Poa litorosa* and *Polystichum vestitum*, 10. XI. 1950, Turbott, allotype ♀ and paratypes in Dominion Mus., Wellington, other paratypes in Entomology Div., D.S.I.R., Nelson, in Canterbury Mus., Christchurch, and in Bishop Mus. Honolulu.

Ecology: A ground weevil living on coastal and lower montane herbfield and in tussock grass, found associated with *Pleurophyllum criniferum* (Compositae) and *Poa litorosa* (Gramineae).

Remarks: In both external and internal features, this form is closer to Campbell I. populations than to those of Auckland Is.

Gromilus exiguus (Brookes), n. comb. Figs. 142–144, 174–176, 275d.

Br., 1951, Cape Exp. Ser. Bull. **5**: 59, f 19 (*Stilbodiscus*). *bifoveatus* Br., 1951, *Ibid.* **5**: 60, f 20 (*Stilbodiscus*). **New Synonymy.**

Front and proximal part of rostrum dull, alutaceous, punctures obsolete, distal part shiny. Scape thin. Sculpture on pronotum very apparent on alutaceous integument. Elytra elongate, usually more than 1.8× longer than wide. Tarsal segment 3 small, deeply lobed. Wing/elytron ratio .12–.14. ♂. Aedeagus as in figs. 142–144. ♀. Sternite 8 with long manubrium (fig. 176). Hemisternites and bursal sclerite as in figs. 174, 175. Length 4.2–6.5 mm; width 1.7–2.5 mm.

Campbell I., common all over the island from coast to highland. Total of 133 specimens collected throughout the year.

TYPE LOCALITY: Campbell I., without specified locality. Type. (1) *Stilbodiscus exiguus* Brookes: Holotype ♂, 5.1×1.9 mm, no date, no definite locality, Campbell I., Sorensen, in Dominion Mus., Wellington. (2) *Stilbodiscus bifoveatus* Brookes: Holotype ♀ (not ♂, as stated by Brookes!), 6.0×2.25 mm, 7. XI. 1944, under wet sacks, Station 3, Campbell I., prob. Sorensen, in Dominion Mus., Wellington.

Ecology: A ground weevil common from coast to highland, found in daytime mainly under stones and at the base of herbs.

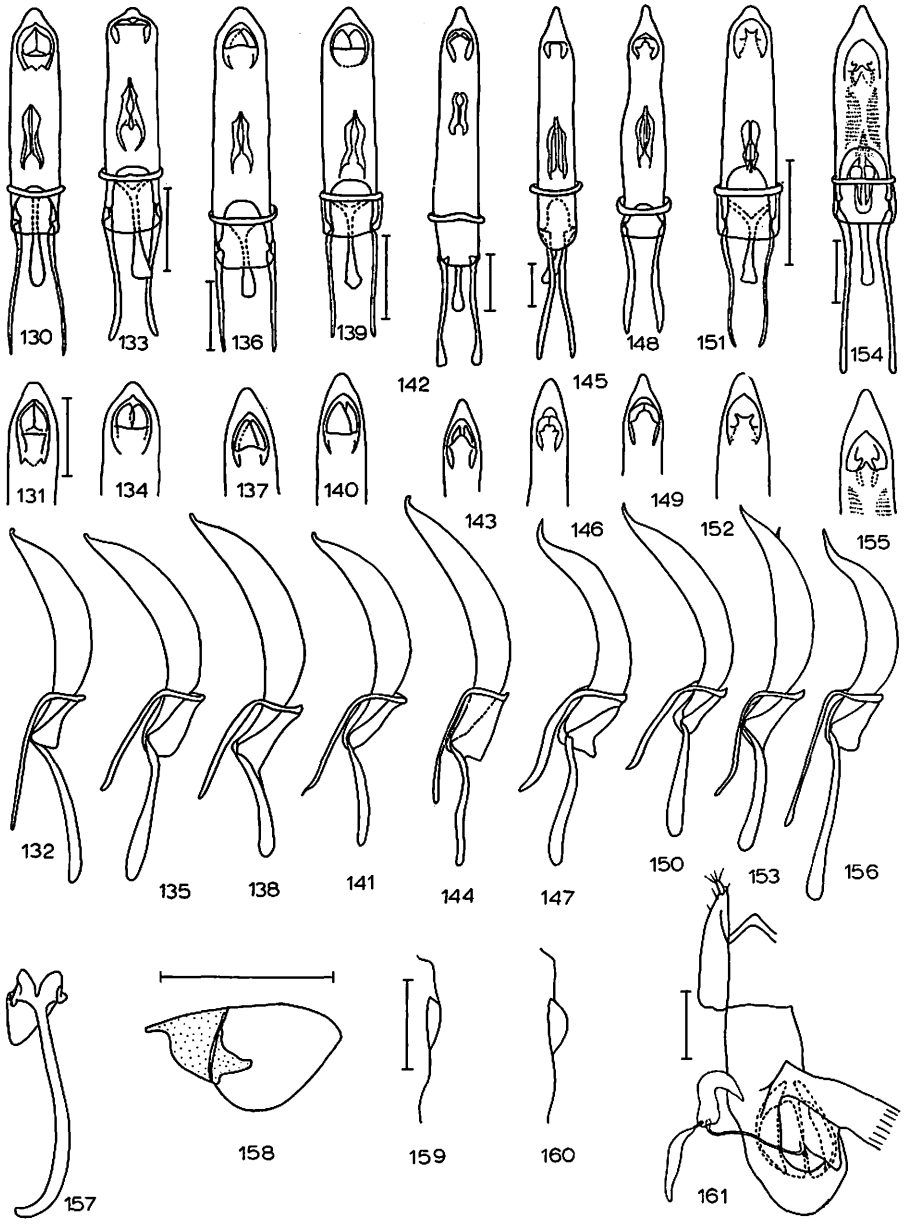
Remarks: Brookes has based his description of *exiguus* on a dozen specimens belonging to 2 different species, 6 of these (including holotype) being small specimens of the present species, the other 6 being large specimens of *insularis robustus* (Brookes). The name *exiguus* is quite inappropriate for this rather large species, but, unfortunately, has to be kept as its synonym *bifoveatus* has become a homonym of *G. bifoveatus* (Broun) described under the synonymous genus *Clypeorhynchus*.

Gromilus veneris (Kirsch)

This species also shows remarkably distinct geographical races on Auckland Is. and Campbell I. It has the general appearance of *exiguus* (Brookes), but is larger as a rule and readily separable by its shiny and strongly sculptured front and rostrum and by the larger tarsal segment 3 apart from distinct genitalia.

Gromilus veneris veneris (Kirsch), n. comb. Figs. 145–147, 161, 177–179.

Kirsch, 1877, Dtsch. Ent. Zschr. Berlin **21**: 168 (*Steriphus*).—Krone, 1877, *Ibid.* **21**: 156



Figs. 130–161. *Gromilus* spp. Dorsal, apical, and lateral aspect of aedeagi of: 130–132, *G. laqueorum* n. sp., Snares; 133–135, *G. insularis insularis* Blanchard, Rose I., Auckland Is., (holotype of *opacus* Kirsch); 136–138, *G. insularis robustus* (Brookes), Campbell I.; 139–141, *G. insularis antipodarum* n. ssp., Antipodes Is.; 142–144, *G. exiguus* (Brookes), Beeman Hill, Campbell I.; 145–147, *G. veneris veneris* (Kirsch), Ranui Cove, Auckland Is.; 148–150, *G. veneris setarius* (Broun), Tucker Cove, Campbell I.; 151–153, *G. frontalis* (Broun), Ranui Cove, Auckland Is.; 154–156, *G. fallai* (Brookes), Ocean I., Auckland Is.; 157, sternite 9 of ♂ of *i. insularis*, ventral; 158, right wing of *veneris setarius*; 159, pterygia of *laqueorum*; 160, pterygia of *i. insularis*; 161, ♀ genitalia of *v. veneris*, Rose I., ventral. (Scales beside figs. equal 0.5 mm. Figs. 130–132 same scale; figs. 133–135, 157 same scale; figs. 136–138 same scale; 139–141 same scale; 142–144 same scale; 145–150 same scale; 151–153 same scale; 154–156 same scale; 159, 160 same scale.)

(*Steriphus*).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 197 (*Steriphus*).

Sculpture on rostrum and front finer and shallower than in the other race. Pronotum with shallow median furrow that often is interrupted in the middle, the whole pronotum dull, although the distal part of the median furrow could be shiny. Wing/elytron ratio .16 (figs. 145–147, 161, 177–179). Length 5.8–7.3 mm; width 2.10–2.75 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, Crozier Point, Bivouac Hill, Giants Archway. Also, French I., Ocean I., Rose I., Ewing I. Total, 21 specimens collected in Nov., Dec. & Jan.

TYPE LOCALITY: South coast of Rose I., Auckland Is. Lectotype ♂, 5.8×2.1 mm, 21. I. 1875, Rose I., on open peat, Krone, in Staatliches Museum für Tierkunde, Dresden, kindly forwarded by Dr. R. Hertel for examination. A lectotype label added by me.

Ecology: Apparently rather rare, found from supralittoral zone up to 430 m. Most specimens have been obtained in the supralittoral zone under boulders near *Cotula plumosa* (Compositae), *Poa litorosa* (Gramineae), and *Anisotome latifolia* (Umbelliferae).

Gromilus veneris setarius (Broun), n. comb. Figs. 148–150, 158, 180–182, 275e.

Broun, 1909, Subantarct. Is. N. Z. **1**: 118, pl 5: 6 (*Stilbodiscus*, as species).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 59 (*Stilbodiscus*, as species).

Sculpture on rostrum and front coarser than in *veneris* s. str. Pronotum usually broadly flattened or depressed along the median line, particularly so on the distal 1/2, shiny at least on this depressed area. Wing/elytron ratio .12–.13. ♂. Aedeagus as in figs. 148–150. ♀. Sternite 8 as in fig. 182. Hemisternite and bursal sclerite as in figs. 180, 181. Length 6.1–8.0 mm; width 2.25–3.00 mm.

CAMPBELL I.: very common from sea shore up to the highlands existing all over the island. Total of 160 specimens collected all through the year.

TYPE LOCALITY: Campbell I., without definite locality. Holotype ♂, Campbell I., in the Brit. Mus., Lond.

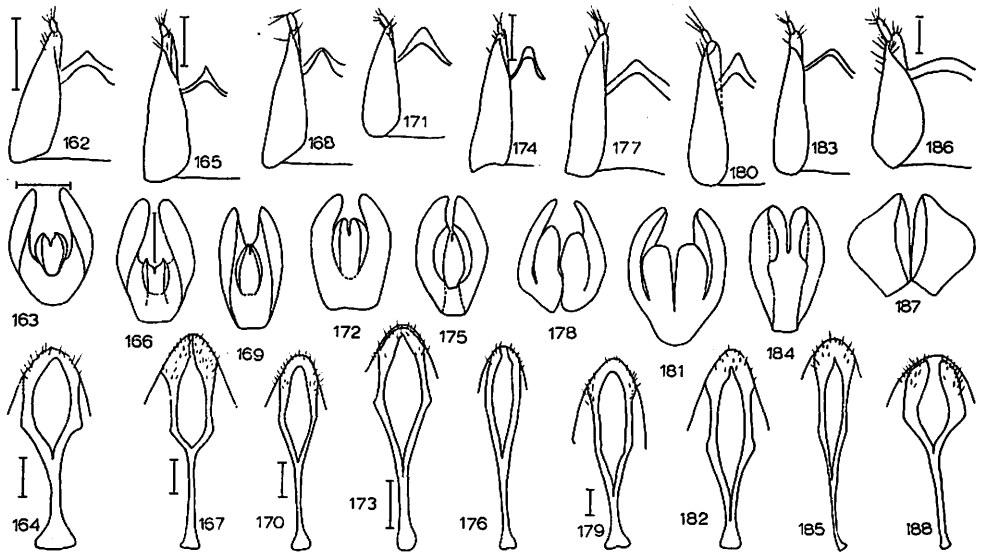
Ecology: A ground weevil hiding at daytime under stones and at the base of herbs, mainly of *Poa* (Gramineae) and *Bulbinella* (Liliaceae). Occurs from the supralittoral zone to the highlands.

Gromilus frontalis (Broun), n. comb. Figs. 151–153, 183–185.

Br., 1909, Subantarct. Is. N. Z. **1**: 116 (*Hycanus*).—Hudson, 1909, *Ibid.* **1**: 61 (*Hycanus*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 56 (*Hycanus*).

Black or piceous, dull, legs and antennae ferruginous. Appressed hairs on elytra very short and fine, lacking erect setae on interstriae 2 & 4 except at base and on declivity. Rostrum with a median depression close behind insertion of antennae, proximal portion with an elongate latero-dorsal impression, partly shiny, partly dull, proximal portion of rostrum shiny. Scape thin to beyond middle, then thickening. Mucro of hind tibiae of ♂ smaller than spur. Tarsal segment 3 small. Wing/elytron ratio .13–.14. ♂. Aedeagus as in figs. 151–153. ♀. Sternite 8, hemisternite, and bursal sclerite as in figs. 183–185. Length 3.75–5.10 mm; width 1.60–2.15 mm.

AUCKLAND IS. AUCKLAND I.: Ranui Cove, Lindley Point, Dea's Head, Terror Cove,



Figs. 162–188. ♀♀ of *Gromilus* spp. Ventral aspect of hemisternite, bursal sclerite, and sternite 8 of 162–164. *G. laqueorum* n. sp., Snares; 165–167, *G. insularis insularis* Blachard, Dundas I., Auckland Is.; 168–170, *G. insularis robustus* (Brookes), Lookout Bay, Campbell I.; 171–173, *G. insularis antipodarum* n. ssp., Antipodes Is.; 174–176, *G. exiguus* (Brookes), Tucker Cove, Campbell I.; 177–179, *G. veneris veneris* (Kirsch), Rose I., Auckland Is.; 180–182, *G. veneris setarius* (Broun), Tucker Cove, Campbell I.; 183–185, *G. frontalis* (Broun), Ranui Cove, Auckland Is.; 186–188, *G. fallai* (Brookes), Adams I., Auckland Is. (Scales beside figs. equal 0.25 mm, Figs. 162, 171, 172, 183, 184 same scale; figs. 165, 168, 175 same scale; 164, 169, 177, 178, 180, 181, 185 same scale; 173, 187 same scale; 170, 176 same scale; 179, 182, 188 same scale.)

Webling Bay, Bleak Hill, Mt. Eastern, west coast opposite Mt. Stoney, Bivouac Peak, Mt. Eden. Ocean I. Rose I. Ewing I. Enderby I. Adams I. Total, 119 specimens collected from Nov.–Mar.

TYPE LOCALITY: Enderby I. Holotype in Brit. Mus., Lond.

Ecology: Common from supralittoral zone to tops of ranges. Usually found in daytime under logs, stones, in leaf litter, and at the base of plants.

Remarks: This is the only species from the Subantarctic Islands that has a bicuspid plate above the ostium of the aedeagus, a feature that is most common in extra-subantarctic species of the genus and in *Liparogetus*.

Gromilus fallai (Brookes), n. comb. Figs. 154–156, 186–188.

Br., 1951, Cape Exp. Ser. Bull. 5: 58, f 18 (*Pseudohycanus*).

Black or piceous, legs and antennae piceous. Appressed hairs on elytra small, fine, abundant. Dorsal surface of rostrum with strongly raised lateral margins above insertion of antennae, distal part shiny, proximal part moderately shiny, with obsolete punctures. Front shiny, punctate. Scape thick, cylindrical from very near the base to the apex. Hind tibiae of ♂ with a very small mucro. Tarsi long, segment 3 large and deeply lobed, claw segment long. Wing/elytron ratio .18. ♂. Aedeagus as in figs. 164–156, with additional ar-

mature. ♀. Sternite 8, hemisternite, and bursal sclerite as in figs. 186–188. Length 6.4–7.4 mm; width 2.7–3.2 mm.

AUCKLAND IS. AUCKLAND I.: Mt. Eden. Rose I. Ocean I. Adams I. Total, 12 specimens collected from Dec.–Feb.

TYPE LOCALITY: Adams I. Holotype ♂, 6.6×2.8 mm, 2. XI. 1944, Falla, in Dominion Mus., Wellington.

Ecology: Found in daytime under stones and logs, at the base of *Stilbocarpa polaris* and *Acaena minor*.

Remarks: A most remarkable species because of the cylindrical scape and, in the ♀, because of the rhomboidal bursal sclerite.

10. Genus **Nestrius** Broun, 1893

Nestrius Broun, 1893, Mn. N. Z. Coleopt. **1893** (7): 1480 (type species: *N. serripes* Br.).

Drymaria Br., 1909, Ann. Mag. Nat. Hist. ser. 8, **4**: 56 (type species: *Dr. cilipes* Br.).— Marshall, 1926, *Ibid.*, ser. 9, **18**: 14 (as syn. of *Nestrius* Br.).

Phyllodytes Br. (non Wagler 1830), 1893, Man. N. Z. Coleopt. **1893** (7): 1479 (type species: *Ph. foveatus* Br.).

Phyllodytesius Schenkling, 1929, IN Junk Coleopt. Cat. pars **106**: 57 (nom nov. for *Phyllodytes* Br., non Wagler). **New Synonymy.**

Plotnus Br., 1893, Man. N. Z. Coleopt. **1893** (7): 1481 (type species: *Pl. ovithorax* Broun). **New Synonymy.**

Proboscocoelus Broun, 1909, Ann. Mag. Nat. Hist. ser. 8, **4**: 55 (type species: *Pr. sculpturatus* Broun). **New Synonymy.**

Eyes small to very small, flat or slightly convex, rounded or transverse, lateral. Fovea of front obsolete. Rostrum moderately long, thick. Scrobes shallow and wide, with ill-defined margins, directed towards eyes. Pterygia well developed. Mandibles with 2 or 3 long setae. Scape passing well beyond eyes, rather thick and gradually widening; segment 1 of funicle longer than 2; club nearly compact, with a single more distinctly visible suture beyond middle. Prothorax usually wider beyond middle, base truncate or slightly arched, with very weak or absent ocular lobes; disc very coarsely punctate. Scutellum invisible. Elytra without humeral callus, basal margin rather sharp and high above mesothoracic peduncle. Wings highly atrophied, broad, wing/elytron ratio about .10. Metepisternal suture absent. Front tibiae with a row of short bristles at distal 1/2 or 1/3 of their lower edge. Fore and mid tibiae in both sexes and also hind tibiae in ♂♂ with mucro and spur, hind tibiae of ♀♀ without mucro but with spur.

♂. Parameres very rudimentary or absent. Basal sclerite of internal sac present, exposed base of main body of aedeagus. Aedeagus symmetrical or asymmetrical, its shape specifically different.

♀. Sternite 8 entirely sclerotized but with the 2 arms present as darker struts. Hemisternites long and narrow, undivided; styli apical, well developed, compressed, with long setae. Bursa copulatrix long, with or without armature. Spermathecal duct inserted in a depression of bursa near base of oviduct, moderately long. Spermatheca falciform, spermathecal gland near spermathecal duct.

Relationships: This genus could be regarded as intermediate between the Neozelandic

Gromilus Blanchard and the Patagonian *Falklandius* Enderlein but with obviously closer links to the former. Broun placed the 11 species he described in 5 genera distributed over the subfamilies Otiorhynchinae and Rhyparosominae. A close examination of more than a thousand specimens of the 27 species seen by myself has revealed that no generic subdivision can satisfactorily be achieved.

Ecology: It is well known by New Zealanders that *Nestrius* species are constantly found in leaf litter throughout the year. No adults have ever been observed feeding either at night or in daytime. *Nestrius* is certainly an important element in the leaf litter fauna of New Zealand. The larvae should be hypogeous, ectophytic, feeding upon roots of quite different plants. The gut contents of the adults of more than 10 species have been sent to Dr. B. H. Hercus in order to find out what kind of plants they were feeding on. Her findings were that all the vegetable material belonged definitely to Dicotyledons.

Geographical distribution: *Nestrius* is endemic to the New Zealand fauna occurring on both main islands, on Stewart I. and Snares Is. The species are fairly restricted in their distribution as is to be expected in flightless and leaf litter inhabiting weevils. Of the 27 species so far known to me, 6 occur in the North Island (2 endemic), 23 in the South Island, 2 in Stewart I., and 1 on Snares Is. The Subantarctic Islands of New Zealand have a single species which is on Snares and shows a close relationship with an undescribed species from Stewart I. The other species that I am reporting below from the Auckland Is. is certainly not native to the islands.

Key to species of Nestrius

Interstria 4 at base without a dentiform projection extending on to basal angles of prothorax. Multifid hairs on rostrum, front, sides of pronotum, and humeral area very scarce or absent. Setae very short, those on elytral declivity about 0.06 mm. long. 2.8 mm. Snares Is. ..... **laqueorum**

Interstria 4 at base with a strong dentiform projection extending on to basal angles of prothorax. Multifid hairs on rostrum, front, sides of pronotum, and humeral area abundant. Setae of elytra long, those on declivity about 0.15 mm. long. 3.8–4.5 mm. Auckland Is. (doubtful record), North Island of New Zealand ..... **bifurcus**

Nestrius laqueorum Kuschel, n. sp. Figs. 189–192, 200.

Derm dark castaneous, elytra slightly variegate with faint darker markings. Appressed hairs scanty, bifid or multifid hairs very rare. Setae short and broad, especially those on elytra, their length on elytral declivity about 0.06 mm.

Eyes convex, granulose, small, about 20 ommatidia per eye. Rostrum, from distal margin of epistome to front margin of eyes, about 1.64× longer than its apical width, its upper surface in lateral view only slightly more curved than its ventral surface; proximal portion dull, with 2 median ridges; distal portion shiny and smooth except at its base. Pterygia slightly projecting beyond lateral margins of rostrum. Mandibles with 2 long setae. Segment 1 of funicle much longer than 2, about 1.65–1.80× longer, last segments distinctly transverse. Club oval, about 1.50–1.55× longer than wide, rounded at base. Prothorax as long as wide to 1.03× longer than wide, lateral margins strongly and uniformly rounded, widest at middle. Disc convex, the coarse punctures round, their intervals not ridged and without deep smaller punctures. Ocular lobes absent. Elytra broadly elliptical, 1.44–

1.50× wider than prothorax, and about 1.50× longer than their maximal width; humeral zone rounded and widening, then subparallel, and finally broadly rounded; declivity steep, almost vertical. Interstriae 2 & 4 not raised at base; decumbent hairs irregularly distributed on interstriae with alternating small bare and pubescent areas. Mucro of hind tibiae of ♂ shorter than spur. Tarsi short, segment 3 very small, slightly wider than 2, not bilobed. Ventrite 1 with a single row of coarse punctures at basal and apical margins, elsewhere as in other segments with very fine shallow punctures, all abdominal hairs decumbent or nearly so.

♂. Tergite 7 broadly emarginate. Parameres absent. Aedeagus as in figs. 189–191, its tip apiculate, acute; dorsal surface less sclerotized than lateral margins. Basal sclerite rather large, lying between bases of apophyses; walls of internal sac with fine short spines.

♀. Unknown.

Length 2.8 mm; width 1.20–1.25 mm.

SNARES IS.: 2♂♂, XI. 1947, Falla.

TYPE LOCALITY: Snares Is.

Holotype ♂, 2.8×1.25 mm, XI. 1947, Falla, in Dominion Mus., Wellington; paratype ♂ in Entomology Div., D. S. I. R., Nelson.

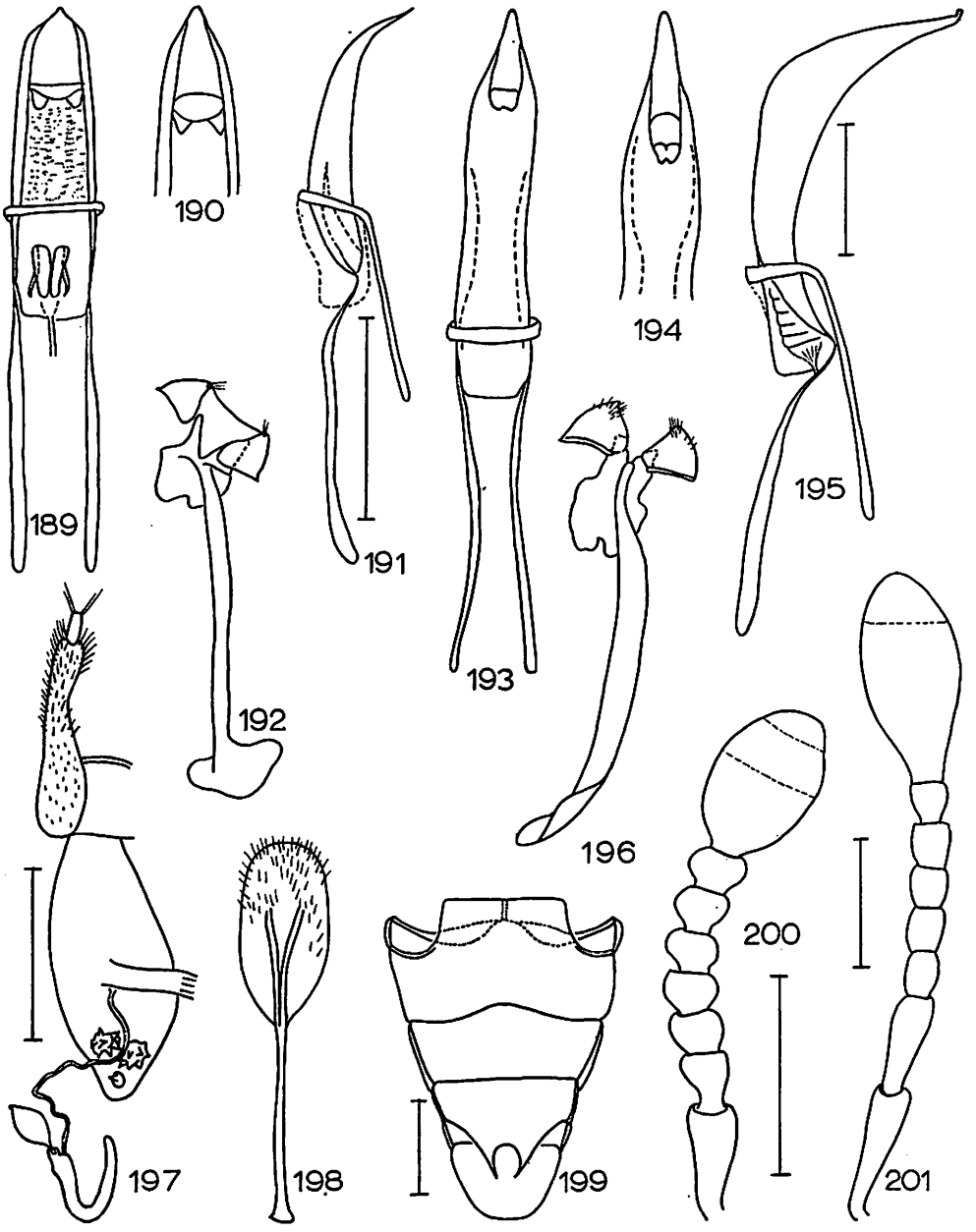
Ecology: The 2 specimens were obtained from a leaf litter sample taken at the base of tussock grass.

Remarks: Characterized by round prothorax, ventrally curved rostrum, very small and entire tarsal segment 3, and very short setae. Its closest relative is an undescribed species from Stewart I.

Nestrius bifurcus Kuschel, n. sp. Figs. 193–199, 201.

Derm dark castaneous or piceous, swollen part of femora paler. Appressed hairs scanty, denser on rostrum in front of eyes and on humeral area; bifid or multifid hairs abundant. Setae long, those on elytral declivity about 0.15 mm long.

Eyes small, convex, granulose, 18 to 21 ommatidia per eye. Rostrum, from distal margin of epistome to front margin of eyes, 2.05–2.27× longer than its apical width, moderately curved; dorsal surface with 2 ridges, these more distinct between insertion of antennae. Pterygia moderately projecting beyond margins of rostrum. Mandibles with 3 long setae. Segment 1 of funicle 1.14–1.40× longer than 2, the last segment about as long as wide, not transverse; club elongate, 2.0–2.2× longer than wide, its base slightly pedunculate. Prothorax 1.10–1.17× longer than wide, widest beyond middle. Disc very coarsely punctate, intervals often sharply ridged and with additional smaller punctures. Ocular lobes very weak. Elytra elongate, 1.23–1.46× broader than prothorax, and 1.61–1.74× longer than their maximal width; humeral area widening in straight line, declivity moderately sloping. Interstria 2 with a small tubercle at base, interstria 4 with a strong tooth protruding on to basal angles of prothorax and visible in lateral aspect as a dentiform process. Lower edge of tibia with long setae, hind tibiae with more than 20 setae which are 2.5× longer than those on the dorsal edge. Mucro of hind tibiae of ♂♂ rudimentary or very small. Tarsi slender, segment 3 distinctly wider than 2, not distinctly bilobed but slightly emarginate. Front claw segment normal. Ventrites 1 & 2 coarsely punctate at least on sides. All ventrites with longer semierect setae in ♂♂ and with decumbent short hairs in ♀♀.



Figs. 189-201. *Nestrius* spp. *N. laqueorum* n. sp., Snares: 189, aedeagus, dorsal; 190, apex of aedeagus; 191, aedeagus, lateral; 192, sternites 8 & 9 of ♂, ventral; 200, antenna. *N. bifurcus* n. sp., ♂ from Rimutaka Range, North Island, ♀ from Auckland Is.: 193, aedeagus, dorsal; 194, apex of aedeagus; 195, aedeagus lateral; 196, sternites 8 & 9 of ♂, ventral; 197, ♀ genitalia, ventral; 198, sternite 8, ventral; 199, abdomen of ♀; 201, antenna. (Scales beside figs. 191, 195, 197, 199 equal 0.5 mm; beside figs. 200, 201 equal 0.25 mm. Figs. 189-192 same scale; figs. 193-196 same scale; figs. 197, 198 same scale).

Ventrite 3 in ♀ projected distally into a bifurcate lamina, its tips reaching slightly beyond middle of ventrite 5 (fig. 199); ventrite 5 of ♀ not notched at distal margin.

♂. Tergite 7 broadly emarginate. Sternites 8 & 9 as in fig. 196. Parameres absent. Aedeagus as in figs. 193–195, its dorsal and ventral surface strongly sclerotized, with a broad shallow median groove on dorsal surface.

♀. Tergite 8 feebly emarginate. Sternite 8 as in fig. 198. Genitalia as in fig. 197, hemisternites very hairy; bursa copulatrix with 3 spiny sclerites near the end, 1 small, 2 larger.

Length 3.8–4.5 mm; width 1.50–1.75 mm.

AUCKLAND IS. (doubtful record), without definite locality, 1 ♀, XII. 1944, Turbott.

NORTH ISLAND. Rimutaka Range, 1♂, 1♀, X. 1949, O'Connor. Wainuiomata, 1♂, XI. 1930, Hudson.

TYPE LOCALITY: Wainuiomata, near Wellington, North Island.

Holotype ♂, 4.5×1.75 mm, Wainuiomata, XI. 1930, Hudson, allotype ♀ and a paratype ♀ in Dominion Mus., Wellington, 1 pararype ♂ in Entomology Div., D. S. I. R., Nelson.

Ecology: All specimens obtained in leaf litter.

Remarks: *Nestrius bifurcus* belongs to a group of 5 species that have the 3rd ventrite in the ♀ prolonged into a lamina. In 1 species, *N. hudsoni* Marshall, from Wellington area and Marlborough district, the lamina is trifurcate whilst in the other 4 it is bifurcate. The new species can readily be identified by the dentiform projection at the base of the interstria 4 and by the subentire tarsal segment 3, both characters being taken together. The ♂ has a very specific aedeagus, and the ♀ has quite unique genitalia in that the hemisternites are extensively and unusually hairy and the bursa copulatrix has spiny sclerites near its end.

There is no doubt about identifying the Auckland Is. specimen with those of the Wellington area. The group of *Nestrius* which *N. bifurcus* belongs to is, so far, restricted to southern North Island and to northern South Island. It is virtually certain that the group is not represented in southern South Island or Stewart I. Therefore, the presence of *N. bifurcus* on Auckland Is. cannot be assumed to be natural. There are 2 possible explanations for the specimen being reported from Auckland Is.: (1) that the species actually has arrived in Auckland Is. by some accident, most likely taken by man in a boat, (2) or that the only known specimen from the Auckland Is. has been wrongly labelled. It would be better to question, so far, the presence of *Nestrius bifurcus* for Auckland Is. till additional material has been secured. (See also remarks under *Phrynixus thoracicus*).

PHRYNIXINAE Kuschel, n. subfam.

Head globose. Eyes moderate in size, but usually small to very small, sometimes absent, lateral or latero-dorsal, with strongly convex ommatidia or some or all ommatidia flat and glassy. Rostrum moderately long, curved; epistome without distinct posterior margins. Mandibles decussate, with 2 or 3 teeth and with 1 short seta. Scrobes very shallow to deep, parallel to rostrum or directed towards gular angle. Insertion of antennae at distal 1/3 or 2/5. Scape reaching front margin of eyes. Funicle with 7–5 segments, segment 1 usually longer than 2. Club 4-segmented, sutures distinct or indistinct. Prothorax widest at or

beyond middle. Ocular lobes absent or present. Scutellum usually invisible. Elytra without humeral callus. Wings vestigial or absent. Prosternum not excavated. Metasternum very short. Metepisternal suture without sclerolepidia. Trochanter usually without an erect seta. Femora unarmed. Tibiae with uncus or mucro on internal angle, when absent then 2 spurs present; without ascendant comb; premucro absent. Tarsi lineal, narrow, seldom with segment 3 slightly wider than 2, soles spongiose, not bristly; segment 3 entire, truncate at tip or slightly emarginate, exceptionally bilobed. Claw segment long, claws free and simple, with short basal seta. Hindgut with rectal ring.

♂♂. Tergite 8 very slightly exposed beyond sternites 7 & 8 with 2 separate plates, having few very short setae; median membrane with microtrichia. Sternite 9 not articulate, with 2 symmetrical arms and with sclerotized lobe; manubrium upcurved. Tegmen moderate in size, ring not articulate laterally, parameres well developed, pubescent or setose. Aedeagus depressed, main body much shorter than apophyses; dorsal surface membranous, ventral surface sclerotized, usually forming a broad ventral plate; apex bare, broadly rounded or slightly emarginate, not apiculate, *i. e.* apex not suddenly narrowed to form a projection. Internal sac well exposed beyond base of main body, usually with basal sclerite which consists of sclerotized folds and not of strongly sclerotized bars or tubes; other armature sometimes present.

♀♀. Sternite 8 with 2 sclerotized arms, with few very short setae and with abundant microtrichia on median membrane. Hemisternites sclerotized; styli apical, usually thick and short, with numerous very short apical setae. Bursa copulatrix with a simple or double cochleariform sclerite in an invagination of ventral surface, seldom without sclerite. Insertion of spermathecal duct at or near base of oviduct at base of sclerite; oviduct bent into invagination of bursa. Spermatheca falciform, with thick base. Spermathecal gland distant from spermathecal duct.

Sculpture and vestiture. The great majority of species with tubercles, or nodules, or other asperities on pronotum and elytra and often also with tufts of multifid hairs or scales; antennae and tarsi often with pruinose-sericeous vestiture.

Type genus: *Phrynixus* Pascoe

Relationships: Although most of the genera to be included here have been placed in Rhyparosominae the internal structures show that Phrynixinae are quite close to Hylobiinae. Phrynixinae can readily be separated from Hylobiinae by the lack of a bare corbel carina. Some fern Phrynixinae resemble very much the Rhyparosominae of ferns, but the former can be separated from the latter by the short seta on mandibles and claws, by the presence of parameres in the ♂♂, and by numerous short setae on the tip of the styli in the ♀♀.

Ecology: All known Phrynixinae are flightless and of nocturnal habits. They occur mainly in forests and dense bush of temperate and cold climates. The habits of the larvae are of 2 different types. Those of 1 group develop in decaying wood and their adults are usually found in leaf litter and under logs in daytime while nothing is known about their food plants. The 2nd group lives in the stipites (petioles) of ferns and their adults hide in daytime in the stock or at the base of the plant while feeding at night upon the pinnae of the fronds.

Geographical distribution: This subfamily occurs in SE Australia, Tasmania, New Zealand, Subantarctic Islands of New Zealand, on the mountains of New Caledonia, and in

southern Chile. No genera have yet been described from New Caledonia or Chile.

Remarks: It seems advisable to give a full list of the genera that belong to Phrynixinae which, with few exceptions, have been under Rhyparosominae. When the previous subfamily has been other than Rhyparosominae it is mentioned in brackets after the name of the genus.

Genera to be transferred to Phrynixinae: *Abrotheus* Broun, *Allaorops* Br., *Allostyphlus* Br., *Amphiskirra* Br., *Araeoscapus* Br., *Astyphlus* Br., *Bradypatae* Br., *Chamaepsephis* Br., *Cuneopterus* Sharp, *Dermotrichus* Shp., *Dinichus* Pascoe, *Dolioceuthus* Broun, *Erymneus* Pascoe, *Halliellara* Schenkling, *Hectaeus* Broun (Cossoninae), *Idus* Br. (Cossoninae), *Lithocia* Br., *Megacolabus* Br., *Pachyprypnus* Br., *Phemus* Br., *Phrynixodes* Br., *Phrynixus* Pascoe, *Rachidiscodes* Broun, *Rachidiscus* Br., *Rystheus* Br., *Styphlotelus* Br., and *Syagrius* Pascoe.

The other genera described as Rhyparosominae have already been mentioned elsewhere in this paper, with the exception of *Bantiades* Broun and *Memes* Broun which are to be transferred to Hylobiinae.

11. Genus **Notonesius** Kuschel, n. gen.

Head globose, not constricted laterally, slightly depressed on dorsum between posterior margins of eyes. Front between eyes about as wide as rostrum at apex. Eyes not protruding, lateral, transverse, broadly elliptical, small, most ommatidia convex, those on hind and lower margin flattened and apparently not functional. Rostrum subcylindric, curved, without carinae. Scrobes invisible in dorsal aspect, directed towards gular angle, subcontiguous underneath, deep, dorsal edge directed below lower angle of eyes. Mandibles without long setae. Prementum bare. Antennae inserted a little in front of middle. Scape reaching eyes. Funicle 7-segmented, segment 1 much longer than 2, segments 3–7 strongly transverse, all segments setose. Club 4-segmented, segment 1 smaller than 2 and loosely joined to rest of club. Prothorax longer than wide, widest beyond middle, convergent towards base and apex, distal constriction moderate on sides. Disc transversely convex, without tubercles or asperities, with shallow median furrow. Ocular lobes absent. Scutellum invisible. Elytra oblong-elliptical, base in concave arch, suture not projected towards prothorax. Ten complete striae, stria 10 very fine and very close to elytral margin for more than proximal 1/2. Interstriae convex, not projected forwards at base, without tubercles. Wings absent. Prosternum in front of coxae longer than behind them, front coxae contiguous, mid coxae very close, mesosternal process very narrow. Metasternum between mid and hind coxae much shorter than width of a middle coxa. Metepisternal suture weak in front, invisible behind. Abdomen not pyriform, ventrites gradually narrowing from base to apex; suture between ventrites 1 & 2 complete, arched in middle, 3 & 4 taken together at least as long as 2. Trochanter without long erect seta. Femora unarmed, moderately clavate. Tibiae nearly straight, with small mucro on internal angle. Tarsi narrow, lineal, segment 3 about as wide as 2, entire, its sole with vestiture on lateral and distal margins; claw segment widening towards apex, claws free, simple, moderate. Vestiture: very scanty, without multifid hairs and without tufts.

♂. Tergite 7 covering most of 8. Sternite 8 with 2 separate plates, setae very few and very short. Sternite 9 strong, upcurved, with thick arms and a large sclerotized lobe. Tegmen not articulate, parameres long, pubescent. Aedeagus with very short body and very long apophyses, these not articulate at base; dorsal surface of aedeagus membranous,

ventral surface membranous on sides, a broad median area softly sclerotized forming a long ventral plate. Internal sac long, without basal sclerite, but with dense fine armature on the walls. ♀. Unknown.

Type species: *Notonesius aucklandicus* n. sp.

Relationships: All the external and internal structures point towards Phrynixinae where it belongs, and more particularly to the group feeding upon ferns. There is no described genus that I know of which is at all closely related to *Notonesius*.

Ecology: The only specimen discovered on Auckland Is. was found in a leaf litter sample. It is almost certain that *Notonesius* is linked as larva and adult to ferns. The intestinal tract of the single available specimen had no vegetable matter, therefore it was not possible to prove the above assumption.

Geographical distribution: So far endemic on Auckland Is. As the gap between the known genera of Phrynixinae living on ferns and *Notonesius* is quite considerable, it is most likely that some other genera and species will be discovered in southern areas of the main islands of New Zealand thus narrowing the existing gap between the genera.

Notonesius aucklandicus Kuschel, n. sp. Figs. 208, 209, 216.

Derm rufo-testaceous, shiny and slightly coriaceous on dorsum and legs dull and alutaceous on ventral surface. No hairs visible on body except under high magnification.

Head very finely punctate. Front with slight median depression, between eyes as wide as rostrum at apex. Rostrum, from distal margin of epistome to front margin of eyes, 1.37× shorter than prothorax, and 2.75× longer than its own distal width, slightly tapering a short distance at base, then cylindric, densely and finely punctate, striolate-punctate beyond antennae, with a rather indistinct smooth median line. Scape clavate at distal 1/3, the stalk smooth, the swollen part striolate-punctate. Funicle setose, segment 1 thick, much longer than 2, 3–7 strongly transverse. Club a little longer than the preceding 6 segments of the funicle, 1.8× longer than wide, oblong-ovate with broadly rounded or subtruncate base and with subacute tip: segmentation very apparent, especially between segment 1 & 2, segment 1, 1.2× shorter than 2, the last 2 segments taken together longer than 2. Prothorax 1.08× longer than wide, widest beyond middle, distal constriction slight on sides, obsolete on dorsum; base reclinate, leaning against basal slope of elytra, arched, with sharp edge; disc with slight longitudinal convexity and with stronger transverse convexity, with a shallow median groove becoming obsolete towards apex; sculpture coriaceous, with fine and very irregular grooves, the intervals between the grooves very shiny and with scattered fine punctures each bearing a fine short hair. Elytra 1.42× wider than prothorax and 1.66× longer than their maximal width, elongate-elliptic, strongly arched at base. Striae sulcate, stria 4 with 27–29 punctures. Interstriae slightly convex, finely coriaceous, with a single row of very fine punctures, 3 & 5 wider and more convex at base with 4 narrower between them. Prosternum shiny, tubular at apex, descending towards coxae. Mesosternal process very narrow, not wider than funicle. Metasternum 1/2 as long as diameter of a mid coxa, alutaceous, with a few obsolete punctures on sides. Metepisternum impunctate. Abdomen alutaceous, with very scattered, fine and shallow punctures, hairs very fine and short, sparse, more dense near distal margin of ventrite 5. Femora finely punctate at base, transversely coriaceous on swollen part, with very fine short hairs. Tibiae straight, alutaceo-

coriaceous, lower edge on distal 1/2 with scattered short bristles; mucro small, forming an obtuse angle with lower edge of tibiae.

♂. Tergite 7 truncate. Sternites 8 & 9 as in fig. 216. Tegmen as in fig. 208, with long pubescent parameres. Aedeagus as in figs. 208, 209, internal sac wider at base, with longitudinal folds, and with fine spinules distributed as shown in fig. 208.

Length 3.30 mm; width 1.35 mm.

AUCKLAND IS. ADAMS I.: 1♂, 13. XI. 1954, Gourlay.

TYPE LOCALITY: Adams I., Auckland Is.

Holotype ♂, data as above, in Entomology Div., D. S. I. R., Nelson.

Ecology: No data, but probably like other fern weevils of this subfamily it hides at the bases of fronds in the daytime and feeds at night. The most likely ferns for this species would be *Blechnum* and *Polystichum*.

12. Genus **Phrynixus** Pascoe, 1875

Phrynixus Pasc., 1875, Ann. Mag. Nat. Hist. ser. 4, **16**: 221 (type species: *Ph. terreus* Pasc.).

It is not possible to define this genus without a critical study of all the closely related genera described by Pascoe, Sharp and Broun.

Ecology: The larvae of *Phrynixus* live in decaying wood. Adults have nocturnal habits and are to be found in forest and bush litter from sea level up to the alpine zones. Nothing is known about host plants. It seems that both larvae and adults have no special preferences.

Geographical distribution: *Phrynixus* is a New Zealand genus with numerous species. Some species have been described from SE Australia, but these need further study before we can say anything about their true relationships.

KEY TO SPECIES OF PHRYNIXUS

1 (2). Funicle with segments 3–7 setose. Club broadly ovate. Elytra with scattered short spines in addition to the usual tufted tubercles or knobs. Wings vestigial. 3.6–4.8 mm. Campbell I., Chatham I., North and South Islands.....**astutus**-complex

2 (1). Funicle with only segment 7 setose. Club oblong-obovate. Elytra without spines apart from the usual tufted tubercles or knobs. Wings absent.

3 (4). Prothorax much wider (1.1×) than long, the sides strongly rounded. Base of interstria 3 neither raised nor thickened. Derm of pronotum and elytra very glossy. 3.5–4.5 mm. Snares Is. ..... **laqueorum**

4 (3). Prothorax about as long as wide, sides nearly parallel in proximal 1/2. Base of interstria 3 thickened and raised. Derm of pronotum and elytra dull, slightly shiny on middle of dorsum only. 3.0–3.5 mm. Auckland Is. (doubtful) North Island of New Zealand..... **thoracicus**

Phrynixus astutus-complex Figs. 202, 203, 210, 211, 217–219, 223, 224.

Phrynixus astutus Pascoe, 1876, Ann. Mag. Nat. Hist. ser. 4, **17**: 59.

Unfortunately, I am forced to leave the 3 specimens from Campbell I. under the general heading of *astutus*-complex as the confusion in the literature could not satisfactorily be

solved without examining the entire type material. ♂ and ♀ genitalia of Campbell I. specimens are given in the figs. 202, 203, 210, 211, 217–219, 223, 224. Length 3.6–4.8 mm; width 2.0–2.5 mm.

Campbell I.: 3, Fleming.

Remarks: The dorso-lateral margin of the aedeagus is unusually broad in the single available ♂ from Campbell I. compared with that in specimens I have examined from elsewhere.

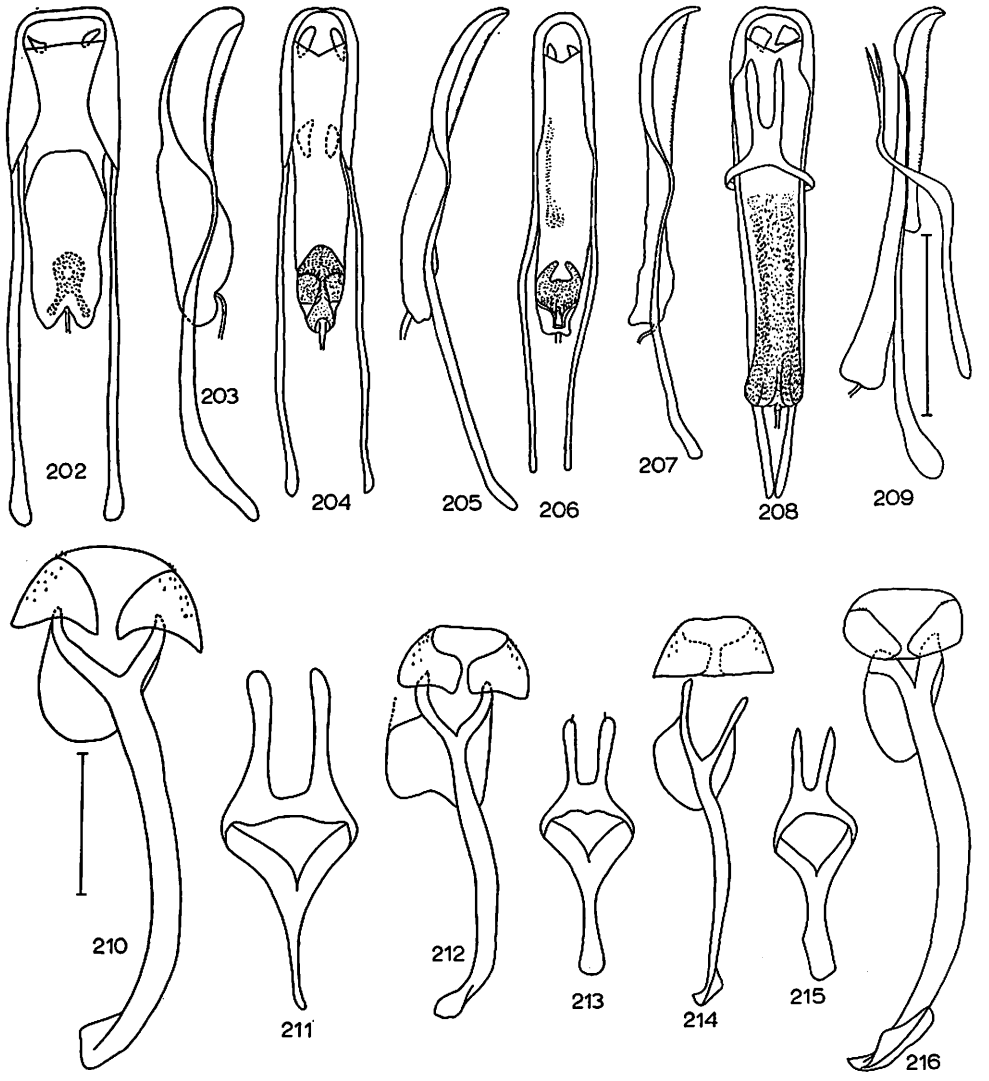
Phrynixus laqueorum Kuschel, n. sp. Figs. 204, 205, 212, 213, 220–222, 225.

Derm piceous, very shiny, antennae, tarsi, part of rostrum and of legs castaneous.

Eyes moderately protruding. Front between eyes 1.20–1.33× narrower than distal width of rostrum, shortly tufted. Rostrum in ♂♂ very slightly shorter than prothorax, 3.7× longer than its distal width, in ♀♀ 1.15× longer than prothorax and 4.5× longer than its distal width; curved, densely squamose, setae short, not tufted, but with a small short tuft on each side just above insertion of antennae. Scape not granulose, covered with scattered scales. Funicle thin, very shiny, with very few fine hairs, only segment 7 setose. Club oblong-obovate, cuneate or slightly pedunculate at base. Prothorax about 1.1× wider than long, sides strongly rounded, disc evenly convex, without depressions and without tubercles, moderately punctate, intervals very glossy. The multifid hairs or scales partly raised forming small tufts. Elytra 1.32–1.46× wider than prothorax, and 1.31–1.37× longer than their maximal width, transversely and longitudinally convex, with a very shallow scutellar depression, truncate at base between protruding basal calli of interstria 5. Striae fine, punctate, intervals as high as interstriae. Interstriae about 2× as wide as striae, very smooth and shiny, without granules or tubercles, with scattered scales not concealing derm and with numerous tufts of setae. Wings absent. Abdomen dull, alutaceous, very finely punctate throughout, suture between ventrites 1 & 2 complete, fine on middle, deep on sides. Legs not pruinose-sericeous, without long setae, femora clavate, tibiae dorsally arched, ventrally sinuous; front tibiae with about 5 short bristles on ventral edge on distal 1/3, all tibiae with rather strong mucro continuous with lower edge of tibiae, stronger in ♂♂ than in ♀♀. Tarsal segment 3 very slightly wider than 2.

♂. Tergite 7 almost entirely covering 8, distal margin weakly emarginate. Tergite 8 truncate but with a very slight emargination in middle. Sternite 8 as in fig. 212, with extremely short setae near latero-apical end of plates, the wide portion of membrane with dense microtrichia. Sternite 9 as in fig. 212. Parameres without pubescence but with setae (fig. 213). Aedeagus as in figs. 204, 205, dorsal surface membranous, ventral surface with a wide softly sclerotized median plate reaching distally as far as plates of ostium and proximally almost as far as apical end of basal sclerite, broadly rounded at tip, truncate at base. Apophyses continuous with aedeagus. Internal sac with a complex basal sclerite as shown in fig. 204.

♀. Tergites 7 & 8 as in fig. 225, distal margin of latter very finely crenulate. Sternite 8 as in fig. 220, the arms broad but laterally without sharp lines; setae extremely short. Hemisternites subcontiguous, undivided, without setae; styli apical with papillae, without setae. Bursa copulatrix with a long cochleariform sclerite, in the hollow of sclerite lies the oviduct, which is shown evaginated in fig. 221. Spermatheca with short projection at insertion of duct.



Figs. 202–216. Phrynixinae, ♂♂. *Phrynixus astutus*-complex, Campbell I.: 202, aedeagus, dorsal; 203, aedeagus, lateral; 210, sternites 8 & 9, ventral; 211, tegmen, dorsal. *Phrynixus laqueorum* n. sp., Snares: 204, aedeagus, dorsal; 205, aedeagus, lateral; 212, sternites 8 & 9, ventral; 213, tegmen, dorsal. *Phrynixus thoracicus* (Broun), Auckland Is.: 206, aedeagus, dorsal; 207, aedeagus, lateral; 214, sternites 8 & 9, ventral; 215, tegmen, dorsal. *Notonesius aucklandicus* n. sp., Adams I., Auckland Is.: 208, aedeagus, dorsal; 209, aedeagus, lateral; 216, sternites 8 & 9, ventral. (Scales beside figs. equal 0.5 mm. Figs. 202–207, 210–215 same scale; figs. 208, 209, 216 same scale).

Length 3.5–4.5 mm; width 1.8–2.2 mm.

SNARES IS.: 7♂♂, 3♀♀, Falla, Fleming, XI., XII. 1947.

TYPE LOCALITY: Snares Is.

Holotype ♂, 3.5×1.85, Snares, XI. 1947, from tussock roots and debris, Falla, allotype ♀ and paratypes in Dominion Mus., Wellington. Other paratypes in Entomology Div., D. S. I. R., Nelson, and Bishop Mus., Honolulu.

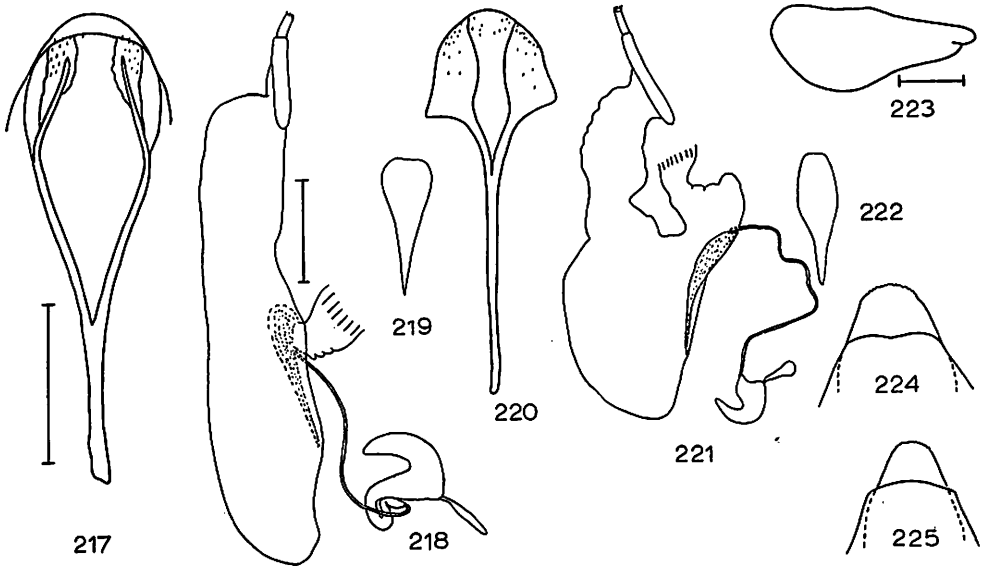
Ecology: All specimens were obtained at the base of tussock.

Remarks: So far, I have not seen close relatives of this species from the main islands of New Zealand. The general facies is not unlike that of *Ph. squamalis* Broun from northern South Island. Very striking characters of the new species are the very glossy derm that can be seen through the vestiture and also the lack of a basal impression on the pronotum.

Phrynixus thoracicus (Broun), n. comb. Figs. 206, 207, 214, 215.

Br., 1893 Man. N. Z. Coleopt. **1893** (7): 1474 (*Chamaepsephis*); 1893, Ann. Mag. Nat. Hist. ser. 6, **12**: 300 (*Araeoscapus*, No. 2553).
curvirostris Br., 1921, Bull. N. Z. Inst. **1** (7): 639 (*Dermotrichus*). **New Synonymy.**
fasciculatus Br., 1910, *Ibid.* **1** (1): 62 (*Araeoscapus*). **New Synonymy.**
mucronatus Br., 1910, *Ibid.* **1** (1): 63 (*Araeoscapus*). **New Synonymy.**
obscurus Br., 1893, Man. N. Z. Coleopt. **1893** (7): 1475 (*Chamaepsephis*); 1893, Ann. Mag. Nat. Hist. ser. 6, **12**: 300 (*Araeoscapus*, No. 2554). **New Synonymy.**
remotus Brookes, 1951, Cape Exp. Ser. Bull. **5**: 54, f 16 (*Phrynixus*). **New Synonymy.**

The single specimen described by Brookes as *Phrynixus remotus* from Auckland Is. has exactly the same data as the *Nestrius bifurcus* specimen mentioned above under this species.



Figs. 217–225. *Phrynixus* spp., ♀♀. *Ph. astutus*-complex, Campbell I.: 217, sternite 8, ventral; 218, genitalia, lateral; 219, bursal sclerite ventral; 223, left wing; 224, tergites 7 & 8. *Ph. laqueorum* n. sp., Snares: 220, sternite 8, ventral; 221, genitalia, lateral (bursal sclerite evaginate); 222, bursal sclerite, ventral; 225, tergites 7 & 8. (Scales beside figs. 217, 218 equal 0.5 mm; beside fig. 223 equals 0.1 mm. Figs. 217, 220 same scale; figs. 218, 219, 221, 224, 225 same scale).

It is probable that both specimens have been obtained out of a leaf litter sample from an area near Wellington, North Island and wrongly labelled as being from Auckland Is. It is clear that *remotus* Brookes is a North Island species which has been described several times by Broun. The ♂ genitalia of the Auckland Is. specimen are figured in this paper (figs. 206, 207, 214, 215). Length 3.0–3.6 mm; width 1.50–1.75 mm.

AUCKLAND IS.: No definite locality or date, 1♂, 1944, Turbott.

NORTH ISLAND: Common species throughout south of parallel 37.

TYPE LOCALITIES AND TYPES: (1) *curvirostris* Broun, Wadestown, Wellington, in Brit. Mus., Lond. (2) *fasciculatus* Broun, Waimarino, BMNH. (3) *mucronatus* Broun, Waimarino, BMNH. (4) *obscurus* Broun, Mt. Pirongia, BMNH. (5) *remotus* Brookes, 3.0 × 1.55 mm, Auckland Is., in Dominion Mus., Wellington. (6) *thoracicus* Broun, Mt. Pirongia, BMNH.

Ecology: Common in forest litter from lowland up to 1000 m and higher.

Remarks: I am very thanklul to Mr. R. T. Thompson for helping to sort out synonymy of this species.

Subfamily LEPTOPIINAE

13. Genus **Platyomida** White, 1846

Platyomida White, 1846, Voy. Erebus aud Terror **11**: 14 (type species: *Pl. binodis* White). —Sharp, 1886, Trans. Roy. Dublin Soc. ser. 2, **3**: 415.—Broun, 1893, Man. N. Z. Coleopt. **1893** (5): 1186 (note).

Empaeotes Pascoe, 1876, Ann. Mag. Nat. Hist. ser. 4, **18**: 59 (type species: *Em. crispatus* Pascoe).—Broun, 1893, Man. N. Z. Coleopt. **1880** (1): 441.—Sharp, 1886, Trans. Roy. Dublin Soc. ser. 2, **3**: 415.

Eurynotia Broun, 1893, Man. N. Z. Coleopt. **1880** (1): 440 (type species: *E. pulcherrima* Broun).—Sharp, 1886, Trans. Roy. Dublin Soc. ser. 2, **3**: 415.

Rostrum distinctly longer than wide, length from distal margin of epistome to front margin of eyes. Scrobes narrow, directed towards lower 1/2 of eyes. Prementum bare. Pronotum with a broad median furrow. Margins of ventrite 5 with a very sharp edge throughout.

♂. Internal sac exposed beyond base of main body of aedeagus.

♀. Sternite 8 symmetrical, notched or excised at tip, with long setae.

Relationships: There are several close relatives in the faunas of New Zealand and New Caledonia.

Ecology: Apparently confined to forests and bush. The larvae are subterraneous, ectophytic, and polyphagous. The adults occur on trees and shrubs and are nocturnal.

Geographical distribution. Restricted to New Zealand and adjacent islands, including Snares and Chatham Is.

Platyomida brevicornis australis Kuschel, n. subsp. Figs. 226–234.

Elevations on interstria 3 & 5 at end of dorsum low, nodules absent on upper part of elytral declivity and on proximal 1/2 of interstria 7 as well. Wing/elytron ratio .26.

♂. Sternite 9 as in figs. 229, 230, very thick and strongly upcurved. Aedeagus as in

figs. 226, 227, tip broad, spatulate. Internal sac almost reaching middle of apophyses, with a dorso-apical bulb at insertion of ejaculatory duct; walls with very small broad spicules, these more dense at base and at a short distance from base.

♀. Sternite 8 as in fig. 234, symmetrical. Hemisternites as in figs. 231, 232, brad in lateral aspect, the distal part with slight trace of an apico-ventral lobe, the proximal part with a strongly sclerotized ventral stripe. Bursa copulatrix folded and invaginated along ventral surface, without armature. Spermathecal duct very long and thin, its bursal end strongly expanded, inserted near base of oviduct. Spermatheca as in fig. 231, but general shape individually quite variable.

Length 11.6–14.3 mm; width 4.4–6.1 mm.

SNARES IS.: 1♂, 15. XI. 1907, Hudson.; 3♂♂, 1♀, 31. I. 1961, Knox.

TYPE LOCALITY: Snares Is.

Holotype ♂, 12.0×4.4 mm, 31.I.1961, Knox, and allotype ♀ in Canterbury Mus., Christchurch, paratypes in Entomology Div., D.S.I.R., Nelson and Dominion Mus., Wellington.

Ecology: Collected on *Olearia lyallii* (Compositae).

Remarks: *Platyomida brevicornis brevicornis* Broun, 1904 was described from a single specimen from Puysegur Point, SW South Island. It occurs also in Bluff, Halfmoon Bay, Mt. Anglem, and Chatham Is. The armature of the internal sac in the ♂ and the ♀ genitalia are specific, therefore I do not hesitate in regarding the population of Snares Is. as a simple geographical race of *brevicornis*, although the tip of the aedeagus is very different in these 2 subspecies being narrow and apiculate in *brevicornis* s. str., and broad and spatulate in *australis*. I wish to thank Mr. R. T. Thompson for examining the type of *brevicornis* Broun. The Chatham Is. specimens have been described as *Platyomida versicolor* Broun, 1911.

14. Genus **Heterexis** Broun, 1909

Heterexis Br., 1909, Subantarct. Is. N. Z. **1**: 113 (type species: *H. sculptipennis* Br.).
Campbellorhinus Brookes, 1951, Cape Exp. Ser. Bull. **5**: 50 (type species: *C'rhinus seticostatus* Br.). **New Synonymy.**

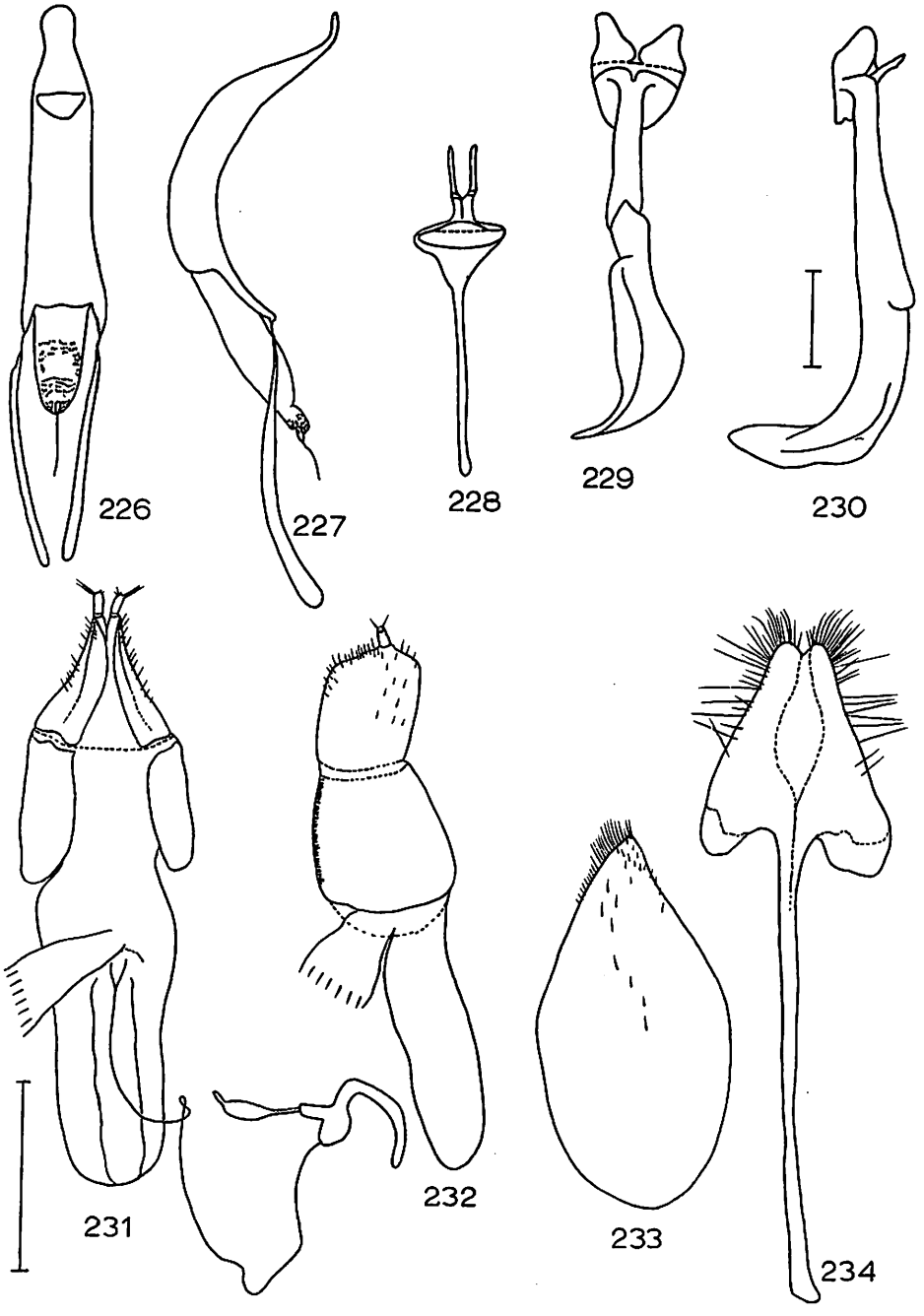
Rostrum very thick and short, very slightly longer than wide. Scrobes strongly widened and directed downwards below lower angle of eyes. Prementum bare. Pronotum with a broad continuous or interrupted median furrow. Margins of ventrite 5 without a sharp edge.

♂. Internal sac contained in main body of aedeagus, not exposed beyond base.

♀. Sternite 8 symmetrical, acute at tip, with short setae.

Relationships: All 3 genera of Leptopiinae which are endemic to the Subantarctic Islands of New Zealand show clear relationships with *Platyomida* White in having in common broad hemisternites that lack sclerotized struts and in having a short vagina and a short bursa copulatrix. *Heterexis* shares with *Platyomida* also a bare prementum, but differs by having a very short rostrum, strongly widening scrobes that are directed downwards, a non-exposed internal sac in the ♂, and an acute sternite 8 in the ♀.

Ecology: Ground weevils of nocturnal habits found in daytime under stones and other objects, and particularly at the base of plants. The larvae are subterraneous living upon roots.



Figs. 226-234. *Platyomida brevicornis australis* n. spp., Snares; 226, aedeagus, dorsal; 227, aedeagus, lateral; 228, tegmen, dorsal; 229, sternite 9 of ♂, ventral; 230, sternite 9, lateral; 231, ♀ genitalia, ventral; 232, *idem*, lateral; 233, tergite 7, lateral; 234, sternite 8, ventral. (Scales beside figs. equal 1.0 mm. Figs. 226-230 same scale; figs. 231-234 same scale.)

Geographical distribution: The 2 species are confined to Auckland and Campbell Is. with 1 species on each.

KEY TO SPECIES OF HETEREXIS

Derm black. Rostrum not carinate. Scales on dorsum of elytra piliform, linear, or lanceolate. ♂: aedeagus as in figs. 235, 236. ♀: ventrite 5 deeply excised. Larger species. 13.8–18.5 mm. Auckland Is. ..... **sculptipennis**

Derm fuscous or piceous. Rostrum carinate. Scales on dorsum of elytra ovate. ♂: aedeagus as in figs. 243, 244. ♀: ventrite 5 slightly emarginate. Smaller species. 8.8–11.7 mm. Campbell I. ..... **seticostatus**

Heterexis sculptipennis (Brookes) Broun, 1909 Figs. 235–242.

Brn., 1909, Subantarct. Is. N. Z. 1: 114.—Brookes, 1951, Cape Exp. Ser. Bull. 5: 53.

Derm very black. Scales on dorsum of elytra piliform, linear or lanceolate. Rostrum without median carina. Elytra nodulose, the dorsal uneven interstriae costate mainly on proximal 1/2, also the even interstriae often nodulose. Ventrite 5 of ♀ deeply excised. Wing/elytron ratio .16. ♂: Sternite 9 as in figs. 238, 239, moderately upcurved. Aedeagus long, parallel, transversely convex, the tip broad and rounded; apophysis directly attached to main body, strongly sinuous; internal sac hidden in the strongly sclerotized aedeagus (figs. 235, 236). ♀: Sternite 8 symmetrical, apiculate and acute (fig. 242). Hemisternites as in figs. 240, 241, tip rounded, styli moderately long; bursa copulatrix longitudinally depressed on ventral surface; spermathecal duct short with thickened walls, its bursal end not expanded; spermatheca as in fig. 241, but shape a little variable. Length 13.8–18.5 mm; width 5.3–8.7 mm.

AUCKLAND IS. AUCKLAND I.: Wilkes Peak, elytra only. ADAMS I.: 18 obtained at all altitudes in Aug., Sept., Nov., & Feb.

TYPE LOCALITY: Adams I., Auckland Is. Lectotype ♂, 15.0×6.1 mm, Adams I., 18.XI. 1907, Speight in Dominion Mus., Wellington.

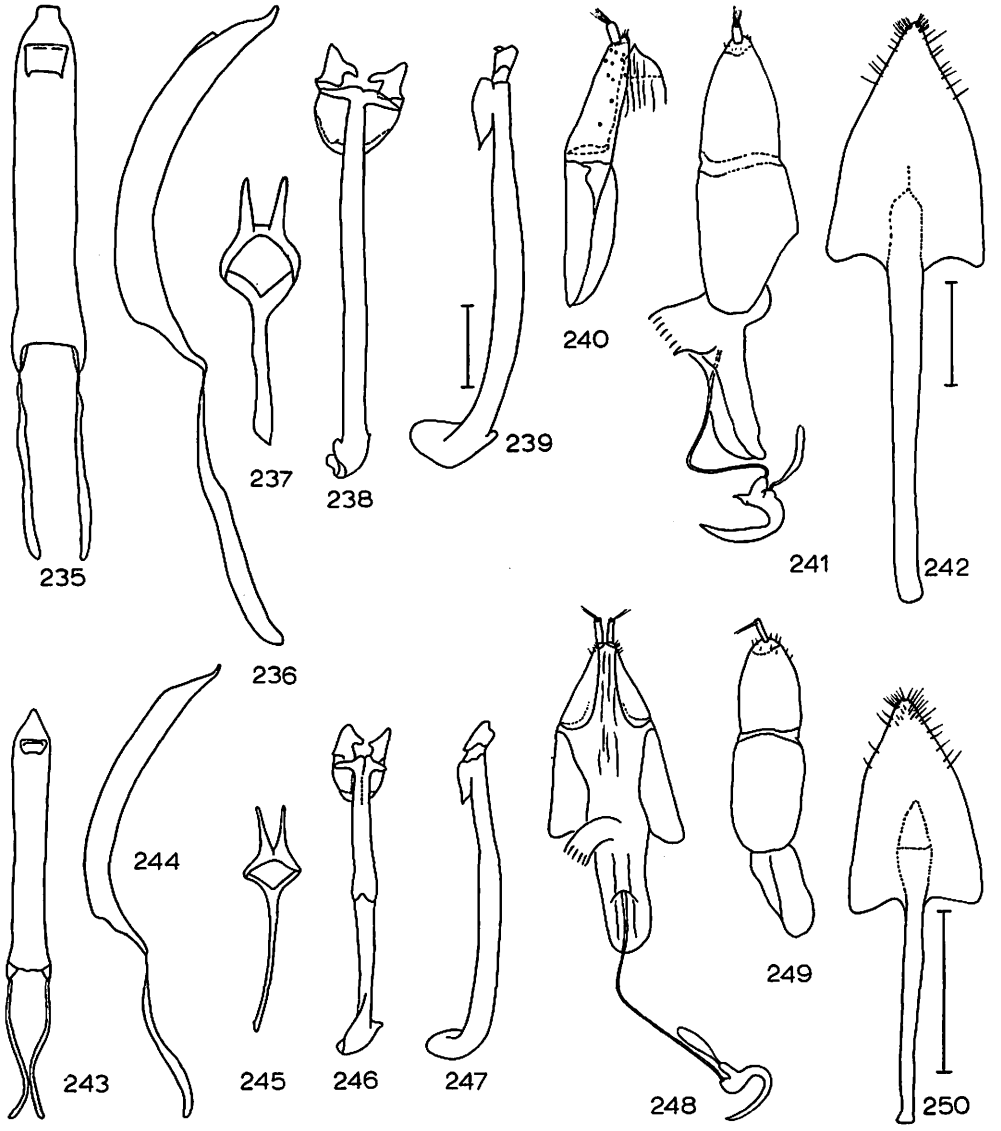
Ecology: Common under stones and at the base of plants from lowland to the high ranges in Adams I.

Remarks: This is probably the only species that shows a limited range of distribution in the Auckland Is., being so far restricted to Adams I. and to the southern Auckland I. (main island). Brookes has suggested that the elytra found on Wilkes Peak, South Auckland I. could have been carried by a bird. As this seems to be very unlikely, I assume that the species actually occurs on the southern main island.

Heterexis seticostatus (Brookes), n. comb. Figs. 243–250, 275f.

Brookes, 1951, Cape Exp. Ser. Bull. 5: 50, f 14 (*Campbellorhinus*).

Derm fuscous or piceous. Scales on dorsum of elytra ovate. Rostrum with a fine median carina. Elytra with uneven interstriae raised and slightly nodulose on distal part, the even interstriae not at all nodulose. Ventrite 5 of ♀ weakly emarginate at tip. Wing/elytron ratio .10. ♂: Sternite 9 as in figs. 246, 247. Aedeagus as in figs. 243, 244, apiculate and acute at tip. ♀: Sternite 8 as in fig. 250; genitalia as in figs. 248, 249. Length 8.8–11.7 mm; width 3.5–5.3 mm.



Figs. 235–250. *Heterexis* spp. *H. sculptipennis* Broun, Adams I., Auckland Is.: 235, aedeagus, dorsal; 236, *idem*, lateral; 237, tegmen, dorsal; 238, sternite 9 of ♂, ventral; 239, *idem*, lateral; 240, hemisternite, ventral; 241, genitalia, lateral; 242, sternite 8 of ♀, ventral. *H. seticostatus* (Brookes), Campbell I.: 243, aedeagus, dorsal; 244, *idem*, lateral; 245, tegmen, dorsal; 246, sternite 9 of ♂, ventral; 247, *idem*., lateral; 248, ♀ genitalia, ventral; 249, *idem*., lateral; 250, sternite 8 of ♀, ventral. (Scales besides figs. equal 1.0 mm. Figs. 235–239 same scale; figs. 240–247 same scale; 248–250 same scale.)

CAMPBELL I.: Windlass Bay, St. Col Peak Ridge, Yvon Villarceau Peak region, Tucker Cove, Garden Cove, and Lookout Bay. Total, 96 specimens found in most months of the year.

TYPE LOCALITY: Windlass Bay, Campbell I. Holotype ♂, 9.1×3.7 mm, Windlass Bay, 22. XI. 1947, Sorensen, in Dominion Mus., Wellington.

Ecology: It seems to be particularly common at the base of *Bulbinella rossii* (Liliaceae).

Remarks: This is the only adelognathous curculionid endemic to Campbell I. Although its general appearance is quite striking and different from that of *H. sculptipennis* these 2 species are actually very closely related.

15. Genus **Oclandius** Blanchard, 1853

Oclandius Bld., 1853, Voy. Pôle Sud **4**: 202 (type species: *O. cinereus* Bld.).
Aucklandius Gemminger & Harold, 1871, Cat. Coleopt. **8**: 2242 (emend.).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 194.
Catodryobius Broun, 1909, Subantarct. Is. N. Z. **1**: 108 (type species: *C. vestitus* Br.).
Inocatoptes Br., 1902, Trans. Proc. N. Z. Inst. **34**: 178 (type species: *I. incertus* Broun); 1909, Subantarct. Is. N. Z. **1**: 112. **New Synonymy.**

Rostrum short and thick. Scrobes wide, directed towards lower angle of eyes. Lateral genal suture visible as a proximal foveiform impression. Prementum with a pair of setae. Pronotum at least partly raised along median line, without a median furrow. Front and mid tibiae with mucro and spurs.

♂. Aedeagus with a sloping flat surface on each side. Internal sac exposed beyond base of main body, without a basal sclerite; ejaculatory duct thin, not coiled.

♀. Sternite 8 strongly asymmetrical. Hemisternites broad. Bursa copulatrix with a ventral longitudinal invagination, without ampulla at spermathecal duct insertion; spermathecal duct thin at both ends, inserted a short distance from base of oviduct.

Relationships: Related as a whole to *Platyomida* and *Heterexis*, but readily separable by the presence of a pair of setae on the prementum and by the internal features in both sexes.

Ecology: The species of Snares Is. seems to have very much the same habits as those of *Platyomida* in that the adults occur on woody plants, on trees and shrubs, whilst the other 2 species seem to be strictly confined to the ground occurring under stones, and logs and at the base of plants. The larvae are in the soil, usually at a depth of 5–30 cm. Only those of *C. cinereus* have been collected so far. They were feeding upon the roots of *Bulbinella rossii* (Liliaceae).

Geographical distribution: The 3 species of this genus are restricted to the Subantarctic Islands. One is endemic on Snares Is., 1 is confined to Auckland Is., and the 3rd is common to Auckland and Campbell Is.

KEY TO SPECIES OF OCLANDIUS

1 (4). Segment 7 of funicle not transverse, fig. 268. Elytra of ♂♂ shorter, not more than 1.8× longer than wide. ♀♀ smaller, the hemisternites with an apicoventral lobe.

2 (3). Derm dull. Rostrum distinctly carinate along median line and with a longitudinal depression on each side of carina. Mandibles usually with 3 or 4 long setae. 11.5–16.0 mm. Snares Is. ..... **vestitus**

3 (2). Derm shiny. Rostrum with a smooth not distinctly raised median line, without a longitudinal impression on each side of median line. Mandibles usually with 5 or more long setae. 12.1–18.1 mm. Auckland Is., Campbell I. ..... **cinereus**

4 (1). Segment 7 of funicle strongly transverse, fig. 269. Elytra of ♂♂ very elongate, more than 1.9× longer than wide. ♀♀ larger, the hemisternites with rounded tip, without an apico-ventral lobe. 17.5–23.4 mm. Auckland Is. ... **laeviusculus**

Oclandius vestitus (Broun), n. comb. Figs. 251–254, 262, 263.

Broun, 1909, Subantarct. Is. N. Z. **1**: 109, pl. 3: 10 (*Catodryobius*).—Hudson, 1909, *Ibid.* **1**: 58 (*Catadryobius*, sic.).

Derm dull. Rostrum thinner than in the other species, the pterygia more strongly rounded and laterally protruding, thus latero-apical angle of rostrum rounded; distinctly carinate along the median line and with a longitudinal impression on each side of carina. Mandibles with 3 or 4 long setae. Prementum with a pair of very short setae. Antennae usually reaching beyond margins of eyes. Prothorax uniformly squamose, punctate-coriaceous, with a distinctly raised median line at least on distal 1/2. Elytra with semierect setae on all interstriae, setae a little tufted on interstria 3, 5, & 7. Wing/elytra ratio .12. ♂: Sternite 9 as in fig. 254, with very long manubrium. Aedeagus as in figs. 251, 252, the tip rather broad. ♀: Sternite 8 as in fig. 263. Hemisternites as in fig. 262, spermathecal duct relatively short. Length 11.5–16.0 mm; width 4.9–7.0 mm.

SNARES IS.: 20 collected from Nov.–Feb. by Fleming, Hudson, and Knox.

TYPE LOCALITY: Snares. Holotype in Brit. Mus., Lond.

Ecology: This species is found on *Olearia lyallii* (Compositae) together with *Platyomida brevicornis australis*. It thus seems to have very different habits from those of the other 2 species of the genus which are strictly ground inhabitants.

Remarks: It is a distinct species, but very close to *O. cinereus* Blanchard from Auckland Is. and Campbell I.

Oclandius cinereus (Blanchard), 1853 Figs. 255–258, 264, 265, 268, 275g.

Bld., 1853, Voy. Pôle Sud **4**: 203, pl. 13: 17 (*Ryssocarpus* on plate).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 194 (*Aucklandius*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 45 (*Aucklandius*).

aterrimus aterrimus Brookes, 1951, *Ibid.* **5**: 48 f 13 (*Aucklandius*). **New Synonymy.**

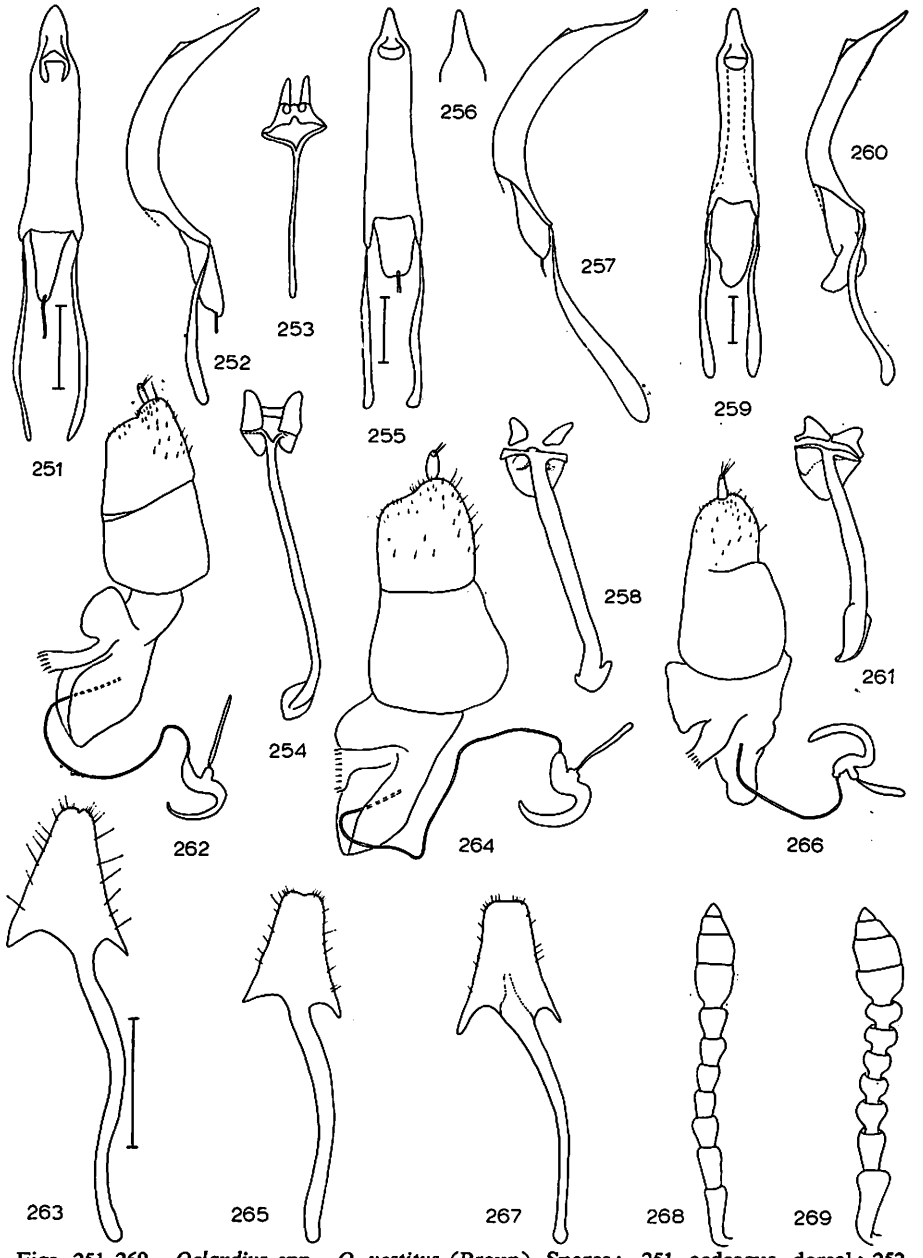
aterrimus aucklandicus Br., 1951, *Ibid.* **5**: 49 (*Aucklandius*). **New Synonymy.**

benhami Broun, 1909, Subantarct. Is. N. Z. **1**: 110 (*Catodryobius*).—Hudson, 1909, *Ibid.* **1**: 60 (*Catadryobius*, sic!).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 45 (*Aucklandius*).

cupreosus Br., 1951, *Ibid.* **5**: 47, f 12 (*Aucklandius*). **New Synonymy.**

erubescens Broun, 1909, Subantarct. Is. N. Z. **1**: 111, pl. 3: 1 (*Catodryobius*).—Hudson, 1909, *Ibid.* **1**: 61 (*Catadryobius*, sic!).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 45 (*Aucklandius*).

incertus Broun, 1902, Trans. Proc. N. Z. Inst. **34**: 178 (*Inocatoptes*); 1909, Subantarct. Is. N. Z. **1**: 113 (*Inocatoptes*).—Hutton, 1902, Trans. Proc. N. Z. Inst. **34**: 175 (*Inocatoptes*).—Gourlay, 1950, *Ibid.* **78**: 196 (*Inocatoptes*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 53 (*Inocatoptes*). **New Synonymy.**



Figs. 251–269. *Oclandius* spp. *O. vestitus* (Broun), Snares: 251, aedeagus, dorsal; 252, *idem.*, lateral; 253, tegmen, dorsal; 254, sternite 9 of ♂, ventral; 262, ♀ genitalia, lateral; 263, sternite 8 of ♀, ventral. *O. cinereus* Blanchard, Ranui Cove, Auckland Is.: 255, aedeagus, dorsal; 256, *idem*, apex; 257, *idem*, lateral; 258, sternite 9 of ♂, ventral; 264, ♀ genitalia, lateral; 265, sternite 8 of ♀, ventral; 268, antenna. *O. laeviusculus* (Broun), ♂ from Summit Dome, Adams I., ♀ from Disappointment I., Auckland Is.: 259, aedeagus, dorsal; 260, *idem*, lateral; 261, sternite 9 of ♂, ventral; 266, ♀ genitalia, lateral; 267, sternite 8 of ♀, ventral; 269, antenna. (Scales beside figs. equal 1.0 mm. Figs. 251–254, 265, 266, 268, 269 same scale; figs. 255–258, 267 same scale; figs. 259–261 same scale; figs. 262–264 same scale).

sorenseni Br., 1951, Cape Exp. Ser. Bull. **5**: 46, f 11 (*Aucklandius*). **New Synonymy.**
tetricus Broun, 1909, Subantarct. Is. N. Z. **1**: 110, pl. 3: 11–13 (*Catodryobius*).—Hudson, 1909, *Ibid.* **1**: 60 (*Catadryobius*, sic!)—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 45 (*Aucklandius*).

Derm piceous or black. Rostrum thick, widening very little at tip, pterygia visible from above but not or very slightly protruding, latero-apical angle of rostrum forming a right angle; median line smooth, not raised, without longitudinal impression on each side of median line. Mandibles with 5 or more long setae. Prementum with a pair of long setae. Scape seldom reaching beyond hind margin of eyes; all segments of funicle longer than wide. Prothorax with fine scattered punctures, disc with fine sparse scales, lateral margins with vitta of larger and denser scales, distal 1/2 of median line slightly and broadly raised, disc usually with a rounded or transverse depression on middle of each side. Elytra of ♂♂ less than 1.8× longer than wide, often interstria 3, 5 & 7 convex or raised; setae indistinct, or sometimes distinct on uneven interstriae only, but not clearly tufted. Wing/elytron ratio .14–.16. ♂: Sternite 9 as in fig. 258, with thick short manubrium. Aedeagus as in figs. 255–257, its dorsal surface in lateral aspect gently curved also in middle, distal part apiculate, narrow, subject to individual variations. ♀: Sternite 8 as in fig. 265, distal margin either gently emarginate, or truncate, or rounded. Hemisternites very broad, the distal portion with a broad apico-ventral lobe. Spermathecal duct long, rather thin; spermatheca somewhat variable at insertion of duct and gland, fig. 264. Length 12.0–18.8 mm; width 4.8–8.7 mm.

AUCKLAND IS. Generally spread on islands and islets, found so far on Auckland I. (main island), Ocean I., Rose I., Ewing I., Enderby I., and Adams I. Total, 116 specimens collected from Aug.–Feb.

CAMPBELL I. Also generally distributed on the island. Total of 256 specimens.

TYPE LOCALITIES AND TYPES: (1) *aterrimus aterrimus* Brookes: holotype ♂, 16.1×6.6 mm, Mt. Puiseux, Campbell I., 24. I. 1943, Sorensen, in Dominion Mus., Wellington. (2) *aterrimus aucklandicus* Brookes: holotype ♂, 15.1×6.6 mm, Dome, 640 m, Adams I., Auckland Is., 18. XI. 1944, Turbott, in Dominion Mus., Wellington. (3) *benhami* Broun: holotype ♂, Enderby I., Auckland Is., 27.XI.1907, Benham, in Brit. Mus., Lond. (4) *cinereus* Blanchard: Auckland Is. (Port Ross), probably in Laboratoire d'Entomologie, Paris. (5) *cupreosus* Brookes: holotype ♂, 14.8×6.0 mm, Mt. Honey, Campbell I., 1.I.1943, Sorensen, in Dominion Mus., Wellington. (6) *erubescens* Broun: holotype ♂, 14.3×5.8 mm, Carnley Harbor, Auckland Is., 20. XI. 1907, Benham, in Dominion Mus., Wellington. (7) *incertus* Broun: holotype ♀, about 15.0–6.7 mm (a very teneral specimen with crushed elytra), highland at the head of Port Ross, Auckland Is., I. 1901, Butler, in Canterbury Mus., Christchurch. (8) *sorenseni* Brookes: holotype ♂, 15.1×6.0 mm, Head of Tucker Cove, 20 m, Perseverance Harbor, Campbell I., 10. XI. 1945, Sorensen, in Dominion Mus., Wellington. (9) *tetricus* Broun: Carnley Harbor, Auckland Is., 17–20. XI. 1907, Hudson, in Brit. Mus. Lond.

Ecology: A very common species occurring from supralittoral zone to highlands throughout Auckland and Campbell islands. It is probably a more or less polyphagous species, but has commonly been found associated with *Bulbinella rossii* (Liliaceae), a broad-leafed summer green perennial herb which is abundant in open moist situations. The adults feed upon the leaves of this plant at night and hide at the base in daytime. Larvae and pu-

pae have been secured around the rootstock of *Bulbinella rossii* as deep as 30 cm in the soil in both Auckland and Campbell Is.

Remarks: The number of synonyms could suggest a high degree of variation in this species. As a matter of fact, the range of variation is absolutely normal for large species inhabiting cold climates. A comparison of the populations of Auckland Is. with those of Campbell I. do not show any significant difference. The only slight difference, from a statistical point of view, is that the vestiture on the dorsum of the elytra consists mostly of scales in the Auckland Is. specimens whereas it is mostly of hairs in a large number of Campbell I. specimens. As a whole the vestiture is more variable in Campbell I. specimens than in Auckland Is. ones. Very hairy and very scaly specimens occur together under the same plant on Campbell I. as abundant recent collecting has clearly shown.

Oclandius laeviusculus (Broun), n. comb. Figs. 259–261, 266, 267, 269.

Br., 1902, Trans. Proc. N. Z. Inst. **34**: 179 (*Lyperobius*); 1909, Subantarct. Is. N. Z. **1**: 114 (*Heterexis*).—Hutton, 1902, Trans. Proc. N. Z. Inst. **34**: 175 (*Lyperobius*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 54 (*Heterexis*).

grandis Broun, 1909, Subantarct. Is. N. Z. **1**: 112, pl. 3: 15 (*Catodryobius*).—Hudson, 1909, *Ibid.* **1**: 61 (*Catadryobius*, sic!).—Gourlay, 1950, Trans. Proc. Roy. Soc. N. Z. **78**: 195 (*Aucklandius*).—Brookes, 1951, Cape Exp. Ser. Bull. **5**: 46 (*Aucklandius*). **New Synonymy.**

Very close to *cinereus*. Last segments of funicle broader and more distinctly stalked at least the 7th transverse, fig. 269. ♂♂ more elongate, always more than 1.8×, usually more than 1.9× longer than wide. Smallest ♀♀ more than 20 mm long. The squamose vestiture distinctly narrower, scales mostly piliform, others of lineal or lanceolate order. Setae of elytra longer, loosely tufted. Wing/elytron ratio .12. ♂: Sternite 9 as in fig. 261. Aedeagus as in figs. 259, 260, its dorsal surface in lateral aspect slightly depressed in middle, with or without a longitudinal groove. ♀: Sternite 8 as in fig. 267. Distal portion of hemisternites rounded, without an apico-ventral lobe; spermathecal duct short (fig. 266). Length 17.0–23.4 mm; width 6.8–10.8 mm.

AUCKLAND IS. Found so far on Ewing I., French I., Adams I., and Disappointment I. Total, 37 specimens collected from Nov.–Jan.

TYPE LOCALITY: highland of Adams I., Auckland Is. Types. (1) *laeviusculus* Broun: highlands of Adams I., I.1901, Bollans, in Brit. Mus., Lond. (2) *grandis* Broun: holotype ♀, 21.7×9.5 mm, Disappointment I., Auckland Is., 28.XI.1907, Browne, in Dominion Mus., Wellington.

Ecology: A ground species found from the supralittoral zone to the highlands under logs and stones, but more commonly under *Pleurophyllum* (Compositae), *Stilbocarpa* (Araliaceae), and *Anisotome* (Umbelliferae).

Remarks: It is interesting that this species has, so far, not been collected on the main island of the Auckland Is.

16. Genus **Catodryobiolus** Brookes, 1951

Catodryobiolus Br., 1951, Cape Exp. Ser. Bull. **5**: 51 (type species: *C. antipoda* Br.).

Rostrum short and thick. Scrobes wide, directed towards lower angle of eyes. Lateral

genal suture visible as a long sinuous furrow almost reaching tip of rostrum. Prementum with a pair of setae. Pronotum at least partly raised along the median line without a broad median furrow. Front and middle tibiae with mucro without spurs.

♂. Aedeagus evenly convex on dorsal surface, without a sloping flat surface on each side. Internal sac contained in main body of aedeagus, not exposed beyond base of main body, with a long strong basal sclerite. Ejaculatory duct very thick and coiled.

♀. Sternite 8 as in fig. 274, symmetrical. Hemisternites broad. Bursa copulatrix without a ventral longitudinal invagination, with an ampulla at spermathecal duct insertion. Spermathecal duct gradually and strongly thickening towards its bursal end.

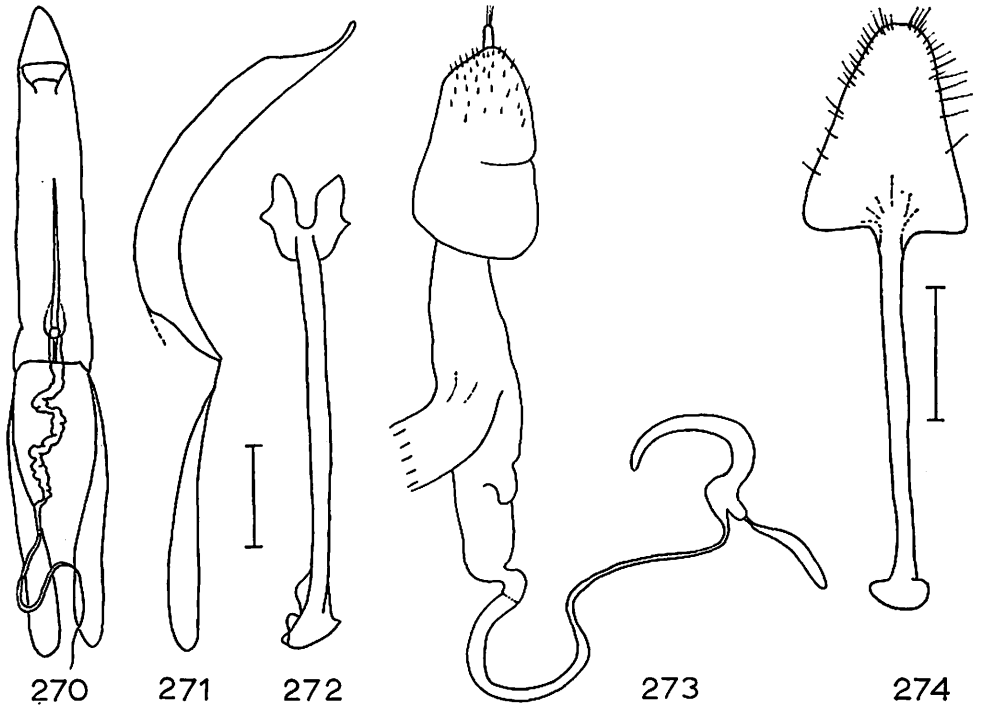
Relationships: Related to *Oclandius* Blanchard and differing mainly by the very peculiar internal genitalic structures.

Ecology: A ground weevil with the same ecological requirements as *Oclandius* and *Heterexis*.

Geographical distribution: Endemic to Auckland and Campbell islands.

Catodryobiolus antipoda Brookes, 1951 Figs. 270–274, 275h.

Br., 1951, Cape Exp. Ser. Bull. **5**: 52, f 15.



Figs. 270–274. *Catodryobiolus antipoda* Brookes, Auckland Is.: 270, aedeagus, dorsal; 271, *idem.*, lateral; 272, sternite 9 of ♂, ventral; 273, ♀ genitalia, lateral; 274, sternite 8 of ♀, ventral. (Scales beside figs. equal 0.5 mm. Figs. 270–272 same scale; figs. 273, 274 same scale.)

Derm fuscous. Vestiture with appressed hairs and with lineal or lanceolate scales; elytra with loosely tufted setae on weak elevations. Rostrum with a fine median carina. Pterygia and scrobes visible in dorsal aspect. Scape reaching beyond hind margin of eyes. Prothorax alutaceous with a sharp median carina abbreviated at base and apex. Wing/elytron ratio .12–.13. ♂: Sternite 9 as in fig. 272. Aedeagus as in figs. 270, 271, basal sclerite strongly chitinous, subuliform with swollen base. ♀: Sternite 8 as in fig. 274. Genitalia as in fig. 273. Length 6.5–10.0 mm; width 2.7–4.8 mm.

AUCKLAND IS. 17 from Ocean I., Ewing I., and Adams I.

CAMPBELL I.: Windlass Bay, St. Col Peak Ridge, Shoal Point, Tucker Cove, and Ve-

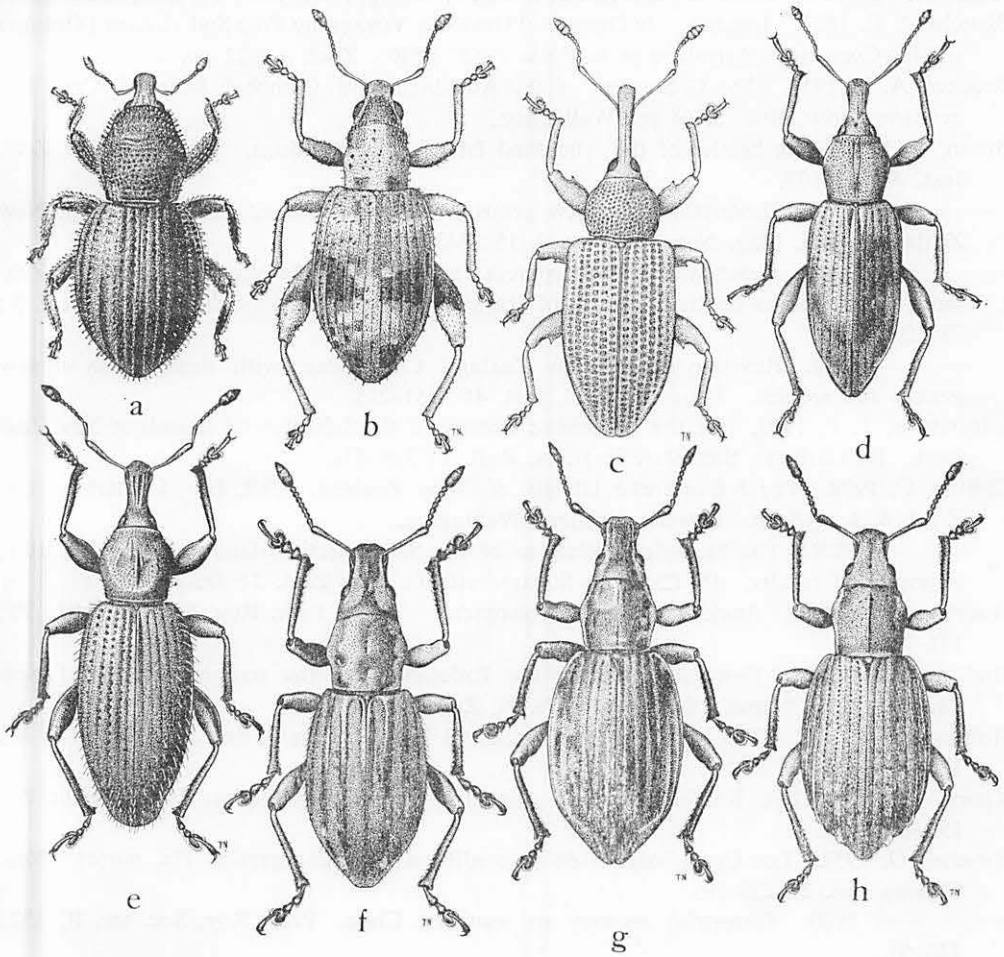


Fig. 275. a, *Notacalles suillus* Kuschel n. sp., ♀, Ranui Cove, Auckland Is.; b, *Pactolotypus subantarcticus* Kuschel n. sp., ♂, Beeman Camp, Campbell I.; c, *Peristoreus innocens* Kirsch, ♂, Ranui Cove, Auckland Is.; d, *Gromilus exiguus* (Brookes), ♂, Beeman Hill, Campbell I. (setae on body omitted); e, *Gromilus veneris setarius* (Broun), ♂, Tucker Cove, Campbell I.; f, *Heterexis seticostatus* (Brookes), ♂, Garden Cove, Campbell I.; g, *Oclandius cinereus* Blanchard, ♀, Mt. Honey, Campbell I.; h, *Catodryobiolus antipoda* Brookes, ♀, Ewing I., Auckland Is.

nus Bay. Total of 15 specimens.

TYPE LOCALITY: Ocean I., Auckland Is. Holotype ♂, 8.9×3.7 mm, Ocean I., Auckland Is., IV. 1944, Turbott, Dominion Mus., Wellington.

Ecology: Most specimens have been found under logs of *Metrosideros umbellata* and *Olearia lyallii*, under *Stilbocarpa* and *Acaena*, but some specimens have been taken off *Olearia lyallii*, at night.

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Pacific Insects Monograph 7: 494-495 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HYMENOPTERA: BRACONIDAE

By C. F. W. Muesebeck

United States National Museum

Abstract: *Rogas gressitti* Muesebeck, n. sp. is described from 24♀♀ and 57♂♂ collected on Campbell I. by J. L. Gressitt in November and December, 1961.

Late in 1961, Dr. J. Linsley Gressitt collected a long series of specimens of a species of the braconid genus *Rogas* on Campbell I. Apparently the species was generally distributed there for it was taken at a number of different localities; and it was the only species of *Rogas* collected. The series was referred to me for identification, but I have been unable to place the species as a described form and I am therefore, describing it as new.

Rogas gressitti Muesebeck, n sp. Fig. 1.

This appears to be readily distinguishable from all species of *Rogas* thus far described from the Australian Region in having the 2nd dorsal abdominal suture weakly impressed and not punctate or foveolate and in having tergites 1–3 very weakly sculptured.

♀: A slender species. Head barely wider than thorax, closely and finely granular; face more than 2× as wide as high; length of malar space more than 1/3 eye height and about equal to basal width of mandible; eyes very slightly emarginate opposite bases of antennae; maximum width of eyes about 1.33× width of temples; temples strongly convex, not receding from eye margins; longest diameter of lateral ocellus about 1/2 as long as ocello-ocular line and fully as long as postocellar line; antennae as long as body, 35–38 segmented, even shortest segments distinctly longer than broad; occipital carina weak, broadly interrupted medially.

Mesoscutum flat, minutely granularly sculptured, mat; notauli indicated only anteriorly; disc of scutellum longer than wide, slightly convex, surface finely shagreened, suture very broad and shallow at base and divided by a median longitudinal ridge; propodeum finely granularly rugulose, with a usually complete though weak median longitudinal carina; mesopleuron rugulose anteriorly, shagreened posteriorly; metapleuron finely granular. All femora and tibiae very slender; hind coxae finely granular; inner calcarium of hind tibia longer than outer and about as long as segment 4 of hind tarsus; anterior and mid tarsi a little shorter than their tibiae; all tarsi with segment 5 very large and conspicuously widened apically. First abscissa of radius unusually short, less than 1/2 as long as 1st intercubitus; 2nd abscissa of radius more than 1.5× as long as 1st intercubitus and about 1/2 as long as 3rd abscissa of radius; nervulus postfurcal by a little more than its length; mediella slightly longer than lower abscissa of basella which is more than 2× length of

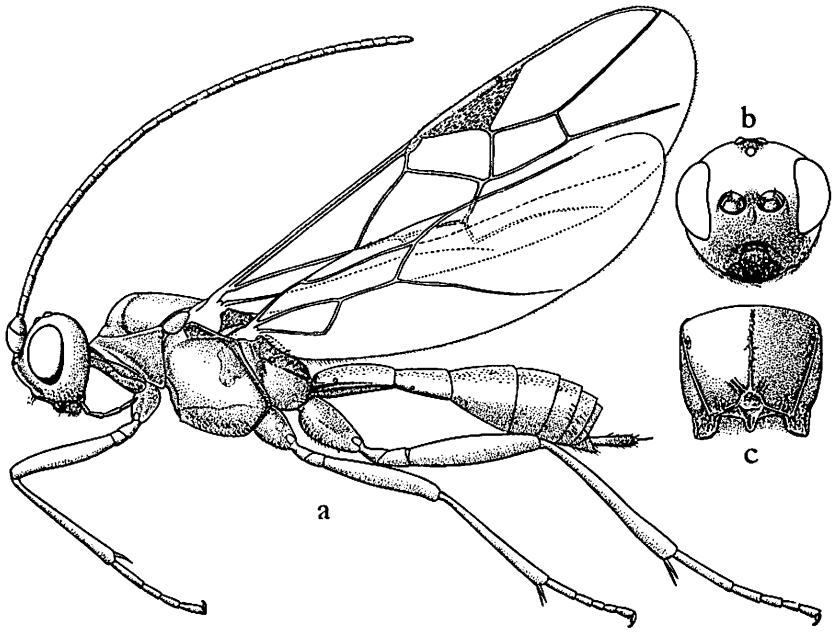


Fig. 1. *Rogas gressitti*, n. sp. a, lateral view of adult; b, frontal view of head; c, propodeum.

nervellus; radiella represented only by a weak fold, which is slightly sinuate.

Abdomen covered with closely placed, short, appressed hairs; tergite 1 slightly longer than broad at apex, finely granularly rugulose and with a complete median longitudinal carina; tergite 2 noticeably wider than long, sculptured like the 1st but with median carina weaker and not extending to caudal margin of tergite; suture 2 fine, very shallow and not punctate or foveolate; tergite 3 more than 2× as wide as long, very finely granular or shagreened basally; remainder of abdomen smooth and shining; ovipositor sheath extending slightly beyond apex of last tergite.

Yellowish brown, with occiput, patches on mesonotal lobes, pleura and abdomen often indefinitely darker; all tarsi with apical segment darkened; wings subhyaline, stigma and veins yellowish brown. Length: about 4.5 mm.

♂: Essentially like ♀; antennae a little more slender.

Holotype ♀ (D.S.I.R.), Beeman Camp, Campbell I., XI. 1961, Gressitt.

Described from 24♀♀ & 57♂♂ collected by Dr. J. L. Gressitt at several different localities on Campbell I. in November and December, 1961. (Beeman Camp, Tucker Cove in Malaise trap, on *Dracophyllum*, St. Col, Mt. Dumas, Mt. Honey to Puiseux, mostly on *Dracophyllum*). Paratypes in Bishop Museum, Dominion Museum, Wellington, New Zealand, and the United States National Museum.

Apanteles probably n. sp., near **tasmanicus** Cam.

A single specimen was taken in the air-trapping nets at Beeman Point, 1962, by K. P. Rennell.

Pacific Insects Monograph 7: 496-500 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HYMENOPTERA: ICHNEUMONIDAE

By Henry Townes

American Entomological Institute, Ann Arbor, Michigan

Abstract: Three new species of ichneumonids are described from Campbell Island: *Gelis campbellensis, Campoplex disjunctus* and *Diadegma agens. G. campbellensis* is not a true *Gelis*, but a wingless geline of problematic genus.

Recent insect collecting on Campbell I. has resulted in the capture of 3 species of Ichneumonidae, all new to science. These are described below.

Key to Campbell I. species of Ichneumonidae

1. Wingless; abdomen depressed, segments 4–6 being wider than deep...**Gelis campbellensis**
   Winged; abdomen compressed, segments 4–6 being deeper than wide..... 2
2. Abdominal segment 1 without a pit (glymma) on the side; carinae of propodeum as in fig. 2c ..... **Campoplex disjunctus**
   Abdominal segment 1 with a pit (glymma) on the side, in front of spiracle; carinae of propodeum as in fig. 3c .....**Diadegma agens**

Gelis campbellensis Townes, n. sp. Fig. 1.

♂: Body 2.7–3.1 mm long, a little more slender than in ♀; antenna about 1.1× as long as body, not thickened apically, postmedian segments about 1.7× as long as wide; legs a little longer than ♀; hair sockets on tergite 2 separated by about 1.5× length of hairs, on tergite 3 separated by about the length of the hairs; epipleura of tergites 2 & 3 narrow, folded under. Structure otherwise as in ♀.

Black. Palpi blackish brown; apical 1/2 of mandible, tegula, extreme hind corner of pronotum, and often anterolateral part of mesoscutum reddish brown; legs fuscous brown, darkest basally and on tarsi, mid and hind coxae blackish

♀: Body 2.6–3.0 mm long; general proportions as in fig. 1a; apical margin of clypeus broadly truncate, narrowly reflexed; face (fig. 1b) frons, cheek, and clypeus mat, frons weakly mat; cheek with a distinct but very shallow groove between eye and mandible; mandible narrowed apically, its outer face flat near base, not at all swollen; temple weakly mat or subpolished, its hairs very sparse; thorax strongly mat; tegula small; wings represented by very small stubs; propodeum (fig. 1c) smooth except for well-developed api-

1. Results of field work supported by the National Science Foundation grants G-18800, G-23720 from the U. S. Antarctic Research Program.

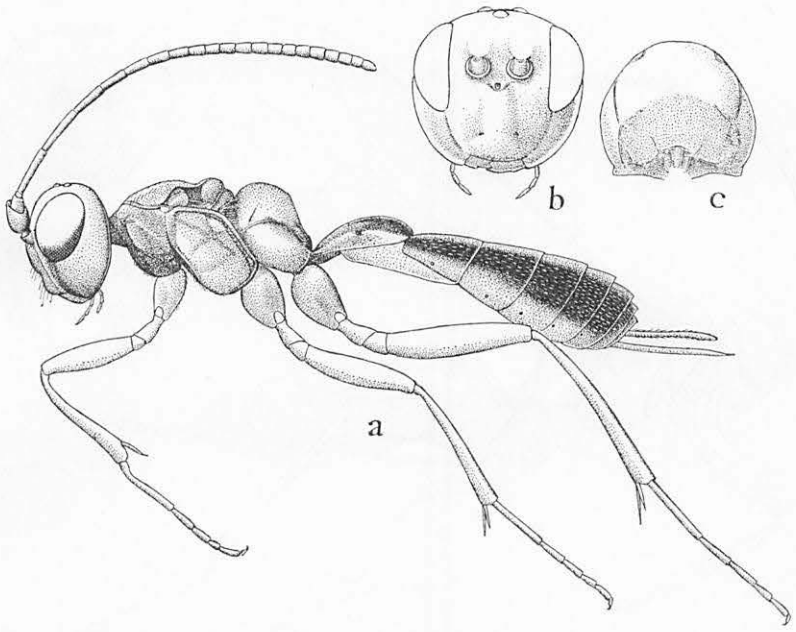


Fig. 1. *Gelis campbellensis* Townes. a, lateral view; b, head; c, propodeum.

cal transverse carina, this carina stronger and weakly bent forward at center and sublaterally; femora mat and weakly granular due to the raised hair sockets; tergite 1 strongly mat, weakly arched, its spiracle at middle, dorsolateral carina complete but blunt, and median dorsal carinae absent; tergites 2 & 3 mat, their apical 0.3± subpolished; tergite 4 and following faintly mat; hair sockets on tergite 2 separated by about 3× the length of hairs, those on tergite 3 separated by about 2× the length of hairs; epipleura of tergites 2 & 3 narrow, not separated by a distinct crease; ovipositor 0.45× as long as body, tip weakly sagittate.

Black. Palpi, apical 1/2 of mandible, collar, hind corner of pronotum, tegula, most of front 1/2 of mesoscutum, front legs, and mid and hind legs beyond coxae, various shades of brown.

This species is not a true *Gelis* but a wingless member of some related genus. It differs from *Gelis* in lacking a swelling at base of mandible and in having spiracle of tergite 1 at mid-length. Its correct genus cannot be determined until the genera in this area are better understood.

Holotype ♀ (D.S.I.R., Nelson), Courrejolles Penin., ca. 220–230 m, in mollymawk colony on rock cliffs, 12.II.1963, Rennell.

Paratypes: 1♂, 3♀♀, same data as type except 13.II.1963, 1♂, 1♀ (*in copulo*), *ibid.*, Wise; 4♂♂, 1♀, beach of Lookout Bay, Campbell I., among *Poa*, 19.XII.1961, J. L. Gressitt (Townes); 1♂, beach of Lookout Bay, Campbell I., 16 or 19.XII.1961, Gressitt; ♂, Mt. Lyall, 200–400 m, Campbell I., 5.XII.1961, Gressitt; 2♂♂, on rocks, Mt. Lyall, 19.II. 1963, Rennell; ♂, Lyall-Beeman Saddle, 70 m, Campbell I., among *Pleurophyllum speciosum*,

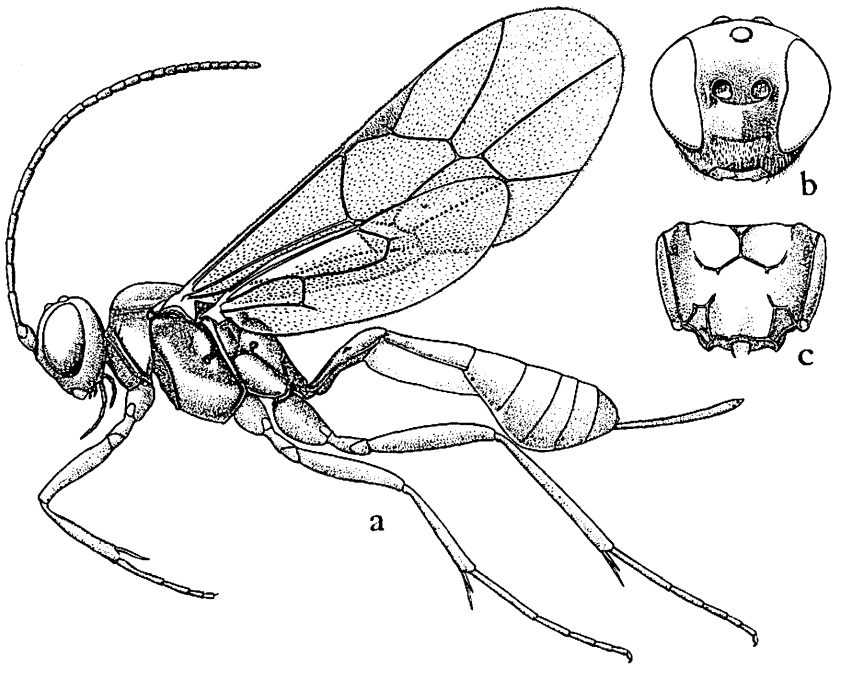


Fig. 2. *Campoplex disjunctus* Townes. a, lateral view; b, head; c, propodeum.

12. XII. 1961, Gressitt; ♂, Mt. Dumas, 400 m, 3. II. 1963, Wise. Paratypes in Bishop Mus., Dominion Mus. and Townes coll.

Unusual features of this species are the absence of the areolet and the fact that the discoidella does not connect with the nervellus.

Campoplex disjunctus Townes, n. sp. Fig. 2.

♂: Unknown.

♀: Front wing 2.9–3.6 mm long; head in front view (fig. 2b) subcircular, clypeus rather small, its margin truncate; temple rather strongly convex; lateral ocellus separated from eye by about 1.3× its diameter; flagellum with 25 or 26 segments; juncture of occipital and hypostomal carinae above base of mandible by about 0.33× the basal width of the latter; thorax completely mat except that speculum is smoother or subpolished, its setiferous punctures hardly visible; propodeal carinae as in fig. 2c; tarsal claws pectinate at base; areolet absent, the part of cubitus between intercubitus and recurrent vein 2 about 1.3× as long as intercubitus; nervellus vertical, not broken; discoidella represented by a weak furrow which is connected neither with nervellus nor wing margin; abdominal segment 1 mat, about 2.8× as long as wide; tergite 2 about as long as wide; ovipositor sheath about 1.55× as long as apical depth of abdomen; ovipositor of moderate thickness, its tip 1.35× as deep as shaft.

Black. Mandible, palpi, and tegula stramineous; front and mid legs pale brown, tibiae somewhat darkened and tarsi brown; hind leg beyond coxa light brown, tarsi somewhat

infuscate, trochanter 2, adjacent ends of hind femur, and hind trochanter 2 pale brown.

Holotype ♀ (D.S.I.R., Nelson), Tucker Cove, 4 m, Campbell I., in Malaise trap, 18–21. XII.1961, Gressitt.

Paratypes (Bishop, Townes): 2♀♀ same data as type except dated 16–18. XII. 1961; 1 ♀, Beeman Hill, sweeping, 2. II. 1963, Wise.

Diadegma agens Townes, n. sp. Fig. 3.

Front wing 3.7–4.5 mm long; clypeus (fig. 3b) moderately small, its apical margin moderately convex, very narrowly and weakly reflexed; temple moderately convex; flagellum with about 28 segments in ♂, about 25 segments in ♀; thorax mat, its punctures very fine, weak, and inconspicuous; speculum subpolished; propodeal carinae as in fig. 3c; central part of propodeum strongly mat and with fine weak rugulosity; tarsal claws apparently simple; areolet present or absent, usually absent in ♂ and present in ♀, when present small, with a long stalk above and intercubital vein 2 weak; nervellus weakly arched, slightly inclivous; abdominal tergite 1 mat, about 2.8× as long as wide, it glymma moderately large and deep; tergite 2 about 1.05× as long as wide in ♂, about 0.90× as long as wide in ♀; ovipositor sheath about as long as apical depth of abdomen; ovipositor moderately stout.

Black. Mandible, palpi, and tegula pale yellow; apex of scape usually brown in front;

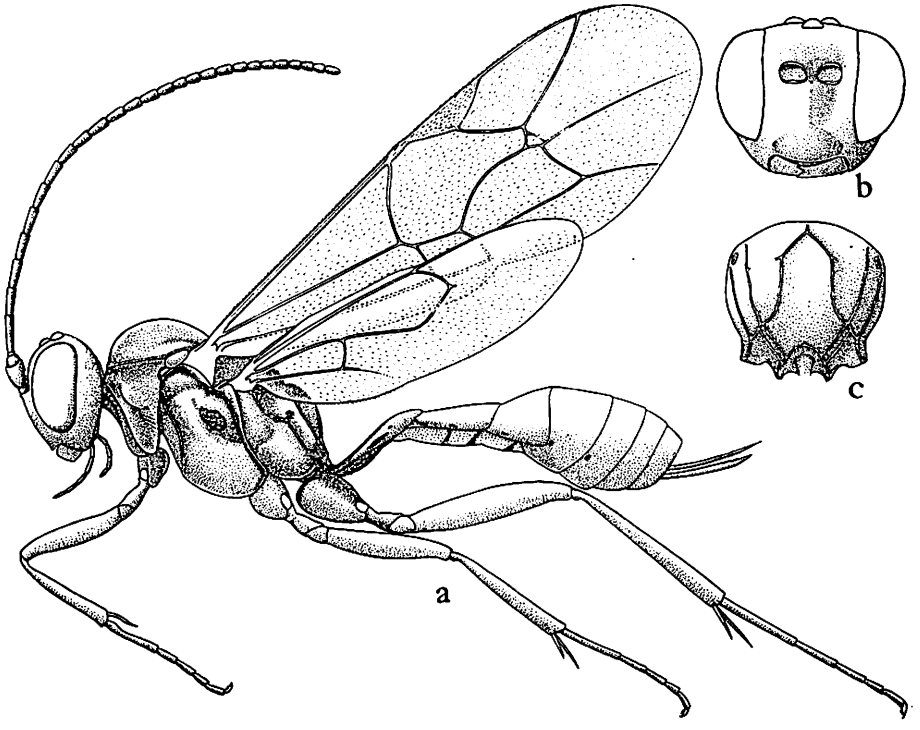


Fig 3. *Diadema agens* Townes. a, lateral view; b, head; c, propodeum.

legs dull fulvous, the front trochanters and coxa largely yellowish, hind coxa and trochanter 1 black, and tarsi infuscate.

This species is similar in general to such northern hemisphere species as *patens* and *obliterata*. It differs from these in the sporadic presence of the areolet, shorter, stouter ovipositor and minor differences in the propodeal carinae. Though similar to a number of species in the Holarctic area, it seems to be identical with none of them. Specimens were sent to Mr. Rolf Hinz and Dr. J. F. Perkins for examination. These gentlemen could find nothing like them in the European fauna. Dr. Perkins remarks (*in litt.*) that its real relations appear to be with some Australian—New Zealand species.

Holotype: ♀ (D.S.I.R., Nelson), Tucker Cove, 4 m, Campbell I., in Malaise trap, 5–8. XII. 1961, Gressitt.

Paratypes: 53♂♂, 11♀♀, same data as type except for dates as follows: 16♂♂, 3♀♀, 27.XI–1.XII. 1961; 11♂♂, 3♀♀, 1–3. XII. 1961; 2♂♂, 3–5.XII.1961; 9♂♂, 1♀, 5–8.XII. 1961; 14♂♂, 2♀♀, 16–18. XII. 1961; 1♂, 2♀♀, 18–21. XII. 1961, Gressitt. Paratypes in collections of BISHOP, TOWNES, HINZ, & LONDON.

Pacific Insects Monograph 7: 501-503 July 15, 1964

INSECTS OF CAMPBELL ISLAND. HYMENOPTERA : EULOPHIDAE[1]

By G. J. Kerrich[2] and C. M. Yoshimoto[3]

Abstract: One new species *Ardalus campbellensis* (Hymenoptera, Eulophidae) from Campbell I. is described for the first time.

The Campbell I. eulophid described below is referred provisionally to the genus *Ardalus* Howard. The characterization given by Howard (1896)[4] has not been improved upon since that date. The type species *aciculatus* Howard has the hind tibia with 2 spurs, but in other respects looks much like an *Elachertus* with the notauli, except near the fore margin of the mesoscutum, sharp and shallow and the scutellar furrows, which curve round and meet before hind margin, also shallow. The types of *A. laevigatus* and *politus*, described by Howard (1896), and *Diglyphus albipes* Ashmead, later placed in *Ardalus*, are in the British Museum (Nat. Hist.), and it is considered that these species do not belong to the same genus.

Gahan (1922)[5] described a new species in *Ardalus* and associated an earlier described species of his own with that genus. From the descriptions it appears that both these species are closely related to *aciculatus* Howard.

In 1958, a short series of ♂ specimens, reared from *Epichorista emphanes* (Meyr.) (Lep., Tortricidae) was received from New Zealand. That species has the scutellar furrows absent, though there is a furrow before the hind margin, but on the basis of its general resemblance to the type species in other respects, it was determined as an *Ardalus*. The species now at hand is clearly congeneric with it. In some respects, these New Zealand forms are like a eulophine genus such as *Dimmockia* Ash. or *Necremnus* Thomson, but the antennal funicle segments are short, and in the ♂ quite unbranched. It is likely that they will later be transferred to some other genus but at present it seems best to give them the above provisional placing. The hind tibia bears 2 spurs.

Ardalus campbellensis Kerrich and Yoshimoto, n. sp.

Head, seen from above, shaped rather as in *Elachertus artaeus* (Walker) (Kerrich 1961, fig. 2)[6] but more strongly transverse and as wide as thorax, very short in middle, the up-

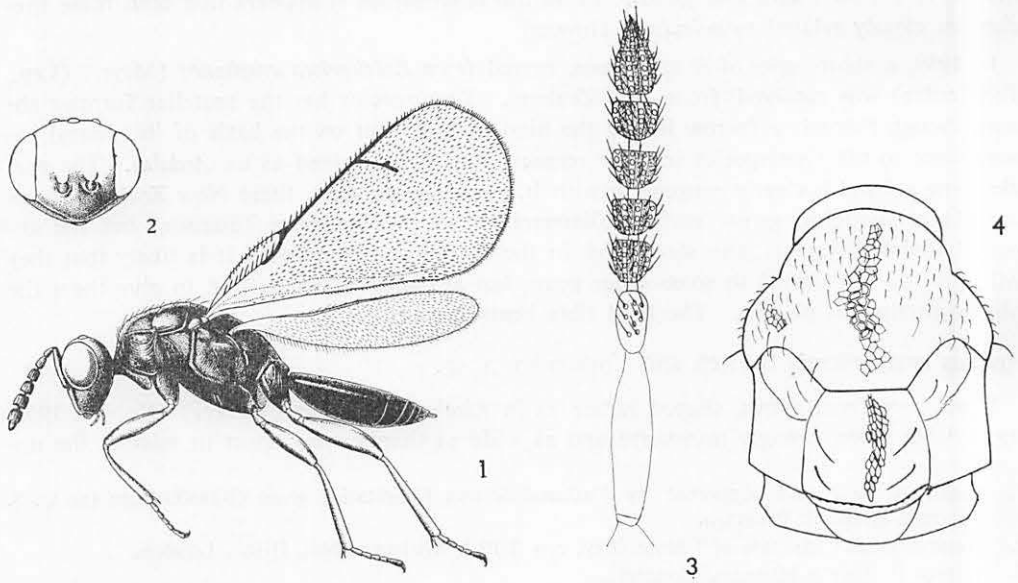
1. Results of field work supported by National Science Foundation grant G-18800 from the U. S. Antarctic Research Program.
2. Commonwealth Institute of Entomology, c/o British Museum (Nat. Hist.), London.
3. Bernice P. Bishop Museum, Honolulu.
4. J. Linn. Soc. Lond., Zool. **26**: 161-62.
5. Proc. U. S. Nat. Mus. **61**: 20-21.
6. Bull. Ent. Res. **52**: 769.

per face and occiput both being deeply emarginate. Ocelli in a very obtuse triangle, POL being almost 2× OOL. Head sculpture in greater part finely but very distinctly alutaceous, sparsely and very finely piliferous-punctate, the large scrobes strongly shining. Eyes moderately strongly but rather sparsely hairy.

Antennae of ♀ inserted at lower level of eyes; scape almost parallel-sided, about 4.5× as long as broad; pedicellus almost 2× as long as broad; 1 ring-segment (so far as we can see in dry mounts); postanellus about 1.5× as long as broad, about equal in length to pedicellus; funicle segment 2 about quadrate, the 2 following shorter and broader: club 2-segmented with apiculus, hardly longer than the 2 apical funicle segments combined. Antennae of ♂ (fig. 3) inserted just below the lower level of eyes; scape shorter than in ♀, gradually broadening to near apex, about 3× length of its greatest breadth; funicle segments more widely separated, *i. e.* more strongly petiolate, than in ♀.

Pronotum and mesoscutum scaly-reticulate and sparsely beset with fine punctures bearing hairs of moderate strength: reticulation wider on hinder 1/2 of mid lobe of mesoscutum, and extremely fine near hind margin of pronotum and on axillae; strong bristles about as in *Elachertus* species; mid lobe of mesoscutum strongly produced back between axillae. Scutellum bearing 2 pairs of strong bristles, and a moderately strong furrow just before and following hind margin; reticulate sculpture much sharper and more outstanding than on mesoscutum (this condition often described as punctate), becoming only gradually weaker at sides, and tending to become more longitudinal in anterior 1/2. Sculpture on postspiracular sclerite about as on anterior part of mesoscutum; on mesopleura, mesosternum, metanotum and propodeum finely alutaceous.

Petiolar segment smooth, rather pyriform, about 1.5× as broad near apex as its length



Figs. 1–4. *Ardalus campbellensis* n. sp. 1, whole insect in sinistro-lateral view; 2, head in facial view (1–2, drawings by artist, Nagatani); 3, antenna of ♂ in dorsal view; 4, thorax seen from above (3–4, authors' text figures).

in ♀, but only slightly broader in ♂. Remainder of gaster almost circular in outline in ♀, obovate in ♂, the first large tergite about 2/5 its total length in both sexes.

Fore wings as in fig. 1, rather uniformly ciliate on apical 1/2, with stigma rather elongate; subcosta bearing 6–9 bristles; costal cell with a row of hairs on upper surface, extending more than half way from apex to base, and 3 rows on under surface.

Length 1.4–2.0 mm.

Head and mesonotum dark green with moderate brassy reflection; pleura, propodeum and gaster blackish, with weak, bright reflection. Antennae brownish black, with bright reflection. Legs rufotestaceous, paler towards apex, with superimposed metallic coloring which in ♀ is on coxae in greater part, femora and tibiae in part above and on sides, and tarsal apices, and in ♂ is still more extensive.

Holotype ♀, Campbell I., Beeman Lookout Point, 19.XII.1961; allotype ♂, Beeman Camp, 2–50 m, ex *Dracophyllum* flowers, 12–17. XII. 1961, Gressitt; 2♀♀, 2♂♂ paratypes, near Beeman Camp, 12–21. XII. 1961, Gressitt. Holotype and allotype in D.S.I.R, Nelson, New Zealand; 2♀♀, 3♂♂ paratypes in Bishop Mus.; ♀♂ paratype in British Mus. (Nat. Hist.).

Since the series recorded below, from the South Island of New Zealand, was reared from a tortricid, it is likely that this species is a parasite of a similar small moth.

Ardalus sp.

Differs from *A. campbellensis* n. sp. as follows: reticulation on pronotum and mesoscutum very much coarser and more outstanding. Sculpture of scutellum becoming rather suddenly very much weaker at sides, which are almost shining. Pterostigma less elongate. Length 1.7–2.0 mm.

NEW ZEALAND: 3♂♂, South Island, Reefton, *ex Epichorista emphanes* (Meyr.)(Lep., Tortricidae), 1959, L. W. Newman.

Ardalus aciculatus Howard differs from *A. campbellensis* n. sp. principally as follows: head somewhat less transverse and with ocelli in a less obtuse triangle; more strongly hairy, the piliferous punctures rather strong; eyes strongly and densely hairy. Antennae (♀) inserted just above lower level of eyes; all funicle segments much longer than broad. Pronotum and mesoscutum with punctation much denser, and the hairs arising from the punctures decidedly stronger. Mid lobe of mesoscutum produced back very little. Scutellum with 2 pairs of strong bristles, and with a pair of distinct though rather shallow furrows that curve round and join before hind margin: sculpture longitudinal-reticulate in hinder 1/2, running into finer striae in anterior 1/2, Sculpture of postspiracular sclerite finely alutaceous: dorsellum much shorter; petiolar segment distinctly finely reticulate, strongly transverse. Remainder of gaster oval, considerably longer than broad. Fore wings altogether more strongly and sparsely hairy: costal cell with 2 rows of hairs on under surface. Metallic reflection on thorax more bronzy; gaster largely dull testaceous above and beneath near base; antennal scape yellowish; legs dull testaceous, with hardly any metallic coloring except on mid and hind coxae.

A ♀ paratype of *A. insuetus* (Gah.) has been received in exchange from the U. S. National Museum and has been compared with the holotype and one other specimen of *aciculatus* How. in the British Museum. The characters for separation given by Gahan (1922) seem to be of doubtful significance, but the sculpture of the mesoscutum is much more strongly outstanding in *insuetus*.

Pacific Insects Monograph 7: 504-506 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HYMENOPTERA: ENCYRTIDAE[1]

By G. J. Kerrich

COMMONWEALTH INSTITUTE OF ENTOMOLOGY, LONDON, ENGLAND

Abstract: *Antipodencyrtus procellosus* n. gen., n. sp. is described from 3♀♀, 3♂♂ in grass tussock collected on Campbell Island by K. P. Rennell on December 30, 1962.

The insect described below belongs to the Encyrtid tribe "Ectromatini" as defined by Compere & Annecke (1960); see also Compere (1947)[2]. The "Ectromatini" have typically the mandibles sharply bidentate, paratergites present in the ♀, and the ♀ hypopygium boat-shaped and covering the resting ovipositor, though each of these characters is lacking in some genera within the tribe. So far as is known, the mode of oviposition is similar, and the host insects are soft-bodied Coccids. The "Ectromatini" can be divided into several groups of genera, of which the *Anagyrus* group was treated by Compere (1947)[2] and the *Aphycus* group by Compere & Annecke (1960)[3]. Two other groups are under study by the present author, and the new genus belongs to one of these.

As was noticed by Dr. Yoshimoto, the Campbell I. encyrtid most generally resembles *Xanthoencyrtus* Ashmead. Both are flattened insects, with the head tilted to some extent forward, especially in the ♀, and the antennae inserted very low, not far above the mouth. The genus compares best, however, with *Hungariella* Erdös (=*Tetracnemus* Timb. *non* Westwood) and *Anarhopus* Timberlake, in that all 3 have the antennal funicle 5-segmented in both sexes, ramose in the ♂. The 3 genera may be separated as follows:

1. Brachypterous forms unknown; thorax normally convex in both sexes; ♀ antennae moderately compressed and moderately clavate; ♂ antennae with 4 long rami and a vestige.....**Hungariella** Erdös
2. Brachypterous forms unknown; thorax in ♂ normally convex, in ♀ with scutellum flattened but still well raised above metanotum; ♀ antennae notably stout and compressed; ♂ antennae with 4 long rami and a small but distinct 5th ramus .....**Anarhopus** Timberlake
3. Brachypterous in both sexes; whole thorax flattened in both sexes, the scutellum very little raised above metanotum; ♀ antennae moderately compressed and rather strongly clavate; ♂ antennae with 3 very long rami.....**Antipodencyrtus** n. gen.

1. Results of field work supported by the National Science Foundation grant G-23720 from the U. S. Antarctic Research Program.
2. Univ. Calif. Publ. Ent. **8**: 3-5, 15-18.
3. J. Ent. Soc. S. Africa **23**: 376-80.

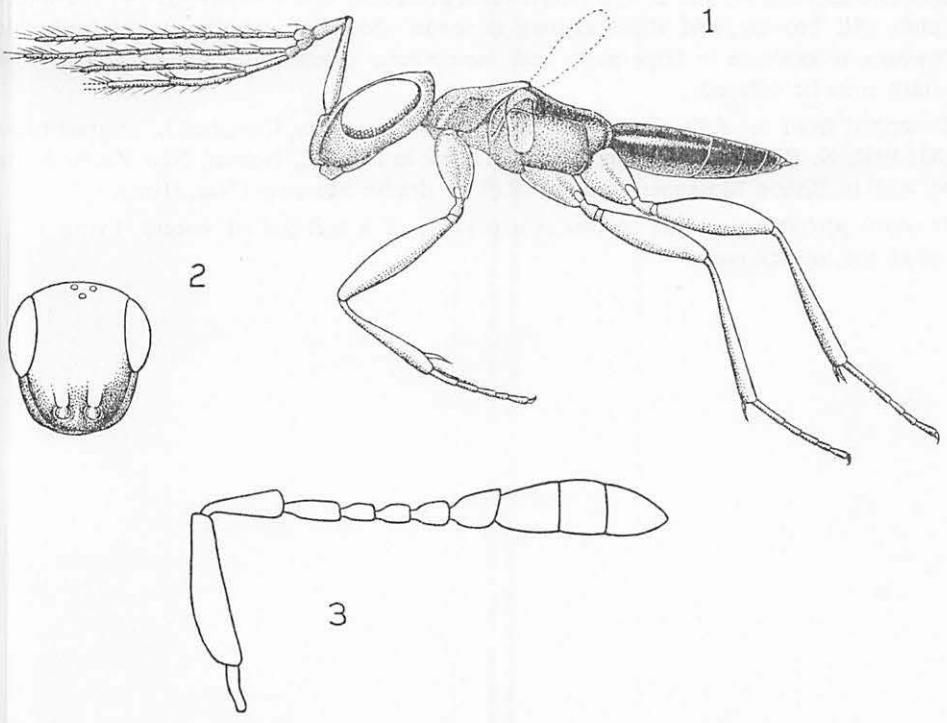
Genus **Antipodencyrtus** Kerrich, n. gen.

Affinities as stated above. ♀: Head from above biconcave, moderately emarginate anteriorly, rather strongly so posteriorly; with eyes nearly reaching occipital margin, pubescent; frontovertex very much wider than an eye, the lateral ocelli remote from eye margin; face elongate, with toruli separated from mouth by about their own breadth; common scrobal impression large, extending more than 1/2 way up orbiti. Mandibles bidentate. Antennae of moderate length, moderately compressed, very distinctly clavate, the funicle 5-segmented. Thorax flattened; axillae meeting in middle; propodeum distinctly reticulate on upper surface. Legs, notably hind femora, rather stout. Brachypterous.

Male differs as follows: toruli separated from mouth by about their own length. Antennae with rami on funicle segments 1–3, the rami all over-reaching base of club, long-hairy, and bearing longer and stronger hairs at apex. Sculpture somewhat stronger, and darker coloring more extensive than in ♀.

Antipodencyrtus procellosus Kerrich, n. sp.

♀: Face and cheeks finely reticulate: frontovertex, pro- and mesonota very delicately reticulate, rather sparsely and coarsely hairy. Eyes rather sparsely and coarsely hairy, very



Figs. 1–3. *Antipodencyrtus procellosus*, n. sp. 1, whole insect, ♂, in sinistro-lateral view (lacking antennal club); 2, head of ♂, in facial view; 3, right antenna of ♀, in dextro-lateral view. (Figs. 1 and 2 are artist's (Nagatani) drawings, fig. 3 an author's text-figure.)

distinctly so ×45. Antennae rather sparsely and coarsely hairy; scape 4× and pedicellus 3× as long as broad; funicle segment 1 cylindrical, more than 2× as long as broad, the 3 following gradually shorter and broadening; funicle segment 5 much larger and more strongly broadened, little longer than its apical breadth; club very distinctly enlarged, 3× as long as broad, and longer than the last 4 funicle segments combined. Fore wings extending just beyond metanotum, hind wings just beyond propodeum. Gaster delicately reticulate, the 1st large tergite about 1/2 its total length. Length 0.8–1.0 mm.

Head metallic green with bright reflections; thorax and propodeum pale testaceous, the pro- and mesonota except peripherally, and scutellum in greater part green with bright reflections, and the mesopleura lightly overspread with some darker coloring; tegulae, wings and legs except tarsal apices, stramineous; mandibles deep testaceous; antennae with scape, pedicellus and funicle below stramineous, the scape and pedicellus slightly, the funicle wholly above, and the club dusky, with some infusion of green metallic coloring. The ♂ differs in having the scutellum wholly, except for its lateral extensions, the propodeum in large part, and the mesopleura much more strongly and extensively, dark metallic colored.

♂: Differs in having sculpture on frontovertex much sharper and more outstanding, and on mesoscutum somewhat stronger. Antennal flagellum with hairs very much longer than in ♀; pedicellus 2× as long as broad; flagellar segment 1 much broader than pedicellus, broader than long; 2 shorter and much narrower; segment 3 a little longer than, 4 almost 2× as long as, and 5, 1/3 longer than, pedicellus and broader than 4; the undivided club still broader, and about as long as scape. Scutellum wholly, except forits lateral extensions, propodeum in large part, and mesopleura much more strongly and extensively, dark metallic colored.

Described from the following: 3♀♀, 3♂♂, Northwest Bay, Campbell I., in grass tussock, 30.XII.1962, K. Rennell. Holotype ♀ and allotype in D.S.I.R., Nelson, New Zealand; paratype ♀♂ in Bishop Museum; paratype ♀♂ in British Museum (Nat. Hist.).

It seems probable that this species is a parasite of a soft-bodied coccid living on the roots of the tussock-grass.

Pacific Insects Monograph 7: 507–508 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HYMENOPTERA: DIAPRIIDAE

By Carl M. Yoshimoto

B. P. Bishop Museum, Honolulu, Hawaii

Abstract: One species, *Antarctopria latigaster* Brues and a new subspecies, *A. latigaster campbellana* are known from Campbell I.

This study was made possible through the collection of Dr. J. L. Gressitt, Mr. K. A. J. Wise and Mr. K. P. Rennell of the Bishop Museum.

Antarctopria latigaster Brues Fig. 1.

Antarctopria latigaster Brues, 1920, Austral. Ant. Exp. ser. C, **5** (8): 27–28.—Yoshimoto, 1962, Pacific Ins. 4 (4): 973–74.

Specimens examined: 10♀♀, Monument Harbor, in indentation under surface of stone on beach, 9. II. 1963, Rennell, Wise; 10♀♀, Shoal Pt., 0–10 m, kelp on beach, 5. I. 1963; 9♀♀, Beeman Beach, 1–2 m, under rock, 29.XII.1963; 1♀, Beeman Camp, 2–50 m, sweeping *Poa*, 12–17. XII. 1961, Gressitt; 1♀, Beeman Camp, 21. XII. 1962, Rennell, Reared 29. XII. 1962, Coelopid puparia; 5♀♀, Lookout Bay Beach, 2 m, 14. XII. 1962, Reard 26. XII. 1962, Coelopid puparia; 6♂♂, Lookout Bay Beach, 2 m, under rocks, 30.XII.1961, 21.XII. 1962, Rennell; 6♂♂, Beeman Beach, 1–2 m, kelp on beach, 16. XII. 1962, 21. XII. 1962, Rennell; 2♂♂, Shoal Pt., kelp on beach, 7. II. 1963, Rennell; 1♂, Tucker Cove, 0–30 m, *Dracophyllum*, 7. VII. 1962, Rennell; 1♂, Middle Cove, NW Bay, under kelp and stones, 5. II.1963; Wise; 1♂, Lookout Bay, Perseverance Harbor, in rotting kelp on beach, 3.II.1963, Wise; 1♂, Smooth Water Bay, shore cliffs, 2.II.1963.

DISTRIBUTION: Macquarie and Campbell Is.

Antarctopria latigaster campbellana Yoshimoto, n. subsp.

♀: Body length 2.1–2.5 mm. Body and antennal club fuscous, except thorax sometimes reddish brown, antennal scape and segments 1–5 brownish, legs brownish yellow, and apical tarsal segment blackish. Head seen from dorsal view 1.3–1.5× as broad as long. Antenna similar to *A. latigaster*. Mesothorax narrow as seen from dorsal view (2.0 : 3.0), surface with scattered minute punctation. Propodeum with large punctation, narrower than long (1.5 : 2.0). Sparse whitish pubescence covering entire body. Petiole longer than wide (2.0 : 1.0).

Specimens examined: Holotype ♀ (D.S.I.R., Nelson), Beeman Camp, sedge, 3.VIII.1962. Paratypes: 6♀♀, same data as type; 1♀, Beeman Camp, sedge, 27. VII. 1962, Rennell, 2 ♀♀, Venus Cove, tussock, 2.II.1963, Rennell; 5♀♀, Tucker Cove, 0–100 m, sedge, 7.VIII.

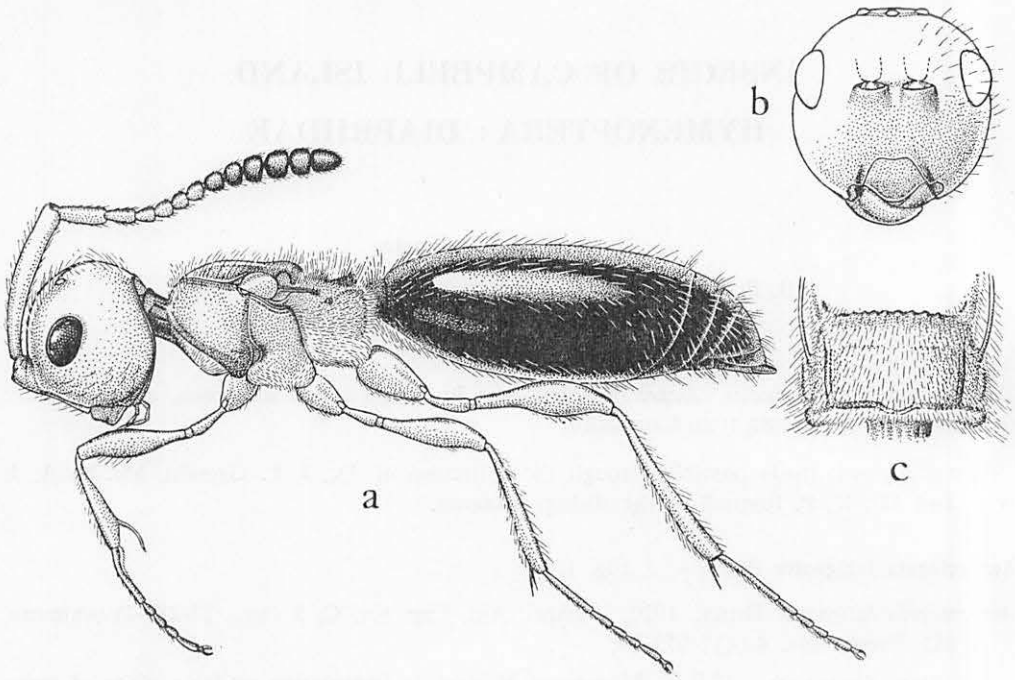


Fig. 1. *Antarctopria latigaster* Brues ♀. a, profile of body; b, frontal view of head; c, propodeum.

1962, Rennell, Gressitt; 1♀, Shoal Pt., 0–10 m, Tussock, 29.VII.1962.

♂: Body length 2.1–2.5 m. Similar to ♀ except as follows: Head slightly narrower than ♀. Antenna moniliform, similar to ♂ *A. latigaster*.

SPECIMENS EXAMINED: 7♂♂, 15♀♀, Beeman Camp, 50 m, sedge, 27. VII. 1962, 3. VIII. 1962, Rennell; 3♂♂, Shoal Pt., 0–10 m, Tussock, 29. VII. 1962; 1♂, Venus Cove, Tussock, 2. II. 1963, Rennell; 1♂, Northwest Bay, 5 m, Tussock, 30. XII. 1962, Rennell.

DISTRIBUTION: Campbell I.

Antarctopria latigaster campbellana differs from *A. latigaster* by having the surface partially smooth with punctation and sparse fine hairs, and genitalia without spines at apex of cuspis. Also, both sexes of *A. campbellana* are fuscous and wingless; however, the ♂ and ♀ of *A. latigaster* are generally brownish yellow to dark brown and possesses a narrow, elongated rudimentary stock of the reduced forewing. I found that the ♀ possesses a much smaller sized reduced forewing (resembling a large spine) than that of the ♂ and I was in error (Pacific Insects **4**: 973).

Pacific Insects Monograph 7: 509–512 July 15, 1964

INSECTS OF CAMPBELL ISLAND.
HYMENOPTERA: CYNIPOIDEA: EUCOILINAE

By Carl M. Yoshimoto

B. P. Bishop Museum, Honolulu, Hawaii

Abstract: *Kleidotoma* (*Pentakleidota*) *subantarctica* n. sp. from Campbell I., is the first record of a cynipid wasp from the subantarctic islands. It is described from 128 specimens (104♀♀, 24♂♂).

The following new species is the first cynipid wasp to be recorded from a subantarctic island.

I wish to thank J. L. Gressitt, K. P. Rennell, and K. A. J. Wise for their material; also, I am grateful to R. L. Doutt, University of California at Albany for the loan of Kieffer's type specimens.

Kleidotoma (Pentakleidota) subantarcticana Yoshimoto, n. sp. Figs. 1, 2.

♀: Body length 1.2 mm long; forewing 1.5 mm.

Jet-black; legs with tibiae and tarsus fuscous. Malar space 1/2 height of eye (fig. 1b). Antennal segment 1 obconical, 3× as long as broad, longer than 2; segment 2 subcylindrical, as long as broad, shorter than 1; segment 3 elongate, 1.5× longer than 2; segments 4–8 subequal in length, shorter than 9; club 5-segmented, segments 9–12 subequal in length, gradually thickened toward apical segment; segment 13, 1.5× longer than 12, apex acuminate (fig 2). Basal radial vein constricted in middle and apical margin of wing slightly emarginate (fig. 2a). Dorsal margin of pronotal plate hemispheric-shape. Scutellar disc broad, surface smooth, polished to striate, and rounded at margin; scutellar cup oblong, linearly convex, slightly raised above disc, posterior end with a moderate size pit in center (fig. 2f). Coxae striate; metaepimeral plate longitudinally striate at side view. Abdomen 1.5× as long as broad; thick, wavy, golden yellowish, ring hairs at base of tergite 2 (fig. 2k).

♂: Body length 1.2–1.4 mm long; forewing 1 mm. Similar to ♀ except as follows: antennal segment 3, 1.5× as long as 4, inner surface emarginate, gradually thickened apically; segments 4–15 subequal in length (fig. 2j). Scutellar disc striate. Forewing reduced in size (fig. 2e).

Holotype ♀ (D.S.I.R.), Beeman Hill, Campbell I., ex nest of sooty albatross, 11.XII.1962, Gressitt. Allotype, same data as holotype, Gressitt. Paratypes: ♂, Courrejolles Penin., 200 m, ex *Diomedia impavida*, 14. XII. 1962, Gressitt, nest; ♂, Monument Harbor, 9.II.1963, Rennell; ♂, NW Bay, 5 m, beach rocks and kelp, 30.XII.1962, Rennell; ♂, Shoal Pt., 7. II.1963, Rennell; 4♂♂, Shoal Pt., 0–10 m, beach kelp, 5.I.1963, Rennell; 5♀♀, NW Bay,

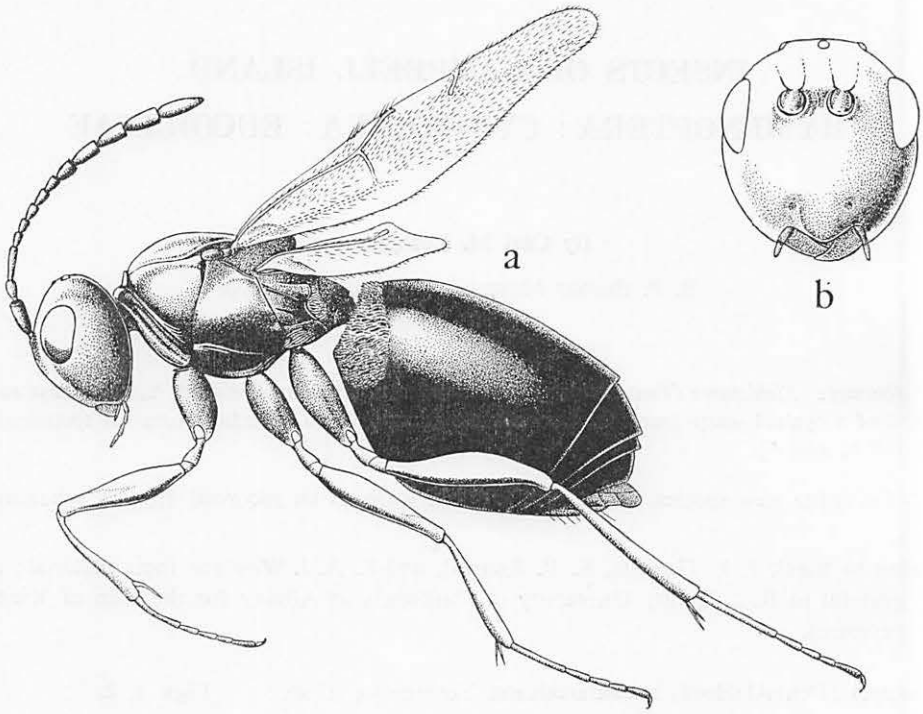


Fig. 1. *Kleidotoma* (*Pentakleidota*) *subantarcticana* Yshm., n. sp. a, ♀ profile of body; b, frontal view of head.

5 m, beach rocks and kelp, 5.I.1963, Rennell; 5♀♀, NW Bay, 5 m, beach rocks and kelp, 5. I. 1963, Rennell; 65♀♀, Shoal Pt., 0–10 m, beach kelp, Rennell; 19♀♀, 16♂♂, Shoal Pt., 0–10 m, beach kelp, 18. XII. 1962, Rennell; 4♀♀, Shoal Pt., 7. II. 1963, Wise; 2♀♀, Venus Cove, Tussock, 2. II. 1963, Rennell; 8♀♀, Lookout Bay, Perseverance Harbor, 3. II. 1963, Rennell.

This is a unique species and differs from other members of *Kleidotoma* in the Pacific and Asia and from Kieffer's North American *Kleidotoma* type specimens at the University of California at Albany.

Note on the reduction of fore wing

The study of *Kleidotoma* (*Pentakleidota*) *subantarcticana* n. sp. represents a fascinating problem of evolution, particularly of the fore wings. This species is known from Campbell I. (52°30′S. Lat.) and the Auckland Is. (50°S. Lat.), but is not known from Macquarie I. (54°30′S. Lat.), the southernmost subantarctic island. It is highly probable that the ancestor of *Kleidotoma* originally came from New Zealand, the "subcontinent" (Gressitt *et al.*, 1961), by means of aerial dispersal. Somehow under the adverse climatological and isolated conditions, the gravid female of the ancestral *Kleidotoma* was able to become established on these islands.

From the standpoint of the reduction of the fore wings, the most conspicuous differences

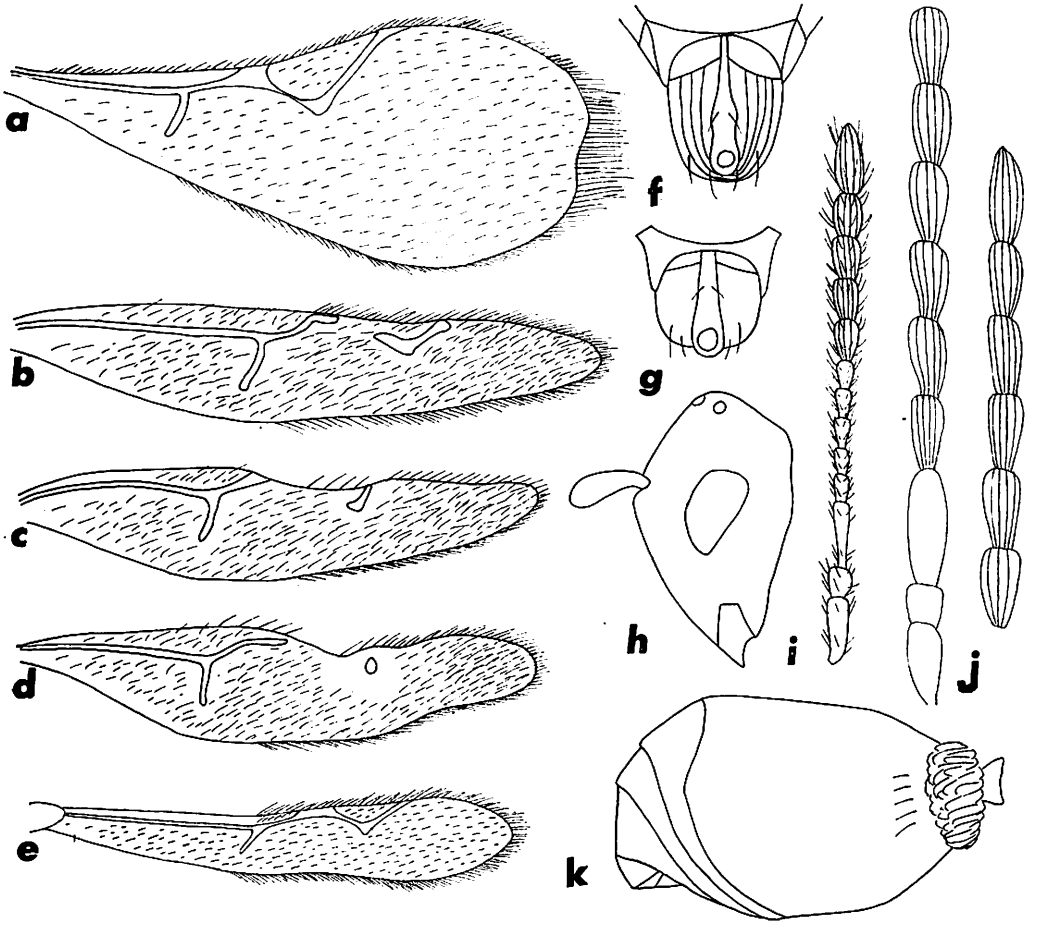


Fig. 2. *Kleidotoma* (*Pentakleidota*) *subantarcticana* Yshm. a–d, ♀ fore wing; e, ♂ fore wing; f, g, ♀ scutellum; h, profile of ♀ head; i, ♀ antenna; j, ♂ antenna; k, ♀ abdomen.

Table 1. Incidence of radial cell reduction and scutellar disc striations of *K.* (*Pentakleidota*) *subantarcticana*.

	Scutellar disc			Reduction of Radial cell			
	Striated	Partially smooth	Smooth	Fig. a Normal (no reduction)	Fig. b Radius 1 & 2	Fig. c Radius 2	Fig. d Radius 3
♂♂	16	4	1				
♀♀	90	11	3	1	11	66	26

in the extreme forms of the female from Campbell I. are wing size, and the shape and extent of the radial cell. A gradual gradation in the reduction of the radial cell is clearly shown among the 104♀♀ specimens in Table 1 and fig. 2 a–d. In the ♂, the fore wing

probably has undergone similar reduction as the ♀, but the loss of the radial cell is not evident. Under the rate of evolution that exists today, there probably is still a small incidence of the more generalized type form, since one specimen with fully developed wings was collected at Beeman (fig. 2a).

In all except 1 ♀ specimen examined, the apical 1/2 of the costal margin becomes suddenly narrowed and the apex comes more or less to a point. The subcosta is reduced to a short rod just beyond the fork of radius 1; radius 1 is "disjointed" at the base while 1/2 of radius 1 is branched at base of radius 2. Radius 2 is "split" at base and apex, forming a gap in the middle. The entire radius 1 and apical subcosta are greatly reduced, leaving a tiny portion or a short segment of the radius. In the specialized form, the apical 1/2 of the fore wing is covered with dense long hairs, whereas, in the generalized form it is covered with sparse short hairs.

Another point of interest besides the fore wing is the smooth surface of the scutellar disc present among the conventional striate ones (fig. 2f). Four out of 112 specimens possess smooth scutellar discs while 15 specimens fall into the category of a partially smooth disc or the intermediate form.

Pacific Insects Monograph 7: 513–514 July 15, 1964

INSECTS OF CAMPBELL ISLAND. PEAT INSECTS[1]

By J. L. Gressitt and G. A. Samuelson

BISHOP MUSEUM, HONOLULU

Abstract: Material of about 20 species of arthropods was extracted from peat samples from three levels of a coastal bank at Tucker Cove, Campbell I.

A collection of peat samples was made on Campbell Island in order to determine if there might have been some conspicuous extinction of species, or other changes, during recent millenia. The samples were taken at three levels (26 cm, 76 cm, 126 cm) in a vertical bank on the west side of Tucker Cove, near the inner end of the inlet, very near the location of the old dock. At this point the peat was nearly two meters thick. The samples measured about 20×20×12 cm in size. The lower sample was taken at about a meter above high tide level. One sample, from a fourth level, 176 cm depth, was originally taken by Gressitt. One of the original four samples was lost in transit and this was replaced in early 1962 by K. P. Rennell. Then all of these samples were lost, and were replaced by Rennell and K. A. J. Wise.

Probably the samples reported here are much less than 10,000 years old. A series of samples taken on the Snares by C. A. Fleming from a similar, but tussock-covered bank, was reported by Harris (1953)[2] as being less than 2,000 years old. Dr. Fleming informs us (letter of 2 March 1964) that a radiocarbon date available for Auckland I. (NZ-313) 60 cm below surface is about 6,290 years old. Likewise for Macquarie I., basal peat below gravel proved to be about 7,600 years old; basal peat, depth 3 m, about 1,510; and peat 3.3 m depth, about 2,565 years old. Similarly in Fiordland, southern South Island, N. Z., samples ranged from 800 to 5,610 years old.

In addition to the main samples, a small sample was examined in the field by Gressitt. This was from a large piece beached on the east side of Tucker Cove measuring 2×1.5×0.6 meters. The very small sample analyzed produced the following:

Orthoptera: Rhaphidophoridae. *Notoplectron* (many fragments)
Diptera: puparium (1)
Coleoptera: Carabidae. *Pseudoopterus* sp. (2)
Byrrhidae. *Liochoria sorenseni* Brks. (1)
Curculionidae. *Gromilus veneris setarius* (Broun) (1)

The records from the main lots of peat are enumerated in Tables 1–3. The material seems to mainly represent recognizable existing species.

1. Results of field work supported by grants from the National Science Foundation (USARP).
2. See Bibliography, for literature cited.

Table 1. Arthropods from peat sample #1, 26 cm below surface.

Acarina: Cryptostigmata (30)
Hemiptera: Homoptera: Pseudococcidae (1)
Diptera: puparium (3)
Sciaridae (1)
Coleoptera: Carabidae. *Pseudoopterus* spp. (22)
Kenodactylus capito Brn. (2)
Leptodiridae. *Paracatops campbellicus* (Brks.) (116)
Staphylinidae. *Nesomalium campbellensis* Steel (7)
Colle campbellensis Steel (1)
Byrrhidae. *Liochoria sorenseni* Brks. (10)
Curculionidae. *Notacalles* spp. (3)
N. sp. nr. *multisetosus* and *suillus* (?different from both) (1)
Gromilus veneris setarius (Brn.) (3)
G. sp. (3)
G. exiguus (Brks.) (14)
Oclandius cinereus Bl. (2)
Catadryobiolus antipoda Brks. (2)
Hymenoptera: Pupal case (6)

Table 2. Arthropods from peat sample #2, 76 cm below surface.

Coleoptera: Carabidae. *Pseudoopterus* spp. (1)
Leptodiridae. *Paracatops campbellicus* (Brks.) (1)
Byrrhidae. *Liochoria sorenseni* Brks. (2)

Table 3. Arthropods from peat sample #3, 126 cm below surface.

Acarina: Cryptostigmata (2)
Coleoptera: Carabidae. *Pseudoopterus* spp. (10)
Byrrhidae. *Liochorea sorenseni* Brks. (12)
Curculionidae. *Gromilus* sp. (1)
Oclandius prob. *cinereus* Bl. (1)
weevil (1)
Hymenoptera: Pupal case (1)

Pacific Insects Monograph 7: 515–530 July 15, 1964

INSECTS OF CAMPBELL ISLAND. ECOLOGY[1]

By J. L. Gressitt, K. P. Rennell and K. A. J. Wise
BISHOP MUSEUM, HONOLULU

Abstract: The ecology of the Campbell Island land arthropod fauna is fairly simple, but not thoroughly understood. The majority of species are scavengers, with relatively small numbers of herbivores and predators and very few parasites of insects.

With the various obstacles and limitations during the period of field study (1961–63), it was not possible to gather a great deal of ecological information. For instance, Gressitt and Wise each spent only about 5 weeks on the island and were principally involved in the general survey of the land arthropod fauna. Gressitt also attempted to carry on an extensive dispersal experiment, and Wise went partly to advance his study of the Collembola and to fill gaps while consulting with Rennell on aspects of the general survey which had not been adequately pursued. Rennell, during his entire 18 months on the island, was occupied with a full-time assignment at the weather station, and did all the entomological work in his spare time. Also, as a rule the weather is inhospitable for field observations, with strong wind and mist predominating.

Because of the limited fauna, many of the ecological situations are rather simple. There is a general scarcity of predators and parasites of insects (see Table 1). There is a high proportion of insects and other arthropods which is associated with sea birds and their rookeries. Some of these are direct parasites of the birds, but many are scavengers. Then there are insects associated with the wallowing places of the elephant seals. Some flies breed in excrement left on land by the various seals. Much of the remainder of the fauna is associated with tussock grass, mosses and other mat and cushion plants, and to a lesser extent with the dominant *Bulbinella rossi* (*Chrysobactron*) lilies and the *Dracophyllum* scrub (see Arthropod environments, p. 20). Apparently because the fauna is so limited and therefore natural enemies and competitors so few in number, the range of habits of many of the species appears to be much wider than would be the case with a larger fauna. Thus ecologic niches are less restricted than usual.

The climate of Campbell I. (see p. 34 and next article) is such that insects may be active much of the year. Although temperatures are rarely high, they are also rarely very low. Thus adult insects of quite a few species may be found in mid winter. Rennell caught adults of a number of species in winter, and trapped 367 specimens of 9 species in the air nets during the winter months of June, July and August. However, the 1962 winter was unusually warm. In spite of the mild climate with adults of some groups found in winter, some species appear to be quite seasonal. Some have only been found in early or

1. Results of field work supported by grants G-18800 and G-23720 from the National Science Foundation (U. S. Antarctic Research Program).

late summer, but others have only been seen in early spring (or late fall).

Predators: Some of the 10 or so introduced birds (all or most of the land birds) undoubtedly feed to a considerable extent on insects. These would particularly include *Turdus philomelos*, *T. merula*, *Anthus novaeseelandiae*, *Zosterops lateralis* and *Sturnus vulgaris* (see Vertebrate fauna, p. 31). However, some of these maintain low populations, and none of them are extremely abundant. Thus they probably do not play a very great role in keeping down arthropod populations, and probably have little selective evolutionary influence on the insect fauna. Sorensen (in Salmon 1956) made the statement that the only bird that might have preyed on the small brachypterous jumping moths was the pipit (*Anthus*), and that he did not feel that the pipit was ever abundant enough to have exerted any influence on the evolution of the moths. Sorensen (1951) felt that the pipit was not recently introduced. It is extremely rare (Bailey & Sorensen 1962). Sorensen never observed any of the introduced birds feeding on insects, nor did we.

Some of the sea birds feed on insects occasionally. On sunny days Gressitt observed the red-billed gulls catching a common syrphid-fly, probably *Syrphus flavofasciens* Miller, and sometimes blow flies (*Calliphora* spp.), in the sheltered area between the high peat bank and the hostel door, at Beeman. The gulls would run a few steps forward and catch the flies in their beaks as the flies hovered in the sunshine protected from the wind. Probably this gull, the black-backed gull and the skua feed occasionally on the large populations of the maggots and adults of the coelopid flies, particularly the larger flightless species (*Baeopterus*, fig. 2d, and *Icaridion*) which are massed in the rotting *Durvillea* kelp washed up on beaches. However, this was not observed.

The introduced Norway rat may be the most important predator of insects currently on the island. The rat is extremely abundant and ranges over the ground in the tussock in particular, and this is one of the richest general arthropod environments. Rennell found numerous remains of the largest weevil, *Oclandius cinereus* Bl., in clusters under tussock near the entrances to rat nests.

Predaceous arthropods are rather few in number. Some of the prostigmatic (trombidiform) mites are undoubtedly predaceous on certain minute or immature insects. The spiders may be the most important group. Some of the species are quite abundant and are frequently seen under rocks or cushion plants, or among dense tussock growth (fig. 1a).

Among the true insects there are no predaceous bugs. There are only a few flies which may be predaceous, such as the syrphids (fig. 1d) and empids. The former may feed in part on the mealy-bugs. Among the beetles the three species of carabids, the 12 staphylinids, the pselaphid, the orthopterid and the single coccinellid may be the only predators. The salpingid (fig. 3a) might be predaceous. Most of them undoubtedly feed upon larvae of flies and beetles in the protected environments such as under rocks and cushion plants and in rookeries and rotting *Durvillea* kelp. Great numbers of staphylinids were found in the rotting kelp where coelopid fly larvae were abundant. The coccinellid beetle very likely feeds on the native mealy-bugs, and perhaps also on the introduced aphids.

No predaceous wasps occur on the island. Therefore, the spiders and others appear to have rather few enemies except the carabids, staphylinids, symphylids, centipede and pseudoscorpions, which might eat their young. The Campbell phalangids might be predators or scavengers, or both. Several of the Campbell spiders have well-protected silken capsules forming the egg-cases, so the eggs are well-protected.

Parasites of arthropods: As with predators, there are very few insects parasitic upon insects of Campbell. Probably the arthropods which reached Campbell by oversea dispersal came without their parasites. It is unlikely that a parasitized individual could reach the island and become established, with all the severe obstacles. Only 10 species of Hymenoptera were found on the island. However, the only more southern Hymenoptera fauna known (other than in southernmost S. America) is that on Macquarie I., which consists of 1 or 2 species. No spider egg-parasites were detected, although some might occur. Most of the Campbell Hymenoptera probably parasitize Lepidoptera and Diptera. However, the wingless ichneumonid *Gelis campbellensis* Townes may parasitize the mealy-bugs. The common diapriid (*Antarctopria latigaster* Brues) and the cynipid (*Kleidotoma subantarcticana* Yoshimoto) definitely parasitize the coelopid kelp fly larvae. They are easily reared from the coelopid puparia collected from under rotten *Durvillea* kelp. Rennell wrote (27. XII. 1962):

"Wasps [cynipid]. I found at Shoal Point a species of small short-winged wasp. I think it cannot fly because I did not see one fly while catching 35 specimens with tweezers. I found that if I failed to catch them with the first attempt then they seemed to let go of their hold and usually managed to fall to a lower level in the kelp. I cannot see exactly how they are able to move from one patch of kelp to another.....

"The wingless wasps [diapriid] from among fly puparia on the beach I have also found under quite large stones. I found four specimens under one rock. These are adults which are running around when the rock is turned over. Where these wasps are there are also numbers of fly puparia. Of all the puparia which I have collected I have not hatched one fly, but I am getting wasps over a period of several weeks, which indicates I think that the time spent in the puparium is longer than the fly (more than a month).....This year has been unusually warm. The other day the highest temperature ever recorded, 19°C was recorded. This may, I feel, affect the numbers of *Bulbinella* weevils....."

Possibly the eulophid (*Ardalus campbellensis* Kerrich & Yoshimoto) also parasitizes coelopid larvae, or it may have been an additional species of minute wasp which emerged from a coelopid puparium and was later lost. Other species of *Ardalus* are known to parasitize tortricid moths. Probably the flightless encyrtid, *Antipodencyrtus procellosus* Kerrich, parasitizes some of the mealy-bugs. This leaves only the one or two braconids *Rogas gressitti* Muesebeck and the questionable *Apanteles* sp., the two winged ichneumonids, *Campoplex disjunctus* Townes and *Diadegma agens* Townes, and perhaps the *Ardalus*, to parasitize the 29 species of moths. In spite of attempts to rear several kinds caterpillars, including both free-living species and leaf-miners, few rearings of moths, and none of their parasites, were successful. The *Apanteles* was taken only in trap nets.

Parasites of vertebrates: These include the ticks, certain mites, the Phthiraptera and the Siphonaptera. They are associated primarily with the sea birds. The ticks are found around nests in rookeries and feed primarily on the birds when on the nests. Some of the laelaptine mites, the feather mites and other mites spend much of their time on the bodies or feathers of the birds. Of the Phthiraptera, the Mallophaga spend all their lives among feathers of birds, and the Anoplura are associated with rats, sheep and seals. The fleas are associated with albatrosses, some other birds, and rats. A host-parasite list follows below.

Herbivores: This group presumably includes all the moths, about 1/3 of the beetles, a

Table 1. Summary of food habit type and abundance, by orders

	No. Spp.	Scavenging	Parasitic	Phytophagous	Predaceous
Amphipoda	6	C*			
Isopoda	21	B			
Araneida	16				B-C
Opiliones	2	?			A, B
Pseudoscorpionida	2				A
Mesostigmata	23	A-C	B	?	
Metastigmata	2		B-C		
Cryptostigmata	24+	B, C			
Astigmata	2	B	B		
Prostigmata	20	?		?	A-C
Chilopoda	1				A
Diplopoda	2	A			
Symphyla	2				B
Collembola	46	B, C			
Plecoptera	3	A-C			
Orthoptera	1			A	
Mallophaga	23		B		
Anoplura	3		B		
Psocoptera	3	B			
Thysanoptera	1			A	
Homoptera	11			B-C	
Trichoptera	1	B			
Lepidoptera	29			B-C	
Diptera	81	A-C	B	B	C
Siphonaptera	3		B-C		
Coleoptera	43	A-C		A-C	B-C
Hymenoptera	10		A-C		
No. of species	381	197	46	67	65

* Relative abundance: A-rare; B-intermediate; C-abundant.

very few of the flies, the single orthopteran, the single thrips, the aphids and the mealybugs. Thus about 67 species are probably involved. The orthopteran is a nocturnal feeder, possibly on lichens on *Dracophyllum*. The thrips may feed on introduced plants, the aphids probably feed largely on introduced plants. Some were found on *Cotula plumosa*. The mealy-bugs feed on bases of stems, and roots, of tussock grass. The brachypterous moths probably feed largely on tussock grass, sedges, mat plants and lichens. *Euproteodes* (fig. 1f) is probably a leaf-miner in sedge. *Tinearupa sorenseni* Salm. & Brad. (fig. 1 g–i) probably feeds on lichens on rock surfaces in the upper splash zone. Larvae of some of the geometrids (fig. 1 b, c) apparently feed on *Dracophyllum*.

The byrrhid *Liochoria sorenseni* Brks. may feed on roots of mat plants. The tenebrionid *Pseudhelops tuberculatus posticalis* Brn. (fig. 2 f, g) is found in the same environment.

Two of the weevils, *Oclandius cinereus* Blanch. (fig. 3 d–f) and *Gromilus veneris setarius* (Brn.) (fig. 3 b, c), feed on leaves of *Bulbinella rossi* as adults and larvae of the former feed on the roots. Feeding marks of the two species are shown in fig. 4. Rennell states (19. X. 1962)

"The small weevil eats only the edge of the leaf and is usually in the remains of leaves around the *Bulbinella* shoots, but at Monument Harbor, Six-foot Lake area..... every plant has been chewed and I found about 10 specimens in one tussock. The large weevil found around the NW slopes of Mt. Dumas has a different form of feeding on *Bulbinella*. The feeding marks are deeper and occasionally a hole is eaten through in the center of the

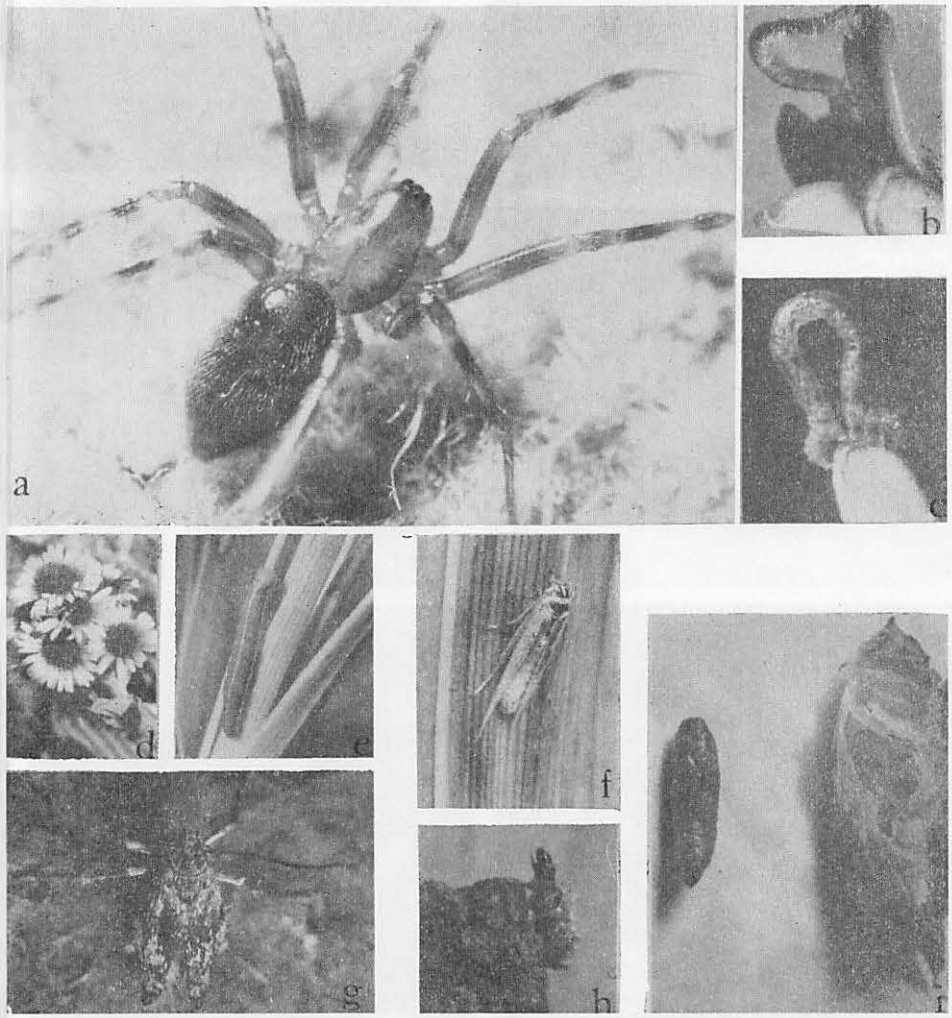


Fig. 1. a, *Mynoglenes marrineri* Hogg, Beeman Hill; b, lepidopterous (geometrid) larva on *Coprosma*, St. Col Ridge; c, same; d, syrphid flies, *Helophilus campbellicus* Hutt., center, and *Syrphus novaezealandiae* Macq., right, on flowers of *Pleurophyllum speciosum* Hook. f.; e, lepidopterous larva on *Dracophyllum scoparium*, Beeman Pt.; f, brachypterous moth (?*Euproteodes*) on sedge, Tucker Cove; g, brachypterous moth, *Tinearupa sorenseni* Salm & Brad., on rock surface in upper splash zone, Monument Hrbr.; h, larva of same, in case on rock; i, chrysalis and cocoon, probably of same, Courrejolles Pen. (mostly by Rennell, partly by Gressitt, XII. 1961; d by Dr. E. J. Godley).

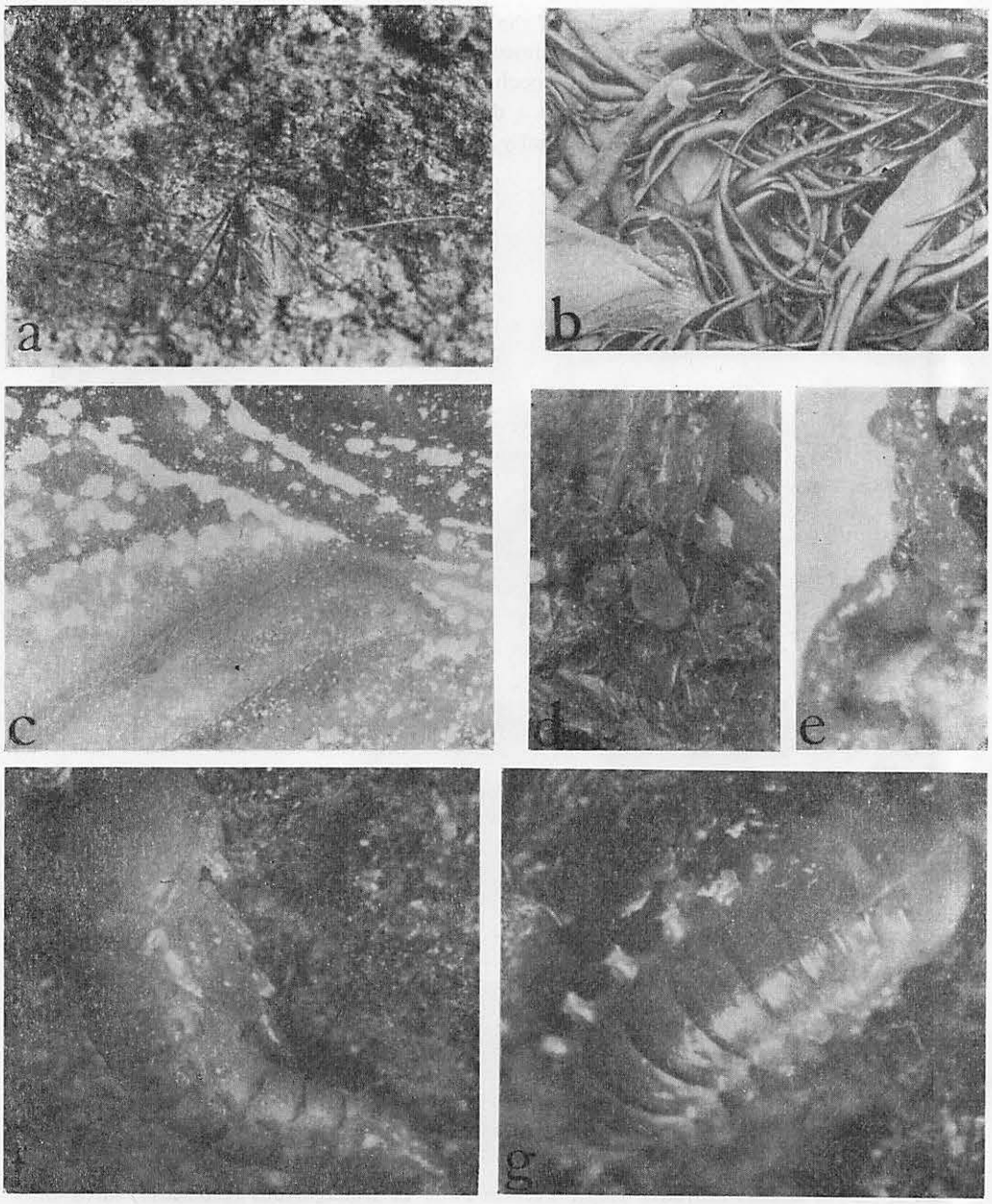


Fig. 2. a, crane-fly *Limonia* (*D.*) *kronei* (Mik) under overhanging boulder in upper splash zone, Rocky Bay; b, *Durvillea* kelp on upper rocky beach, Rocky Bay, with masses of eggs of coelopid flies in lower left; c, close-up of same egg masses; d, adult ♀ coelopid, *Baeopterus robustus* Lamb, same environment; e, adult staphylinid beetle, same environment; f, pupa, probably of tenebrionid beetle *Pseudhelops tuberculatus posticalis* Broun, under moss; St. Col Ridge; g, dorsal view of same (Gressitt and Rennell, XII. 1961).

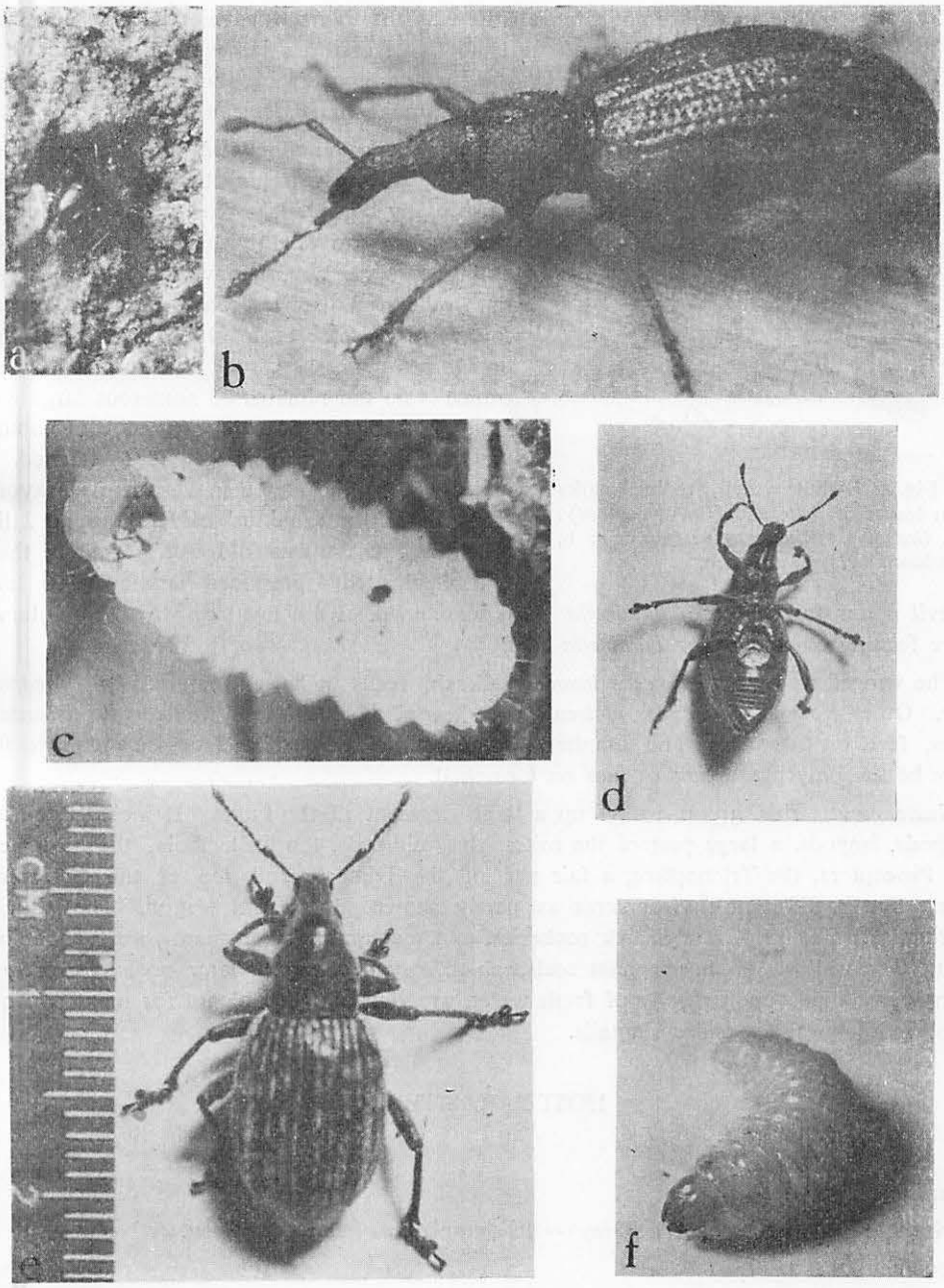


Fig. 3. a, salpingid beetle *Antarcticodomus fallai* Brookes in cavity on underside of rock in inter-tidal zone, Tucker Cove; b, weevil *Gromilus veneris setarius* (Broun), under moss on rocks, St. Col Ridge; c, larva, probably of same; d, *Oclandius cinereus* Blanch., underside; e, same, dorsal view, from *Bulbinella*, Shoal Pt.; f, larva, probably of same, from among adjacent roots of *Bulbinella* and *Poa*, Shoal Pt. (photos by Rennell and Gressitt).

leaf. Some feeding marks are not eaten all the way through the leaves (fig. 4). The feeding is done from the undersurface of the leaf. Most of these large weevils are found in the surrounding tussock, but occasionally one is found among the *Bulbinella* debris.

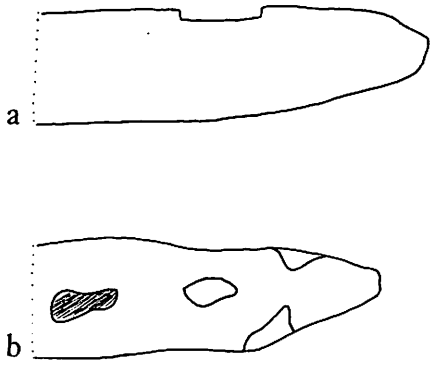


Fig. 4. Adult weevil feeding marks on leaves of *Bulbinella* (*Chrysobactron*): a, *Gromilus veneris setarius* (Broun); b, *Oclandius cinereus* Blanch.

"The marks on the *Bulbinella* leaves are most obvious, and by searching the weevil responsible can usually be found. Some weevils from near Courrejolles are slightly blacker than the NW Dumas specimens, but I have found some blacker than others on Dumas. The different colors are found in the same bush. I also found a rat hole on Dumas under a tussock and around the entrance were the remains of numerous large weevils. Probably 20–30 wing covers and about 5 or 6 foreparts with parts of legs attached. It appeared that the abdomen was the most favored portion. In the same tussock I still found 2 live specimens, so the rats did not get all of them. I also collected 4 presumed larvae of the large weevil under tussock and *Bulbinella* roots combined. I am not sure whether the larvae were feeding on tussock or *Bulbinella* roots."

The winged weevil, *Peristoreus innocens* Kirsch, feeds in flowers or seeds of *Dracophyllum*. Other weevils, *Notacalles piciventris*, *N. kronei*, *N. suillus* and *Pactolotypus subantarcticus*, feed on *Coprosma*, and another *Notacalles* on *Hebe*. The 3 or 4 cecidomyid flies may be the only phytophagous flies on Campbell.

Scavengers: This group makes up a large segment of the fauna. It includes the amphipods, isopods, a large part of the mites, the millipeds, the Collembola, the Plecoptera, the Psocoptera, the Trichoptera, a fair part of the Diptera, and 1/3 of the Coleoptera. These live in different environments as partly shown in the next section. The strata of rotting *Durvillea* kelp, mollymawk rookeries, and mat and cushion plants, are very important. The wallows of the elephant seals, which may be small or large pools, generally of rich soupy mud, andgenerally of fresh water, are rich breeding places for many kinds of flies, and some mites and springtails.

HOST-PARASITE LIST

MAMMALIA

Otariidae

Neophoca [Otaria] hookeri (Gray)—*Antarctophthirus microchir* (Trou. & Neum.)

Phocidae

Mirounga leonina (L).—*Lepidophthirus macrorhini* End.

Muridae

Rattus norvegicus (Berk.)—*Polyplax spinulosa* (Burm.); *Nosopsyllus* (*N.*) *fasciatus* (Bosc)

Bovidae

Ovis aries L.—*Damalinia ovis* (Schr.); *Melophagus ovinus* L.

AVES

Spheniscidae

Eudyptes c. crestatus Mill.—*Ixodes uriae* Wh.; *Austrogonoides cristati* Kel.

Eudyptes pachyrhynchus sclateri Bull.—*Austrogonoides concii* (Kél.)

Diomedeidae

Diomedea ex. exulans L.—*Docophoroides* sp.

Diomedea ep. epomophora Less.—*Ixodes uriae* Wh.; *Austromenopon affine* (Piag.); *Harrisoniella hopkinsi* Eichler; *Perineus* sp.; *Docophoroides brevis* (Duf.); *Nosopsyllus* (*N.*) *fasciatus* (Bosc)

Diomedea melanophris impavida (Math.)—*Perineus diomedeae* (J. C. Fabr.); *Parapsyllus longicornis* (End.)

Diomedea chrysostoma Forst.—*Ixodes uriae* Wh.; *Perineus* spp. (2); *Parapsyllus longicornis* (End.)

Phoebetria palpebrata (Forst.)—*Ixodes uriae* Wh.; *Perineus diomedeae* (J. C. Fabr.)

Procellariidae

Macronectes giganteus (Gmelin)—*Austromenopon ossifragae* Eichl.; *Perineus obscurus* (Rud.); *Docophoroides murphyi* (Kell.)

Pachyptila desolata alter (Math.)—*Ixodes pterodromae* Arth.; *Notiopsylla kerguelensis* (Tasch.)

Puffinus griseus (Gmel.)—*Ixodes pterodromae* Arth.; *Halipeurus* sp.; *Trabeculus hexacon* (Water.); *Notiopsylla kerguelensis* (Tasch.)

Hydrobatidae

Garrodia nereis (Gould)—*Notiopsylla kerguelensis* (Tasch.); *Philoceanus garrodiae* (Clay)

Pelecanoides urinatrix exsul Salvin—*Austromenopon elliotti* Timm.; *Pelmatocerandra setosa* (Gieb.); *Notiopsylla kerguelensis* (Tasch.)

Phalacrocoracidae

Phalacrocorax c. campbelli (Filhol)—*Pectinopygus* sp.

Stercorariidae

Stercorarius [Catharacta] skua lonnbergi Math.—*Harrisoniella grandis* (Piag.); *Saemundssonia stresemanni* Timm.

Laridae

Larus dominicanus Licht.—*Saemundssonia lari* (O. Fabr.); *Quadraceps fuscolaminulatus* (End.); *Notiopsylla kerguelensis* (Tasch.)

Larus novaehollandiae scopulinus Forst.—*Saemundssonia lari* (O. Fabr.); *Quadraceps lingulatus* (Water.)

Sterna vittata bethunei Bull.—*Saemundssonia* sp.

ARTHROPOD COMMUNITIES

The following represents an arbitrary classification of the principal communities and strata for arthropods on Campbell I. Some of the species listed for the various niches may not be truly associated therewith, but with the information available it is difficult to prove or disprove this. Many collection records believed to be accidental are not included. Nevertheless many species appear below under several categories.

Littoral-Supralittoral

Inter-tidal: *Orchestia bollonsi* Chilt.; *Oramia hoggi* Forst.; *Amaurobioides maritima* Cambr.; oribatid mites; *Bdellodes* (*H.*) *petila* Aty.; *Hanseniella campbellensis* Jub.-Jup.; *Papillomurus ochraceus* Salm.; *Parisotoma picea* Salm.; *Limonia* (*D.*) *kronei* (Mik); *Kenodactylus capito* Broun; *Baeostethus chiltoni* Brn.; *Pselaphotheseus hippolytae* Park; *Antarcticodomus fallai* Brookes.

High-water line: *Triacanthella alba* Carp.; *T. sorenseni* Salm.; *Subantarctica flava* Salm.; *Colonavis litoralis* Wise; *Sorensia subflava* Salm.; *Pseudokatianna triclavata* Salm.; *Leptocera* spp.; *Macrocanace australis* (Hutt.); *Hydrellia enderbii* (Hutt.); *Scatella* spp.; *Limnophora* spp.; *Arpediomimus kronei* (Kies.); *Nesomalium campbellensis* Steel; *Halmaeusa nesiotes* Steel; *Antarcticodomus fallai* Brks.; *Orchesia rennelli* Gr. & Sam.

Durvillea kelp: *Chiltonia minuta* Bous.; *Orchestia aucklandiae* Bate; *O. bollonsi* Chilt.; *Laestrygones albiceres* Urq.; *Amaurobioides maritima* Cambr.; *Triacanthella sorenseni* Salm.; *Hypogastrura armata* (Nic.); *Subantarctica flava* Salm.; *Colonavis litoralis* Wise; *Entomobrya nivalis* (L.); *Pseudokatianna triclavata* Salm.; all Coelopidae; *Macrocanace australis* (Hutt.); *Paralimnophora antipoda* Harr.; *P. depressa* Lamb; *Limnophora* spp.; *Omaliomimus venator* (Brn.); *Nesomalium campbellensis* Steel; *Halmaeusa sparsepunctata* Steel; *Antarctopria latigaster* Brues; *Kleidotoma subantarcticana* Yoshimoto.

Rocky upper splash zone: *Oramia hoggi* Forster; *Rhagidia mildredae* Str.; *Subantarctica flava* Salm.; *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Colonavis litoralis* Wise; *Tinearupa sorenseni* Salmon & Bradley; *Musotima nitidalis* (Walk.); *Limonia* (*D.*) *kronei* (Mik); *Empidadelpha stigmosa* Sm.; *Orchesia rennelli* Gr. & Sam.; *Antarcticodomus fallai* Brks.

Protected shores with Hebe & tussock: *Mynoglenes marrineri* Hogg; *Clynotis barresi* Hogg. *Hebe*: *Spilopsocus avius* Sm., *Notacalles planidorsis* (Kirsch).

Aquatic Communities

Streams: *Oxyethira albiceps* (McL.); Chironomidae; *Austrosimulium vexans* (Mik).

Under stones in streams: *Aucklandobius complementarius* End.; *Apteryoperla longicauda* Ill.; *Acanthomurus rivalis* Wise; *Tomocerura colonavia* Salm.; *Pseudokatianna triclavata* Salm.

Polluted stream (*chicken yard*): *Ayersacarus plumapilus* Hunt.; *Psychoda severini* Tonn.; *Atheta amicula* (Steph.).

Ponds (FW Pool near beach): *Allorchestes compressus* Dana; *Hypogastrura armata* (Nic.); *H. pseudopurpurascens* Wom.; *Lepidophorella australis* Carp.; *Lepidobrya violacea* Salm.; *Smittia* spp.

Elephant seal wallows: *Psychoda pulchrima* Satch.; *P. spatulata* Satch.; *Hydrellia ender-*

bii (Hutt.); *Helophilus antipodus* Sch.; *Coelopa debilis* Lamb; *Leptocera* spp.; *Macrocanace australis* (Hutt.); *Australimyza anisotomae* Harr.; *Limnophora* spp.

Under rocks near water: *Macrocanace australis* (Hutt.); *Selonomus linearis* Steel; *Gromilus insularis robustus* (Brks.).

TUSSOCK GRASSLAND

Tussock grass: *Parorchestia insularis* Chilt.; *Pounamua gressitti* Forst.; *Laestrygones albiceres* Urq.; *Icona alba* Forst.; *Mynoglenes marrineri* Hogg; *Clynotis barresi* Hogg; *Pantopsalis rennelli* Forst.; *Apatochernes antarcticus* Beier; *Stereotydeus undulatus* Str.; *S. nudisetatus* Str.; *Rhagidia mildredae* Str.; *Microtrombidium karriensis* Wom.; *Colonavis grandis* Salm.; *Lepidophorella australis* Carp.; *L. brachycephala* (Mon.); *Entomobrya nivalis* (L.); *Lepidiaphanus eudyptidus* Salm.; *Lepidobrya thalassarchia* Salm.; *L. violacea* Salm.; *Longkingia salmoni* Wise; *Aulacorthum solani* (Kalt.); *Myzus ascalonicus* Donc.; *Proterodesma byrsopola* Meyr.; *Sorensenata agilitata* Salm. & Brad.; *Exsilirarcha graminea* Salm. & Brad.; *Witlesia gressitti* Munr.; *Erioptera* (*T.*) *pilipes campbellicola* Alex.; *Psychoda pulchrima* Satch.; *P. campbellica* Q.; *P. eremita* Q.; *P. spatulata* Satch.; *Mycetophila campbellensis* Harr.; *Bradysia rubra* (Harr.); *Leptocera* spp.; *Hydrellia enderbii* (Hutt.); *Australimyza anisotomae* Harr.; *Coenosia filipennis* Lamb; *Limnophora* spp.; *Pseudoopterus marrineri* (Brn.); *P. tarsalis* (Brn.); *Acrotrichis subantarctica* Gr. & Sam.; *Paracatops campbellicus* (Brks.); Staphylinidae; *Veronicobius aucklandiae* (Kirsch); *Gelis campbellensis* Townes; *Antipodencyrtus procellosus* Kerr.; *Antarctopria latigaster campbellana* Yoshm.

Other grass: *Penthaleus major* Duges.

Sedges: *Euproteodes galathea* Vtte; *Campbellana attenuata* Salm. & Brad.; *Poecilohetaerella bilineata* (Hutt.); *Leptocera* spp.; *Hydrellia enderbii* (Hutt); *Australimyza anisotomae* Harr.; *Coenosia filipennis* Lamb; *Limnophora brunneinota* Harr.; (leaf mold): *Orchestia bollonsi* Chilt.

Bulbinella: *Parorchestia insularis* Chilt.; *Ayersacarus plumapilus* Hunt.; *Leptolaelaps reticulatus campbellensis* Hunt.; *Tullbergia subantarctica* Salm.; *Aulacorthum circumflexum* (Buck.); *Zygomyia similis* Tonn.; *Hydrellia enderbii* (Hutt.); *Australimyza anisotomae* Harr.; *Poecilohetaerella bilineata* (Hutt.); *Acropsilus borboroides* Oldr.; *Syrphus novaezealandiae* Macq.; *Halophilus campbellicus* Hutt.; *Calliphora viridiventris* Swed.; *Coenosia filipennis* Lamb; *Limnophora* spp.; *Melanophthalma globipennis* (Rttr); *Heterexis seticostatus* (Brks.); *Oclandius cinereus* Bl.

Tussock leafmold or roots: *Leptolaelaps reticulatus campbellensis* Hunt.; *Androlaelaps pachyptilae* (Z. & T.); *Symphylella essigi* Michelb.; *Tulbergia scalpellata* Salm.; *T. subantarctica* Salm.; *Hypogastrura armata* (Nic.); *Colonavis grandis* Salm.; *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Sorensia minuta* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Lepidophorella nigra* Salm.; *Lepidobrya violacea* Salm.; *Nipaecoccus campbellensis* Beard.; *N. longispinus* Beard.; *Trionymus danthoniae* Morr.; *Limonia* (*D.*) *arthuriana* (Alex.); *Erioptera* (*T.*) *pilipes campbellicola* Alex.; *Corynoptera subantarctica* Steff.; *Selonomus linearis* Steel; *Allodrepa decipiens* Stl.; *Colle campbellensis* Stl.; *Acrotrichis subantarctica* Gr. & Sam.; *Melanophthalma globipennis* (Rttr.); *Holopsis nitidus* Endr.-Y.; *Veronicobius aucklandiae* (Kirsch); *Catadryobiolus antipodus* Brks.; *Antipodencyrtus procellosus* Kerr.; *Antarctopria latigaster campbellana* Yoshm.

Moss, Mat and Cushion Plants

Moss on rocks: *Gohia clarki* Forst.; *G. wenhami* (Forst.); *Hina delli* (Forst.); *Pholcomma hickmani* Forst.; *Clynotis barresi* Hogg; *Apatochernes antarcticus* Beier; *Systellochernes zonatus* Beier; *Leptolaelaps reticulatus campbellensis* Hunt.; *Eupodes longisetatus* Str.; *Stereotydeus undulatus* Str.; *S. nudisetatus* Str.; *S. pulcher* Str.; *Rhagidia mildredae* Str.; *Microtrombidium karriensis* Wom.; *Bdellodes* (*H.*) *multicia* Aty.; *Hanseniella campbellensis* Jub.-Jup.; *Xenylla novazealandia* Salm.; *Hypogastrura armata* (Nic.); *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Tomocerura colonavia* Salm.; *Parisotoma octooculata ovata* Salm.; *Sminthurinus discordipes* Salm.; *Nipaecoccus longispinus* Beard.; *Corynoptera subantarctica* Steff.; *Meropathus campbellensis* Brks.; *Selonomus linearis* Steel; *Halmaeusa nesiotes* Stl.; *Pseudhelops tuberculatus posticalis* Brn.; *Gromilus insularis robustus* (Brks.); *G. exiguus* (Brks.).

Moss on ground: *Ayersacarus plumapilus* Hunt.; *A. gressitti* Hunt.; *Globoppia gressitti* Wall.; *G. campbellensis* Wall.; *Oppia diaphora* Wall.; *O. beemanensis* Wall.; *O. disjuncta* Wall.; *Leptolaelaps reticulatus campbellensis* Hunt.; *Androlaelaps pachyptilae* (Z. & T.); *Eupodes longisetatus* Str.; *Stereotydeus pulcher* Str.; *Rhagidia mildredae* Str.; *Nanorchestes antarcticus* Str.; *Microtrombidium karriensis* Wom.; *Bdellodes* (*H.*) *multicia* Aty.; *B.* (*H.*) *gressitti* Aty.; *Tullbergia subantarctica* Salm.; *Colonavis grandis* Salm.; *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Sorensia subflava* Salm.; *Papillomurus ochraceus* Salm.; *Lepidophorella australis* Carp.; *Entomobrya nivalis* (L.); *Pseudhelops tuberculatus posticalis* Brn.

Mat-cushion plants: *Ayersacarus plumapilus* Hunt.; *A. gressitti* Hunt.; *Rhagidia mildredae* Str.; *Lorryia* sp.; *Nanorchestes antarcticus* Str.; *Tullbergia subantarctica* Salm.; *Nipaecoccus longispinus* Beard.; *Megaselia* (*M.*) *insulana* Brues; *Pseudoopterus marrineri* (Brn.); *P. tarsalis* (Brn.); *Selonomus linearis* Stl.; *Halmaeusa nesiotes* Stl.; *Colle campbellensis* Stl.; *Liochoria sorenseni* Brks.; *Orchesia rennelli* Gr. & Sam.; *Pseudhelops tuberculatus posticalis* Brn.; *?Notacalles* spp.; *Gromilus* spp.; *Heterexis seticostatus* (Brks.); *Gelis campbellensis* Townes.

Lichens: *Stereotydeus nudisetatus* Str.; *S. pulcher* Str.; *Rhagidia mildredae* Str.; *Bdellodes* (*H.*) *multicia* Aty.; *Xenylla novazealandia* Salm.; *Hypogastrura morbillata* (Salm.).

Lichens on rocks: *Brachycaudus helichrysi* (Kalt.).

Tillaea on rocks: *Parisotoma octooculata ovata* Salm.; *Pseudokatianna campbellensis* Salm.; *Brachycaudus helichrysi* (Kalt.); *Myzus ascalonicus* Donc.

Native Herbs

Pleurophyllum speciosum: *Parorchestia insularis* Chilt.; *Linyphia setosa* Forst.; *Oramia hoggi* Forst.; *Mynoglenes marrineri* Hogg.; *Pantopsalus rennelli* Forst.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Lepidiaphanus eudyptidus* Salm.; *Lepidobrya thalassarchia* Salm.; *Jacksonia papillata* Theo.; *Myzus ascalonicus* Donc.; *Holoneurus aliculatus* Yuk. (leaf mold); *Gelis campbellensis* Townes.

Pleurophyllum criniferum: *Proisotoma octojuga* Salm.; *Lepidophorella australis* Carp.; *Lepidiaphanus eudyptidus* Salm.

Stilbocarpa polaris: *Microtrombidium karriensis* Wom.; *Lepidophorella communis* Salm.;

Myzus ascalonicus Donc.; *Rhopalosiphoninus staphyleae* (Koch); *Psychoda spatulata* Satch.; *Nesomalium imitator* Stl. (leaf mold); *Gromilus insularis robustus* (Brks.).

Anisotome: *Oramia hoggi* Forst.; *Mynoglenes marrineri* Hogg.; *Australimyza anisotomae* Harr.; *Limnophora* spp.; *Allodrepa decipiens* Stl.

Pittosporum: *Pactolotypus subantarcticus* Kohl.

Peat

Peat bank: *Oramia charybdis* (Hogg.); *Lepidophorella australis* Carp.; *L. nigra* Salm.

Coprosma-Myrsine Scrub

Coprosma: *Laestrygones albiceres* Urq.; *Icona alba* Forst.; *Longkingia salmoni* Wise; *Notoplectron campbellensis* Rich.; *Spilopsocus avius* Sms.; *Austropsocus insularis* Sms.; *Hydriomena similata* Walk.; *Notacalles piciventris* (Brn.); *N. kronei* (Kirsch); *N. suillus* Kschl.; *Pactolotypus subantarcticus* Kschl.

Myrsine: *Notacalles multisetosus* (Broun). *Myrsine leaf mold*: *Rhopalosiphoninus staphyleae* (Koch).

Dracophyllum Scrub

Dracophyllum: *Parorchestia insularis* Chilt.; *Pantopsalis rennelli* Forst.; *Entomobrya nivalis* (L.); *Lepidiaphanus eudyptidus* Salm.; *Longkingia salmoni* Wise; *Spilopsocus avius* Sms.; *Epiphryne charidema* (Meyr.) (on *D. longifolium* Forst.); *Australimyza anisotomae* Harr.; *Notacalles piciventris* (Brn.); *Peristoreus innocens* Kirsch; *Rogas gressitti* Mues.; *Campoplex disjunctus* Townes; *Ardalus campbellensis* Kerr. & Yoshm.

Drac. leaf mold: *Textricella wisei* Forst.; *Apatochernes antarcticus* Beier; *Ayersacarus gressitti* Hunt.; *Eupodes longisetatus* Str.; *Ereynetes* sp.; *Leptolaelaps reticulatus campbellensis* Hunt.; sphaerotrichopid; *Schedotrigona* sp.; *Tullbergia subantarctica* Salm.; *Lepidophorella australis* Carp.; *Lepidophorella communis* Salm.; *Aulacorthum circumflexum* (Buck.); *Myzus ascalonicus* Donc.; *Notiopsylla kerguelensis* (Tasch.); *Colle campbellensis* Steel.

Moss on Dracophyllum: *Systellochernes zonatus* Beier; *Stereotydeus pulcher* Str.; *Xenylla novazealandia* Salm.; *Sminthurinus discordipes* Salm.; *Notoplectron campbellensis* Rich.

Lichens on Dracophyllum: *Oramia charybdis* (Hogg.); *Hina delli* (Forst.); *Clynotis barresi* Hogg.; *Systellochernes zonatus* Beier; *Eupodes longisetatus* Str.; *Xenylla novazealandia* Salm.; *Hypogastrura obliqua* (Salm.); *Parafolsomia decemoculata* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Lepidophorella communis* Salm.; *Lepidobrya violacea* Salm.; *Sminthurinus discordipes* Salm.; *Longkingia salmoni* Wise; *Notoplectron campbellensis* Rich.; *Aulacorthum solani* (Kalt.); *Capua plagiatana* Walk.; *Bradysia rubra* (Harr.).

Rocks on Hilltops

Sorensia subflava Salm.; *Tomocerura colonavia* Salm.; *Apteryoperla campbelli* Ill.; *Pseudoopterus marrineri* (Brn.); *P. tarsalis* (Brn.); *Pselaphotheseus hippolytae* Park; *Pseudhelops tuberculatus posticalis* Brn.; *Gromilus exiguus* (Brks.); *G. veneris setarius* (Brn.).

BLOODSUCKERS (For parasites of known hosts see Host-parasite list.)

Austrosimulium vexans (Mik).

EXCREMENT (seals, sheep, cattle)

Paralimnophora spp.; *Limnophora* spp.; Staphylinidae.

CARRION

Psychodidae; *Heloclusia* (*H.*) *antipoda* Harr.; *Leptocera* sp.; *Scatella* sp.; Calliphoridae; *Meropathus campbellensis* Brks.; *Nesomalium campbellensis* Steel.

ROOKERIES

Mollymawk nests: *Parorchestia campbellana* Bousf.; *Orchestia bollonsi* Chilt.; *Oramia hoggi* Forst.; *Gohia clarki* Forst.; *G. wenhami* (Forst.); *Pounamua gressitti* Forst.; *Mynoglenes insolens* Simon; *Clynotis barresi* Hogg.; *Apatochernes antarcticus* Beier; *Ayersacarus plumapilus* Hunt.; *Leptolaelaps reticulatus campbellensis* Hunt.; *Androlaelaps pachyptilae* (Z. & T.); *Ixodes uriae* Wh.; *Rhagidia mildredae* Str.; *Microtrombidium karriensis* Wom.; *Bdellodes* (*H.*) *gressitti* Aty.; *Tullbergia subantarctica* Salm.; *Hypogastrura armata* (Nic.); *Parafolsomia decemoculata* Salm.; *Sorensia subflava* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Longkingia salmoni* Wise; *Nipaecoccus campbellensis* Beard.; *Trionymus danthoniae* Morr.; *Erioptera* (*T.*) *brachyptera* Alex.; *Psychoda eremita* Q.; *P. spatulata* Satch.; *Corynoptera subantarctica* Steff.; *Australimyza anisotomae* Harr.; *Parapsyllus longicornis* (End.); *Nesomalium campbellensis* Steel; *Pseudhelops tuberculatus posticalis* Brn.

Tillaea in mollymawk rookery: *Lepidiaphanus eudyptidus* Salm.

Under stones in mollymawk rookery: *Subantarctica flava* Salm.; *Colonavis grandis* Salm.; *Parafolsomia litorea* Salm.; *Tomocerura colonavia* Salm.; *Lepidiaphanus eudyptidus* Salm.; *Lepidobrya thalassarchia* Salm.; *L. violacea* Salm.; *Pseudokatianna triclavata* Salm.; *Phenacoleachia australis* Beard.; *Witlesia psammitis campbellensis* Munr.; *Schoenophilus pedestris campbellensis* Harr.; *Hydrellia enderbii* (Hutt.); *Scatella brevis* Harr.; *S. acutipennis* Harr.; *Meropathus campbellensis* Brks.; *Orchesia rennelli* Gr. & Sam.; *Gromilus exiguus* (Brks.).

On rock in mollymawk rookery: *Erioptera brachyptera* Alex.; *Tinearupa sorenseni* Salm. & Brad.; *Gromilus exiguus* (Brks.); *Gelis campbellensis* Townes.

Sooty albatross nest: *Apatochernes antarcticus* Beier; *Androlaelaps pachyptilae* (Z. & T.); *Ixodes uriae* Wh.; *Hypogastrura armata* (Nic.); *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Megaselia* (*M.*) *scalaris* (Loew); *Meropathus campbellensis* Brks.; *Halmaeusa sparsepunctata* Stl.; *Kleidotoma* (*P.*) *subantarcticana* Yoshm.

Royal albatross nest: *Psychoda spatulata* Satch.; *Scatella* sp. (under dead chick).

Penguin (*Megadyptes antipodes*) *nest*: *Apatochernes antarcticus* Beier.

Penguin (*Eudyptes c. crestatus*) *nests*: *Orchestia bollonsi* Chilt.; *Microtrombidium karriensis* Wom.; *Ayersacarus plumapilus* Hunt.; *A. gressitti* Hunt.; *Ixodes uriae* Wh.; *Parisotoma octooculata ovata* Salm.; *Psychoda brachyptera* Q.; *Meropathus campbellensis* Brks.; *Acrotrichis subantarctica* Gr. & Sam.; *Paracatops campbellensis* (Brks.).

Under stones in penguin (E. crestatus) rookery: *Nesomalium campbellensis* Steel; *Halmaeusa nesiotes* Stl.

Shag (Phalacrocorax c. campbelli) nest: *Mynoglenes insolens* Simon.

Dove prion (Pachyptila desolata) nest: *Androlaelaps pachyptilae* (Z. & T.).

Sooty shearwater (Puffinus griseus) nest: *Ayersacarus gressitti* Hunt.; *Androlaelaps pachyptilae* (Z. & T.); *Ixodes uriae* Wh.; *Notiopsylla kerguelensis* (Tasch.); *Paracatops campbellensis* (Brks.).

Black-backed gull nest: *Tullbergia subantarctica* Salm.; *Brachycaudus helichrysi* (Kalt.); *Myzus ascalonicus* Donc.; *Psychoda spatulata* Satch.

On rocks in penguin rookery: *Erioptera (T.) pilipes campbellensis* Alex.; *Macrocanace australis* (Hutt.); *Scatella brevis* Harr.; *Limnophora* spp.; *Gromilus insularis robustus* (Brks.); *G. exiguus* (Brks.).

Mat plants in rookeries: *Ixodes uriae* Wh.; *Tullbergia subantarctica* Salm.; *Xenylla novazealandia* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Erioptera brachyptera* Alex.; *Scatella* sp.; *Paracatops campbellensis* (Brks.); *Halmaeusa nesiotes* Stl.; *H. sparsepunctata* Stl.; *Pseudhelops tuberculatus posticalis* Brn.

Tillaea in penguin rookery: *Xenylla novazealandia* Salm.; *Parasinella castanea* Salm.; *Cryptopygus campbellensis* Wise; *Pselaphotheseus hippolytae* Park; *Gromilus insularis robustus* (Brks).

In Cave, Courrejolles

Agrotis ipsilon (Hufn.)

Introduced Plants

Stellaria: *Bdellodes (H.) flexuosa* Aty.; *Myzus ascalonicus* Donc.; *Australimyza anisotomae* Harr.

Weeds: *Stereotydeus undulatus* Str.; *Bdellodes (H.) multicia* Aty.; *Henicops maculatus* Newp.; *Hypogastrura armata* (Nic.); *Parafolsomia litorea* Salm.; *P. decemoculata* Salm.; *Taeniothrips hawaiiensis* (Morg.).

Pelargonium: *Aulacorthum malvae* (Mosl.).

Debris

Surface debris (incl. stones in camp area): *Henicops maculatus* Newp.; *Onychiurus subantarcticus* Salm.; *Triacanthella sorenseni* Salm.; *Hypogastrura armata* (Nic.); *H. pseudopurpurascens* Wom.; *Anurida granaria* (Nic.); *Neanura radiata* Salm.; *N. hirtella schotti* (Wom.); *Parafolsomia litorea* Salm.; *Folsomia* sp.; *Proisotomurus lapidosus* Salm.; *Sorensia subflava* Salm.; *Papillomurus ochraceus* Salm.; *Parisotoma octooculata ovata* Salm.; *Lepidophorella australis* Carp.; *L. communis* Salm.; *L. nigra* Salm.; *Tomocerus setoserratus* Salm.; *Entomobrya nivalis* (L.); *Lepidiaphanus eudyptidus* Salm.; *Lepidocyrtus cyaneus cinereus* Fols.; *Lepidobrya mawsoni* (Tilly.); *L. thalassarchia* Salm.; *L. violacea* Salm.; *Pseudokatianna campbellensis* Salm.; *Nipaecoccus campbellensis* Beard.; *Nesomalium campbellensis* Stl.; *N. imitator* Stl.; *Gromilus veneris setarius* (Brn.).

Chicken yard debris: *Stereotydeus undulatus* Str.; *Eulaelaps stabularis* (Koch); *Hypogast-*

rura armata (Nic.); *Proisotoma xanthella* Salm.; *Papillomurus ochraceus* Salm.; *Entomobrya nivalis* L.; *Psychoda severini* Tonn.; *Acrotrichis subantarctica* Gr. & Sam.; *Atheta amicula* (Steph.).

Malaise Trap Only

Tortrix melanosperma Meyr.; *Scoparia triscelis* Meyr.; *Xylosciara brevipes* Steff.; *Cordylomyia gressitti* Yuk.; *Clinocera gressitti* Sm.

In Buildings

Trogium pulsatorium (L.); *Platyptilia aeolodes* Meyr.; *Agrotis ipsilon* (Hufn.); *Ptinus tectus* Bld.

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INSECTS OF CAMPBELL ISLAND. SUMMARY[1]

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Abstract: The 300 described species of land arthropods on Campbell I. are 47% endemic. Nineteen genera (7%) appear to be endemic, but some of these undoubtedly occur also in the Auckland Is. The dominant relationships of the Campbell I. fauna appear to be with New Zealand. The Campbell fauna is much more similar to that of the Auckland Is. than to that of Macquarie I. There are not many indications of close relationship with the fauna of southern South America. There appear to be a number of subcontinental elements in the Campbell fauna, and perhaps a minority came by oversea dispersal. The severe windy climate has a great influence on evolution on the island. There is a strong tendency toward wing loss. A number of the winged species use their wings very little. Many Campbell species appear to be very plastic, both ecologically and morphologically.

Composition of the Campbell I. fauna: There appear to be more than 381 species of land arthropods on Campbell I. These belong to 27 distinct groups (classes, subclasses or orders). About 138 families and 280 genera are represented on the island (see table 1 and fig. 10). Of these, 300 species are reported upon in this volume, besides about 60 from nearby areas such as Macquarie I., the Auckland Is., the Snares and the Antipodes.

SYSTEMATIC LIST

Before discussing the zoogeography of the Campbell I. fauna, the following list of the Campbell species is presented, to give a concisepicture of thefauna. This list is an attempt to enumerate the species in systematic order, and not always in the order followed in the main text, which represents the division of the collection among collaborators. The list includes some groups not treated in the text. I am grateful to several collaborators (B. Ainscough, L. Brundin, L. Eldridge, Danielle B. Fellows, J. A. Wallwork, N. Wilson) for supplying tentative information on representation in groups not yet studied. The list is limited to Campbell I. and omits species recorded or described in this volume from the Auckland Is., Snares, Antipodes or Macquarie I.

The last column indicates additional distribution records, such as areas not indicated in the main columns, or more specific records, such as for the southern part of New Zealand only (South Island, or Stewart I.). Also, for normally winged groups, an "X" on right side of last column indicates that the species has the wings absent, brachypterous or slightly reduced, and thus is flightless or practically flightless.

1. Results of field work supported by National Science Foundation grants G-18800 and G-23720 from the U. S. Office of Antarctic Programs (USARP).

Table 1. Systematic list of Campbell I. species indicating distribution.

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas
AMPHIPODA												
Talitroidea												
Hyalidae												
Allorchestes compressus Dana			×						×	×		
Hyalellidae												
*Chiltonia minuta** Bousf.	×											
Talitridae												
*Parorchestia campbelliana** Bousf.	×											
? P. insularis Chilt.			×									
Orchestia aucklandiae Bate			×					×				Stewart, South I.
O. bollonsi Chilt.			×	×				×				South, Bounty Is.
ISOPODA												
Oniscoidea												
Armadillidiidae												
6 species	?											
Oniscidae												
Spherillo rugulosus (Miers)			×					×				South I.
Porcellionidae												
2 species	?											
Trichoniscidae												
9 species	?											
Styloniscidae												
Styloniscus magellanicus Dana			×								×	
Notoniscus australis (Chilt.)	×											
Scyphacidae												
Scyphoniscus magnus Chilt.			×									
ARANEAE												
Dictynidae												
Oramia hoggi** Forst.	×											
O. charybdis (Hogg)								×				
*Pounamua gressitti** Forst.	×											
Agelenidae												
*Gohia clarki** Forst.								×				
G. wenhami (Forst.)			×									
Hina delli* (Forst.)			×									
Toxopidae												
Laestrygones albiceres Urq.			×					×				Chatham Is.

* New taxa

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas
Amaurobioididae												
Amaurobioides maritima Cambr.			×						×	×		
Theridiidae												
Icona alba Forst.			×									
*Pholcomma hickmani** Forst.	×											
Symphytognathidae												
*Textricella wisei** Forst.	×											
Argiopidae												
Araneus pustulosus Walck			×					×				
Linyphiidae												
Mynoglenes insolens Simon			×	×	×							Chatham Is.
M. marrineri Hogg			×	×	×							
*Linyphia setosa** Forst.	×											
Attidae												
Clynotis barresi Hogg			×									
OPILIONES												
Phalangiidae												
*Pantopsalis rennelli** Forst.	×											
Triaenonychidae												
Neonuncia campbelli Forst.	×											
PSEUDOSCORPIONIDA												
Chernetidae												
*Apatochernes antarcticus** Beier	×											
*Systellochernes** *zonatus** Beier	×											
ACARINA												
MESOSTIGMATA												
Laelaptidae												
*Ayersacarus** *plumapilus** Hunt.	×		×		×							
*A. gressitti** Hunt.	×											
*Leptolaelaps reticulatus campbellensis** Hunt.	×		×									
Androlaelaps pachyptilae (Zumpt & Till)						×						
Haemogamasidae												
Eulaelaps stabularis (Koch)								×				Africa, Asia, Europe, N. America
Trachytina												
? genn. spp.	?											
Uropodina												
Thinozerconidae												
n. gen.: n. sp.	×											
Polyaspididae												
Calotrachytes sclerophyllus (Michael)								×				

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas
n. gen.: 2 n. spp.	××											
Uropodidae												
Uropoda: 4 n. spp.	×× ××											
Parasitidae												
4 spp.	??											
Rhodacaridae												
3 spp.	??											
Cercomegistidae												
? gen. sp.	?											
Veigaiaidae												
?	?											
METASTIGMATA												
Ixodidae												
Ixodes uriae White		×	×	×	×	×	×	×	×	×	×	Arctic, N. America, Europe.
I. pterodromae Arthur					×				×	×		Marion I.
CRYPTOSTIGMATA (Oribatei)												
Phthiracaridae												
? gen. sp.	?											
Camisiidae												
Acronothrus sp./spp.	?											
Holonothridae												
Holonothrus sp./spp.	?											
Plateremaeidae												
Plateremaeus sp./spp.	?											
Carabodidae												
Eutegeus sp./spp.	?											
? gen. sp.	?											
Microzetidae												
? gen. sp.	?											
Oppiidae												
*Globoppia gressitti** Wallw.	×											
*G. campbellensis** Wallw.	×											
*Oppia diaphora** Wallw.	×											
*O. beemanensis** Wallw.	×											
*O. disjuncta** Wallw.	×											
Podacaridae												
Podacarus sp./spp.	?											
Alaskozetes sp./spp.	?											
Halozetes sp./spp.	?											

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas
Eupelopidae												
Eupelops sp./spp.	?											
Ceratozetidae												
Ceratozetes sp./spp.	?											
Neotrichozetes sp./spp.	?											
? gen. sp.	?											
Mycobatidae												
Mycobates sp./spp.	?											
Scheloribatidae												
Scheloribates sp./spp.	?											
? gen. sp.	?											
Haplozetidae												
Totobates sp./spp.	?											
? gen. sp.	?											
ASTIGMATA												
Acaridae												
? gen. sp.	?											
Analgoidea												
Alloptes sp.	?											
PROSTIGMATA												
Scutacaridae												
? gen. sp.	?											
Stigmaeidae												
4 spp.	??											
Eupodidae												
*Eupodes longisetatus** Str.	×											
Penthalodidae												
*Stereotydeus undulatus** Str.	×											
*S. nudisetatus** Str.	×											
*S. pulcher** Str.	×											
Penthaleus major (Duges)								×	?	×	×	Cosmopolitan
Rhagidiidae												
*Rhagidia mildredae** Str.	×											
R. sp.	?											
Tydeidae												
Lorryia sp.	?											
Pachygnathidae												
Nanorchestes antarcticus Str.		×										
Trombidiidae												
Microtrombidium karriensis Womersl.									×	×		
Ereynetidae												

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas
Ereynetes sp.	?											
Bdellidae												
Bdellodes (*Hoploscirus*) *petila* Atyeo								×				(South I.)
B. (*H.*) *flexuosa* Aty.								×				(South I.)
B. (*H.*) *multicia* Aty.			×									
B. (*H.*) *gressitti** Aty.	×											
CHILOPODA												
Henicopidae												
Henicops maculatus Newport								×	×	×		Introduced
DIPLOPODA												
Sphaerotrichopidae												
gen. sp.	×							?				
Metopidiotrichidae												
Schedotrigona sp.	×											
SYMPHYLA												
Scolopendrellidae												
Symphylella essigi Michelb.												California
Scutigerellidae												
*Hanseniella campbellensis** Jub.-Jup.	×											
COLLEMBOLA												
Arthropleona												
Onychiuridae												
Tullberginae												
Tullbergia scalpellata Salm.	×											
T. subantarctica Salm.			×					×				
Onychiurinae												
Onychiurus subantarcticus Salm.	×											
Hypogastruridae												
Hypogastrurinae												
Xenylla novazealandia Salm.			×					×				
Triacanthella alba Carp.	×											
T. sorenseni Salm.	×											
Hypogastrura armata (Nic.)								×				Cosmopolitan
H. pseudopurpurascens Wom.								×				
H. morbillata (Salm.)								×				
H. obliqua (Salm.)	×											
Brachystomellinae												
Subantarctica flava Salm.	×											

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas
Colonavis grandis Salm.	×											
*C. litoralis** Wise	×											
Anuridinae												
Anurida granaria (Nic.)									×	×	×	Cosmopolitan
Neanurinae												
Neanura radiata Salm.								×				
N. hirtella schotti (Wom.)								×			×	
Isotomidae												
Anurophorinae												
*Cryptopygus campbellensis** Wise	×											
Proisotominae												
Parafolsomia litorea Salm.	×											
P. decemoculata Salm.			×									
Folsomia sp.	?											
Proisotoma octojuga Salm.	×											
P. xanthella Salm.	×											
Isotominae												
*Acanthomurus rivalis** Wise	×											
Proisotomurus lapidosus Salm.	×											
Sorensia subflava Salm.			×									
S. minuta Salm.	×											
Papillomurus ochraceus Salm.	×											
Tomocerura colonavia Salm.	×											
Parisotoma picea Salm.	×											
P. octooculata ovata Salm.			×									
Tomoceridae												
Lepidophorellinae												
Lepidophorella australis Carp.								×				
L. communis Salm.								×				
L. nigra Salm.								×				
L. brachycephala (Mon.)								×				
Tomocerinae												
Tomocerus setoserratus Salm.								×				
Entomobryidae												
Entomobryinae												
Entomobrya nivalis (L.)								×				Cosmopolitan
Parasinella castanea Salm.	×											
Lepidiaphanus eudyptidus Salm.	×											
Lepidocyrtus cyaneus cinereus Fols.								×				N. America
Lepidobrya mawsoni (Tilly.)					×							
L. thalassarchia Salm.	×											
L. violacea Salm.	×											

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas	Flightless
Symphypleona													
Sminthuridae													
Sminthurinus discordipes Salm.	×												
Pseudokatianna campbellensis Salm.	×												
P. triclavata Salm.	×												
*Longkingia salmoni** Wise	×												
PLECOPTERA													
Grypopterygidae													
Aucklandobius complementarius End.			×										
Apteryoperla campbelli Ill.	×												×
A. longicauda Ill.	×												×
ORTHOPTERA													
Rhaphidophoridae													
*Notoplectron** *campbellensis** Richards	×												×

PHTHIRAPTERA	HOSTS
Mallophaga	
Menoponidae	
Austromenopon affine (Piaget)	*Diomedea e. epomophora* Lesson
A. ossifragae Eichler	*Macronectes giganteus* (Gmelin)
A. elliotti Timm.	*Pelecanoides urinatrix exsul* Salvin
Philopteridae	
Austrogoniodes concii (Keler)	*Eudyptes pachyrhynchus sclateri* Buller
A. cristati Keler	*E. crestatus crestatus* Miller
Harrisoniella hopkinsi Eichler	*Diomedea e. epomophora* Lesson
H. grandis (Piaget)	*Catharacta skua lonnbergi* Mathews
Perineus sp.	*Diomedea e. epomophora* Lesson; *D. chrysostoma* Forste
P. diomedeae (F.)	*Diomedea melanophris impavida* (Mathews); *Phoebetria palpebrata* (Forster)
P. obscurus (Rudow)	*Phoebetria palpebrata* (Forster); *Macronectes giganteus* (Gmel.)
P. sp.	*Diomedea chrysotoma* Forster
Halipeurus sp.	*Puffinus griseus* (Gmelin)
Philoceanus garrodiae (Clay)	*Garrodia nereis* (Gould)
Pelmatocerandra setosa (Giebel)	*Pelecanoides urinatrix exsul* Salvin
Trabeculus hexacon (Waterston)	*Puffinus griseus* (Gmelin)
Docophoroides brevis (Dufour)	*Diomedea ep. epomophora* Lesson

D. murphyi (Kellogg)	*Macronectes giganteus* (Gmelin)
D. sp.	*Diomedea ex. exulans* L.
Pectinopygus spp.	*Phalacrocorax c. campbelli* (Filhol)
Saemundssonia stresemanni Timm.	*Catharacta skua lonnbergi* Mathews
S. lari (O. Fabr.)	*Larus dominicanus* Licht.; *L. novaehollandiae scopulinus* Forster
S. sp.	*Sterna vittata bethunei* Buller
Quadraceps fuscolaminulatus (End.)	*Larus dominicanus* Licht.
Q. lingulatus (Waterston)	*L. novaehollandiae scopulinus* Forster
Trichodectidae	
Damalinia ovis (Schrank)	*Ovis aries* L.
Anoplura	
Hoplopleuridae	
Polyplax spinulosa (Burm.)	*Rattus norvegicus* Berkenhout
Echinophthiridae	
Antarctophthirus microchir (Trou. & Neum.)	*Otaria hookeri* Gray
Lepidophthirus macrorhini End.	*Mirounga leonina* (L.)

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas	F'less
PSOCOPTERA													
Elipsocidae													
*Spilopsocus avius** Smithers	×												×
Philotarsidae													
Austropsocus insularis Smithers					×								×
Trogiidae													
Trogium pulsatorium (L.)								×	×	?	?	Subcosmopolitan, Crozet Is.	×
THYSANOPTERA													
Thripidae													
Taeniothrips hawaiiensis (Morg.)												Hawaii, E. Asia	
HOMOPTERA													
Aphididae													
Aulacorthum circumflexum (Buckt.)								×				Widespread	
A. malvae (Mosley)								×				〃	
A. solani (Kalt.)								×				〃	
Brachycaudus helichrysi (Kalt.)								×				〃	
Jacksonia papillata Theo.					×			×				〃	
Myzus ascalonicus Doncaster								×				Scotland, Iceland, Norway, U.S.A.	
Rhopalosiphoninus staphyleae (Koch.)								×				Widespread	

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas	Flightless
Pseudococcidae													
*Phenacoleachia australis** Beardsley			×										♂×
*Nipaecoccus campbellensis** Beard.	×												
*N. longispinus** Beard.			×										♂×
Trionymus danthoniae Morrison			×									Stewart I.	♂×
TRICHOPTERA													
Hydroptilidae													
Oxyethira albiceps (McLach.)			×					×				Chatham Is.	
LEPIDOPTERA													
Tineidae													
Proterodesma byrsopola Meyr.			×					×					
Hyponomeutidae													
Tinearupa sorenseni Salm. & Bradley	×												×
Campbellana attenuata Salm. & Bradley	×												×
Elachistidae													
Euproteodes galathea Viette	×												×
Oecophoridae													
Endrosis lactella Denis & Schiff.			×					×		×	×	Cosmopolitan	
Cosmopterygidae													
Reductoderces fuscoflava Salm. & Bradley	×												×
Tortricidae													
Capua plagiatana Walker			×					×					
Tortrix melanosperma Meyr.								×					
Sorensenata agilitata Salm. & Bradl.	×												×
Pyraloidea													
Pterophoridae													
Platyptilia aeolodes Meyr.			×					×				Chatham Is.	
P. falcatalis (Walk.)								×					
Pyralidae													
Crambinae													
Exsilirarcha graminea Salm. & Brad.	×												×
Scopariinae													
Scoparia rotuella (Feld. & Rogen.)								×					

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas	F'less
S. halopis Meyr.			×										
S. triscelis Meyr.			×					×					
S. parmifera Meyr.			×					×				(South I.)	
S.? albafascicula Salm.	×												
Antiscopa epicomia (Meyr.)			×					×				Kermadec Is.	
Witlesia pachyerga (Meyr.)								×				(North I.)	
*W. psammitis campbellensis** Munr.	×												
*W. gressitti** Munr.	×												
Nymphulinae													
Musotima nitidalis (Walk.)			×					×		×		Chatham Is.	
Geometridae													
Hydriomena similata Walk.			×					×				(North, S. & Stewart)	
Epiphryne charidema (Meyr.)			×					×				(North & S. Is.)	
Xanthorrhoe orophylloides Huds.			×										
*X. campbellensis** Dugd.	×												
*Chloroclystis impudicus**Dugd.	×												
C. suffusa Huds. group								×				(North & S. Is.)	
Noctuidae													
Agrotis ypsilon (Hufn.)			×					×				Polynesia, E. Asia, Holarctica	
DIPTERA													
Trichoceridae													
Nothotrichocera antarctica (Edw.)			×										
Paracladura antipoda (Mik)			×										
Tipulidae													
Limonia (Dicranomyia) arthuriana (Alex.)								×				(South I.)	
L. (D.) kronei (Mik)			×										
Erioptera (Trimicra) brachyptera Alexander	×												×
*E. (T.) pilipes campbellicola** Alex.	×												(×)
Molophilus (Molophilus) sp. nr. *jenseni* Alex.								×					
M. (M.) sp.	?												
Psychodidae													
*Psychoda brachyptera** Quate	×												×
P. pulchrima Satch.								×					
*P. campbellica** Quate	×												
*P. eremita** Quate	×												
P. spatulata Satch.				×	×			×		×			×
P. severini Tonnoir								×		×		Holarctica	

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas	Flightless
Chironomidae													
Maoridiamesa sp.	?											(genus tricentric Austr.)	
Podonominae													
Parochlus sp.	?											gen. Ant./NZ.	
Orthocladiinae													
Smittia spp.	×?											g. wide, Austral	
Simuliidae													
Austrosimulium vexans (Mik)			×					×					
Sciaridae													
*Xylosciara brevipes** Steffan	×												
*Corynoptera subantarctica** Steffan	×												×
*Bradysia campbellensis** Steffan	×												
B. rubra (Harrison)	×												
Mycetophilidae													
*Allodia antennata** Harrison	×												
*A. brunnea** Harr.	×												
Exechia hiemalis (Marsh.)								×					
*Mycetophila campbellensis** Harr.	×												
Paradoxa fusca Marsh.								×					
Platyura brevis Tonnoir								×					
Tetragoneura minima Tonn.								×					
T. sp.	?												
Zygomyia similis Tonn.								×					
Z. submarginata Harr.	×												
Ceratopogonidae													
*Monohelea campbellensis** Toku.	×												
Cecidomyiidae													
*Cordylomyia gressitti** Yukawa	×												
*Holoneurus aliculatus**Yukawa	×												×
? gen. sp.	?												
Empididae													
*Empidadelpha stigmosa**Smith	×												
*Clinocera gressitti** Smith	×												
Dolichopodidae													
Acropsilus borboroides Oldr.	×												×
*Schoenophilus pedestris campbellensis** Harr.	×												×

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas	F'less
Syrphidae													
Helophilus antipodus Schin.			×					×					
H. campbellicus Hutton								×					
Syrphus flavofaciens Miller								×					
S. novaezealandiae Macq.			×					×				Chathams, Kermadecs	
Phoridae													
Megaselia (M.) scalaris (Loew)								?		×		Cosmotropical, Europe, N. America	×
M. (M.) insulana Brues								?		×		Cosmotropical	×
Sapromyzidae													
Poecilohetaerella bilineata (Hutton)			×					×					
Helomyzidae													
Heloclusia (H.) antipoda Harr.			×	×									
*H. (H.) brevicaudata** Harr.	×												
Coelopidae													
Baeopterus robustus Lamb			×										×
Icaridion nasutum Lamb	×												×
Coelopa debilis Lamb	×												
Coelopella plebia Malloch			×										
Chaetocoelopa littoralis (Hutton)			×					×					
Sphaeroceridae													
*Leptocera (Limosina) rennelli** Harr.	×												
L. (Limosina) thomasi Harr.								×				Chatham Is.	
L. pectinifera (Villen.)								?				Europe, Falklands, Juan Fernandez	
Canaceidae													
Macrocanace australis(Hutt.)				×									
Ephydridae													
Hydrellia enderbii (Hutton)			×					×					
*Scatella acutipennis** Harr.	×												×
*S. brevis** Harr.	×												×
S. nitidifrons Tonn. & Mall.								×					
S. nelsoni T. & M.								×					
Milichiidae													
Australimyza anisotomae Harr.				×									
Calliphoridae													
Calliphora icela (Walker)			×					×					
C. quadrimaculata Swederus			×									Subcosmopolitan	
C. viridiventris (Mall.)	×												
Muscidae													
Coenosia filipennis Lamb	×												×

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas	Flightless
C. fumipennis Lamb	×												
Paralimnophora antipoda Harr.	×												
P. depressa Lamb			×										
Limnophora aureifacies (Mall.)								×					
L. brunneivittata Harr.	×												
L. brunneinota Harr.	×												
L. minuta Harr.	×												
L. sorenseni Harr.	×												
L. sp. A	?												
L. sp. B	?												
L. sp. C	?												
Melanochelia insularis (Lamb)	×												
Hippoboscidae													
Melophagus ovinus (Linn.)								×	×	×	×	Cosmopolitan (parasite)	×
SIPHONAPTERA													
Ceratophyllidae													
Nosopsyllus (N.) fasciatus (Bosc)					×							Cosmopolitan	
Pygiopsyllidae													
Notiopsylla kerguelensis (Tasch.)					×		×					Subantarctic	
Rhopalopsyllidae													
Parapsyllus longicornis (End.)												St. Paul I.	
COLEOPTERA													
Carabidae													
Pseudoopterus marrineri (Broun)	×												×
P. tarsalis (Broun)	×												×
Kenodactylus capito Broun			×										×
Hydraenidae													
Meropathus campbellensis Brks.	×												×
Ptiliidae													
*Acrotrichis subantarctica** Gr. & Sam.	×												×
Leptodiridae (Anisotomidae)													
Paracatops campbellicus (Brks.)	×												×
Staphylinidae													
Omaliinae													

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas	F'less
Selonomus linearis** Steel	×												×
Omaliomimus albipenne (Kies.)			×		×								×
O. venator (Broun)			×		×								×
Arpediomimus kronei (Kies.)			×					×				(South I.)	×
Nesomalium campbellensis** Steel	×												×
*N. imitator** Steel	×												×
Allodrepa decipiens** Steel	×												×
Aleocharinae													
Baeostethus chiltoni Broun	×												×
*Halmaeusa sparsepunctata** Steel	×												×
*H. nesiotes** Steel			×										×
Atheta amicula (Steph.)								×				Subcosmopolitan	
Colle campbellensis** Steel	×												×
Pselaphidae													
Pselaphotheseus hippolytae** Park	×												×
Byrrhidae													
Liochoria sorenseni Brks.	×												×
Ptinidae													
Ptinus tectus Boiel.												Cosmopolitan	
Lathridiidae													
Melanophthalma globipennis (Reitt.)			×										×
Tenebrionidae													
Uloma sp.	?												
Pseudhelops tuberculatus posticalis Broun	×												×
Salpingidae													
Antarcticodomus fallai Brks			×										×
Melandryidae													
*Orchesia rennelli** Gr. & Sam.	×												×
Orthoperidae													
*Holopsis oblongus** Endr.-Y.	×												
Coccinellidae													
Veronicobius aucklandiae (Kirsch)			×										×
Curculionidae													
Cryptorhynchinae													
Notacalles planidorsis* (Kirsch)			×									Stewart I.	×
N. piciventris (Broun)			×					×					×
N. kronei (Kirsch)			×					×					×

	Endemic	Antarctica	Aucklands	Snares or Antipodes	Macquarie	Heard	Kerguelen	New Zealand	Tasmania	Australia	S. America	Other areas	Flightless
*N. suillus** Kuschel			×									Stewart I.	×
N. multisetosus (Broun)			×					×					×
Eugnominae													
*Pactolotypus subantarcticus** Kuschel			×										×
Erirhininae													
*Baeosmus serripes** Kuschel	×												×
Peristoreus innocens Kirsch			×									Stewart I.	
Rhyparosominae													
Gromilus insularis robustus (Brks)	×												×
G. exiguus (Brks)	×												×
G. veneris setarius (Broun)	×												×
Phrynixinae													
Phrynixus astutus-complex								×				Stewart I.	×
Leptopiinae													
Heterexis seticostatus (Brks)	×												×
Oclandius cinereus Blanch.			×										×
Catadryobiolus antipodus Brks			×										×
HYMENOPTERA													
Ichneumonoidea													
Braconidae													
*Rogas gressitti** Mueseb.	×												
Apanteles sp. nr. *tasmanicus* Cam.	?												
Ichneumonidae													
*Gelis campbellensis** Townes	×												×
*Campoplex disjunctus** Townes	×												
*Diadegma agens** Townes	×												
Chalcidoidea													
Eulophidae													
*Ardalus campbellensis** Kerr. & Yosh.	×												
Encyrtidae													
*Antipodencyrtus** *procellosus** Kerr.	×												×
Proctotrupoidea													
Diapriidae													

	End.	Ant.	Auck.	Sn.-Ant.	Macq.	H'rd	Kerg.	N. Z.	Tasm.	Aust.	S. Am.	Other areas	F'less
Antarctopria latigaster Brues					×								×
*A. latigaster campbellana** Yosh.	×												×
Cynipoidea													
Cynipidae: Eucoilinae													
*Kleidotoma (Pentakleidota) subantarcticana** Yosh.	×												×

ZOOGEOGRAPHY

Campbell Island has an arthropod fauna with interesting characteristics which speak for detailed consideration. The fauna is by no means as limited as suggested by early studies of this and other isolated subantarctic islands. It appears to be much larger than those of Kerguelen, the Crozets, Marion, Heard, Macquarie or South Georgia, none of which are greatly different from Campbell in latitude. Lesser isolation than most of the others is obvious in glancing at a map. Also, Campbell's situation on a subcontinental shelf in relative proximity to New Zealand correlates with its richer fauna of more continental aspect. On the other hand, some aspects of the fauna are not particularly suggestive of continental nature. The very disharmonic nature of the fauna, with the absence of so many groups, and the high ratio of flightless species, suggest an isolated oceanic island. The disharmony is probably in part related to the extreme environment, and the loss of flight to the prevailing windy nature of the island.

The subantarctic insular environment is very much poorer than that of the southern tip of South America, at the same latitude. Thus the isolated nature of the environment must be of considerable significance, and the climate cannot be held solely responsible for the highly disharmonic fauna. If then Campbell is a subcontinental rather than oceanic island, there must have been considerable extinction of fauna since the island became isolated. This is very likely true to some degree, for the flora demonstrates a parallel situation, with a relatively small number of families and species represented as compared with a similar environment in the Tierra del Fuego area.

The relative representation of insects and plants on Macquarie, Campbell and the Aucklands is somewhat comparable. In each case there appear to be roughly about 3.4–3.5 times as many species of terrestrial arthropods as species of vascular plants.

The contrast between the subantarctic insular environment and that in the northern hemisphere at the same latitude is very great. The temperature maxima are very much higher at the same latitudes in the northern hemisphere and a far richer biota occurs. The subantarctic is dominated by the antarctic climate which is far colder than the arctic. The contrast with the Antarctic continent is also great, as the fauna of the latter is much smaller and is nearly one-half ectoparasitic upon vertebrates.

On Campbell there appear to be almost three times as many species as families of arthropods, whereas on Macquarie there are less than twice as many species as families. The

ratio in the Aucklands is probably close to that of Campbell. With the other evidence for the oceanic nature of the Macquarie fauna, the ratio of less than two species per family suggests youth of the fauna, with little time for proliferation of species. The small number of endemic genera on Macquarie also suggests this. This evidence also may suggest a high extinction rate, lack of proliferation, and separate colonization for each element of the fauna. These suggestions may also apply to Campbell in considerable degree. A number of the genera presently appearing to be endemic to Campbell actually occur on the Aucklands or northward. It is interesting that on Macquarie and Campbell the species : family ratio is about the same for plants and arthropods (Macquarie 2 : 1 ; Campbell 3 : 1). On Macquarie the ratio of species to genera is 1.16 : 1 for plants and about 1.4 : 1 for arthropods, whereas on Campbell it is about 1.7 : 1 for plants and about 1.6 : 1 for arthropods.

In the tropical oceans a strongly disharmonic fauna is indicative of an oceanic island. By being well isolated and never connected with a continent, its fauna is limited by the degrees to which insects have been successful in crossing ocean barriers. In the subantarctic seas, however, a fauna may be extremely limited and yet not necessarily be of purely oceanic origin. There are such rigorous limiting factors, not merely concerned with over-water dispersal, that many groups of arthropods cannot tolerate the environment. Thus if islands such as Campbell are actually remnants of a former larger subcontinental land mass, as their geology seems to indicate, the fauna may have become depauperized from a trend to adversity resulting from changing climate and loss of appropriate environments in the reduction in size of the island. Also, the former New Zealand subcontinent may very likely not have had direct and complete connection with Australia or Antarctica (and South America) in the Tertiary or for a much longer period, or ever. The present New Zealand fauna lacks many otherwise more or less cosmopolitan groups. This is good evidence of very long isolation. Also, the fact that many old "links" which are extinct elsewhere survive in New Zealand is evidence of long isolation from more advanced forms which have eliminated the primitive forms through competition on continental areas.

Thus the land fauna of Campbell (and of the Aucklands) might be classified as a depauperized fragment of an ancient subcontinental fauna, with over-sea recolonization. For those islands farther northeast, the Antipodes and the Bounty Is., the depauperization has proceeded further because of greatly reduced island size; or cataclysms or glaciation may have eliminated or largely eliminated the former land fauna, making the present fauna essentially oceanic in origin. (The Bounty Is. are said to be very rocky and devoid of vegetation). For the Snares, much nearer to the South Island of New Zealand, the situation is probably similar, but the proximity would presumably permit more facile over-sea colonization. Actually, these smaller islands have not been sufficiently investigated entomologically to permit adequate characterization of their faunal makeup and origin. The Chatham Is., much farther north, have a very remarkable fauna for an island group so small and likewise so suggestive of oceanic origin when merely viewed on the map. There is even better representation of fresh-water insects and other groups in the Chathams than in the Aucklands. This again suggests that the group is an old subcontinental fragment.

In the case of Macquarie I. the picture appears to be rather different. Macquarie is more isolated in terms of sea-bottom topography than Campbell and the islands to its north (although recent soundings have shown a more substantial ridge between Macquarie and New Zealand which might have been significant in the distribution of non-abyssal marine

animals). Also, Macquarie is entirely of volcanic origin, contrasting geologically with Campbell. Thus, with its much poorer arthropod fauna, it appears to be a rather typical oceanic island. Its land fauna could have come by over-sea dispersal. Its lack of weevils, tenebrionids and other beetle groups (except staphylinids) represented on other subantarctic islands, appears to be strong evidence of oceanic faunal origin.

The various subantarctic islands have been quite unequally investigated entomologically. Thus the tables (2, 4) and maps (figs. 2–9) do not give a complete or balanced picture. For instance, previously South Georgia and the Falkland Is. have been insufficiently collected. This is also true of Marion I. It is difficult to judge how adequately Heard, Kerguelen and the Crozets have been covered. Currently, a survey in South Georgia is being completed by Bishop Museum (H. Clagg). Another has just been made among the islands just south of Tierra del Fuego (J. Boyd). It is hoped to do further work in the Auckland Is. during the 1964–65 season.

In addition to the question of uneven sampling of different island groups, a point to be borne in mind in this discussion is differing standards for families, genera or other categories in different groups of arthropods. Thus in one group genera may seem to have limited local distribution, whereas in another they may have much larger ranges. Although some of this may be real, it is very likely that different interpretations of genera and generic characters enter into the problem. Also, the differing geographical extent of material seen by investigators is important. These differences may profoundly affect zoogeographic conclusions. In some groups where genera have been said to be in common between the southern continents, specialists are concluding that different genera are involved. In other cases conclusions of the reverse nature are being made, suggesting closer relationships of southern areas.

Environmental aspects: In comparing the arthropod fauna of Campbell with those of Macquarie, the Aucklands and others, viewing in several different perspectives is necessary. Different geological origin, age, degree of isolation, extent of recent vulcanism, glaciation and erosion, as well as latitude, climate, size, ecological diversity and other factors need to be considered. Also, the history of introduced animals (including arthropods), introduced plants, populations of seals and sea birds, and activities of man, must be taken into consideration.

Campbell is intermediate in latitude, in degree of isolation, and in climate, among the three associated island groups, Macquarie, Campbell and the Aucklands, although the range is not great. Macquarie differs from the other two in being of purely volcanic origin. Campbell gives the impression of being younger with its several fairly conspicuous conical hills. However, vulcanism is by no means recent and there has probably been no activity since the late Pliocene. This may have been a little later than the last vulcanism at Macquarie and the Aucklands. In regard to glaciation, all three islands underwent severe glaciation during parts of the Pleistocene. Also, all three have undergone very extensive erosion on the westward sides from sea and wind, greatly reducing the size of the island in each case. In regard to size, Campbell is slightly smaller than Macquarie, and much smaller than the Aucklands. Because Campbell has slightly higher mountains than Macquarie, has deeply indented harbors, more species of plants, more varied geology, and less severe climate, it has greater ecological diversity. Campbell also differs from Macquarie in having more large hills and ridges, without the extensive plateau and the many tarns

or lakes possessed by Macquarie. Again, Campbell is intermediate, for the Aucklands are richer and more varied in these respects, with higher altitudes, richer flora, varied geology, as well as having several sizeable, as well as small, islands subsidiary to the main Auckland Island.

In regard to history of introduced animals, the three islands are very different. In each case the effects of these animals on the vegetation are conspicuous, and within the Aucklands several strikingly different situations prevail. It is difficult to assess the effect that the vegetational changes have had upon the arthropod faunas. On Macquarie, rabbits, cats and the introduced large New Zealand rail (weka, *Gallirallus australis*) are very abundant. The rabbits have greatly reduced the tussock as well as *Stilbocarpa* and other herbs, greatly changing the appearance of the island. The weka feeds actively on insects, and the cats have greatly reduced the petrels and other ground-nesting birds. Rats are also present on Macquarie, and a few sheep on Wireless Hill north of the isthmus. On Campbell, sheep have greatly changed the vegetation, reducing the tussock, *Stilbocarpa*, *Pleurophyllum* and other herbs, and increasing the *Bulbinella*. Rats are extremely abundant and feed on insects and tussock. Cattle and cats are present but much less abundant. The introduced land birds doubtless prey upon insects. In the Aucklands, the main island has been ravaged by pigs, which have greatly reduced tussock, herbs and birds. Cats are also numerous, affecting bird breeding, and goats are present in the north. Rats are absent but mice present. Of the smaller islands, Adams I. has no introduced mammals and apparently represents the primeval condition. It has luxurious growth of tussock and the various succulent herbs. Disappointment I. has no introduced animals, and is a great albatross colony. Enderby I. has rabbits and cattle, with tussock nearly gone and *Bulbinella* dominant above the scrub as on Campbell. Rose I. has rabbits and limited tussock. It formerly had cattle. Ocean I. had sheep for 50 years but not in recent years. It is dominated by rata and *Hebe* scrub, and petrel rookeries. Ewing I. is said to have had no introduced mammals, but on a large area the large *Olearia* trees have replaced tussock and ferns. French I. has been free of disturbance, but is too small and low for some environments.

Since Campbell does not have sizeable off-shore islands like those of the Aucklands, nor a hill separated by a long low isthmus as does Macquarie, there are no obvious general barriers to spread of arthropods, weeds or introduced mammals within the island. (The cattle, however, remain at a small population on a limited part of the island, and most weeds are limited to the camp areas).

Of course many stringent environmental factors are involved in limiting spread. The small off-shore islets around Campbell are largely bare rock. They are fairly inaccessible and remain uninvestigated. The Courrejolles Peninsula is in a sense an island, for its steepness keeps out sheep, and perhaps also cats and rats. The dense mollymawk rookeries on the terraces prevent the development of much tussock.

Many species of arthropods, such as the scutigerellid *Hanseniella campbellensis* Jub.-Jup., occur from the upper inter-tidal zone to nearly the highest altitudes. In both these situations, and on intervening slopes, analogous rocky environment may occur, with moss and mat plants.

The drastic reduction in the populations of elephant seals, sea lions, fur seals and larger penguins as a result of man's activities has had great bearing on arthropod populations and other balances. Also, these and the introduced animals and plants have had a bearing

on populations of the smaller sea birds and others, which again has affected arthropod populations adversely. Perhaps only a few arthropods introduced by man have succeeded in establishing on Campbell. Some of those common to the southern part of the South Island of New Zealand might have been brought by man, but might have come by natural dispersal. If some of these represent relics from a time when there was a common connecting land-mass, perhaps on further study they may prove to have differentiated somewhat from the New Zealand populations. The evidence from the Campbell and Auckland Lepidoptera (Pyraloidea) indicates identical or closely related species on Campbell, Aucklands, Chathams and Kermadecs, suggesting good dispersal possibilities, with same species with ap-

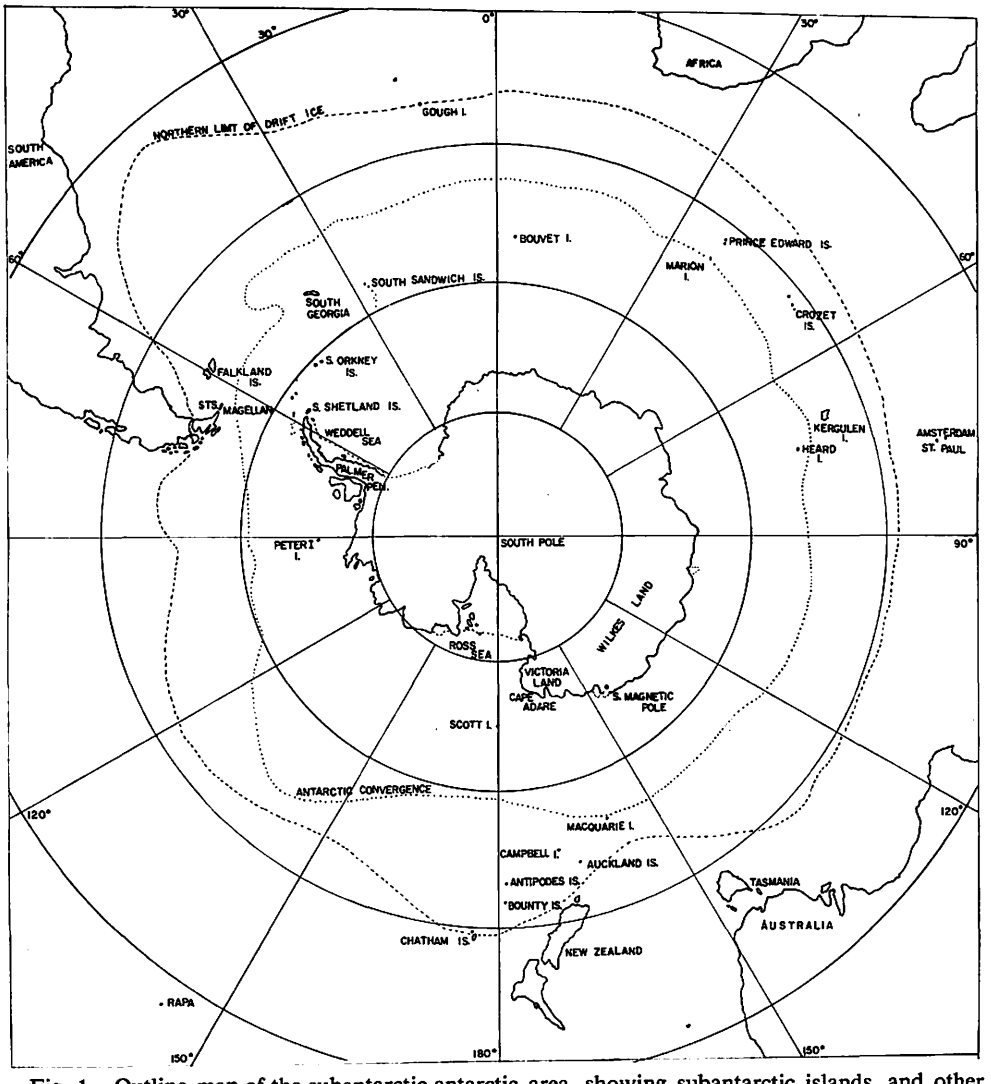

Fig. 1. Outline map of the subantarctic-antarctic area, showing subantarctic islands, and other features, for identification in connection with the following series of distribution maps.

propriate dispersal propensities reaching most of the islands, and also introductions by man (Munroe, *in litt.*).

Macquarie may have no man-introduced insects outside of the camp buildings, and even in the Aucklands there are probably few, other than possible introductions from southern New Zealand.

General distribution by groups

In the following discussion special emphasis is given to generic ranges and other interesting points, as the known distribution of the species is indicated in Table 1, above.

Amphipoda: Of the 6 terrestrial species recorded, 2 are endemic and the other 4 occur in the Aucklands, with 1 extending to Tasmania and Australia, 2 to New Zealand, and 1 of these to the Snares and Bounty Is.

Isopoda: This group has not yet been studied but only roughly sorted (by Danielle B. Fellows and Lucius Eldridge). There appear to be over 25 species, of which 21 may be terrestrial. Of the 4 terrestrial species already recorded, 1 is endemic, and the other 3 occur in the Aucklands, with 1 of these extending to the South Island of New Zealand.

Araneae: The 16 species of spiders on Campbell represent 10 families and 12 genera. Six of the genera are endemic to the New Zealand area. Three (*Gohia, Hina, Icona*) are limited to Campbell and the Aucklands, but there are related undescribed forms in New Zealand. Five genera are of wide southern hemisphere distribution, of which *Hahnia, Araneus* and *Linyphia* are subcosmopolitan. Only 5 of the species are endemic to Campbell, and 9 occur also in the Aucklands. Four occur in New Zealand and 1 of these is not yet known from the Aucklands. Two species are common to Macquarie, Campbell and the Aucklands, and one of these, *A. maritima*, occurs also in Tasmania, Australia and S. Africa. It is interesting that the genus *Myro* occurs in S. America, S. Georgia, S. Africa, Crozets, Kerguelen, Heard, Tasmania, Macquarie, the Snares and New Zealand (undescribed), and in Baltic amber, but not on Campbell or the Aucklands.

Opiliones: Two endemic species of harvestmen are known from Campbell I. The 2 genera occur also in New Zealand. There are no opiliones on Macquarie, 6 in the Aucklands, and many in New Zealand.

Pseudoscorpionida: Surprisingly, 2 genera of pseudoscorpions occur on Campbell. One of the genera is described as endemic in the main text of this volume, but Dr. Beier's paper in the Supplement demonstrates that both of the Campbell genera and species occur in the Aucklands, besides an additional species. Thus in this group Campbell and the Aucklands are closely related. The group has not been found on Macquarie.

Acarina: The mites are only partly studied. Also, mites are in general so poorly known that little generalization can be made on their distribution. Of the identified species, 14 appear to be endemic, 2 found on Antarctica, 4 in the Aucklands, 1 on the Snares, 3 on Macquarie, 1 on Heard, 1 on Kerguelen, 5 in New Zealand, 3 in Tasmania, 4 in Australia and 2 in S. America and elsewhere. One genus appears to be endemic, 3 are in common with Antarctica, but these and others are of wide occurrence. Of the unreported material, a majority appears to represent new species.

Chilopoda: The only centipede extends to Australia and New Zealand and appears to

be introduced.

Diplopoda: The 2 millipedes are not yet named. One appears to occur also in New Zealand.

Symphyla: The 2 symphylids belong to widespread genera, and 1 of the species is common to California and is probably widespread and introduced.

Collembola: The springtails are the second best represented order of insects on Campbell. The 46 species include 26 endemics, 5 in common with the Aucklands, 1 with Macquarie, 14 with New Zealand, 1 with Tasmania, 2 with Australia and 1 with S. America. Of the 29 genera, 3 are endemic, 1 is limited to Campbell, Aucklands and Macquarie, 3 to the New Zealand area, 3 to the New Zealand-Australia area, 1 is southern circumpolar, and 18 are of wide distribution.

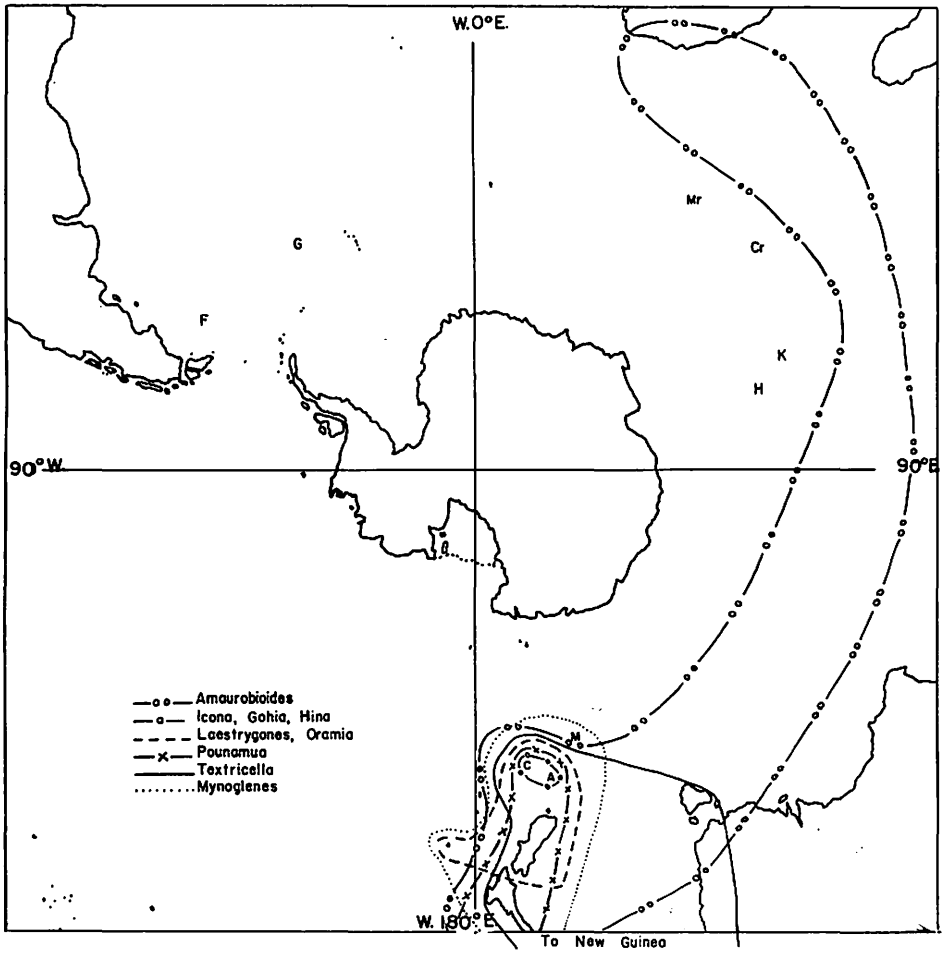

Fig. 2. Map of ranges of the spider genera known from Campbell I. *Textricella* extends as far north as New Guinea. Initials stand for islands as indicated on preceding map.

Plecoptera: The 3 species of Campbell stoneflies are of very great interest as they represent a family found in the southern continents. They represent 2 genera restricted to the New Zealand area. One genus is remarkable because it includes species with both terrestrial and aquatic larvae, and wingless adults. Illies, as he explains in his paper, feels that these species are not secondarily apterous, and stand as evidence that Campbell is continental and that the genus antedates the separation of Campbell and the Aucklands from New Zealand.

Orthoptera: The single species (a "weta") represents an apparently endemic genus of not very close affinity with others in the Aucklands, the Snares and New Zealand.

Phthiraptera: The distribution of the lice is controlled by that of their hosts, so the records are of greater interest in relation to their hosts than to the locality alone. The principal hosts are sea birds, partly of wide range, and seals, besides introduced animals.

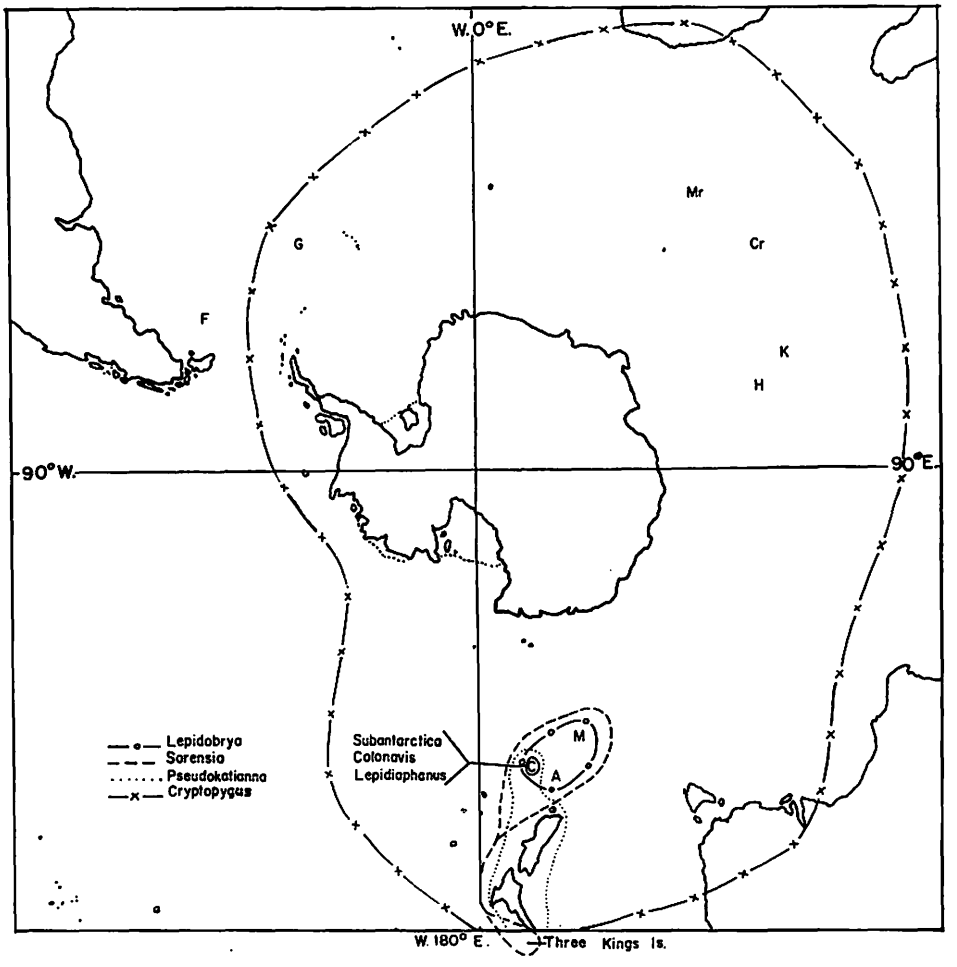

Fig. 3. Map of ranges of some of the genera of Collembola occurring on Campbell I.

Psocoptera: The 3 species, of 3 genera, all flightless, represent an endemic species of an Australian genus, species known only from Macquarie and Campbell, and a subcosmopolite also recorded from the Crozets.

Thysanoptera: The only thrips is probably a widespread species, introduced by man or by natural disperal.

Homoptera: Probably all of the 7 species of aphids were introduced by man. The 4 species of mealybugs (3 genera) are of great interest. The *Phenacoleachia* is extremely interesting. The genus is known only from New Zealand, now extended to the Aucklands and Campbell. Of the other 3, 1 is endemic, 1 occurs also in the Aucklands and the third on the Aucklands and Stewart I. These belong to 2 genera of wide range. The fact that the known males (3 of the 4 species) are wingless is of great interest.

Trichoptera: The single species occurs also in the Aucklands, Chathams and New Zea-

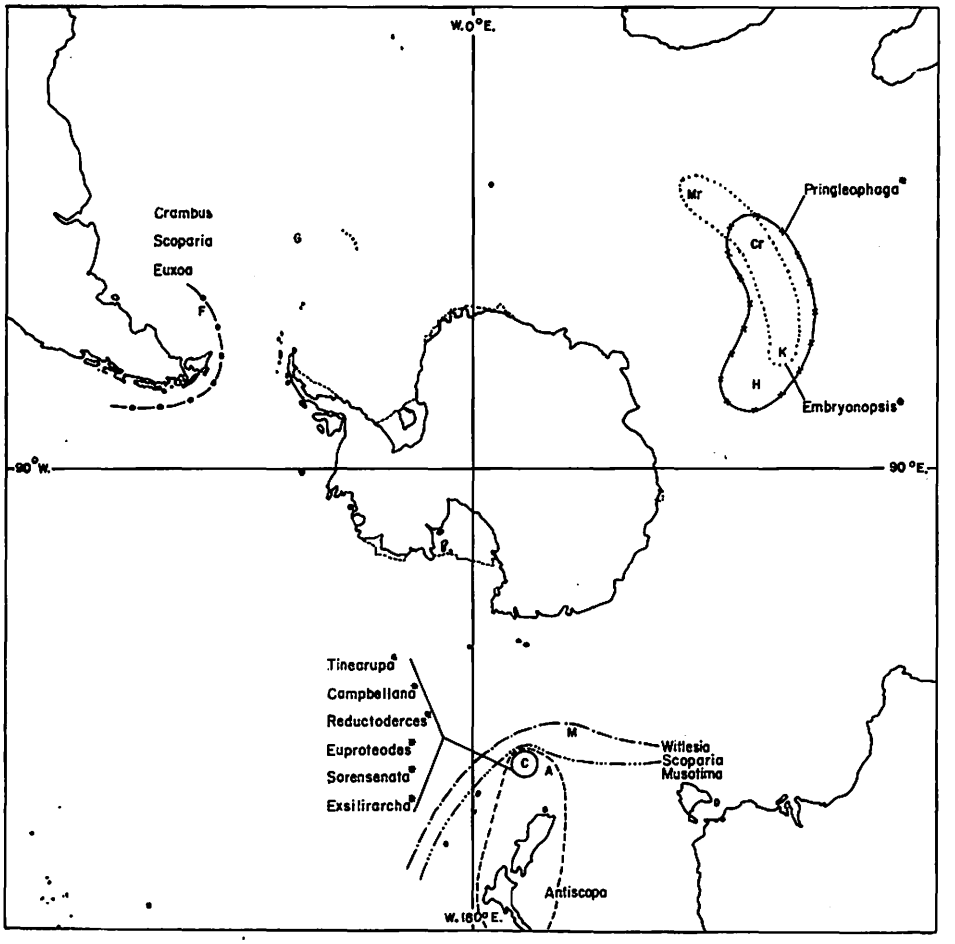

Fig. 4. Map of ranges of some of the genera of moths occurring on Campbell I., and of some other subantarctic islands.

land. The genus is cosmopolitan.

Lepidoptera: The Lepidoptera fauna of Campbell I. is very conspicuous with its high ratio of endemic genera, most of which include but a single flightless species each. Six genera are recorded as endemic. However, at least one of these, and perhaps more, occur in the Auckland Is., but have not yet been recorded from there. In any case, this is a high ratio for the total of 20 genera of Lepidoptera recorded from Campbell and the possible total of 27 genera from the Aucklands (including unrecorded ones in the new collections at hand). The 20 Campbell genera represent 10 families of moths. No butterflies, skippers, sphinx moths or other large types are represented. Of the 20 genera, 5 may be endemic, 1 is common to Campbell and the Aucklands, 1 occurs also in the Aucklands, Chathams and New Zealand, 1 extends to SE Asia, and 12 are cosmopolitan or subcosmopolitan. The affinities of the endemic genera are largely obscure. As far as indicated, the known relatives are in the Auckland Is. and New Zealand.

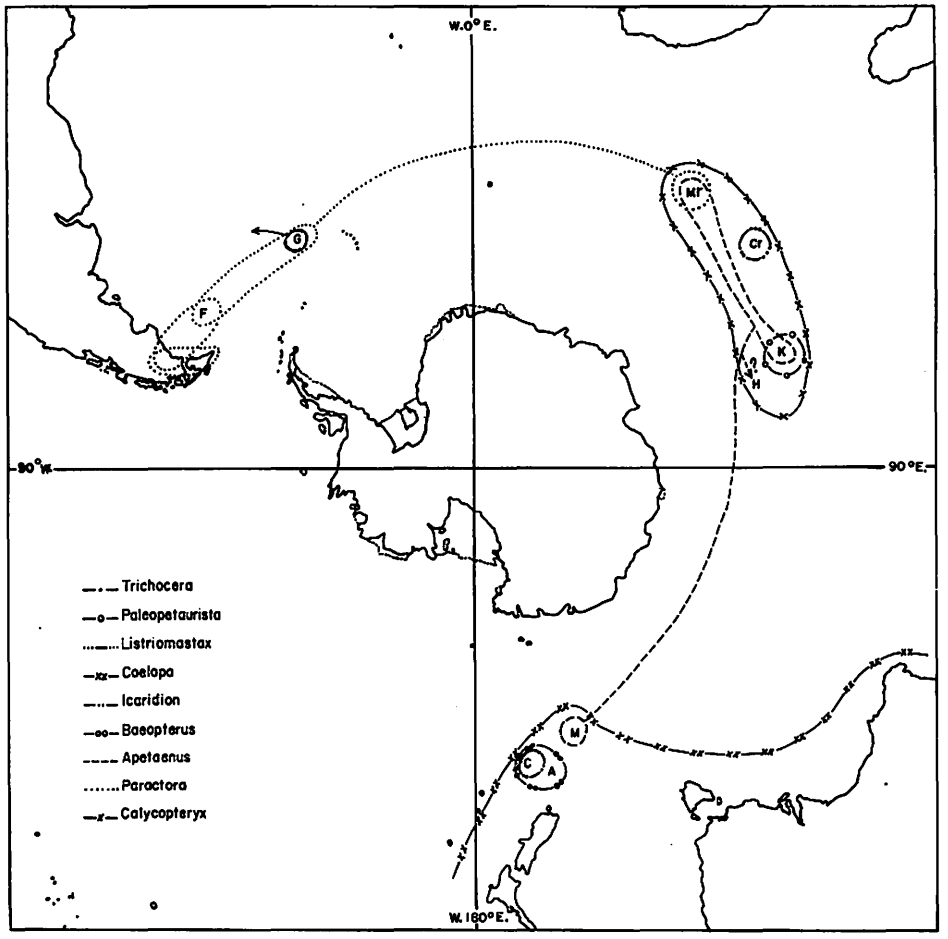

Fig. 5. Map of generic ranges of certain subantarctic Diptera.

Diptera: This is the order with the largest number of species (81) on Campbell I. It is represented by 23 families. The families with the largest number of species (5 or more) are Tipulidae, Psychodidae, Chironomidae, Mycetophilidae, Coelopidae, Ephydridae and Muscidae. Large families such as Culicidae, Stratiomyiidae, Asilidae, Tabanidae, Agromyzidae, Drosophilidae, Tachinidae and Sarcophagidae are absent. Of the 81 species, 35 (possibly up to 41) appear to be endemic. Of the 49 genera, 1 is recorded as endemic, but appears to occur also in the Auckland Is. Three others appear limited to Campbell and the Aucklands (or Snares), 4 to Campbell and New Zealand, 3 extend to New Zealand and Australia, 3 to southern continents including New Zealand, Australia and South America, 3 to Europe, and 24 are cosmopolitan or subcosmopolitan. Only 4 of the genera are also known from Macquarie, and 2 of these are represented by identical species. One species has different subspecies on Macquarie and Campbell. No genera on Campbell appear to be in common with Heard, Kerguelen or South Georgia. Thus a great difference between

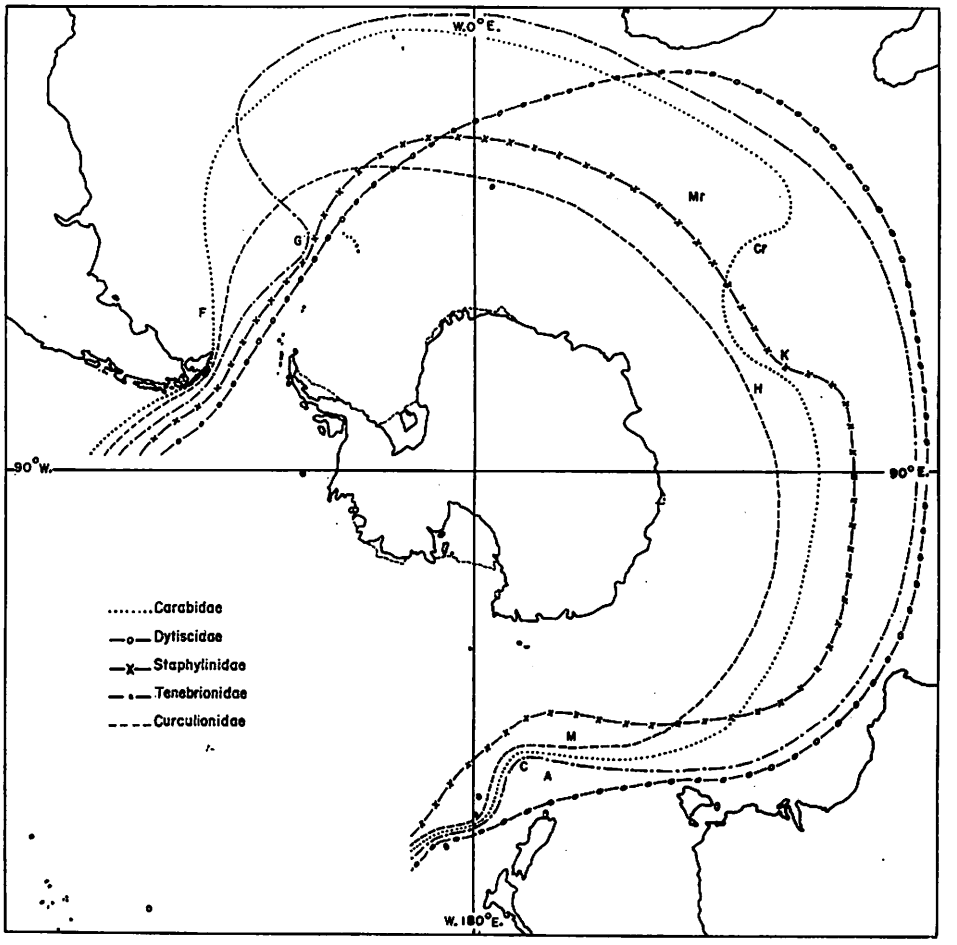

Fig. 6. Map showing southern known extremes of distribution of 5 families of beetles.

Macquarie and Campbell is the greater faunal affinity of Macquarie with the Kerguelen-Heard area. Twelve species of flies have wings reduced or lacking.

Siphonaptera: The 3 species represent 3 families. Each occurs on some other subantarctic islands, and 1 is cosmopolitan.

Coleoptera: This order is very disharmonically represented on Campbell in terms of average world representation. However, it reflects to some extent the relative represention in other very cold and extreme environments. Fifteen families occur on the island. The best represented is the Curculionidae with 15 species of the total of 43 species of beetles. This dominance is in line with that on tropical oceanic islands. Perhaps the family is the largest in the world. The second largest beetle family on Campbell is the Staphylinidae, with 12 species. This is the only family of Coleoptera known to occur on Macquarie, where it is represented by 4 species (of which 2 are in common with Campbell and the

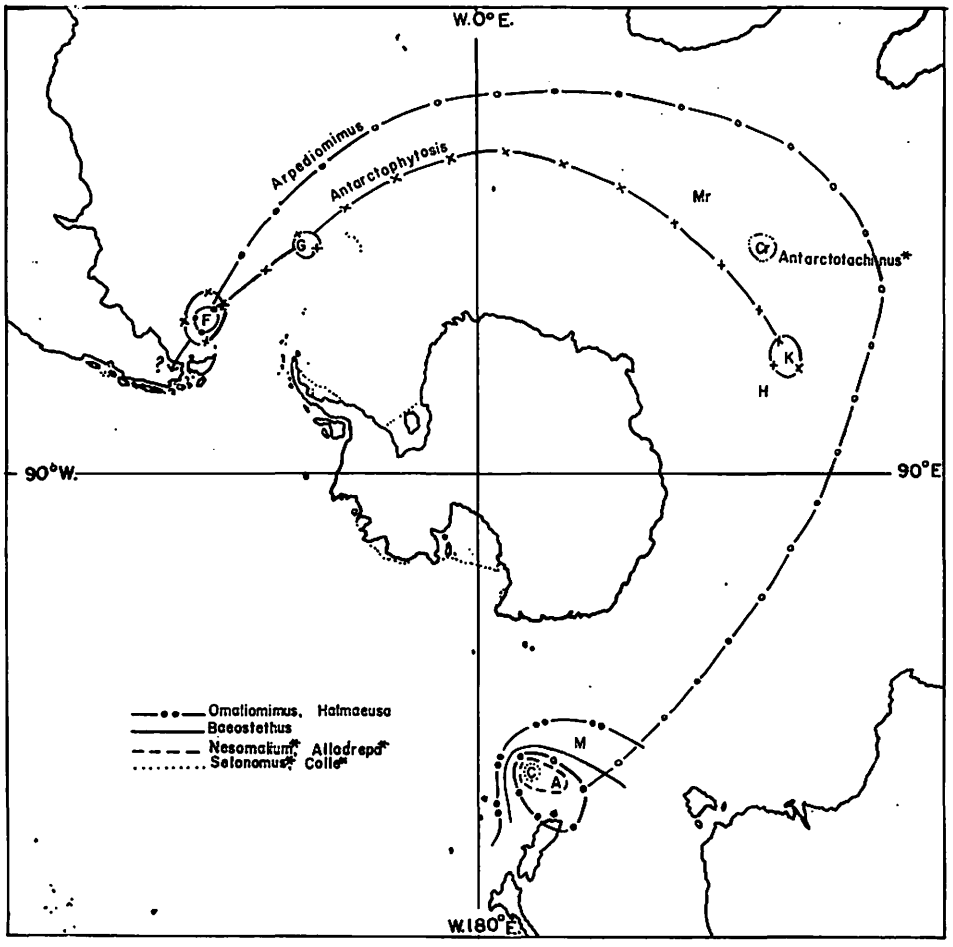

Fig. 7. Map showing generic ranges of Staphylinidae occurring on Campbell I. and other subantarctic islands.

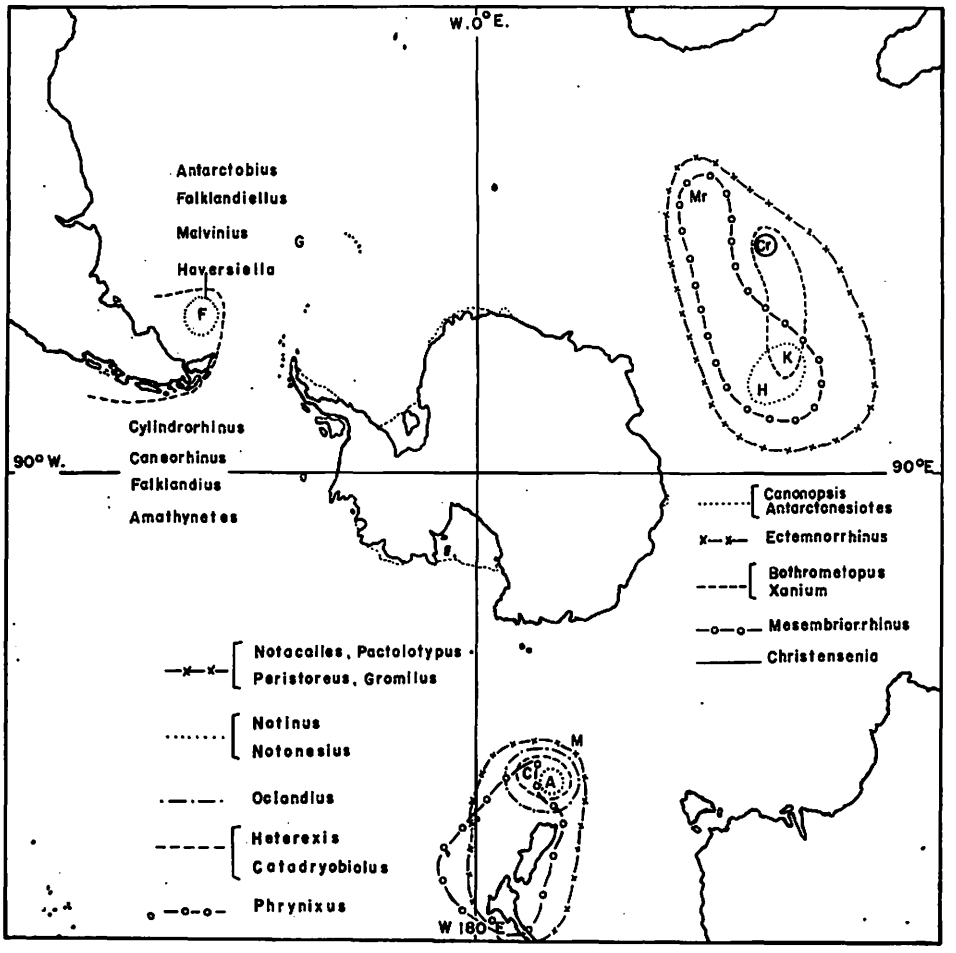

Fig. 8. Map showing ranges of most of the genera of subantarctic weevils.

Aucklands, and another with the Aucklands only). Its representation on Campbell is rather striking, with 2 apparently endemic genera (1 species each), as well as 2 so far known only from Campbell and the Aucklands (3 species). Of the other 5 Campbell species of Staphylinidae, 2 are endemic, 1 is common to the Aucklands, another to the Aucklands and New Zealand, and 1 is subcosmopolitan.

Of the 43 species of Campbell beetles, 23 are endemic, 17 occur also in the Aucklands (5 of these also in New Zealand), 2 are more or less cosmopolitan, and 1 is common to New Zealand. Apparently all but 4 of the Campbell species are flightless or generally flightless. Besides the 3 endemic genera and 4 or more common to Campbell and the Aucklands, 1 genus is common to southern South America, 2 to the Falklands and South Georgia, with 1 of these and 1 other to Indian Ocean subantarctic islands, 3 to New Zealand, and most of the rest are of wide range. When the Aucklands fauna is fully studied, no doubt more genera and species will be found in common with Campbell. One of the

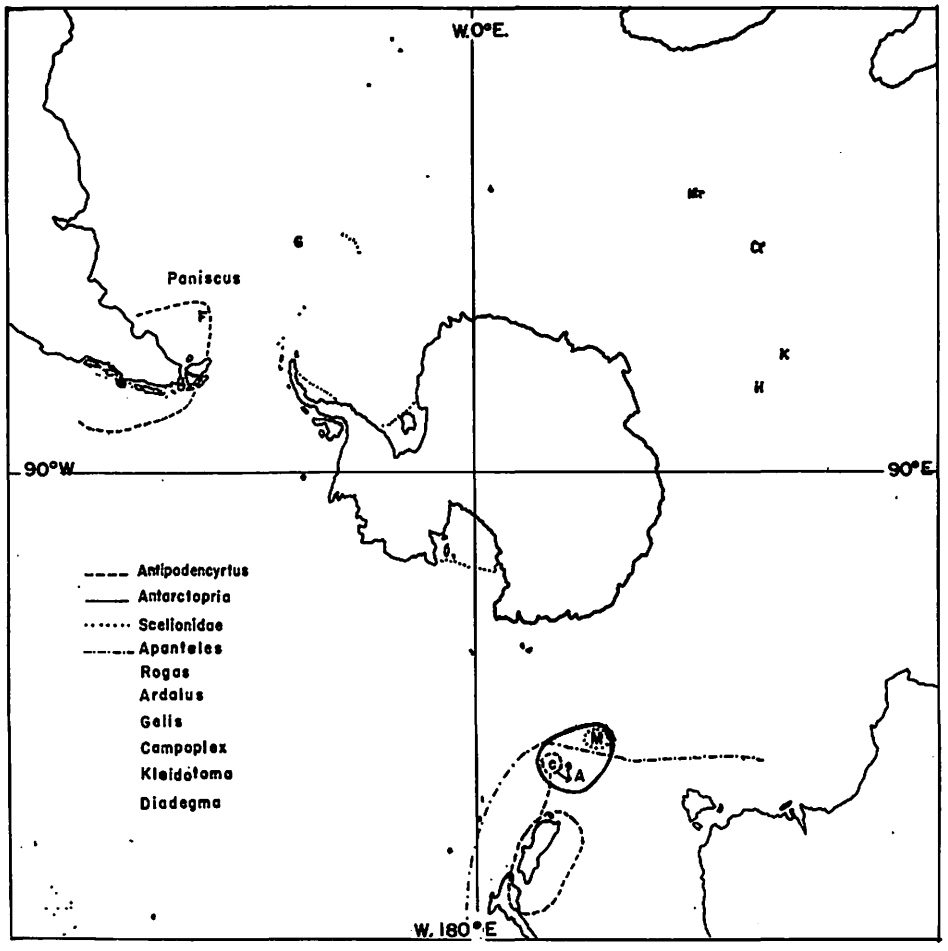

Fig. 9. Map showing ranges of most of the known genera of subantarctic Hymenoptera. The records of an ant (*Camponotus*) from Kerguelen and Crozet are omitted as they are probably erroneous.

endemic Campbell genera seems to have its closest relative in western North America and another in the northern Pacific.

Hymenoptera: Campbell I. is the second most southern island (apart from southern South America) with records of the occurrence of this order. The southernmost, Macquarie, has only 1 or 2 species, whereas Campbell has about 10. This is probably one of the most specialized Hymenoptera faunas that exist, with its high ratio (50 %) of species with wings reduced or lacking. All the species are endemic except one in common with Macquarie (one other not identified). Of the 9 genera, 1 is known only from the nearby subantarctic islands, 1 is common to New Zealand, and the others are cosmopolitan or largely of northern distribution. The absence of ants, bees and aculeate wasps is conspicuous. All of the Campbell species are parasitic, most of them apparently in Diptera and Lepidoptera.

SUBANTARCTIC FAUNAL REPRESENTATION

In comparing Campbell with other subantarctic islands, the richer fauna correlates also with higher minimum temperatures and more extensive flora. Macquarie is slightly cooler and has a much more limited fauna and flora. Heard I. is much colder, and has much more limited biota. Heard is of course also farther from continents than Campbell and Macquarie. Kerguelen is larger and much farther north, but is colder than Macquarie or Campbell, as well as being more isolated. It is close to the Antarctic Convergence and has an icecap somewhat less extensive than that of Heard. Jeannel (1940) considered that the biota of Kerguelen, and particularly its rich fossil flora, proved that it was long connected to Antarctica. He showed the Indian Ocean as very narrow in the Eocene, with Australia, New Zealand and South America still connected to Antarctica. This information is now partly disproved (Adie 1964).

Some of the characteristics of faunal representation on Campbell in particular are discussed in the preceding and following sections. Conspicuous general faunal differences between the insular subantarctic fauna and that of the Arctic include the absence of butterflies, scarcity of Hymenoptera and abundance of beetles in the subantarctic, as compared with the abundance of butterflies and Hymenoptera and scarcity of beetles in the Arctic. Only one butterfly was seen in the Auckland Is., a strong flying vanessine.

Table 2 indicates the number of species recorded, or known to have been collected on various subantarctic islands and Antarctica. This information is rather unbalanced, since collecting and study of the various faunas has been quite unequal. Even for the Auckland Is., the estimates are very conservative. The graph in fig. 10 probably gives a much more realistic estimate (600 species) for the Aucklands.

Distribution patterns: Many genera extend clock-wise (W–E) to Macquarie from long distances around Antarctica as far as from South America. Very few of these genera extend to Campbell. Thus Macquarie and Campbell really have rather little in common, considering their proximity. This appears to suggest that forms successful in oversea dispersal as far as Macquarie failed to carry a bit farther to Campbell. Possibly some of these failed to establish upon Campbell because of competition from forms already present there.

Present patterns of subantarctic distribution do not shed a great deal of light on the question of the validity of the "Austral Region" (Kuschel 1964). One problem is the absence of so many "southern" groups on the actual subantarctic islands. Further coordinated studies of groups for the whole area, covering evolutionary patterns, will help solve this question. In any case, the fact that some of the groups common to the southern continents extend into New Guinea is overbalanced by the predominance of tropical Oriental elements there.

Brundin (1964) stressed the necessity of showing that the species in one southern area represent a specialized offshoot of those found in another, to prove that Antarctica was a faunal migration route. His examples from the chironomid subfamily Podonominae appear to satisfy this requirement, and the subfamily is represented on Campbell I. (But see below, Faunal Origins). Brundin also indicated that for proof of Antarctica as an evolutionary center requires whole complexes of bicentric Austral groups closely related to one another. Penniket (1961; also see Knox 1964) presented interesting data in the Ephemeroptera which seems to satisfy Brundin's second requirement, showing that there are few

Table 2. Approximate numbers of species known from subantarctic-antarctic areas

	Antarctica	S. Georgia	Falklands	Marion	Crozet	Kerguelen	Heard	Macquarie	Campbell	Aucklands	Snares Antipodes Bounty
Araneae	–	4	?	2	6	2	1	3	16	21	6
Opiliones	–	–	1	–	1	1	–	–	2	5	1
Pseudoscorpionida	–	–	–	–	–	–	–	–	2	3	–
Acarina	20	5+	8+	2+	10+	10+	5+	35	71	80	1+
Chilopoda	–	–	–	–	–	–	–	–	1	3	–
Diplopoda	–	–	–	–	–	–	–	–	2	3	1
Symphyla	–	–	–	–	–	–	–	1	2	2	–
Collembola	11	8	10	2	4	9	5	12	46	50	?
Ephemeroptera	–	–	–	–	–	–	–	–	–	1	–
Odonata	–	–	–	–	–	–	–	–	–	1	–
Plecoptera	–	–	–	–	–	–	–	–	3	5	–
Blattaria	–	–	–	–	–	–	–	–	–	1	–
Orthoptera	–	–	1	–	–	–	–	–	1	1	2
Psocoptera	–	–	1	1	1	2	–	1	3	3	?
Thysanoptera	–	–	–	–	1	–	–	1	1	?	–
Mallophaga	16	4+	5	2	?	13	4	20	23	20	?
Anoplura	6	?	1	?	?	1	?	1	3	3	?
Homoptera	–	–	–	–	–	–	–	2	11	14	?
Heteroptera	–	–	1	–	1	–	–	–	–	1	–
Neuroptera	–	–	–	–	–	–	–	–	–	1	–
Trichoptera	–	–	1	–	–	–	–	–	1	2	–
Lepidoptera	–	1	16	1	1	4	1	1	29	40	6
Diptera	2	9	18	3	7	12	3	14	81	95	20
Siphonaptera	1	1	3	?	?	2	2	5	3	5	1
Coleoptera	–	7	52	4	11	17	10	5	43	65	10
Hymenoptera	–	–	1	–	–	–	–	2	10	19	?
Totals	56	39	119+	17	43	73	31	103	354	453+	48

genera known to be in common between southern continents, but several groups of closely related genera—the groups, or subfamilies, being entirely southern. Unfortunately, this order is absent from Campbell, though represented in the Aucklands.

Of the 300 identified species on Campbell, the following are in common with other areas (excluding ectoparasites):

Antarctica	2	St. Paul	1	Tasmania	10
Macquarie	15	Heard	2	Australia	19
Auckland Is.	74	Crozets	1	South America	5
Snares/Antipodes	8	Kerguelen	2	(4 are cosmopolitan)	
New Zealand	88	Marion	1	Other regions	28
				(incl. 16 cosmopolitan)	

In addition, there are 3 species with separate subspecies indicated for Macquarie and

Campbell. The above figures are exclusive of the ticks, lice and fleas. The number in common with the Auckland Is. is certain to be increased when the new collections are fully studied.

Southernmost extensions: In the case of many groups, the southernmost known records (apart from South America) are from Campbell I. Many of the families now known from Campbell have not been recorded from South Georgia, Heard or Macquarie, the isolated subantarctic islands farther south than Campbell. The following families are in this category:

Dictynidae	Ceratozetidae	Hyponomeutidae	Carabidae
Toxopidae	Scheloribatidae	Elachistidae	Ptiliidae
Amaurobioididae	Scutacaridae	Oecophoridae	Leptodiridae
Theridiidae	Stigmaeidae	Cosmopterygidae	Pselaphidae
Symphytognathidae	Tydeidae	Tortricidae	Byrrhidae
Argiopidae	Trombidiidae	Pterophoridae	Lathridiidae
Attidae	Henicopidae	Geometridae	Salpingidae
Phalangiidae	Sphaerotrichopidae	Simuliidae	Melandryidae
Triaenonychidae	Metopidiotrichidae	Mycetophilidae	Orthoperidae
Chernetidae	Scolopendrellidae	Cecidomyiidae	Coccinellidae
Haemogamasidae	Scutigerellidae	Syrphidae	Braconidae
Phthiracaridae	Grypopterygidae	Empididae	Ichneumonidae
Camisiidae	Rhaphidophoridae	Sapromyzidae	Eulophidae
Plateremaeidae	Elipsocidae	Canaceidae	Encyrtidae
Carabodidae	Trogiidae	Milichiidae	Cynipidae
Microzetidae	Hoplopleuridae	Calliphoridae	
Eupelopidae	Pseudococcidae	Muscidae	

Some of these families will undoubtedly later be recorded from South Georgia or Heard I. There are at least 5 families recorded from South Georgia and Macquarie which are not known from Campbell.

Disharmony

The disharmonic nature of the Campbell fauna is conspicuous, with great gaps in the fauna. In general, there is not the obvious speciation characteristic of many isolated tropical oceanic islands. This in general suggests greater youth of the fauna for subantarctic islands.

The orders present in the Auckland Is. which are absent to southward are Ephemeroptera, Blattaria, Odonata and Neuroptera, as well as the suborder Heteroptera. Some important families found in the Aucklands but not on Campbell include Culicidae, Stratiomyiidae, Asilidae, Lonchaeidae, Agromyzidae, Tachinidae, Nitidulidae, Elateridae, Cerambycidae and Anthribidae.

In fig. 10 a graph shows the relative reduction in numbers of groups, genera and species, progressing from the Auckland Is., through Campbell and Macquarie to Antarctica proper. The solid line represents numbers of groups, such as orders of mites and insects, and subclasses for other groups of arthropods. The dashed line represents numbers of species (over a factor of 15), with the actual figures or estimates indicated. The dotted line in-

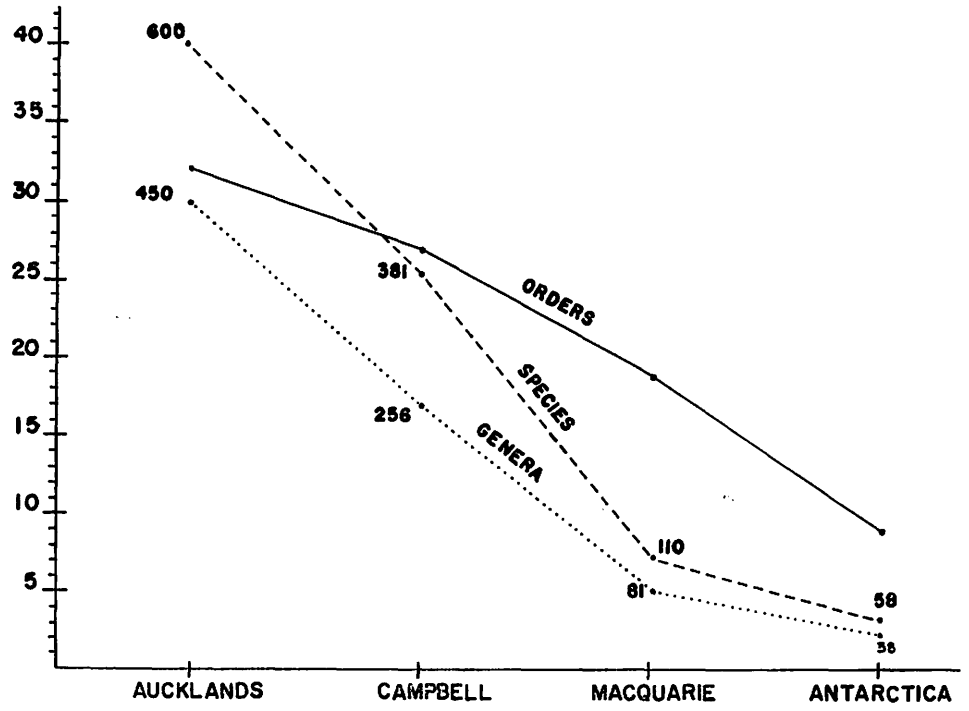

Fig. 10. Graph showing numbers of orders, genera and species of land arthropods occurring in the Auckland Is., Campbell I., Macquarie I. and Antarctica. The numbers are based on published records combined with estimates of numbers in unstudied collections at hand.

dicates numbers of genera (over a factor of 15), with the figures or estimates indicated. Again, the different faunal nature of Macquarie as compared with Campbell, is evident.

Faunal comparison of Campbell and a tropical atoll: The insect fauna of Campbell I. is comparable in number of species to that of a fairly rich humid tropical atoll in the mid-Pacific. A tabulation is made of the species recorded from Campbell as compared with the estimates for Arno Atoll in the Marshall Is. (Usinger & La Rivers 1953; Gressitt 1954, p. 136). The third column in Table 3 represents the number for the world over a factor of 2,500 to make the figures somewhat comparable. The contrast in some groups is rather conspicuous, *i. e.* the fairly large numbers for Orthoptera, Thysanoptera, Heteroptera and Hymenoptera on Arno, as compared with small numbers, or absence, on Campbell. On the other hand, the relative dominance of Collembola on Campbell is conspicuous. Perhaps these were inadequately sampled on Arno, as with the Mallophaga. However, the Collembola are obviously well adapted to cold areas, being the best-represented free-living group in Antarctica proper.

In regard to Table 3 it should be further remarked that the fauna of Arno Atoll is more harmonic than that of Campbell, even though Arno's fauna is extremely disharmonic. Probably in the Arno survey the Heteroptera and aquatic insects were more thoroughly covered than some other groups. Soil fauna, Lepidoptera and ectoparasites were relatively more thoroughly covered on Campbell. On the other hand, there are few insects in the

Table 3. Comparison of species representation on Campbell, Arno and the World.

Order	Campbell I.	Arno Atoll	The World 2500
Thysanura	0	1	0.1
Collembola	46	1	1
Protura, Zoraptera	0	0	0.001
Ephemeroptera	0	0	1-
Odonata	0	5	2+
Plecoptera	3	0	1
Embioptera	0	0	1-
Dermaptera	0	5	0.5
Orthoptera s. lat.	1	26	9
Isoptera	0	4	1-
Psocoptera	3	3	1-
Thysanoptera	1	14	1+
Mallophaga	23	3	1+
Anoplura	3	1	0.1
Homoptera	11	16	10
Heteroptera	0	24	12
Neuroptera s. lat.	0	1	2
Mecoptera	0	0	1-
Trichoptera	1	0	2
Lepidoptera	29	18	45
Diptera	81	83	34
Siphonaptera	3	0	0.6
Coleoptera	43	69	109
Hymenoptera	10	22	42
Orders	14	17	25+
Species	258	296	276—(×2500)

salty atoll soil environment. It is very unlikely that Heteroptera occur on Campbell, and there are probably no additional aquatic insects except Chironomidae (not reported in this volume). Isoptera, Dermaptera and Orthoptera are more dominantly tropical insects and are hardly expected on subantarctic islands. Dominantly temperate aquatic insects like Plecoptera and Trichoptera are hardly to be expected on an atoll. Their representation on Campbell was somewhat unexpected, and appears, at least as regards the wingless stoneflies, to give evidence of continental nature.

An important difference between Campbell and Arno in ecology and population levels is that Campbell is weak in predators and Arno is rather rich in predators (insects and skinks, particularly). Thus populations of herbivorous insects are kept fairly low on Arno. On the other hand, herbivorous insects are less dominant on Campbell in proportion of species representation. Among other differences are the importance of cockroaches and ants on Arno, and their absence from Campbell. The question of insect pollination of plants is an interesting one, as this is important on Arno (perphaps 2/3 of the higher plants are insect pollinated). On Campbell, insect pollinators are probably very few, as there are no bees or other common pollinators other than syrphid flies. Perhaps wingless flies such as *Coenosia* play a role here.

It would be difficult to find an isolated tropical high island analogous in faunal size to Campbell, for comparative purposes. An island of similar size would be richer unless very young, or ruined from introduced biota like the Mangarevan Is. Most young islands, such as those in the Northern Mariana Is., still have volcanic activity and much disturbance. Comparison of fauna between Campbell and the Pribilof Is. should be interesting from the standpoint of more similar climate.

It is interesting to compare the Campbell fauna with that of arctic Canada and with Spitzbergen. The dominance of Diptera is common to all, but in the Queen Elizabeth Is., N. Canada (Downes 1962), Lepidoptera and Hymenoptera are relatively far more important than on Campbell, while Coleoptera are much more poorly represented in the north. Collembola are not mentioned by Downes. On Spitzbergen (Summerhayes & Elton 1923, 1928) the picture is somewhat similar to that of high Arctic Canada, but Lepidoptera are proportionately scarcer than on Campbell. Collembola, as well as spiders and mites, are well represented on Spitzbergen. For N. Canada, Downes stressed the tendency of niches to remain empty, and the randomness of representation. In Spitzbergen, some of the communities in less favorable environments support a fauna similar to that of the Antarctic Peninsula, whereas the most restricted fauna discussed for N. Canada by Downes includes one moth and one parasitic wasp. The latter fauna is suggestive of that of Macquarie I., except that Macquarie has a larger fauna, with six orders of true insects not listed by Downes. Spitzbergen was completely glaciated after separation from Europe, and the insect fauna came by oversea dispersal, through wind, flight and on birds and ships, if not also by drift wood or drift ice (Elton 1925).

Endemism

The degree of endemism for Campbell I., as it now appears, is moderately high. Of the approximately 300 species fully identified from Campbell in this volume, 141 species, or 47%, appear to be endemic to the island. However, when the Auckland Is. fauna is fully studied, this endemism rate may be reduced. Campbell and the Aucklands have lower endemism than might be expected considering their isolation. This is very true if they are compared with the Canaries or Juan Fernandez.

As to genera, the present picture seems to indicate 19 genera as endemic to Campbell I. This represents generic endemism of 7%. In the case of genera, the degree of endemism is likely to be reduced much more than that for species, particularly when the Aucklands fauna is fully studied. Recent field work in the Aucklands provided much material not yet recorded from those islands. A number of the forms collected appear to represent genera now considered endemic to Campbell. It is likely that a number of new genera of mites are to be described from Campbell in the as yet unreported groups. However, it would be surprizing if many of these were actually endemic to Campbell, and did not also prove to occur in the Aucklands and/or Macquarie. Probably many of these genera occur also in New Zealand or more widely, as the groups involved have not been adequately studied, or even studied at all, for this part of the world.

Data on endemism and genera and species possessed in common with Macquarie and the Auckland Is. are presented in Table 4.

In many cases there have proven to be closely related but different populations of a

Table 4. Apparent endemism of Campbell arthropods, by groups, and relationship to Macquarie and Aucklands

	No. genera	Endemic genera	No. species	Endemic species	In common with Macquarie genera	In common with Macquarie species	In common with Auckland Is. genera	In common with Auckland Is. species
Amphipoda	4	0	6	2	?	?	3	4
Isopoda	10?	?	21	5?	?	?	?	?
Araneae	12	0	16	5	1	1	8	9
Opiliones	2	0	2	2	–	–	2	0
Pseudoscorpionida	2	0	2	0	–	–	2	2
Acarina	50	6?	71	16	2+	3+	4+	4+
Chilopoda	1	0	1	0	–	–	0	0
Diplopoda	2	0	2	1	–	–	1	0
Symphyla	2	0	2	1	?	?	?	?
Collembola	29	3	46	26	3+	4+	4+	5+
Plecoptera	2	0	3	2	–	–	2	1
Orthoptera	1	1	1	1	–	–	0	0
Psocoptera	3	0	3	1	1	1	3?	3?
Thysanoptera	1	0	1	0	0	0	?	?
Anoplura	3	0	3	0	3?	3?	2?	2?
Mallophaga	13	0	23	0	12?	20?	12?	22?
Homoptera	10	0	11	1	2	1	8?	9?
Trichoptera	1	0	1	0	–	–	1	1
Lepidoptera	20	5	29	11	1	0	15	12+
Diptera	49	1?	81	35	4	3*	40?	16+
Siphonaptera	3	0	3	0	2	2	3?	3?
Coleoptera	33	3	43	23	1	2	4	16
Hymenoptera	9	0	10	9	1	1	8	?
Totals	262	19	381	141	33	41	122	97

– Group not represented.
* Subspecific relationship is involved in 1 species.

group on Campbell and the Aucklands. In some of these cases there is a closely related species on Stewart I. or the southern part of the South Island of New Zealand. Often the genus may be essentially New Zealand in distribution, extending as far as Campbell, but in other cases extending as far as South America, Australia or rarely South Africa. As more groups are studied jointly from all these areas, more cases of common occurrence of genera on southern continents and subantarctic islands might come to light, or the genera actually may prove to be more restricted as concerns different continents.

Faunal origins

Among the various taxonomic chapters of this volume, diverse views are expressed on the question of the origin of the Campbell fauna. Some workers feel strongly that the island is continental and represents a fragment of a former larger New Zealand land mass, with air dispersal of no significance. Others feel that much of the fauna could have come by oversea dispersal, and that more elements would be present if the island were a continental remnant. There appears to be too much evidence for extensive glaciation in the not

far distant past to assume that conditions could have remained unchanged for long periods. Aspects such as extinction rates and introductions by man are not clear.

Fleming (1964) felt that present data argued too strongly against the derivation of all southern elements through land connections. He stressed that much spread has been recent, since present populated areas were covered with ice. He proposed a "Neoaustral" or "Neonotian" biotic element, to include the young genera, facile at dispersal, which repopulated the oceanic islands through West Wind Drift of air and sea, after maximum glaciation. The other, older, element he called "Paleoaustral" or "Paleonotian" which was widespread in the area as early as the Mesozoic. It is difficult to say whether any of this latter element exists now on Campbell I. Illies obviously feels that the two wingless Campbell Plecoptera represent the equivalent of this element and have been uninterruptedly on Campbell and have had melted water available all of this time. Fleming's position would apparently not permit this because of glaciation. Certainly much of the Campbell fauna suggests much younger age, and possible oversea dispersal. There is of course the possibility that a few elements, such as the wingless Plecoptera, certain Collembola and mites, and a few others, survived the ice-age. They might have persisted, as some arthropods do now in Antarctica, under rocks on exposed slopes or ridges where prevailing winds prevent accumulation of deep snow, so that solar radiation melts ice in contact with rocks up-slope sufficiently to provide moisture in the microenvironment to maintain a few primitive plants and animals (since the air in Antarctica is too dry for most organisms).

Holdgate (1961) and Knox (1964) have pointed out that of the three elements in southern areas (endemic, northern and southern-related), the last is often in the minority. Also, that present distribution is not necessarily a key to past history. Paleobotanical studies have much to contribute to the understanding of past history (Fleming 1964; Cranwell 1964). Cranwell pointed out that Antarctica was the center of evolution of early *Nothofagus* species which are now extinct. Knox (1946) felt that a modified land-bridge or island-archipelago theory will eventually provide the most plausible explanation of southern biogeography.

Contradicting the indications of trans-antarctic migration (Brundin 1964) and evolution on Antarctica (Penniket 1961; Knox 1946), Hennig (1960) stated that none of the Diptera groups occurring in Australia, New Zealand and South America demonstrate evidence for Antarctica as a center of evolution, or even as a migration route. However, Hennig did not rule out the possibility that future comprehensive studies might uncover such evidence of migration or evolution.

Thorne (1964) stated that though circumpolar biotic elements occur among the over-water dispersed biotas of Bounty, Antipodes, Snares, Aucklands and Campbell, these islands should not be separated in a subantarctic zone (as in Godley 1960; Skottsberg 1960; Gressitt 1961) as this obscures their closer ties with New Zealand. Only Macquarie has stronger Antarctic than New Zealand ties, and may be placed in the Kerguelen Province of the Antarctic Region, as done by Knox (1960). Thorne also pointed out that Australia was warmer and moister in the Cretaceous and Tertiary, and has few subantarctic elements, contradicting the idea of continental drift from the south having an important bearing on the Australian biota.

In regard to geological aspects relating to the origin of the fauna, Adie (1964) gives evidence that the present respective positions of the southern continents are different from

those of before the Cretaceous. At that time the other southern continents were closer to Antarctica, although their positions in regard to longitude are not yet clear. Thus the question of the function of land connections or closer stepping stones is largely a matter of whether the group evolved before or after the Cretaceous. Adie also stressed the indications of submarine ridges, such as the Scotia Arc between South America and the Antarctic Peninsula, the ridge from Macquarie towards Cape Adare through the Balleny Is., and the Gaussberg ridge between Kerguelen and East Antarctica. He also emphasized the great geological dissimilarity between West and East Antarctica (which are separated by ice lying on rock below sea level), and presented evidence that they might have once been farther apart. This suggests the possibility of separate migration routes to New Zealand and Australia, and thus closer affinities of South America and New Zealand on one hand and South Africa and Australia on the other. Certainly there is considerable evidence of closer affinity between South America and New Zealand, and this also fits with the great faunal difference between Macquarie and Campbell. That is, possibly one migration route might have been through closer connections along the route Victoria Land or Adelie Land–Balleny Is.–Macquarie–Tasmania, and the other Edward VII Land–Scott I.–Campbell I.–Auckland Is.–New Zealand.

As discussed in the following section, I feel that much of Campbell's fauna represents Recent post-glacial oversea dispersal.

DISPERSAL

Evidence has been accumulating that arthropods of many groups are capable of being wind dispersed for considerable distances over sea. There is fairly convincing evidence that many of the species established on oceanic islands were carried to those islands, or to stepping-stone islands or no longer existing intervening islands, by air currents (Gressitt 1961; Gressitt & Yoshimoto 1964). For instance, there is fairly high correlation between the types of arthropods currently represented on isolated oceanic Pacific islands and the types of insects trapped in air-nets on ships or planes at sea at points quite distant from probable points of origin. As continental shores are approached, more and more insects are trapped. Thus great quantities of insects are carried aloft by rising convection currents over the land, particularly on summer mornings, but at almost any time when temperatures are appropriate. At higher altitudes they are caught by horizontal currents and carried wherever the winds dictate, depending on air speed, direction, and other factors. If sunshine is not too great, and humidity not too low, they may be carried alive for great distances. The number being carried in the air is reduced geometrically with increasing distance from the continental or major insular source areas. Thus for distant isolated islands, chances of successful establishment are very small. Nevertheless, over periods of millions of years, many successful establishments could take place. As might be expected, arthropods with lower specific gravity (generally, but not always, winged) are more apt to become air-borne, and are carried greater distances.

The applicability to Campbell I. of this question of establishment on islands by air dispersal is to some extent disputed by different views expressed in articles in this volume. Some workers feel that since Campbell may be termed continental, that the matter of air dispersal is irrelevant. However, actual evidence for a local history of stable fauna dating from an hypothetical continental condition is almost non-existent. Forms such as the wing-

less stoneflies it is difficult to imagine as being air-borne for great distances. With these, and a few others, there could be some other explanation, such as survival through the ice ages, or transport on feet or feathers of birds. With such large populations of sea birds, largely the same species on neighboring islands to the north, it is conceivable that arthropods or their eggs might be carried from one piece of land to another at intervals (See below).

Fleming (1964) indicated that colonization of subantarctic islands has been by recent, and by oversea dispersal, the islands having been severely glaciated during the Pleistocene. He pointed out that plant genera such as *Sophora*, *Hebe* and *Acaena* are young, and are facile at dispersal, whereas *Nothofagus* and podocarps are old and are not facile at dispersal. The latter are absent, in general, from the subantarctic islands, although some were apparently present in Kerguelen before the period of maximum glaciation. Fleming felt that hypothetical former land connections could not explain all the present distribution in the southern areas.

Preest (1964) suggested that albatrosses and petrels probably revegetated the glaciated islands of subantarctic regions, as Macquarie, by carrying seeds on their feet and feathers. He also pointed out that much of the flora could have been wind-dispersed.

In the Auckland Is. I picked up an Antarctic prion (*Pachyptila desolata*) which had just come in from the sea after dark, battering against vegetation while blinded by artificial light. On examination it proved to have a psocid and some seeds on inner portions of its breast feathers. Also, on Ocean I. I found a weevil, *Pactolotypus depressirostris* (Kirsch) in the feathers of a giant petrel. These and similar examples suggest dispersal possibilities by wide-ranging sea birds (See Falla, 1960).

Kuschel (1964) pointed out that transport could have been by ice-berg from Antarctica to other southern continents during the time since the Cretaceous.

Trapping at sea

Over the past several years, Bishop Museum has been carrying on a program of trapping of air-borne organisms at sea, as well as on certain insular or far southern land areas, in order to document the theory of air dispersal to islands. The trapping at sea has been done on various military and oceanographic ships, mostly of the U. S. Navy, U. S. Military Sea Transport Service, Scripps Institute of Oceanography, and National Science Foundation, but also of the Royal New Zealand Navy, the Armada de Chile, and others. Also, trapping has been done in a Superconstellation plane of the U. S. Navy (VX-6). Work done in Antarctic and subantarctic areas, mostly in the areas south of New Zealand and Tasmania south to McMurdo Sound, has been reported in Gressitt, Leech & O'Brien 1960; Gressitt, Leech, Leech, Sedlacek & Wise 1961; Gressitt, Sedlacek, Wise & Yoshimoto 1961; Yoshimoto, Gressitt & Mitchell 1962; Yoshimoto & Gressitt 1963, and in press. Some of these data are summarized in Gressitt, in press, and Yoshimoto & Gressitt, in press. The trapping methods are described in some of the preceding references, and nets in operation on the "Magga Dan" are illustrated in Gressitt 1961: 53, fig. 20a.

Much of the data on trapping done south of 50° South Latitude are summarized in Table 5. This table shows that many of the insects trapped in the general area of Campbell I. are of groups which actually occur on Campbell and the Auckland Is. This seems to be fairly clear evidence that many of the dominant sorts of insects on these islands are likewise the dominant insects air-borne at sea in similar latitudes.

Table 5. Groups of insects trapped south of 50° South Latitude (at sea, in air, or in Antarctica)

	No. of specimens	Range of degrees Lat. S	Long.	Distance from probable source in km	Group occurs in Antarctica	Subant. Is.
Acarina	4	50–62	159–172E	1600	(*)	*
Araneae	1	59	175E	1300		
?Lycosidae	1	52	175W	900		*
Salticidae	1	52	175W	900		
Micryphantidae	1	77	162E	3200?		
Collembola						
Hypogastruridae	4	63–77	62W, 164–171E	1–400	*	*
Tomoceridae	1	70	85W	1200±	?	*
Blattaria	1	72	170E	2700?		(*)
Thysanoptera						
Thripidae	1	58	175E	1200		(*)
Psocoptera						
Liposcelidae	3	58	175E	1200		*
Homoptera						
Aphididae	7	50–54	166–175E, 66W	80–800		*
Coccidae	1	58	175±E	1200		*
Jassidae	1	53	175±W	1000		
Heteroptera						
Lygaeidae	1	60±	171E	1400		
Lepidoptera						
Gelechiidae	4	55–68	59–80W	150–1400		*
Microlepidoptera	1	54	175E	800		*
Geometridae	1	53	66W	45		*
Nymphalidae	1	71	97W	3500		*
Diptera						
Tipulidae	3	53	61–73W	3		*
Psychodidae	1	53	60W	10		*
Chironomidae	103	52–53	61–69W	3–150	*	*
Mycetophilidae	5	52–54	60–70W, 169E	3–800		*
Bibionidae	2	53	61W	10		
Piophilidae	1	55	159E	1200±		
Coelopidae	2	50–55	166–169E	3–10		*
Sphaeroceridae	2	51–53	170E, 61W	3–600		*
Ephydridae	2	53	61–66W	10–41		*
Drosophilidae	2	53	61W	10		
Coleoptera	1	75	166E	3000		
Staphylinidae	1	53	61W	10		*
Lathridiidae	3	77	166E	3200?		*
Scarabaeidae	1	53	67W	20		
Hymenoptera						
Ichneumonidae	2	53	175W	1000		*
Braconidae	1	53	61W	10		*
Eulophidae	2	53	175W, 66W	80–1000		*

* Group represented by forms similar to those trapped.

(*) Group represented but not, or probably not, by forms trapped.

CAMPBELL TRAPPING EXPERIMENT

To provide information to supplement the trappings at sea, a fairly large-scale trapping experiment was planned for land-based work on Campbell I. The main objectives were to attempt to trap, on windward shores of the island, arthropods being blown to the island from elsewhere, and on leeward shores, those being blown off the island into the sea. This would presumably prove that insects are being blown to the island currently. Also it would demonstrate that those less well adapted to life on the island are subject to constant negative selection (reproductively unsuccessful). Or in other words that non-use of wings proves beneficial and results in species which through natural selection become better adapted for survival on an island of such adverse conditions.

The prevailing winds striking Campbell I. are from the west, and would thus seem to have to bring insects from South America, southernmost Africa, Australia and subantarctic islands. However, at altitudes of 1500 meters or more there are at times northerly winds of 80–100 knots speed. These could theoretically carry insects from New Zealand to Campbell in 10 hours or less. However, there are generally no connective currents to lift insects into this windstream when northerly wind conditions are operating. When weather balloons are liberated at the weather station on Campbell, they often move eastward in the low westerly winds, but after rising to considerable heights they change to a southward course in the northerly winds. Closer to New Zealand there are frequently northerly winds at low altitudes, which accounted for many of the specimens trapped on ships. Thus it is readily conceivable that insects could be blown southward from Australia and New Zealand and then be diverted eastward in the prevailing low westerly winds. As shown in the preceding section, there is not much evidence of affinity between the faunas of Campbell and the Aucklands on one hand and of Macquarie, Tasmania and Australia on the other.

The limited land fauna of the subantarctic islands, as well as the special environmental conditions prevailing, makes them appropriate places for the study of natural dispersal. Campbell I. is theoretically a very appropriate place, for its westward (windward) coasts consist largely of cliffs. Actually, for attempts to trap insects blown to an island from elsewhere, Macquarie I. would be more appropriate than Campbell or the Aucklands, because it has a much smaller fauna of its own for possible contamination, and also because it has windward beaches or low bluffs where mechanical and aerodynamic problems could be overcome with fairly simple equipment. Campbell, on the other hand, with a more extensive fauna, and low valleys leading to coastal areas, is more appropriate to the study of wind-to-ocean destruction of active insects.

The obstacles to successful natural dispersal (which are also obstacles to successful studies of the phenomenon), are so great that concrete documentation is difficult to achieve. These obstacles center around the predominant strong winds and the associated low temperatures and excessive precipitation, with mist or sleet much of the time.

The trapping experiment on Campbell was largely a failure as regards the trapping of insects blown to the island from elsewhere. However, the trapping program for insects being blown off of the island appears to have produced some interesting documentation. Through the interest and cooperation of K. P. Rennell who continued the latter program after my departure from Campbell, the experiment was continued for over 11 months. A total of 4,309 arthropods were trapped in the main experiment on Campbell.

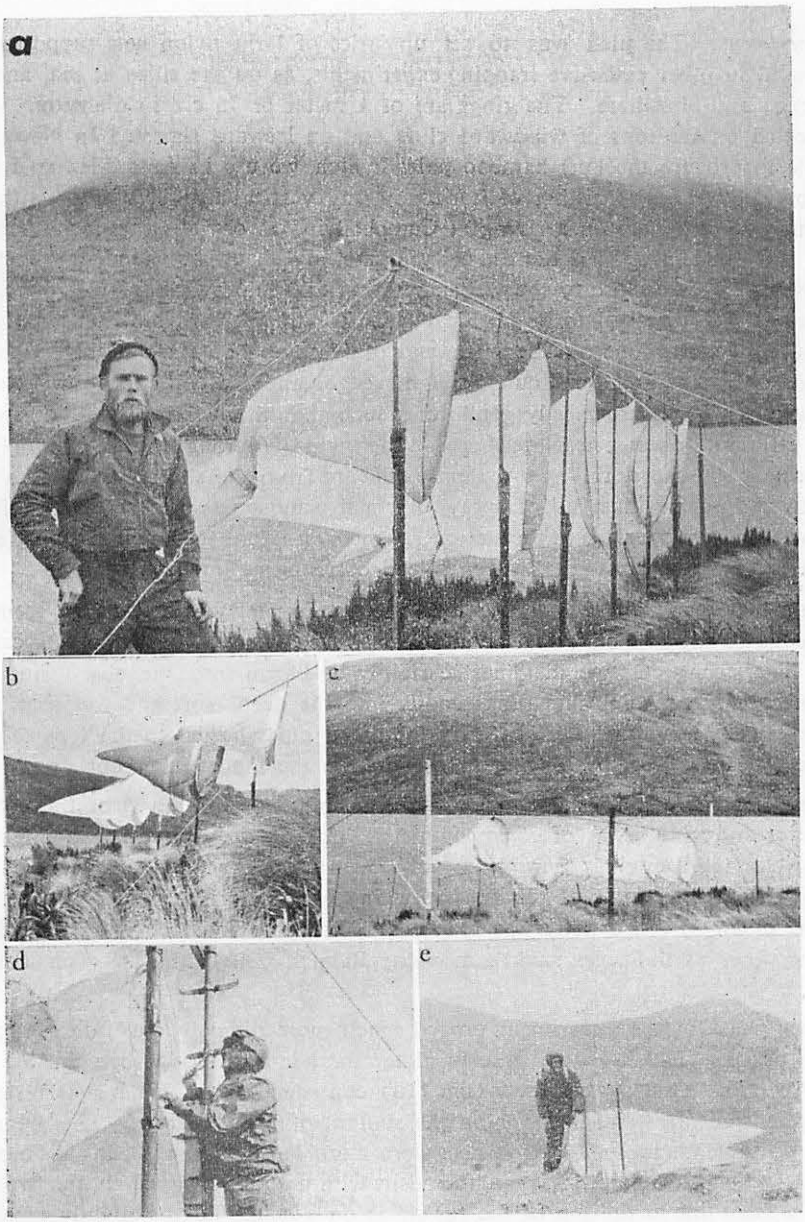

Fig. 11. Dispersal experiments on Campbell I. a, main series of nets at Beeman Point, showing one 75 cm net and five 1 m nets, Rennell at left, 22 Dec. 1961; b, another view of same series, Nov. 1961; c, later view of nets on revised framework in 1962, with old frames at left; at this time three 75 cm and three 1 m nets are flying; d, two 75 cm nets lashed to old weather tower on summit of St. Col Peak, Gressitt held against tower by strong wind, Nov. 1961; e, one of two sets of three 75 cm nets each on ridge between St. Col Peak and Mt. Azimuth, Nov. 1961: experiment was unsatisfactory because of placement of nets.

The experiment: The plan was to set up series of large nylon nets supported by steel rings, as used in other extensive trapping experiments, as on the ships at sea, and on land in Antarctica and elsewhere. The rings are of 1 meter or 75 cm in diameter. Sets were to be erected on the tops of windward cliffs and on leeward shores. In New Zealand I was unable to procure the long bamboo poles which we use in Antarctica so I had fitted a series of steel rods consisting of horizontal and vertical lengths of pipe with threaded attachments. Immediately on arriving at Campbell it was obvious that from the weight of the pipes and other gear, and the difficulty of moving about the island, the metal frames would have to be used close to the weather station and improvisations elsewhere. Fortunately, Beeman Point proved to be an ideal place for the leeward location. Although it is not on the east coast, but near the inner end of Perseverance Harbor, the harbor is wide at Beeman, the point drops off quickly at the edge, and the contours leading down from the windward cliff-tops are mostly gentle and such that the wind blows downward over the point, striking the water near the shore. When wind is strong, this is strikingly obvious. Waves form at the shore, rolling turbulently outward from the shore towards the open sea, while williwaws, whirlwinds full of spray, or small waterspouts are frequent. Often, when weather balloons are liberated at the station (about 40 m from the main trapping site), they are blown downward against the water, instead of rising as intended.

The main battery of nets (fig. 11a–c; see also pp. 24, 29) was erected on Beeman Point, near the edge of the low cliff, and about 10 m above sea level. Any insects carried past this spot in a strong gust would almost certainly be blown into the sea. Since the steel uprights were only 2 m high and sank readily into the deep, soft and wet peat, tall metal fence posts were sunk into the peat and the metal pipes lashed to the tops of the posts. The frame was held erect by long cords or wires to the top of each upright.

Six nets were flown from the frame for over 11 months. Initially 5 of the nets were of 1 m diameter and the 6th was of 75 cm diameter. After a few months, as the replacements of net bags for the 1 m rings were worn out, 75 cm rings were gradually substituted, till at the end of the period, most of the nets operating were on 75 cm rings. This means that the volume of air screened daily was reduced gradually to about 65 % of the initial level. After some time, as the poles sank somewhat, Rennell raised the nets on a new frame (fig. 11c).

The other phase of the experiment proved much more difficult and far less productive. Three sets of nets (2, 3, 3) were erected along the windward ridge between St. Col Peak and Mt. Azimuth. One of these sets (fig. 11d) consisted of two 75 cm nets fastened with strong wire to the old weather tower on the summit of St. Col Peak. The wind at this point was so violent (see p. 40) that nets were worn loose and had their ends blown out as a rule in less than 24 hours. After a few visits with practically no catch, the two nets were rigged on a stout line to the top of the tower, as on a ship. At the slightly greater height the still stronger wind (probably averaging 50 knots) blew the nets out at the ends from whipping because of variation in speed. One net was blown away. This location was finally given up because of the great amount of effort expended with practically no result. Also within a few days after my arrival on Campbell, I set up two additional sets of three 75 cm nets each on the ridge, towards Mt. Azimuth (fig. 11e). These were erected on the crest of the ridge, above the cliff tops. These nets were often still functioning when visited (every 2–3 days). However, as they were not erected sufficiently high on frames, too much

debris entered the nets. Because of the obstacles, poor returns and destruction of nets, this part of the program was abandoned after a few weeks. Most of the insects trapped were obviously local in origin, and probably all were, though many of them were blown up from the bottoms of the cliffs.

A Malaise trap was also operated for brief periods in Tucker Cove, not far from the Beeman Pt. nets (see below under Results).

Results: In the main trapping experiment at Beeman Pt., a total of 4,309 arthropods were taken over the period of just over 11 months. Data from this experiment are presented in Table 6 and in the graphs (figs. 14–20), as explained below, with additional weather data in figs. 12 and 13.

In Table 6 the species trapped in the main experiment are listed systematically with the numbers trapped for each month. The totals indicate the numbers trapped per month and also the total number trapped of each species. This table demonstrates the great numbers trapped of certain weaker fliers, Aphididae, Psychodidae and Chironomidae in general, and certain Sciaridae and Coelopidae. The absence or scarcity of some of the common Lepidoptera and Ichneumonidae is conspicuous. Many individuals of these were seen flying in calm weather upwind from the nets.

Many species were trapped through the entire year, but Aphididae, Tipulidae, *Platyura*, *Tetragoneura*, Syrphidae, *Poecilohetaerella*, *Scatella*, *Macrocanace*, *Leptocera*, *Calliphora*, Muscidae and Hymenoptera were essentially lacking in the winter trappings.

In noting the months with higher catches, it is seen that March, April and October (part) produced more than January or February. December was the richest and August the poorest. Some groups (Psychodidae, Chironomidae, *Exechia* and *Sciara*) had their maxima in early autumn (March, April) whereas many species were maximal in summer. *Coelopa*, however, had its maximum in spring (October).

In studying the table it must be borne in mind that the average net size was reduced in the later months of the experiment, reducing the volume of air screened. Thus the figures for the last few months are lower than they should be in comparison with the earlier months.

In addition to the main air-netting experiment and the smaller unprofitable ones on the high ridges, a modified Malaise trap (Gressitt & Gressitt 1962) was operated on Campbell for two periods in November and December (p. 16, fig. 6f). The catch for the first of these two periods is shown in fig. 14. The catches are given over a factor of 5 (×0.2), to put them on the same scale. Since the trap was checked only every 2–4 days, the line in the graph indicates averages for these periods. For this reason the data cannot be closely correlated with weather conditions. However, there is some obvious correlation with the trapping experiment.

In the cliff-top trapping, the following specimens were taken (late November to mid December):

Amphipoda	1	Coelopidae	2
Araneae	1	Acalyptratae	8
Tipulidae	10	fly fragments	7
Sciaridae	6	Staphylinidae	1
		Total	36

Table 6. Numbers of specimens taken in Beeman Pt. nets, by species and month, 1961–62,

	Nov. (21–30)	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct. (1–26)	Totals
Amphipoda	–	–	–	–	–	–	–	–	1	–	–	–	1
Acarina (Cryptostigmata)	–	8	–	–	–	–	–	–	–	–	–	–	8
Araneae	–	–	–	1	–	–	–	–	–	–	–	–	1
Homoptera: Aphididae	12	611	137	39	7	4	–	–	–	–	–	–	810
Lepidoptera													
Proterodesma byrsopola	1	5	4	–	–	–	–	–	1	–	–	–	11
Diptera													
Nothotrichocera antarctica	15	27	6	–	1	–	1	1	–	–	–	3	54
Tipulidae	3	58	12	3	6	–	–	–	–	–	–	10	92
Psychoda pulchrima	19	26	14	9	3	20	26	13	10	10	14	12	176
campbellica	1	5	–	7	2	11	8	2	–	1	–	3	40
eremita	–	–	–	–	–	–	–	–	1	–	–	–	1
spatulata	–	–	1	10	71	112	39	2	2	–	8	–	245
Chironomidae	2	35	24	102	136	113	94	102	5	10	3	12	638
Austrosimulium vexans	–	1	–	2	1	1	–	–	3	4	1	3	16
Bradysia rubra	3	1	9	11	9	4	8	–	–	–	1	5	51
Exechia hiemalis	20	28	34	67	247	263	130	35	54	34	22	36	970
Zygomyia submarginata	1	1	–	1	8	8	9	4	12	8	–	6	58
Platyura brevis	–	37	28	5	–	–	–	–	–	–	–	–	70
Tetragoneura minima	3	19	16	1	–	–	–	–	–	–	–	–	39
Helophilus antipodus	–	13	2	–	–	–	–	–	–	–	–	–	15
campbellicus	–	5	1	–	–	–	–	–	–	–	–	–	6
Syrphus novaezealandiae	1	10	7	5	3	–	–	–	–	–	–	1	27
Coelopa debilis	8	40	15	36	39	19	52	34	16	32	86	359	736
Poecilohetaerella bilineata	–	2	2	–	–	–	–	–	–	–	–	–	4
Scatella nelsoni	2	4	4	–	–	–	–	–	–	–	–	–	10
Macrocanace australis	–	1	–	–	1	–	–	–	–	–	–	–	2
Leptocera thomasi	1	9	3	2	2	1	–	–	–	–	2	3	23
Australimyza anisotomae	7	9	9	4	1	3	8	3	–	–	1	4	49
Calliphora quadrimaculata	–	–	2	4	–	–	–	–	–	–	–	–	6
viridiventris	–	26	7	10	3	–	–	–	–	–	–	2	48
Limnophora brunneivittata	–	–	–	–	–	–	–	–	1	–	1	–	2
Paralimnophora depressa	6	13	8	3	2	–	–	–	–	–	–	–	32
antipoda	1	3	5	2	–	–	–	–	–	–	–	–	11
Coleoptera													
Ptinus tectus	–	–	–	–	–	–	–	–	–	–	–	6	6
Veronicobius aucklandiae	–	–	–	–	–	–	–	1	–	–	–	–	1
Hymenoptera													
Rogas gressitti	4	14	16	2	–	–	–	–	–	–	–	1	37
Apanteles sp.	–	–	1	–	–	–	–	–	–	–	–	–	1
Campoplex disjunctus	–	2	3	–	–	–	–	–	–	–	–	–	5
Ardalus campbellensis	–	–	–	1	–	6	–	–	–	–	–	–	7
Totals	110	1013	370	327	542	565	375	197	106	99	139	466	4309

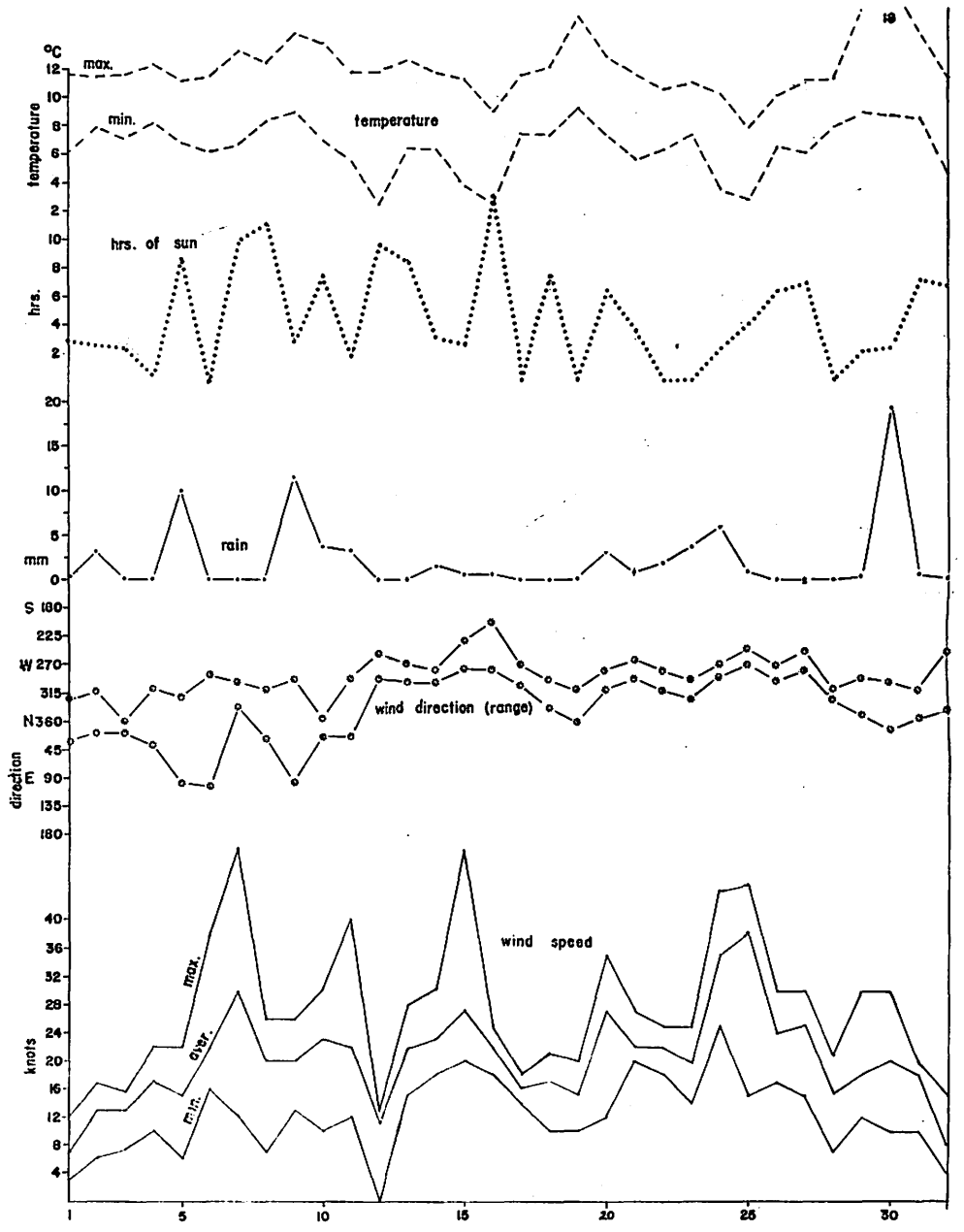

Fig. 12. Graph of general weather conditions for month of December 1961 at Beeman Point, Campbell I.: temperature maxima and minima, centigrade; hours of sunshine; mm of precipitation; wind direction range in degrees of the compass; and wind speed maxima, averages and minima.

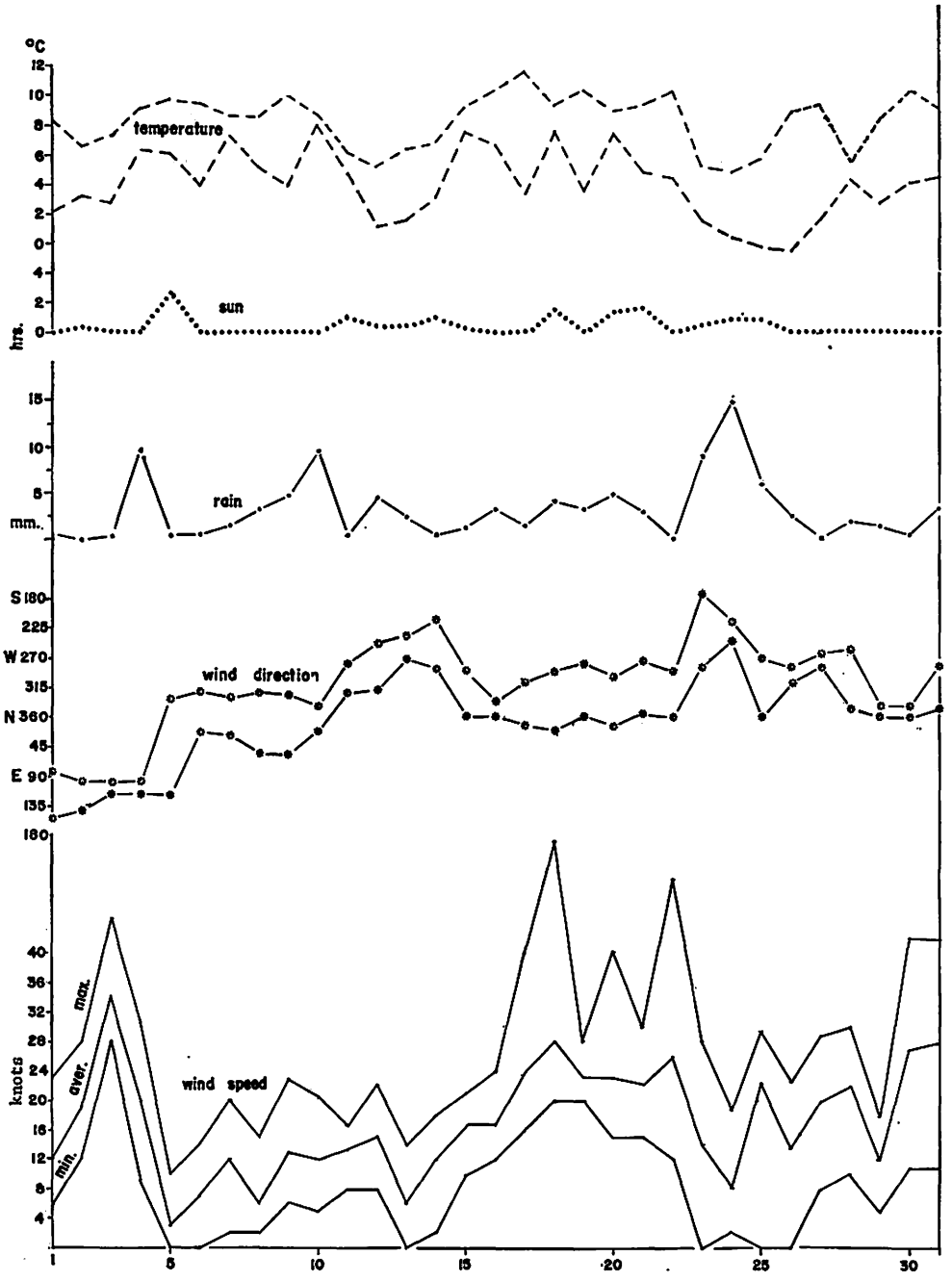

Fig. 13. Graph of general weather conditions for month of June 1962 at Beeman Point, as for fig. 12.

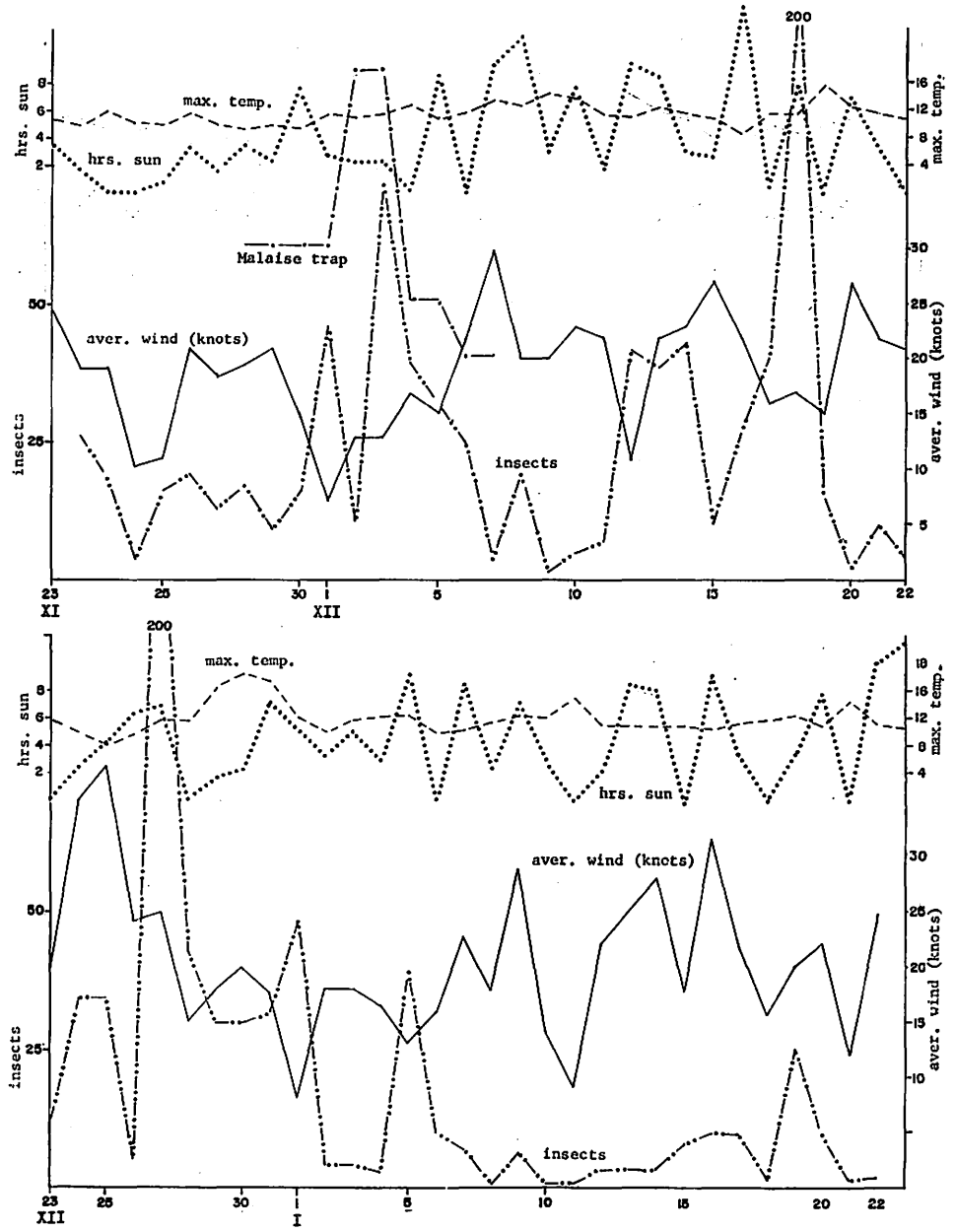

Fig. 14. Graphs of insect trappings at Beeman Point, Campbell I., November 1961 to January 1962, plotted against average wind speed in knots (scale at right), as well as maximum temperature (C) and hours of sunshine. Near center of upper graph is shown numbers of insects taken in Malaise trap in Tucker Cove (over factor of 5). In general, results show more insects trapped when wind was low and temperature and sunshine high.

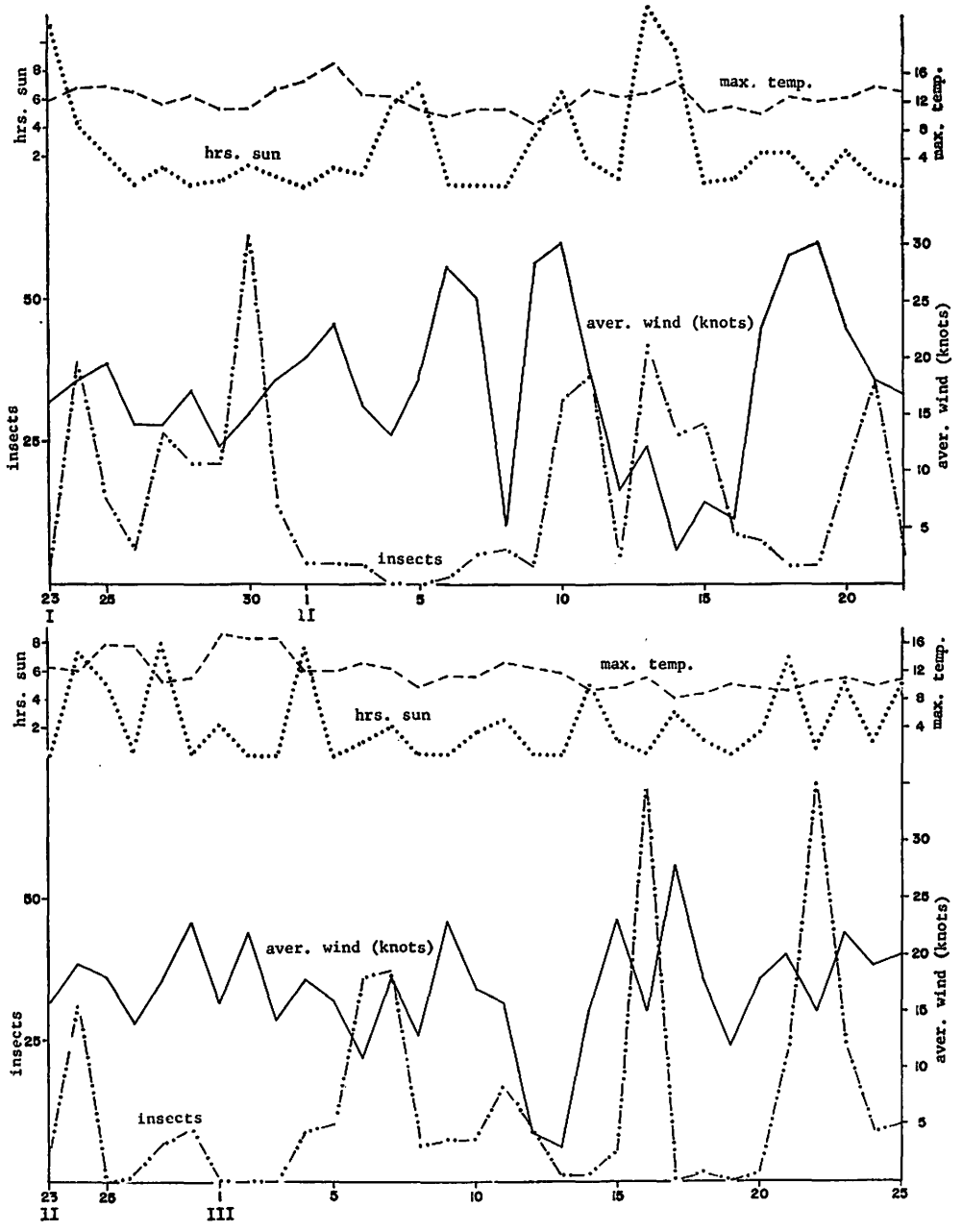

Fig. 15. Graphs of trapping at Beeman Pt., January to March 1962, as in fig. 14.

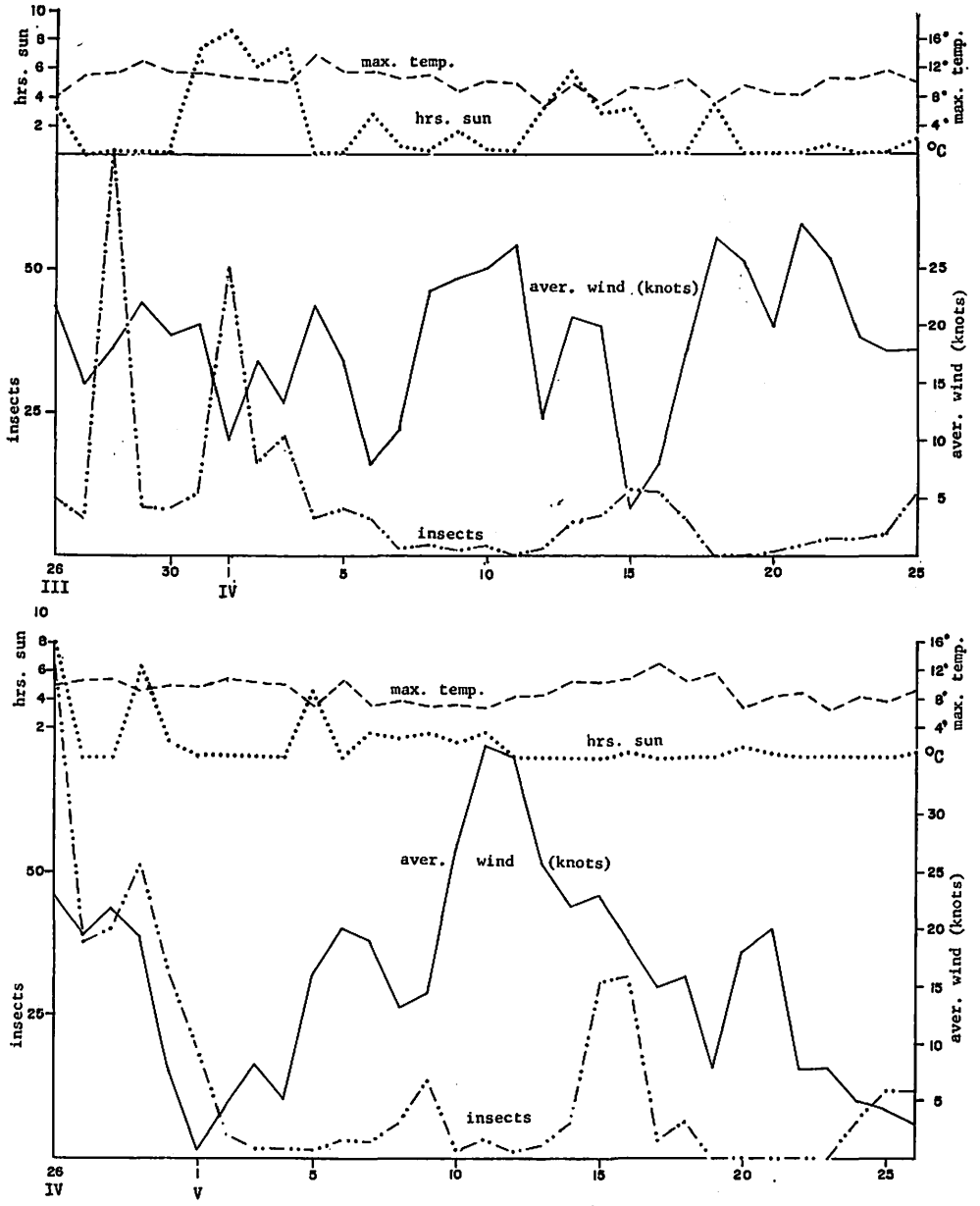

Fig. 16. Graphs of trappings at Beeman Pt., March to May 1962, as in fig. 14.

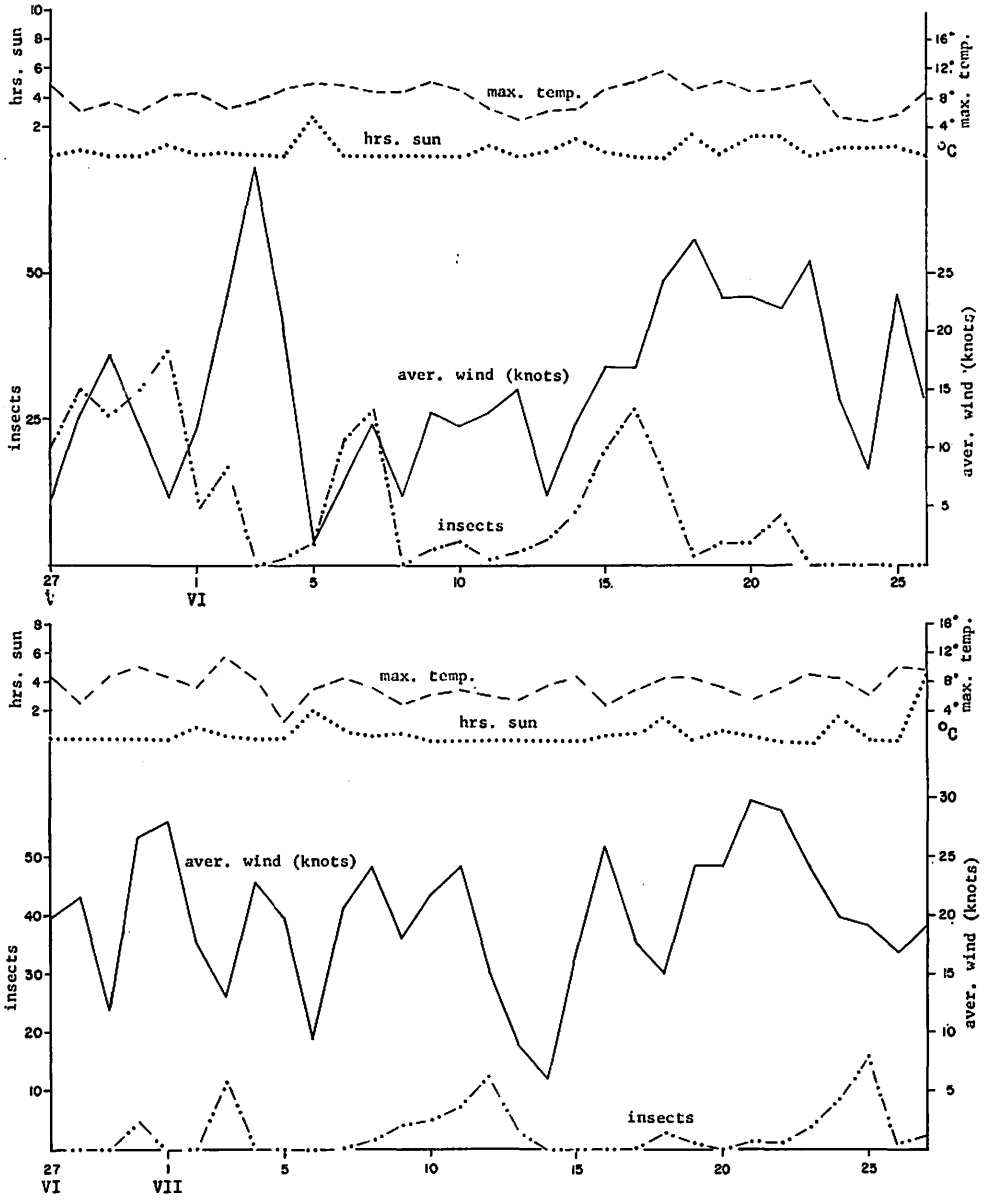

Fig. 17. Graphs of trappings at Beeman Pt., May to July 1962, as in fig. 14.

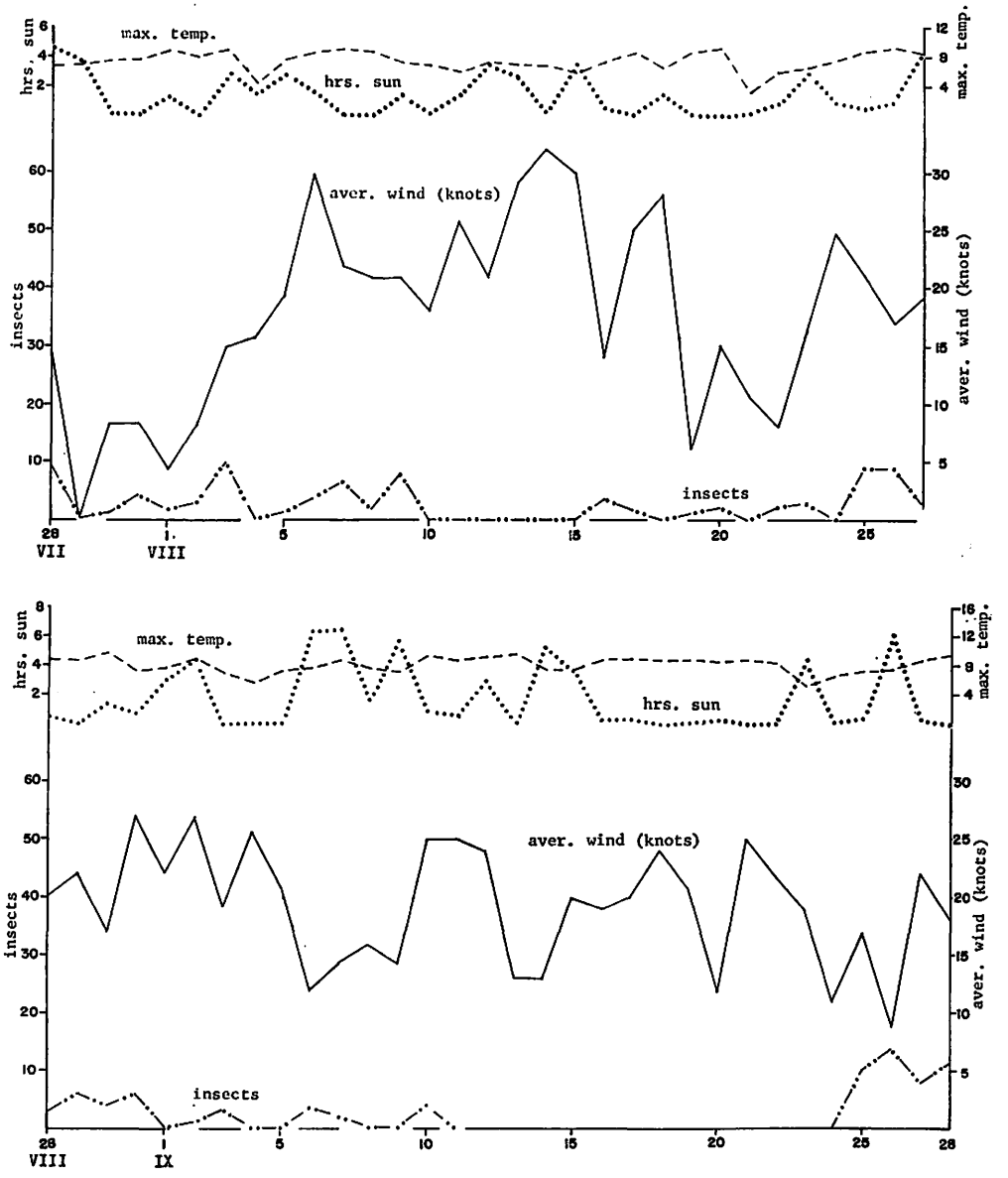

Fig. 18. Graphs of trappings at Beeman Pt., July to September 1962, as in fig. 14.

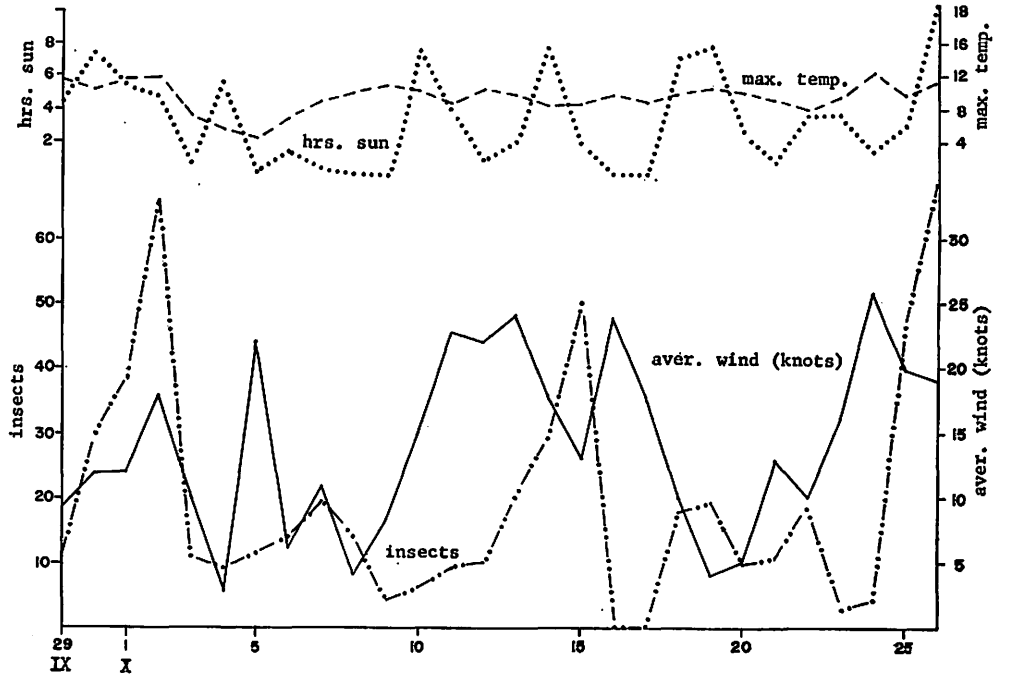

Fig. 19. Graph of trappings at Beeman Pt., September to October 1962, as in fig. 14.

By a study of the graphs it will be seen that in general insect catches were high when wind was low. It must be borne in mind that the winds in the Beeman area are often erratic and turbulent. This often caused reversal of the nets, resulting in loss of trapped specimens. Thus in very many cases the reported catches are far too low. Also, checking of the nets was in general done only twice a day, sometimes only once a day, because of pursuing field work on other parts of the island. During parts of the trapping period, the checking of nets was correlated with the 24-hour weather observation period, whereas in other parts the timing was less well coordinated. These discrepancies were largely dictated by circumstances. At any rate, the respective 24-hour periods do not all coincide, which is another reason for some apparent lack of correlation between trapping results and weather data. In other words, the results as observed by personal experience were much more strikingly coordinated with weather than is apparent from the graphs. Since differences existed in correlating insect catches with maximum, average and minimum wind speeds, in the graphs the catches have been plotted separately with average (figs. 14–19) and maximum (fig. 20) wind speeds. Figs. 14–19 also show maximum temperature and daily hours of sunshine. These two factors are of considerable importance relating to insect flight in such an environment, and in many cases the graphs show positive correlation. In many cases where average wind was low and maximum temperature and sunshine hours were high, but insect catches low, it must be assumed that the maximum wind speeds, or temporary erratic winds, caused reduction in insect flight and/or reversal of nets and loss of trapped specimens.

In order to further document weather conditions, to supplement the extensive general in-

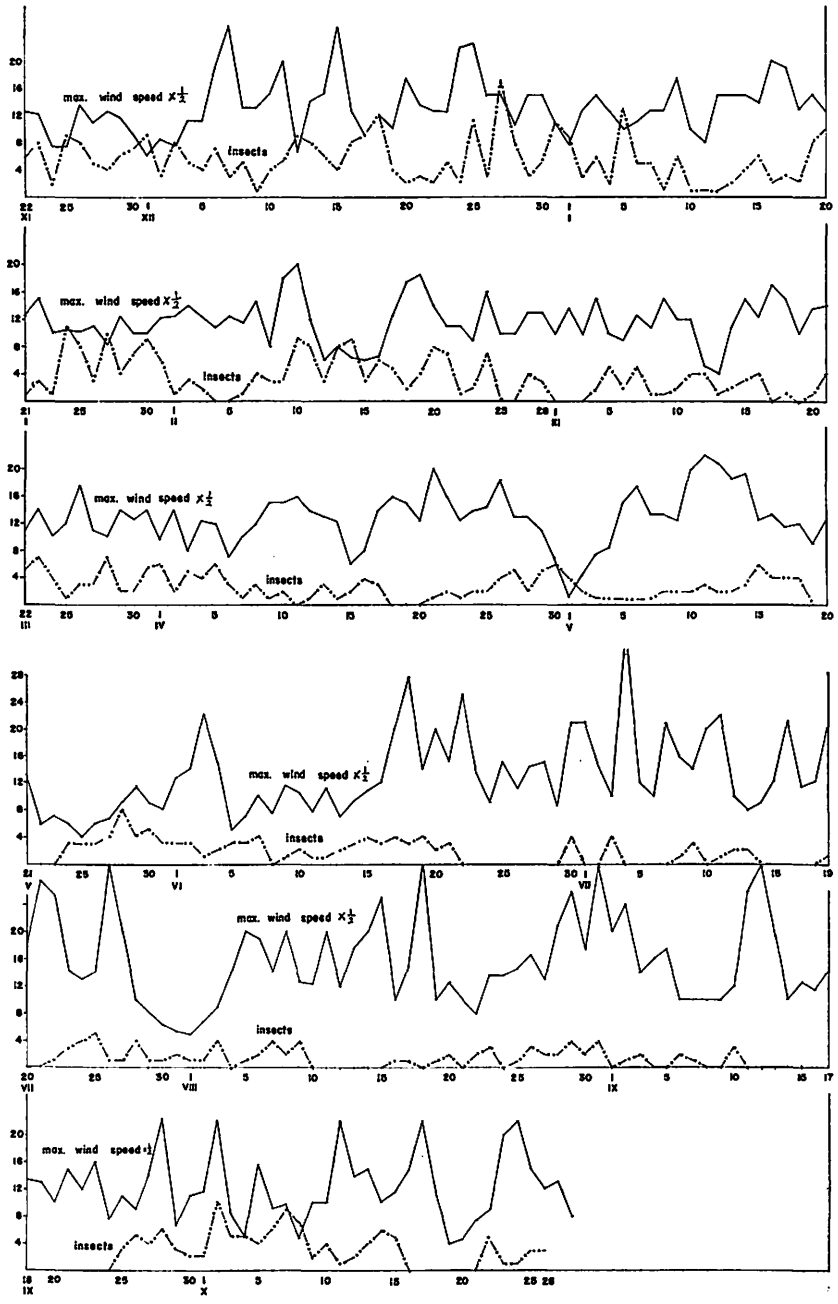

Fig. 20. Graph of complete period of trapping experiment at Beeman Pt., Campbell I., showing number of species trapped daily from 22 November 1961 to 26 October 1962, plotted against maximum wind speed (over factor of 2).

formation presented in the second chapter of this volume (de Lisle, p. 34), more extensive weather data is given in two graphs (figs. 12, 13), one for the month of December 1961 and the other for June 1962. These represent, roughly, early mid-summer and early mid-winter conditions; also, they represent the first full month of the trapping experiment, and a month just past the middle of the dispersal study period. By comparing these two graphs with the differences in trapping results (figs. 14–20), considerable correlation with weather conditions is obvious. In June (1962) the amount of sunshine was extremely limited, averaging less than half an hour per day; the maximum temperature was just over 11°C; and there was more precipitation. However, the wind speed and direction were not much different than in December. Figs. 14–19 show specimens; fig. 20 shows species.

There is a slight discrepancy between data in the table and the graphs. Accidentally, 313 specimens of Psychodidae were excluded from the data for the graphs. In figs. 16–19, the following should have been included: 73 specimens (March), 137 (April), 72 (May), 10 (June), 7 (July), 9 (August), 3 (September) and 2 (October). These data are included in Table 6.

In order to summarize some of the information resulting from the trapping experiment, and to compare with it some of the apparent negative aspects, some figures are presented in Tables 7 and 8. Table 7 gives the numbers of wingless, winged and flightless species in relation to trapping results. This includes both the Beeman and cliff-top trap nets, but not the Tucker Cove Malaise trappings. It should be noted that actually a smaller number may be truly fully winged than indicated on the table. Several apparently fully winged species were never seen in flight or trapped in the air. It is possible that some of these have reduced flight muscles and slightly reduced size or sclerotization of the wings. More study of habits and morphology is required to confirm these points. In certain cases, as noted in the next section, there appears to be good evidence that winged species are not making much use of their wings. Also, the trap collections include some of the introduced species.

Table 7. Ratios of wingless, winged, flightless and trapped species (excluding Malaise trap).

	Species known	Species trapped	Specimens trapped	Species not trapped
Normally wingless groups	198	4	12	194
Flightless (of normally winged groups)	74	1	1	73
Fully winged (see text)	109	40	4332	69
Totals	381	45	4345	336

Table 8 presents partial data on methods of collection of the apparently fully winged species which were not taken in the Beeman trap nets. This is included to indicate possible information on flying habits, although the information is incomplete. Unfortunately, in the general collecting, species actually netted in flight were not documented. However, few were taken in flight, and rather few were seen flying. Although a net was carried most of the time, it was generally used for catching specimens that dropped when roots, herbs, stones and mosses were examined. It was also used for sweeping herbs and beating scrub. However, vegetation was generally too wet for sweeping. Some of the winged species were taken only on rocky shores, or at scattered points around the island. The fact that numbers of specimens of certain species were taken in the Malaise trap is not

Table 8. Collection of winged species not taken in Beeman Pt. trap nets.

	No. species	Distr.	Method of collection: At light Total	At light Max.*	Malaise trap Total	Malaise trap Max.	General collecting Total	General collecting Max.	Average total per species
Thysanoptera	1	wide	–	–	–	–	1	1	1
Aphididae	5x	wide	–	–	–	–	16	6	3
Trichoptera	1	–	–	–	4	4	43	43	47
Microlepidoptera	2	wide	7	7	–	–	3	3	5
	3	N.Z.	3	1	34	33	12	9	16
Pyralidae	4	end.	–	–	25	20	32	16	14
	5	N.Z.	6	5	81	50	64	40	30
Geometridae	3	end., subant.	–	–	80	80	31	17	55
	3	N.Z.	–	–	12	9	41	22	17
Trichoceridae, Tipulidae	3	subant.	1	1	1	1	17	12	6
Psychodidae	1	intr.	–	–	–	–	1	1	1
Sciaridae	2	end.	–	–	71	70	17	17	44
Mycetophilidae	2	end.	–	–	32	30	31	25	31
	2	N.Z.	–	–	114	110	18	10	66
Ceratopogonidae	1	end.	–	–	–	–	1	1	1
Cecidomyiidae	1	end.	–	–	3	3	–	–	3
Empididae	2	end.	–	–	32	17	6	6	19
Syrphidae	1	N.Z.	–	–	28	28	3	3	31
Helomyzidae	2	subant.	–	–	17	17	29	20	23
Sphaeroceridae	1	end.	–	–	17	17	18	18	35
Ephydridae	2	N.Z.	–	–	92	52	820	800	457
Calliphoridae	1	N.Z.	–	–	16	16	5	5	21
Muscidae	3	end., N.Z.	–	–	119	113	79	51	66
Ptiliidae	1	end.	–	–	–	–	54	54	54
Curculionidae	1	N.Z.	–	–	–	–	65	65	65
Ichneumonidae	1	end.	–	–	110	110	35	35	145

* *Max.* means maximum number of specimens of one species. *Total* means total specimens for the family. When numbers in one pair of columns are the same, it means only one species is involved. Thus for the first Microlepidoptera entry, one species was taken only at light, the other only in general collecting, whereas for the next entry, 1 specimen of each of the 3 species was taken at light, 2 species were taken in the Malaise trap, and 2 or 3 in general collecting. *General collecting* includes Berlese funnelling.

x Possibly some of these aphids lack winged formson Campbell. Most of these were taken by Berlese funnel.

necessarily of great significance as far as flight is concerned. Even flightless species are often taken in the Malaise trap, as the insects may crawl all the way up from the ground into the killing chambers, similiar to the way they might crawl up the trunk of a shrub. The base of the trap rested on ferns on peat and old rubbish, and was in contact with *Myrsine* shrubs and close to *Dracophyllum* shrubs. The clearing in the *Dracophyllum* scrub in which the trap was erected was an old rubbish dump of the former Tucker Cove Camp, close to the stream not far from its mouth. It is interesting to note that some of the moths were not taken at light, as well as most of them not having been taken in the trap nets. A few, however, were seen in day flight in good weather, as discussed further below. One

geometrid moth taken in a camp building might have been attracted to light.

EVOLUTION

An island with the climate, isolation and faunal size of Campbell i soft he greatest interest to students of evolution. If it were a more hospitable island it would be an ideal open-air laboratory of evolution. One gains the feeling that here evolution is proceeding at a rapid rate. On the other hand, certain indications suggest that this may not be the case. If evolution is rapid here, then the fauna must be very young, or there must be a very high extinction rate. However, the examination of peat samples did not suggest the latter. There are various indications that much of the Campbell I. fauna is young. The recent glaciation suggests this, as does the morphological and ecological plasticity of many of the species. On the other hand, the great faunal similarities between Campbell and the Auckland Is. and their common dissimilarities from Macquarie I. suggest some similarity of history for the former two as opposed to a more strictly over-ocean faunal origin for Macquarie. The answer to the problem may lie in a history involving for Campbell and the Aucklands some relics of common local land-mass and/or closer stepping stones, plus over-sea dispersal in recent times from a common source of certain species with the propensity for facile dispersal and establishment.

Another indication that much of the fauna is young is the disharmony coupled with the apparent meagre proliferation of species. The high ratio of genera to species plus the apparent separateness of phyletic lines indicate the slight proliferation in the historic sense. Possibly the great majority of species on the island represent separate evolutionary lines and thus separate colonizations. It is also possible that re-introductions of the same species result in gene dilutions from the parent populations and retardation of the evolution of new species through random fixation of genes.

As pointed out by Mayr (1963) the most important forces in the evolution of species are the factors of the environment functioning as selection pressures operating on the normal genic variability. In other words, natural selection (long somewhat mistakenly termed "survival of the fittest", whereas the important fact is the contribution made to the gene pool of the next and subsequent generations, and thus reproductive success). It has been suggested that the selection pressures of the environment are more severe under austere circumstances such as an inhospitable environment like that of Campbell I. It would appear that plants are more successful than land animals in this environment, for the ratio of numbers of species of land arthropods (the dominant land animals in general, and more particularly so on Campbell) to vascular plants (3.4 : 1) is much lower than in most temperate and tropical areas.

Since Campbell I. is small and in some senses the environment rather uniform, it is possible that the "competitive exclusion principle" (see Mayr 1963) or the Gause principle, is of great importance here. That is, proliferation of species is retarded by competition preventing the development of two closely related species in the same niche. However, the variation in niches would appear to be greater than in some I have seen in the tropics which appeared to support two or three species of the same genus or subgenus. No doubt the stringent nature of the Campbell environment plays a role here, and perhaps there has actually been little autochthonous speciation on the island in spite of the seemingly high endemism. The small number of established man-introduced cosmopolitan species is an

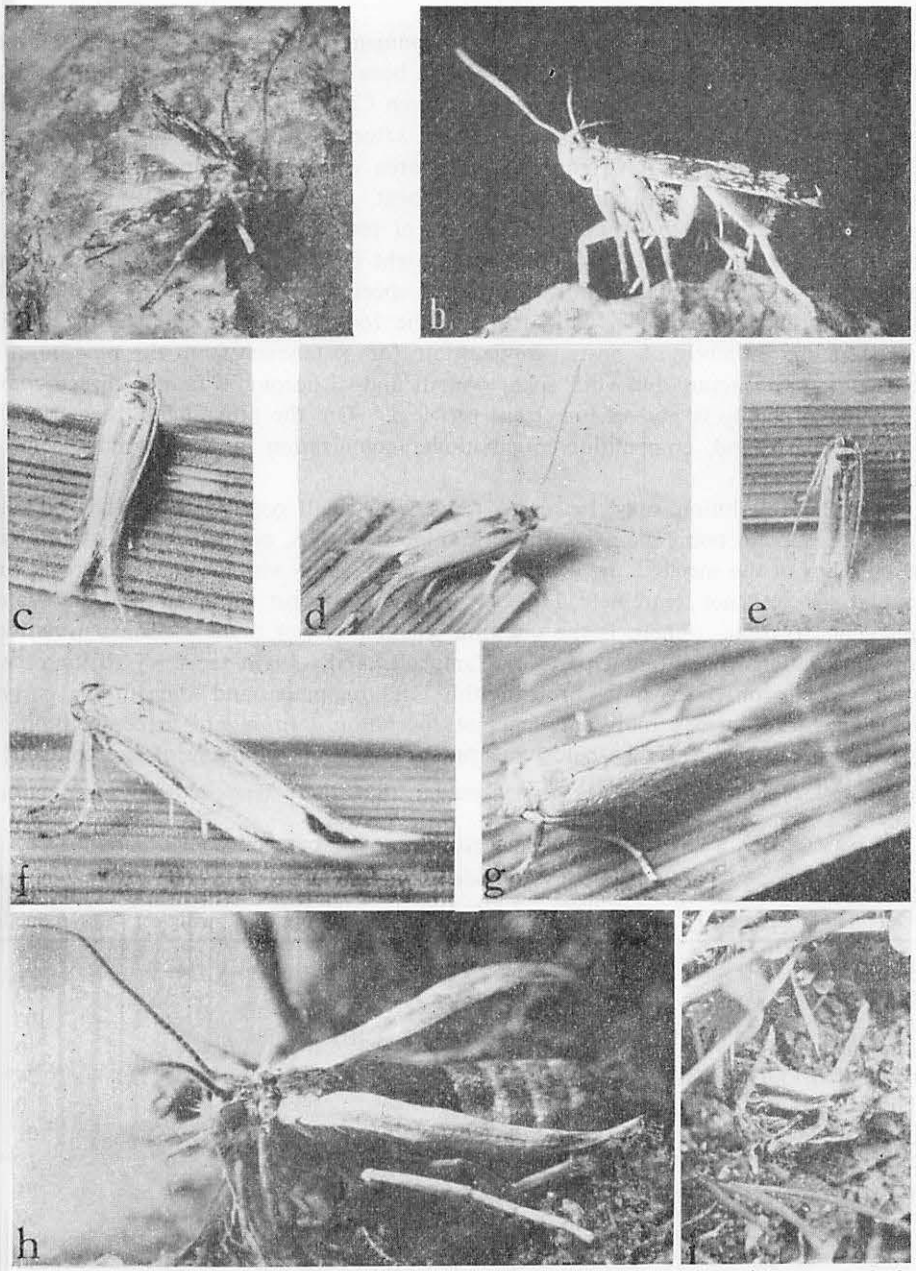

Fig. 21. *Tinearupa sorenseni* Salmon & Bradley on rock with lichens in upper splash zone, Monument Harbor, Campbell I. (hind wing appears much wider than in photograph of type specimen in Salmon & Bradley, 1956, fig. 10); b, same, side view; c, probably *Euproteodes galathea* Viette, on sedge leaf, Tucker Cove, 7.XII.1961; d, same; e, same or different species, same data; f, ditto; g, ditto; h, possibly *Exsilirarcha graminea* Salmon & Bradley ♀ on mossy ground, slope of St. Col Peak, 180 m, 7.XII.1961; i, unidentified flightless moth on ground, Beeman area, I, 1962; all Campbell I. (photos by Rennell, partly with Gressitt).

indication of the stringent limitations of the environment. However, the number of species native to southern New Zealand which may have been introduced is a difficult question. A number of species are possessed in common between Campbell and southern New Zealand, and perhaps more will be found to represent the same species. To succeed on an island like Campbell, species must have come from an area with similar climate, or have evolved gradually to keep in step with changing environment, including climate and biota. With increase or decrease in the number of species of plants and animals on the island, the factors affecting a particular arthropod species might be greatly altered. Thus a species which depends on a particular plant or animal species for its existence would disappear when its host disappeared, but with less specific food habits it might survive. With a reduction in the number of hosts, competition for sustenance from the remaining ones might become more acute, but with such a small and disharmonic fauna, direct competition for food probably is not an important problem. On the other hand, because of the small size of the island, competition might hinder colonization by the second species of a genus.

It is said that evolution may be more rapid with small populations. It is difficult at this stage to estimate population size among Campbell species, partly because of the hidden nature of many of the species. In general it may be safe to assume that effectively breeding populations are not extremely large, which may permit a higher rate of evolution through gene fixation. There is the question whether or not there is some isolation of breeding populations on different parts of Campbell, and thus a tendency to increase the number of species on the island. Probably this is taking place, and some of the purported intra-specific variation may represent incipient speciation. In regard to competition, it is possible that populations may be below the functioning level of many of the controls.

Downes (1962) noted for far northern Canada, that there tended to be a reduction of

Table 9. Wing reduction of normally winged groups on Campbell I.

Order	No. species	Fully winged	Moderately reduced wings	Short or narrow wings	Totally (or nearly) wingless	% of species with wing reduction
Plecoptera	3	1(?)	–	–	2	67
Orthoptera	1	–	–	–	1	100
Psocoptera	3	–	–	2	1	100
Thysanoptera	1	1	–	–	–	0
Homoptera*	11	7(?)	–	–	4	36*
Trichoptera	1	1	–	–	–	0
Lepidoptera	29	23	1	5	–	21
Diptera**	81	67	5	3	6	18**
Coleoptera	43	4	–	2	37	91
Hymenoptera	10	5	1	1	3	50
Totals	183	109	7	13	54	40

* Ratio is probably higher, as winged forms of some of the aphids may be lacking.

** Probably more species have wing muscles and wings slightly reduced in size.

The winged plecopteran has not been taken in recent years, and may be extinct, or may represent a mistaken record. If the introduced insects are subtracted, the ratio of wing reduction might appear higher. But for a number of species, it is not certain whether they are naturally or artificially introduced.

mating flight and often the development of parthenogenesis. The wide, often circumpolar, distribution of arctic species is well known. Obviously, there is much more flight reduction in the subantarctic, where isolation and adversity of environment are more acute. No great tendency toward parthenogenesis has been noted here, however.

The most conspicuous aspect of the Campbell fauna is the high ratio of species which are unable to fly (see Table 9). Of a probable 170 native species of normally winged groups, 68 are flightless, having slightly or greatly reduced wings to no wings at all. This represents a flight loss of about 40 %, or close to the 43 % for the more isolated and apparently more ancient southern Indian Ocean islands. In addition, there are about 13 introduced species, of which 6 are flightless (of normally winged orders). Some of the groups which include flightless native species have a tendency to include flightless species elsewhere. However, in many cases this is not true. Among the groups having a tendency toward wing reduction are certain types of staphylinid beetles, weevils, the ichneumon wasp genus *Gelis* (fig. 22h), and diapriid wasps. Of the rarely wingless groups, some of the examples on Campbell are striking, or even previously unreported or unparalleled as far as known. Among these are all the known male coccids (3 species), the striking cases in the six endemic moth genera (fig. 21), and others. Interesting cases include the two genera of dolichopodid flies (fig. 22 d, e), a muscid fly (fig. 22d), and two of the coelopid flies (figs. 22f, 23, 24).

Only four of the species of beetles (out of 43) are fully winged on Campbell, and two of these (*Uloma* and *Ptinus*) are probably introduced and may not be firmly established. One-half of the Hymenoptera are flightless (fig. 22h, i).

Some remarkable apparent intra-specific plasticity is evident in several Campbell species. This appears to involve both morphology and ecology. For instance, in the flightless dolichopodid fly genus *Schoenophilus* (fig. 22d, e) the variation is so great that the wings in some individuals are long and slender, and in others broadly expanded and spoon-like at tips. These are found in similar or somewhat dissimilar niches, and it is a question whether there is one or more species on the island. In the wingless diapriid wasps there is great variation, but there appear to be separate populations differing in size, one in beached kelp and the other in tussock turf, parasitizing puparia of different families of flies. In the cynipid wasp *Kleidotoma subantarcticana* (fig. 22i) there is great variation in wing size, from nearly complete to fairly small, but generally with distortion and weak sclerotization (see last paper by Yoshimoto). This suggests lack of use and selection for reduction in size.

In the trapping experiment, the fact that many of the trapped specimens would have been blown into the harbor had they not been trapped suggests that these species are subject to negative selection pressure for use of their wings. That certain abundant winged species were not taken in the trapping experiment seems significant. It suggests that these species may have developed the habit of dropping to the ground when there is an increase in wind speed above a certain rate, say of 15 or 20 knots. During the rare calm, sunny periods, a number of species were seen in flight in the Tucker-Beeman area, up-wind from the trap nets. These included some abundant species which were never caught in the traps. Among these were some of the pyralid moths, geometrid moths and the ichneumon wasp *Diadegma agens* (which appeared to be much more abundant than the smaller species *Campoplex disjunctus* which was taken principally in the trap nets). These species which were not trapped are weaker fliers than some of the types commonly caught in the nets,

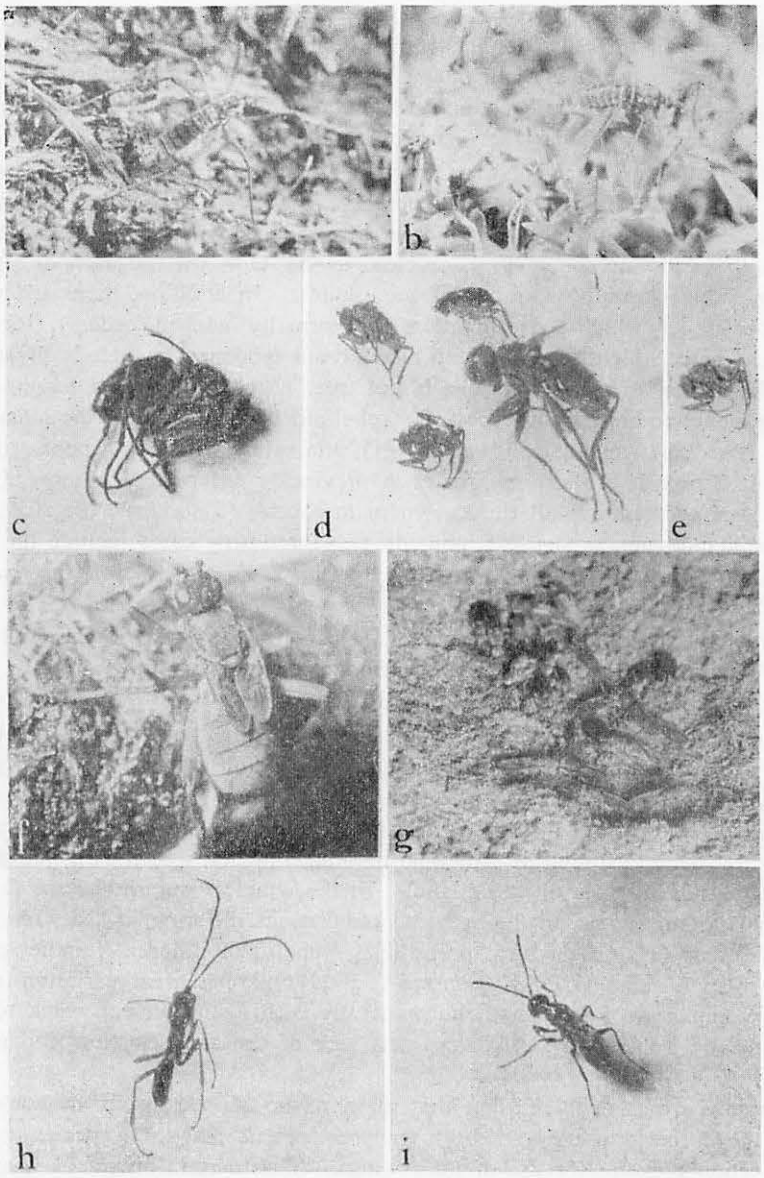

Fig. 22. a, wingless crane-fly, *Erioptera* (*Trimicra*) *brachyptera* Alexander, walking on debris near mollymawk nest, Courrejolles Peninsula, Campbell I.; b, same, on *Colobanthus*; c, probably *Schoenophilus* sp. (Dolichopodidae); d, 4 flightless flies: 2 *Schoenophilus* at left and below (*S. pedestris campbellensis* Harrison), *Acropsilus borboroides* Oldroyd above, *Coenosia filipennis* Lamb, from Beeman—Lyall area, below, XII.1961; e, *Schoenophilus pedestris campbellensis* Harr.; f, *Baeopterus robustus* Lamb ♀ on rotting kelp, shingle beach, Rocky Bay, 20. XII. 1961; g, winged coelopid flies, probably *Coelopa debilis* Lamb, on underside of rock, Rocky Bay, 20.XII.1961, showing failure to fly when disturbed; h, wingless wasp, *Gelis campbellensis* Townes, Beeman area, XII. 1961; i, brachypterous wasp, *Kleidotoma* (*Pentakleidota*) *subantarcticana* Yoshimoto, from Lookout Bay, under *Stilbocarpa polaris*; all Campbell I. (photos mostly by Rennell, partly by Gressitt).

like calliphorid flies, muscids and others, yet are stronger fliers than some which were taken abundantly in the nets, like the aphids, psychodids, sciarids and others. Perhaps some of these were selectively trapped at different wind-speeds, and more precise observations in this direction are needed. It was noticed that aphids and psychodids were abundant in the nets when wind was weaker, or variable, but scarcer when wind was uniformly strong. In some groups representation in the trap catches appeared to be roughly proportionate to local population levels as indicated by all types of collections. However, in other cases the reverse was true, with abundant species lacking as mentioned above, and others taken largely, or solely in the nets (*Apanteles*, *Campoplex*, etc.). Some species, including some of the delicate flies like cecidomyiids, were taken only in the Malaise trap, which was in a very protected spot.

The situation in the fly family Ephydridae is very interesting. Some of the species have reduced wings and have substituted hopping for flying. Some of them can make short flights with the aid of a jump. One of the species, *Hydrellia enderbii*, is among the most numerous species of insects on the island, yet it was never taken in the trap nets, and only 40 specimens were taken in the Malaise trap, as against 800 by other means of collecting. Most of the specimens were swept from tussock, sedge and *Bulbinella*, often near streams or elephant seal wallows. This appears to be a strong indication that these flies are rapidly dispensing with the habit of flying. The other species of ephydrids, including those incapable of sustained flight, were found largely in bird rookeries, around elephant seal wallows and in rotting kelp, all rather windy environments. Some of the moths with reduced wings, as noted by Sorensen (Salmon 1956) have also developed the habit of jumping, often resembling small grasshoppers by their activity. Also, they often sham death when disturbed, falling to the ground or within the tussock heads. This is interesting because of the apparent lack of predators (other than spiders which were not observed on the stems of tussock and sedge, or on the open rock where the various moths were observed). The only native truly insectivorous bird is the pipit, which is now rare.

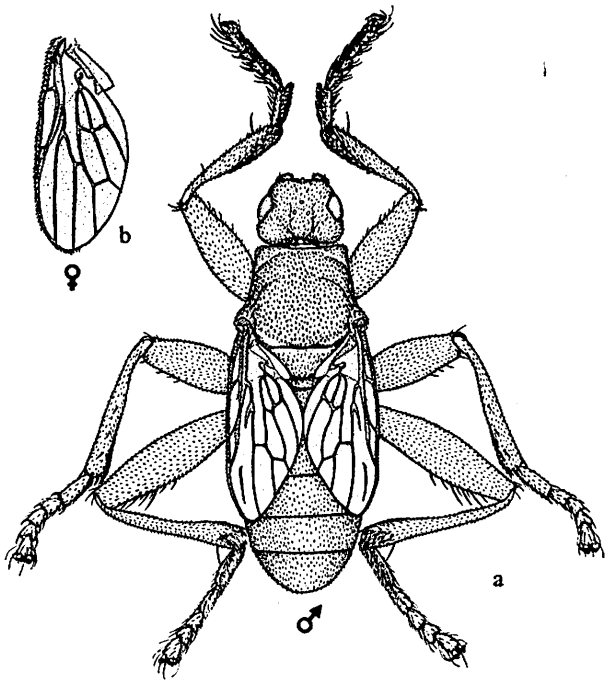

Fig. 23. Brachypterous coelopid fly, *Baeopterus robustus* Lamb ♂ (a) and wing of ♀ (b); Campbell I.

The adaptation of habits of the flightless species is very interesting. Besides the jumping flies and moths mentioned above, there are many which crawl rapidly downward into

vegetation or other surroundings when disturbed. The large flightless coelopid flies (figs. 22f, 23, 24) are difficult to catch since they go downward rapidly under the rotting kelp and beach rocks where they occur. The winged coelopid flies (fig. 22g) often avoid flying when disturbed, crawling downward like the wingless species or remaining on the kelp or rocks. The flightless muscid and the totally wingless dolichopodid (fig. 22d), which often occur on the flower heads of *Bulbinella*, run downward when disturbed, jumping into vegetation on the ground.

It is significant to compare wing reduction on Campbell with that on other small islands or extreme environments. The situation is analogus to those on Macquarie, the Aucklands, the southern Indian Ocean islands and other subantarctic islands. There are analogies in high alpine areas. Jeannel (1940) noted some comparisons between African mountains and the Kerguelen area. I noticed striking superficial analogies (not necessarily closely related forms) between Macquarie, Campbell and Aucklands on one hand with the summits of Mt. Wilhelm and Mt. Giluwe in eastern New Guinea on the other, though this may not have extended to wing reduction. Some analogies, as well as striking differences, were noted above between subantarctic and arctic areas. Again, the latter did not include striking wing reduction. Another analogy which might be significant is the appearance in temperate areas of early spring adults with reduced wings, whereas later appearing relatives are fully winged. Apterism is not highly developed on small tropical Pacific islands.

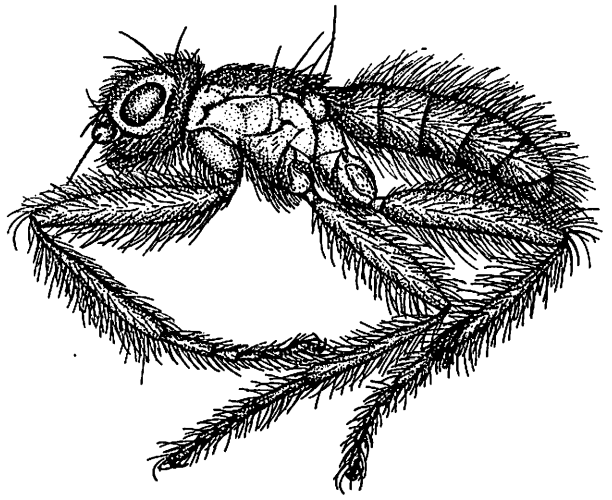

Fig. 24. Apterous coelopid fly, *Icaridion nasutum* Lamb, side view, Campbell I.

In regard to flies of the Kerguelen area, Seguy (1940) made morphological studies and noticed certain definite trends. These included larvae with thick skin, robust pharynx with rigid costae, long malphigian tubules, reduced gastric coeca, short hind intestine, abundant adipose tissue; tough puparia; and adults with heavily sclerotized mouthparts, atrophied notopleural callus, small thorax and reduced wing and leg muscles. In many of the Campbell species, however, the legs are greatly enlarged with wing reduction and the activity suggest saugmented leg muscles. Some, however, like the short-winged crane-fly (fig. 22a, b) move rather slowly.

CONCLUSIONS

Final conclusions on the origin and history of the Campbell I. fauna cannot safely be presented at this time. Seemingly many conflicting ideas have been manifested in this volume. There is much evidence for oversea dispersal to the island, and this correlates with the extensive evidence for fairly recent glaciation. Other geological indications sug-

gest that the island built itself up from a raised submarine plateau through volcanic action and does not necessarily represent a continental fragment left after drift or subsidence. Some of the apterous insects on the island are the only known wingless species in their respective groups. Some evidence suggests that evolution on such an island is very rapid, and that apterism may not be an indication of lengthy isolation. Among the evidence is frequent non-use of wings by winged species, the variation in wing size of some of the brachypterous species, and the general indications of great plasticity and intraspecific variation. The morphological variation appears to correlate with great ecological plasticity, perhaps both being influenced by scarcity of predators and competitors. Because of the great influence of the adverse climate, selection favoring loss of wings and the development of habits better attuned to the local environment is probably proceeding at a rapid rate. In some situations, wingless species (Diptera) appear to be less abundant than winged species. However, the former appear better adapted to the environment, are more cryptic in their appearance and habits and are less readily collected and less easily carried away by the elements.

Other evidence, such as the case of the two species of wingless stone-flies belonging to a genus represented only by wingless species and also occurring in the Aucklands and New Zealand, suggests greater antiquity. Undoubtedly there were at least closer stepping stones in the past, as the islands were once much larger. Also, some well-adapted species might have persisted through the glacial periods, as some free-living groups do now in Antarctica, possibly some of the latter actually having persisted through the periods of maximum glaciation.

It is quite clear that many of the groups now existing in Antarctica and the more southern islands are capable of air-borne dispersal. Representatives of many of them have been taken in trapping aboard ships in these general areas, primarily south of New Zealand and Tasmania, as far south as ocean extends in the Ross Sea, and off the coasts of the southern tip of South America. A few have been taken on the Antarctic continent. These include wingless forms such as spiders, mites and springtails, as well as winged insects. Trapping experiments on Campbell I. indicate that many individuals of the winged forms are blown off the island, whereas the wind has much less effect on the wingless kinds.

The subantarctic faunal make-up is different from that in the Arctic, where there are more Lepidoptera and Hymenoptera, and fewer Coleoptera.

The faunal contrast between Campbell I. and Macquarie I. is very great, both regarding faunal origin and extent of representation. This seems to correlate with submarine topography, the purely volcanic origin of Macquarie and its probable more complete glaciation. It is also slightly suggestive of the possibility that when continental blocks moved in these areas, Macquarie was more closely associated with Kerguelen and other southern Indian Ocean Islands and perhaps also with East Antarctica, while Campbell (and the Aucklands and New Zealand) was associated with West Antarctica and South America. However, as this would have been before the Cretaceous, it could not have had much effect on the present situation except as it related to the long-term isolation of New Zealand and the history of ancient groups.

When the fauna of the Auckland Is. (and New Zealand) is better known, and studied in conjunction with those of South Georgia, the Falklands and southern South America, much more light should be shed on the unsolved questions. By that time, more evidence

will be available on the geological history of the general area.

POSTSCRIPT

A few of the Campbell I. manuscripts were received too late for inclusion in systematic order in the body of this volume. These are included in the APPENDIX. In addition, four papers on Maquarie and/or Auckland Is. arthropods were received during the course of publication of this volume. They are included as a SUPPLEMENT, as some of them bear on zoogeographic matters discussed in the SUMMARY.

Additional acknowledgements: In addition to those acknowledged in the INTRODUCTION (pp. 5–6), I would like to thank P. J. Darlington, Jr., R. R. Forster, E. G. Munroe, L. W. Quate, K. A. J. Wise and E. C. Zimmerman, for kindly reading drafts of parts of the SUMMARY, and for offering suggestions. I also thank C. M. Yoshimoto and J. Yukawa for extensive help in the study of the net-trapped specimens.

ADDENDUM

When this volume was nearly through the press, an advance part of the collections made on Bird Island and the main island of South Georgia was received. These were collected between December 1962 and April 1964, by Harry Clagg.

A preliminary tally of this portion of the collection indicates the following numbers of species, which appear to represent an increase of more than 60 % over the previously recorded fauna of South Georgia:

Acarina	18	Thysanoptera	1	Lepidoptera	1
Araneae	4	Anoplura	2	Diptera	12
Collembola	14	Mallophaga	10	Siphonaptera	2
				Coleoptera	10
				Total	74

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Pacific Insects Monograph 7: 601–606 July 15, 1964

INSECTS OF CAMPBELL ISLAND. APPENDIX. CAMPBELLOBATES ACANTHUS N. GEN., N. SP. (Acari: Cryptostigmata)

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Abstract: A description is provided of *Campbellobates acanthus* n. gen., n. sp. from Campbell Island. The genus possesses an unusual combination of characters reminiscent in some respects of the Scheloribatidae, in others of the Ceratozetidae. A discussion of the possible affinities is given and it is concluded that the genus belongs in the superfamily Oribatuloidea; the familial status is uncertain.

This second paper in the series devoted to taxonomic descriptions of the Oribatei from Campbell Island contains an account of a new form present in collections from the Beeman Hill area. The collections examined in this study were made by Dr. J. L. Gressitt and I am indebted to him for the opportunity to examine them. Type material will be deposited in the Dominion Museum, with paratypes in Bishop Museum.

Genus **Campbellobates** Wallwork, n. gen.

This new genus bears certain superficial resemblances to members of the Scheloribatidae, but differs in so many fundamental respects from other genera within this family that it is proposed to leave open, for the present time, the question of its familial status. It is represented by 5 specimens, all evidently belonging to the same species, from the Beeman Hill locality. A tentative list of generic characters is given below.

Sexual dimorphism present; pseudostigma completely hidden beneath base of pteromorph; integument covering notogaster, venter and anal region with markedly porose microsculpture; 10 pairs of notogastral setae of which 2 pairs are inserted on the pteromorphs; no sub-lamellar ridge; tutorium present; 4 pairs of genital setae; aggenital setae lacking; 1 pair of anal setae; coxisternal and sternal ridges well developed; all tarsi monodactyle, tarsal chaetotaxy shows deficience.

A discussion of the possible affinities of the genus will be given after the description of the type species, *C. acanthus* n. sp.

Campbellobates acanthus Wallwork, n. sp. Figs. 1–5.

Material examined: 5 adults (3♀♀, 2♂♂), Beeman Hill, Campbell I., XI.1961, J. L. Gressitt.

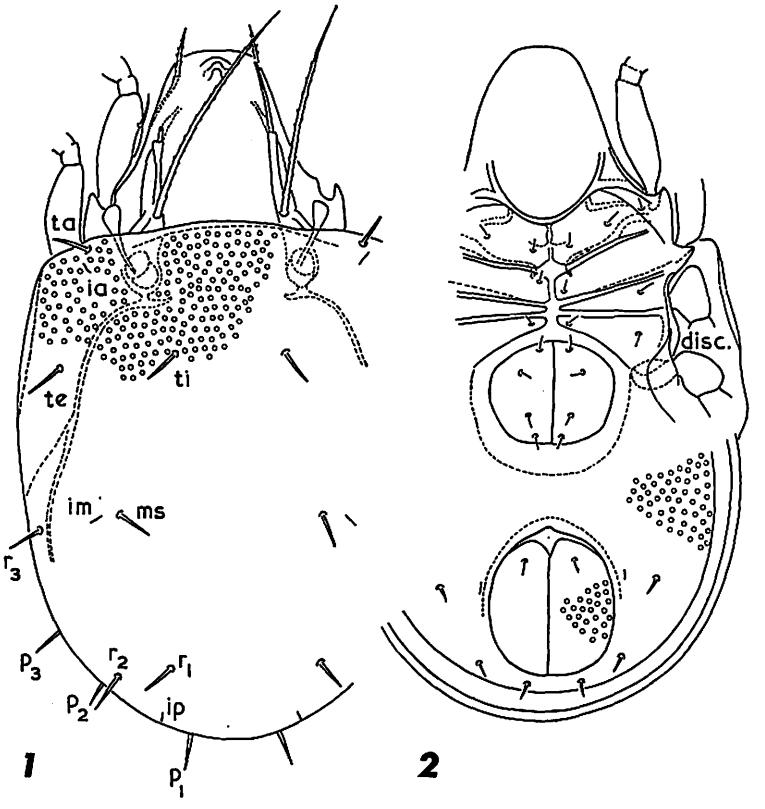
Measurements. ♂♂: Average length of body: 265.9μ (range: 263.2μ–268.6μ); average

width of body (measured at widest part): 160.2 μ (range: 152.4 μ–168.0 μ). ♀♀: Average length of body: 296.8 μ (range: 291.2 μ–308.0 μ); average width of body (measured at widest part): 180.8 μ (range: 173.0 μ–190.4 μ).

Sexual dimorphism is present; ♂♂ differ from ♀♀ in being smaller in body size, having longer and thicker notogastral setae, and in having a relatively smaller genital aperture. The following description applies to the ♀ unless stated otherwise.

Integument: Color of body and legs pale brown. No cerotegument. Notogaster, ventral and anal plates covered with a regular porose microsculpture consisting of ovoid areas, pale in color, 3–5 μ in diameter, arranged in a uniform pattern (fig. 1). This microsculpture is lacking on prodorsum, genital plates, coxisternal region, ventral surface of gnathosoma and legs; the integument is smooth in these regions.

Prodorsum: Rostrum broad, almost truncate in contour when viewed from dorsal aspect (fig. 1); mid-dorsally rostral tectum bears a shallow excavation into which projects a rounded chitinized lobe. Rostral setae inserted laterally on rostral tectum, each on a distinct apophysis which marks the anterior extremity of a lateral prodorsal ridge; setae shorter than their mutual distance and markedly barbed. Lamellae relatively short, extending



Figs. 1-2. *Campbellobates acanthus* n. gen., n. sp., ♀. 1, dorsal view; 2, ventral view. *ta, te, ti, ms,* r_{1-3}, p_{1-3}=notogastral setae; *ia, im, ip*=notogastral fissures; *disc.*=discidium.

from pseudostigma for about 1/2 the length of prodorsum; each ridge is broadly attached to prodorsum and extends above as a vertical blade; anterior extremity of each lamella is produced into a short heavy cusp carrying insertion of lamellar seta; in front of the cusp a short lamellar extension (prolamella ?) is directed antero-medially towards rostrum; this extension does not attain the insertion of rostral seta. Lamellar seta strongly thickened, baculiform, without barbs, curving ventrad following contour of rostral tectum; seta extends anteriorly as far as anterior margin of rostrum. Interlamellar setae inserted on or near posterior part of lamellae; these setae are much longer than the other prodorsal setae and are weakly barbed. Pseudostigma completely hidden beneath base of pteromorph on each side. Sensillus has a slender stalk and a flattened, expanded, glabrous head; most of sensillus hidden beneath base of pteromorph, with only distal part of head projecting.

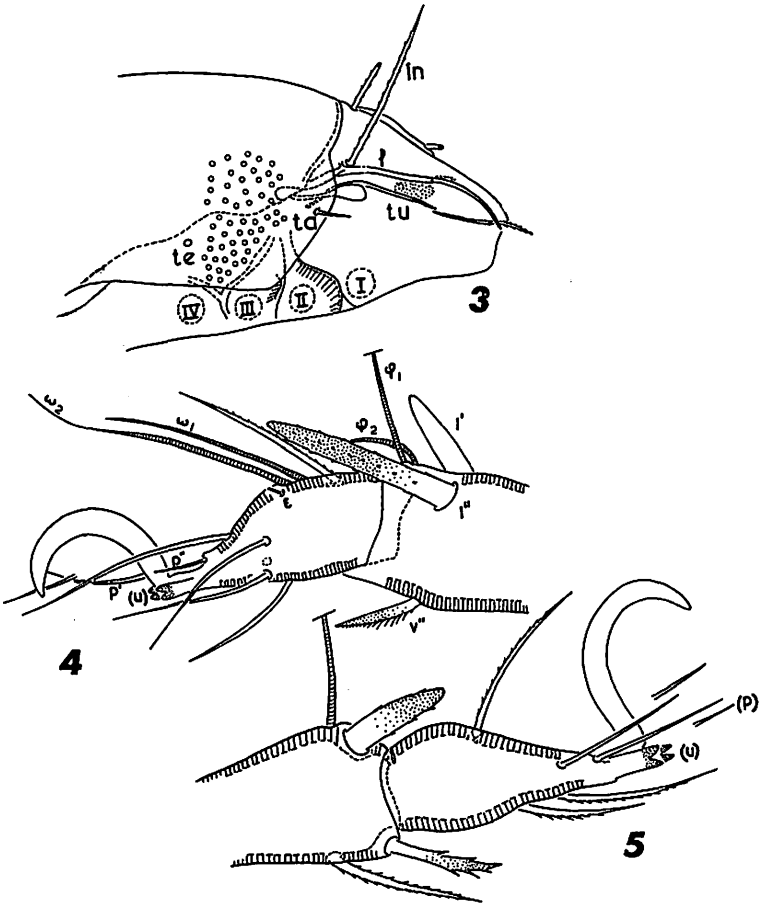
Notogaster: The characteristic ornamentation of this region has been described above. Anterior margin almost straight; pteromorph broadly triangular in lateral view (fig. 3), generally curving postero-ventrad more sharply than indicated in fig. 1. Dorsal shield broadly rounded posteriorly. Ten pairs of thickened, spine-like, weakly barbed, notogastral setae; setae moderately long (*ta*=20 μ in ♀♀) and straight; setae in ♂♂ more strongly developed than in ♀♀. Seta *ta* is inserted near anterior margin of pteromorph; seta *te* is also inserted on pteromorph; the remainder are inserted on the notogaster proper. Fissures *ia*, *im*, and *ip* were noted; *im* is particularly conspicuous. No sacculi or areae porosae were observed. Pteromorphs are without hinges.

Lateral region of podosoma: Details of this region are given in fig. 3. There is no typical sub-lamellar ridge; at level of insertion of interlamellar seta the lamellar ridge is produced into a latero-posterior flange, ornamented with striae, which is directed towards the exopseudostigmatic region; this development does not correspond in appearance to the sub-lamellar ridge found in, for example, the genus *Scheloribates*. A lateral prodorsal ridge, possibly corresponding to the tutorium, is present; this extends, with a slight interruption, from pseudostigma to rostrum where it carries the insertion of rostral seta at its apex. No discrete idiosomal areae porosae were observed, although an irregular area of porose or punctate microsculpture is present between tutorium and lamella. Exopseudostigmatic setae were not observed.

Ventral region: Anal aperture ovoid in shape; anal plates narrower anteriorly than posteriorly; each plate with only a single thickened seta inserted on anterior 1/2. Typically 3 pairs of adanal setae, similar in form to anals; ad_3 inserted lateral to anal field, ad_2 postero-lateral and ad_1 post-anal. Some variation in adanal chaetotaxy; seta ad_2 is lacking on one side in 1♀, seta ad_1 is lacking on one side in 1♂. Adanal fissure (*iad*) located lateral to anal field and aligned more or less parallel to long axis of body. There are no aggenital setae. Genital aperture relatively large, trapezoidal in shape, being broader anteriorly than posteriorly (♂♂ have a relatively smaller genital aperture than ♀♀). Each genital plate has 4 short, slender setae distributed as shown in fig. 2. The development of coxisternal ridges and apodemes is well marked on the ventral region of the podosoma; ridges I continuous with posterior border of camerostome and are U-shaped; apodemes I unite in mid-line in a short sternal apodeme; ridges II, sejugal and III are clearly defined, extending to mid-line where they join a conspicuous sternal ridge; apodemes lie just below the corresponding ridges and are denoted by broken lines in fig. 2. Posteriorly the sternal ridge gives rise to a pair of divergent ridges which run parallel to anterior and an-

tero-lateral rim of genital aperture and include the anterior part of the genital field; these ridges, which may represent coxisternal ridges IV extend laterally to the deeply-set insertion of leg IV; this insertion is large and extends medially to the genital field. Coxisternal setae fine and slender; 7 pairs were identified, corresponding to the formula: (3–1–1–2). Pedotecta I and II well developed; a rounded discidial ridge present, and also a weakly developed circum-pedal ridge.

Legs: Ventral crest lacking on femur I, but present on femora II, III and IV. A conspicuous feature of the legs is the strong development of several setae into thick spines which may be barbed or smooth; such setae are present on genual and tibial segments (figs. 4–5). Tarsal chaetotaxy, expressed by the formula (12–11–9–9) for legs I–IV, is unusual and may represent a deficient condition; iteral setae (*it*) lacking on all tarsi; seta *p''*



Figs. 3–5. *Campbellobates acanthus* n. gen., n. sp., ♀. 3, lateral region of podosoma; 4, tarsus and distal part of tibia of leg I, antiaxial; 5, tarsus and distal part of tibia of IV, antiaxial. *in*=interlamellar seta; *l*=lamella; *tu*=tutorium; *ta, te*=notogastral setae; I, II, III, IV, =insertions of legs. Notations of leg setae follow Grandjean's scheme.

is appreciably shorter than *p'* on tarsus I (fig. 4), but there is no size difference between these 2 setae on the other tarsi (fig. 5); setae (*u*) are dark-colored, thickened and terminally bifid on all tarsi (figs. 4–5). All tarsi furnished with a single strong claw.

Gnathosoma: The structure of this region is normal; the infracapitulum is diarthral; rutellum is pantelebasic.

This new genus shows an unusual combination of characters and it is difficult to ascertain its correct systematic position. In some respects it resembles members of the Scheloribatidae and its closest relationship probably lies with this family. Characters indicating this relationship include: (a) 4 pairs of genital setae, (b) ventrally-curving, unhinged pteromorphs, (c) 10 pairs of notogastral setae, (d) no genal incision on lateral border of camerostome, and (e) a well developed sternal ridge on ventral region of podosoma. The conspicuous porose integumental microsculpture on notogaster and venter is reminiscent of some members of the Scheloribatidae e. g. *Scheloribates ornatus* Bal. and Haplozetidae e. g. *Rostrozetes foveolatus* Selln.

In other respects however, this new genus does not conform with the general character of a scheloribatid mite. The rostral architecture, presence of tutorium and absence of sublamella, the apparent absence of areae porosae and sacculi and the position of adanal seta ad_3 lateral, instead of anterior or antero-lateral, to the anal field are all characters which are not usually associated with the Scheloribatidae. Other distinguishing features include the weak but distinct development of a discidial ridge, the completely covered pseudostigmata, relatively short lamellae, sexual dimorphism, absence of aggenital setae, a single anal seta on each plate, and the deficience shown in coxisternal and tarsal chaetotaxy. The configuration of coxisternal ridges is rather different from that usually found in the Scheloribatidae; typically in this family the ventro-sejugal ridge and ridge III are directed postero-medially and abut on the antero-lateral margin of the genital field.

The presence of a tutorium suggests a comparison with the Ceratozetidae; in this family the tutorium is frequently strongly developed with a free projecting cusp, a condition which is not shown by *Campbellobates*. The Ceratozetidae are further characterized by long lamellae, frequently with freely projecting cusps and a translamella, six pairs of genital setae, a strongly pointed discidium and a distinct genal incision on the lateral border of the camerostome; these characters are not present in *Campbellobates*. On the basis of these differences it is concluded that this new genus shows little relationship to the Ceratozetidae. Some members of the Haplozetidae possess 4 pairs of genital setae. This family is characterized by the possession of hinged pteromorphs and a very strongly developed discidium; *Campbellobates* is distinguished by a lack of these characters.

The above comparisons emphasize the unique combination of morphological characters shown by *Campbellobates*. The genus undoubtedly belongs in the superfamily Oribatuloidea and has more in common with the Scheloribatidae than with other families in this group. However in view of its unusual characters it is proposed to leave open the question of its exact familial status.

NOTE

The genus *Macquariella* Wallwork 1963

In a recent paper on the Oribatei of Macquarie Island (Wallwork 1963) I described as

new the genus *Macquariella* (family Metrioppiidae). This genus name is pre-occupied by *Macquariella* Finlay 1927 and must be rejected as a junior homonym. It is proposed that *Macquariella* Wallwork 1963 be replaced by the name **Macquarioppia** nom. nov. I am indebted to Dr. C. A. Fleming of the New Zealand Geological Survey for bringing the original reference to my attention.

REFERENCE

Wallwork, J. A. 1963. The Oribatei (Acari) of Macquarie Island. Pacific Ins. **5** (4): 721–69.

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INSECTS OF CAMPBELL ISLAND. APPENDIX. LEPIDOPTERA: GEOMETRIDAE

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Abstract: Six species of Geometridae, all in the subfamily Larentiinae, occur on Campbell I. *Xanthorrhoe campbellensis* n. sp. (*X. oxyptera* part) and *Chloroclystis impudicis* n. sp. are endemic and may represent the survivors of the earliest invasion of this island by moths. *Xanthorrhoe orophylloides* Hudson (=*X. subantarctica* Salmon) is common to Campbell and Auckland Is. *Hydriomena similata* Walker, *Epiphryne charidema* Meyrick and *Chloroclystis* sp. near *suffusa* Hudson are present also on Auckland Is. and in the South and North Islands. Genitalia are figured and described. Where possible larvae have been assigned to species, and a key to larvae is given. *Epiphryne* Meyrick (1884) is resurrected for *charidema* and allies, the palaearctic *Venusia* Curtiss being unsuitable.

This paper deals with some 200 adult and larval Geometridae collected during the 1961–63 Bishop Museum collecting program on Campbell I. Material from the Cape Expedition (Salmon 1956) and from the 1907 expedition (Hudson & Meyrick 1909) was also examined. This review is hampered in that the mainland fauna is still imperfectly known, but it has been possible to make some generalizations. No serious attempt has been made to revise the larentiine Geometridae, with 202 described species, since Meyrick (1917) laid down his classification. Prout (1927) modified slight points, but nothing else has been done apart from unpublished reshufflings in the British Museum collections (D. S. Fletcher, pers. comm.) and additions of new species. For the purposes of this paper, no changes are made in the use of the Palaearctic genera *Hydriomena* Hübner, *Chloroclystis* Hüb., and *Xanthorrhoe* Hüb., although *Epiphryne* Meyrick is resurrected to replace the unsuitable *Venusia* Curtiss, for the New Zealand species. Fletcher (pers. comm.) has expressed doubts about the generic placing of *H. similata*, but the study is incomplete.

The Campbell I. geometrid fauna comprises the following six species, with their broad distributions given in parentheses: *Hydriomena similata* Walker (Campbell, Auckland, Stewart, South, North Is.); *Epiphryne charidema* Meyrick (Campbell, Auckland, South Is.); *Xanthorrhoe orophylloides* Hudson (Campbell, Auckland Is.); *Xanthorrhoe campbellensis* n. sp. (Campbell I.); *Chloroclystis impudicis* n. sp. (Campbell I.); *C.* sp. nr. *suffusa* Hudson (Campbell, Auckland, South, North Is.)

The fauna is curiously incomplete. The only species with possible close connections with the very distinctive alpine fauna of the main islands could as easily have been derived from a lowland species. Otherwise there are no alpine representatives, although the flora and climate on Campbell suggest that conditions for such species exist. The Oenochromatinae and Ennominae are absent, although *Gargaphia* (Ennominae) is present on Auckland.

Also, in the North and South Islands, such shrub genera as *Dracophyllum*, *Coprosma*, and *Hebe* (all present on Campbell) support very characteristic groups of geometrids: on *Dracophyllum longifolium* and its allies are found *Declana glacialis* Hudson, *Xanthorrhoe dissimilis* Philpott, and *Epiphryne charidema* (only the last species is found on Campbell); on *Coprosma* spp. are found four species of *Eucymatoge*, *Xanthorrhoe cedrinodes* Meyrick, *Chloroclystis sandycias* Meyrick, *Hydriomena callichlora* (Butler) and *H. similata* (again, only the last is on Campbell); *Hebe* species support a large group of *Chloroclystis* species (the ♂♂ possess long-fasciculate antennal segments), and *Epirrhanthis veronicae* Prout (none are present on Campbell, but one species is present on Auckland Is.).

Campbell and Auckland Is. have similar faunae, but that of Auckland Is. is slightly larger. Species or species groups common to both are: *Hydriomena similata*, *Epiphryne charidema*, the *Chloroclystis* sp. near *suffusa* group, *Xanthorrhoe orophylloides*, and the *Xanthorrhoe oxyptera-campbellensis* group. As a general rule, Campbell I. specimens are smaller and duller than Auckland I. ones.

It has not been possible in the short time available to elucidate fully the status of the subantarctic *Chloroclystis* species. On Campbell I. there are two closely related species (impossible to distinguish with complete accuracy on superficial characters) with apparently overlapping flight seasons but with obvious genitalic differences. Both are clearly related to one Auckland Is. species which is doubtfully distinct from a mainland species. On Campbell the typical form (sp. near *suffusa* Hudson) differs from the Auckland Is. population only in the slight reduction of the comb at the apex of the ductus bursae. The other type, described as *impudicis* n. sp., is endemic and shows great reduction of the comb, loss of the spinose signum bands, and, in the ♂, a reduction in the length of the 8th abdominal segment and obsolescence of the octavals. The ♂♂ of this species are characterized by the presence of straw-colored corematal scales projecting beyond the apex of segment 8. This character is unique, so far as is known. All other *Chloroclystis* spp. examined have the ♂ genitalia completely enclosed by the elongate segment 8. All three populations (*impudicis*, Campbell I. and Auckland I. sp. near *suffusa*) have the labial palpi over 1.9× as long as the compound eye, and the ♂♂ have the antennal segments evenly ciliate in a broad ventro-lateral band, as in the mainland specimens of sp. near *suffusa*. No specimens resemble the type of *C. semialbata* Walker, in which the octavals are double-apexed, and the valvae have a hairy lobe near the base, on the unsclerotised valvula. These characters are also absent in other *Chloroclystis* species examined, but are present in *Phrissogonus testulatus* auctt.

Xanthorrhoe orophylloides occurs on both Auckland and Campbell Islands. There are no distinct characters separating the two populations and Salmon's *subantarctica*, based on the Campbell population, is here synonymised. It is therefore surprising that I am forced to split *X. oxyptera*; there is a distinct morphological difference between the two populations in the valva structure of the ♂. (In both *orophylloides* and the *oxyptera* group, ♀♀ were available from Campbell only.) *X. oxyptera* and *X. campbellensis* are the only known brachypterous New Zealand subantarctic Geometridae. Salmon (1956) points out that brachyptery may not of itself be solely accounted for by the environment of the subantarctic islands, and "that there must have been firstly in these moths a genetic tendency towards brachyptery." The closest relatives (on genitalic structures) to the *oxyptera* group are those species with more or less narrowed wings: *X. helias* Meyrick, *X. exoriens* Prout, *X. nephelias*

Meyrick, *X. sericodes* Meyrick, and *X. imperfecta* Philpott. These in turn are closely related to *X. aegrota* Butler. The closest relatives of *X. orophylloides* are *X. orophylla* Meyrick, *X. rosearia* Doubleday and *X. semifissata* Walker, all of which, like *X. orophylloides*, have broadly triangular wings.

It would be useful to find out what differences in ecology there are between *X. campbellensis* and *X. oxyptera*, and between *Chloroclystis* sp. near *suffusa* and *C. impudicis*. If it is considered that *impudicis* has been derived from near-*suffusa*, it can be concluded that Campbell I. has been invaded twice (at least by *Chloroclystis*), and that the first invasion took place sufficiently long ago for specific integrity to have arisen (in *impudicis*), and to have been maintained during and after a later invasion from the same source.

Table 1 lists the numbers of genera and species of Geometridae recorded from Campbell, Auckland, and Stewart Islands. As well as having a small geometrid fauna, Campbell also has a very small flora – 10 shrub spp., 44 dicotyledonous herb spp., 19 ferns (Allan, 1961). It is debatable whether many geometrid species never reached Campbell I. but could have survived if they had, or whether they did reach it but were wiped out by some climatic factor. If wind still plays a part in bringing moths to the island, then the Bishop Museum collection, gathered as it was over three years, would have provided some evidence. As it is, the larval collections neatly balance the adult collections; there appear to be no strays in the Geometridae.

Table 1. Number of genera and species of Geometridae on subantarctic and Stewart Islands.

	Campbell I.	Auckland Is.*	Stewart I.*
Genera	4	5	21
Species	6 (2 endemic)	8 (2 endemic)	40 (2 endemic)

(* records from Hudson, 1909, 1928, 1939; Meyrick, 1909; Salmon, 1956; Forest Research Institute collections.)

Although the collection amassed by the Bishop Museum has brought to light only one previously unknown species, it constitutes, in conjunction with the Cape collection, a worthwhile sample of the fauna. Unfortunately Bishop Museum specimens are in a poor state of preservation and can best be used for genitalic studies. It is to be hoped that in later expeditions to such places there will be some improvement in the handling of Lepidoptera. The 28 tubes of larvae comprise a valuable, and apparently comprehensive series. In future expeditions, there should be facilities for rearing a percentage of the larvae found. This is particularly useful in cases where (as on Campbell) sibling species occur. In this paper, only the larvae that can with confidence, based on experience with mainland populations, be assigned to species are described. The rest are listed in a key, with suggestions for assigning them to genera.

Terms used in descriptions of genitalia are those advocated by Klots (In Tuxen 1956). Chaetotaxy and abbreviations for larval structures are as in Dugdale (1961). Authorities for plant genera and species are from Allan (1961). Abbreviations in the text are: BISHOP–Bernice P. Bishop Museum, Honolulu; BMNH–British Museum (Natural History), London; WDM–Dominion Museum, Wellington; RoFo: Forest Research Institute, Rotorua.

Hydriomena similata (Walker) Figs. 1–8.

Cidaria similata Walker 1862, Cat. of Lepidopt. in the British Mus. (N. H.) **25**: 1413.
Cidaria timarata Felder, 1864, Reise der Frigatte Novara, plate 132, fig. 19. Holotype ♂ in British Museum (Natural History).

♂ *genitalia* (figs. 1–6): Uncus uniformly slender, curved, longer than juxta. Socii absent, subscaphium lightly sclerotised, forked, apically weakly to obsoletely scobinated, scobinations in transverse rows. A simple transverse bar below subscaphium extends across diaphragma joining margins of tegumen. Fultura superior developed as a pair of long-haired cones, set wide apart. Juxta shaped as figured, covered with long, capitate scales. Valva with valvula covered in similar scales, and an admixture of short curved setae. Costa of valva strong, ending in a sickle-shaped spur at base of which is a shorter, blunt spur of variable length. Sclerotisation of valva indicated by stippling in the figure.

Aedeagus almost as long as costa, rather smaller in some southern specimens, with 12–15 short stout cornuti and a row of 9–12 smaller cornuti. Manica heavily scobinate, scobinations largest dorsally and again laterally.

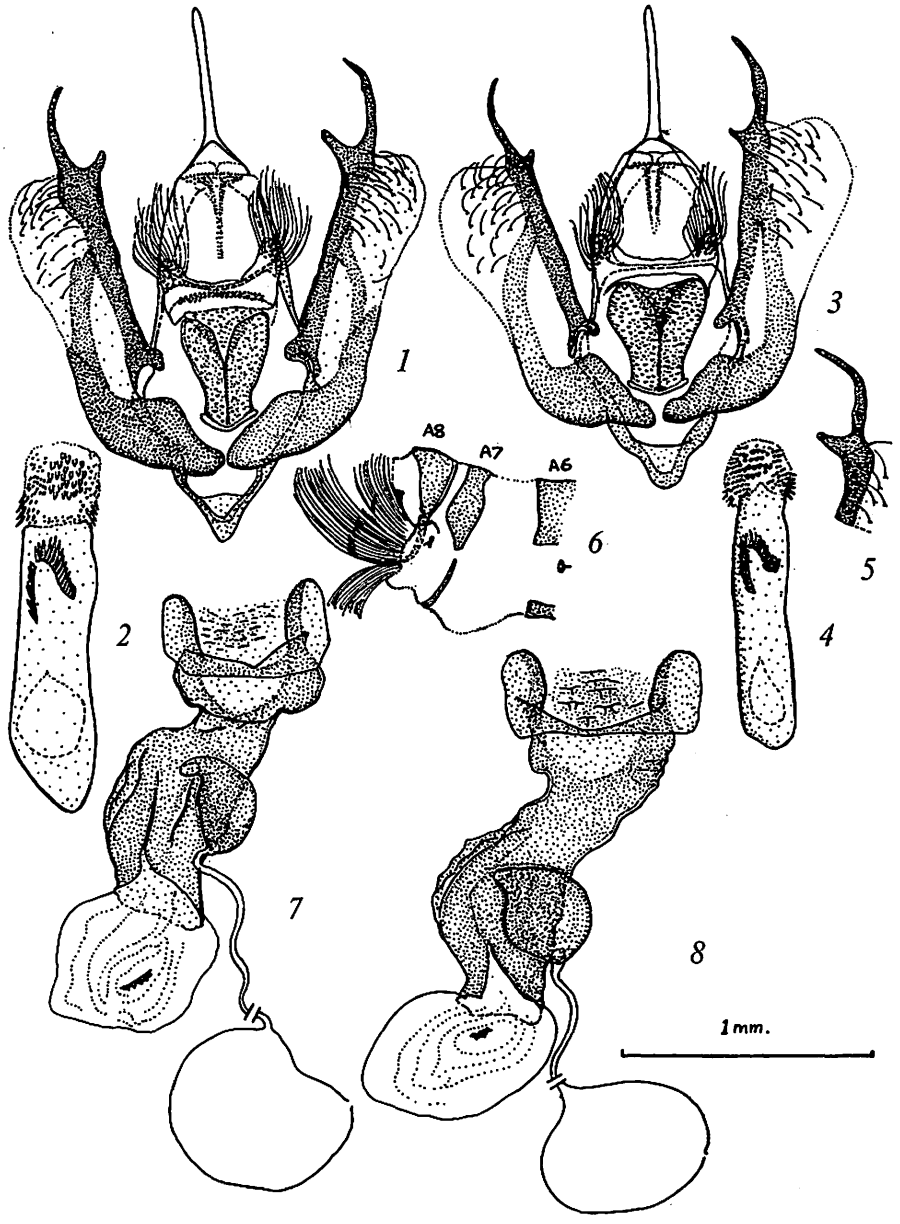
The A7 sternite and tergite are separate; posterior to sclerites, and laterally, an eversible lobe bearing 3 hairpencils and spiracle. The 2 more dorsal hairpencils with long and short ascending 'hairs'; ventral pencil with short decurved 'hairs.' A8 tergite not over 2 × length of A7 tergite dorsally; both withdrawn into A6, with tip of A8 showing, at rest.

♀ *genitalia* (figs. 7–8): Ovipositor lobes short, merging into intersegmental membrane antero-laterally and ventrally. Lamellae surrounding ostiole as figured. Some variation in width of lamella anterovaginalis, and variation in rugosity of the scarcely sclerotised rudimentary lamella postvaginalis. Ductus bursae broad, heavily sclerotised; basal portion of ductus seminalis flask shaped, arising at 1/2 length of ductus bursae, heavily sclerotised; rest of ductus seminalis unsclerotised, expanding at length into a very large seminal vesicle. Corpus bursae oval, set at right angles to ductus bursae, with signum present as a few moderate to obsolete scobinations.

Larva: Instars IV–V with all D, SD and L setae tuberculate; crochets of prolegs in unbroken, irregularly biordinal mesoseries, shortest in center; a dorsal prominence, increasing in size per segment posteriorly on abdominal segments 1–5, arising between setae D_2. These prominences are white/grey anteriorly. Each ocellus margined with a heavily sclerotised ring. All instars with seta SV_2 on A_1, SD_2 seemingly absent on A1–8, and all instars with a ventro-apical protruberance on anal shield. Anal shield with 4 marginal pairs of setae; D_1 posterior to SD_1. Ventroapical protruberance on anal shield serves to distinguish all instars of this species from larvae of other Geometridae on the island.

MATERIAL EXAMINED. (a) Adults: CAMPBELL I. 4♀♀, 2♂♂, Beeman Cove, 10 m, 4. V.1962, C. M. Clark; 1♀, *ibid.*, 6.X.1962, Clark (WDM); 1♀, Tucker Cove, malaise trap, 5–8. XII. 1961, J. L. Gressitt; 1♀, Beeman Camp, 2–50 m, 6–11. XII. 1961, K. P. Rennell; 1♀, *ibid.*, 2. VIII. 1962, Rennell; 1♂, 1♀, *ibid.*, 2. V. 1962, Rennell; 1♂, *ibid.*, 20. V. 1962; 1♂, *ibid.*, 29. X. 1962; 1♂, *ibid.*, 6. IV. 1962, Rennell; 1♀, *ibid.*, 4. II. 1963, Rennell; 1♂, Mowbray Hill, 2. III. 1963, K. A. J. Wise (BISHOP).

(b) Larvae: 1 instar III, Tucker Cove, 1–50 m, 26–30. XI. 1961, ex *Coprosma*, Gressitt; 1 instar III, Tucker Cove, 1.XII.? 1961, ex *Juncus* Gressitt; 1 instar I, Beeman Hill, 180 m, 2–6.XII.1961, ex *Coprosma*, Gressitt; 1 instar I, Beeman, 15.VIII.1962, ex *Coprosma*, Rennell;



Figs. 1–8. *Hydriomena similata.* 1, ♂ genitalia, ventral view (North Island); 2, aedeagus, ventral view; 3, ♂ genitalia, ventral view, Campbell I. (Beeman Camp, 2. V. 1962, Rennell); 4, aedeagus, ventral view; 5, apex of valva costa, Campbell I. (Moubray Hill, 2.III.1963, Wise); 6, ♂ abd. segs. 7 & 8, and scale tufts (diagrammatic); 7, ♀ bursa copulatrix (North Island); 8, *ibid.*, Campbell I. (Beeman Camp, 4. II. 1963, Rennell).

1 instar III, 1 instar IV, St. Col+Beeman, 7. XII. 1961, ex *Coprosma* (Photo No. 1), Rennell; 1 instar IV, Beeman Hill, 2. II. 1963, K. A. J. Wise (BISHOP); 2 instar V, 2 instar IV, 1 instar II, Tucker Cove, 13. VIII. 1962, ex *Dracophyllum*, Clark (WDM).

Host plants: *Coprosma robusta* Raoul; *C. propinqua* A. Cunn.; *C. areolata* Cheeseman; *C. rigida* Cheeseman; *C. pseudocuneata* Oliver; *C. cunninghamii* Hook. f.; *C. rotundifolia* A. Cunn.; *C. ciliata* Hook. f.; *C. rhamnoides* A. Cunn.; *C. parviflora* Hook. f.; *C. linariifolia* Hook. f. (mainland areas) (RoFo records).

DISTRIBUTION.: Campbell I.; Auckland Is.; Stewart I.; sea level to scrub line, South and North Is.

First recorded from Campbell I. by Hudson (1909) as specimens of a moth near to *H. similata* but too worn to be described; Salmon (1956) could not differentiate Sorensen's Campbell specimens from mainland specimens. On genitalia and larvae no consistent differences were seen except that the aedeagus is smaller and the juxta is broader in Campbell I. specimens. Hudson's figure (1928, plate II, f. 2) of the larva, and his description and figure (1928, p. 99, pl. XII, f. 46) of the adult are adequate for color and shape.

Fletcher (pers. comm.) notes that while *H. similata* is at present placed in *Euphyia* in the British Museum collection, he considers it closer to a South African genus which also has Oriental members. As the issue is in doubt, it is best to leave *similata* in *Hydriomena* for the present until further work is done on the revision of geometrid genera. *H. similata* is restricted to *Coprosma* spp., but will 'stray' on to other vegetation in the vicinity of the host plant. The adult is nocturnal.

Genus **Epiphryne** Meyrick 1884

Epiphryne Meyrick, 1884, Trans. & Proc. N. Z. Inst. **16**: 60.
Hermione Meyr., 1884 *Ibid.* **16**: 61 (praeocc.). Type: *xanthaspis* Meyrick.
Panopaea Meyr., 1884 *Ibid.* **16**: 62 (praeocc.). Type: *verriculata* Felder.
Aulopola Meyr., 1886, *Ibid.* **18**: 184 (replacing *Hermione*).
Pancyma Meyr., 1886, *Ibid.* **18**: 184 (replacing *Panopaea*).
Venusia nec Curtiss, 1839: British Entomology, p. 759.—Meyrick, 1917, *Ibid.* **49**: 257. Type (Curtiss): *cambrica* Curtiss.

Typus generis: *Epiphryne undosata* Felder.

This generic name is resurrected because the ♂ and ♀ genitalia do not agree with those of *Venusia cambrica* as illustrated by Pierce (1914). Fletcher (pers. comm.) includes *charidema* Meyrick in *Aulopola* but an examination of *xanthaspis*, *verriculata*, *charidema*, and *undosata* genitalia showed that the features listed below were held in common. *Orthoclydon praefactata* (Walker) and *O. chlorias* Meyrick were also examined; these species differ from the *Epiphryne* group in the modification of the cristae (*sensu* Pierce, 1914) as a diffuse hairy pad, rather than the characteristic bulbous crista base with long, sigmoid, posteriorly projecting setae of *Epiphryne*.

♂. Uncus elongate, apex strongly forked; saccus rounded, large. Labides, slender irregular laths with a complex, often palmate apex; furca elongate, cristae prominent each with 1–3 or many posteriorly directed appressed setae; manica spinose. Valvae elongate, costa wavy or straight; sacculus short, with a fringe of strong setae. Aedeagus variable but with a sharp apex.

♀. Ostiolar lamellae fused, forming a wide deep pit; ductus bursae very short, corpus bursae elongate, globose, unornamented.

Differs from *Venusia* Curtiss in its possession of a strong uncus, different type of labides, possession of cristae, very short sacculus, unornamented corpus bursae. The genus comprises *E. undosata*, *E. verriculata*, *E. xanthaspis*, *E. autocharis* Meyrick, and *E. charidema*.

2. **Epiphryne charidema** (Meyrick), n. comb. Figs. 9–12, 14.

Venusia charidema Meyr., 1909, Subantarctic Islands of N. Z. 1: 70. Holotype ♂ in coll. British Museum (Nat. Hist.), London.

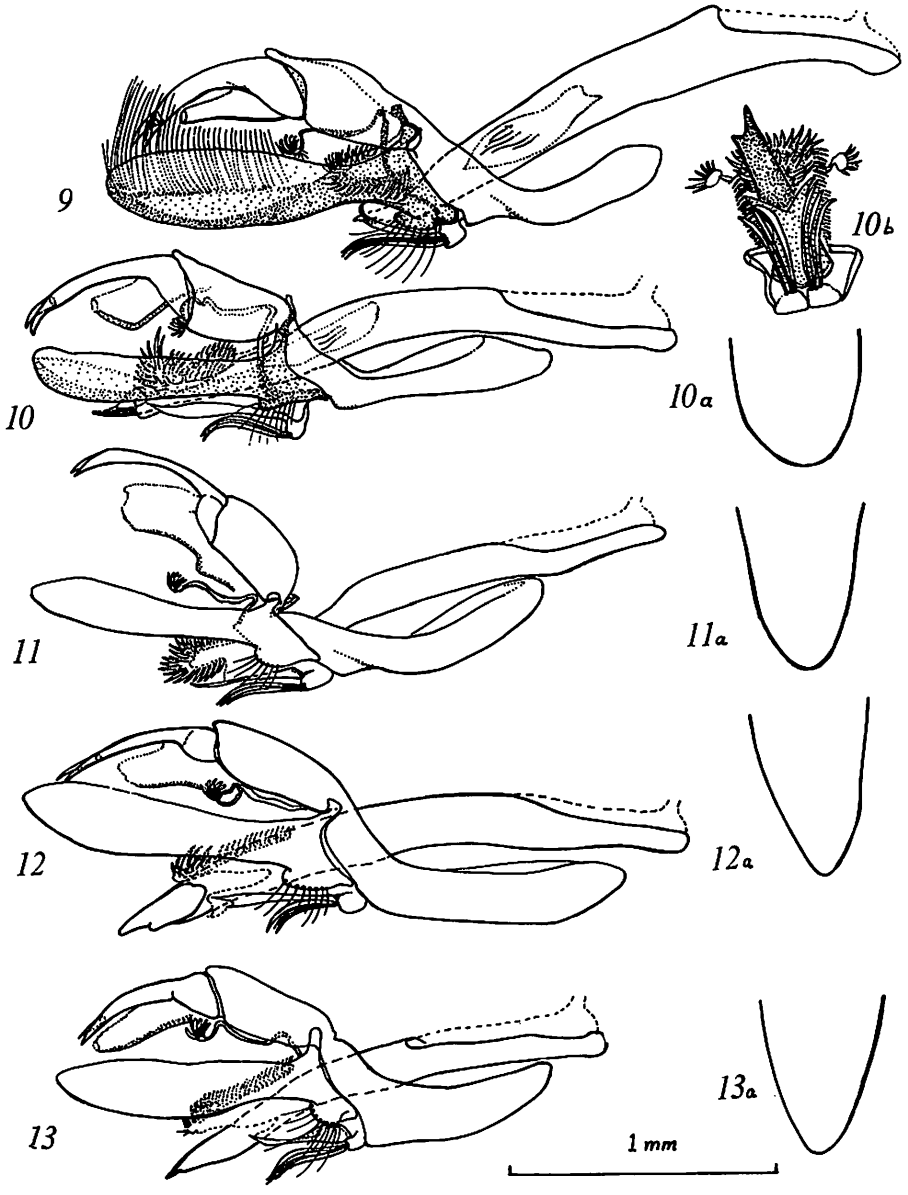
♂ *genitalia* (fig. 9, 9a): Uncus forked at apex, forks 1/4 length of rest of uncus; saccus basal length greater than entire uncus length; saccus apex broadly rounded. Tegumen joined just above costal articulation by a narrow bar. Subscaphium diffuse, weakly sclerotised. Valva elongate oval; costa wide, to apex. Setae on inner face of valva longest subapically. Base of sacculus swollen, fringed with a single marginal series of long curved strong setae.

Annellar structures complex and prominent. Annellus a narrow circlet, with labides present as palmate structures on a pair of irregular stalks. Juxta as figured (fig. 9a) with prominent cristae beyond base, each bearing 3 curved, appressed, flattened setae as long as juxta. Manica thorny, longest thorns apically; basally the thorns are slender, short, densely packed. Aedeagus with a plate-like cornutus (possibly representing several fused cornuti). Apex acuminate. Length slightly longer than length of genitalia (from valva tip to saccus tip).

♀ *genitalia* (fig. 14): Ovipositor not greatly protrusible; ovipositor lobes shortly setose, inner margin emarginate. Ostiole encircled; chamber formed by antero- and postero-vaginal lamellae deeper than ductus bursae is long; tapering. Postero-vaginal lamella with an apical elongation on midline, margin irregular. Ductus bursae heavily sclerotised, 1/4 length of corpus bursae. Ductus seminalis arising at junction of ductus bursae and corpus bursae, ventrally, unsclerotised. Corpus bursae unsclerotised, ovoid.

Larva: Head capsule in instars I–IV with a darkened area ± strongly developed on apex of each parietal lobe; instar V usually with this dark zone absent. Eyes unmargined by sclerotisation in all instars. SV_2 absent on A_1; SD_2 antero-ventrad of SD_1 pinaculum on A_1, directly ventrad of SD_2 on A_{2-8}. All D, SD and L pinaculae oval. Anal shield rounded, wider than long; seta D_1 well posterad of SD_1. All spiracles slightly raised, with a narrow sclerotised margin. Setae long, strong; dorsal setae black; ventral setae paler. Foreleg claws shielded by a chordate scale longer than claw. Proleg crotchets arranged in a mesoseries, on A6 with central 1/3 consisting of alternate hooks and stumps, on A10 with central 1/3 consisting of stumps only. Body smooth. Color pattern: Prothoracic shield darkened; body dark ?green with dorsal midline pallid, and a pallid stripe along line of D setae; another, wider pallid band between setae L_{1-2} and L_{3-4}, below the spiracle; subventral and ventral regions not as dark as dorsal dark areas. Body shape: cylindrical, becoming flattened posteriorly.

MATERIAL EXAMINED. (a) *Adults*: 2♂♂, Campbell I., late autumn 1960 (no name); 1♂, Campbell I., 23. II. 1957, R. M. Smith; 1♂, Beeman Cove, 2. X. 1962, Clark; 1♂, *Ibid.* 4. V. 1962, Clark; 1♂, Garden Cove, 6.IX.1962, Clark (WDM); 1♀, Beeman Camp, 18–21.



Figs. 9-13. 9, *Epiphryne charidema*, ♂ genitalia, lateral view (Campbell I.); 10, *ibid.*, Hollyford Valley; 10a, *ibid.*, saccus apex shape, ventral view; 10b, annellar structures, manica and aedeagus tip; 11, ♂ genitalia, lateral view, Hopkins Valley; 11a, *ibid.*, saccus apex; 12, ♂ genitalia, lateral view, Cobb Valley; 12a, *ibid.*, saccus apex; 13, *E. autocharis*, ♂ genitalia, lateral view, Mt. Ruapehu (North Island); 13a, *ibid.*, saccus apex.

XII. 1961, Gressitt; 2♂♂, *Ibid.*, 13. II. 1963, Wise; 1♀, *Ibid.*, 12. III. 1962, Rennell; 1♂, *Ibid.*, 4.II.1963, Rennell; 2♀♀, *Ibid.*, 2–3.VIII.1962, Rennell; 1♂, *Ibid.*, 13. VIII. 1962, Rennell; 2♂♂, *Ibid.*, 2. V. 1962, Rennell; 1♂, *Ibid.*, 2.VIII.1962, Rennell; 1♂, 2♀♀, *Ibid.*, 6. IV.1962, Rennell; 1♂, *Ibid.*, 11.II.1963, Wise; 1♀, Mt. Honey-Puiseux Saddle, 12. XII. 1961, Gressitt; 1♂, 1♀, Tucker Cove (malaise trap), 1–3. XII. 1961, Gressitt; 1♂, *Ibid.*, 18–21. VII. 1961, Gressitt (BISHOP).

(b) *Larvae*: 1 instar I, Beeman, 3.VIII.1962, ex *Coprosma*, Rennell; 1 pupa, 1 instar V, *Ibid.*, ex *Dracophyllum*; 1 instar III, 2 instar IV, 3 instar V, Beeman Point, 25. XII. 1963, ex *Dracophyllum scoparium*, Wise; 1 instar IV, Tucker Cove, 22.XI. 1961, ex *Dracophyllum*, Gressitt; 1 instar V, Beeman Hill, 11. II. 1963, Wise; 1 instar V, 1 instar IV, 2 instar II, Lookout Bay by beach, 3.XII.1961, ex *Dracophyllum*, Gressitt; 1 instar V, Beeman Hill, 21–25. XI. 1961, Gressitt; 2 instar III, 1 instar V, Beeman Hill, 2. II. 1963, Wise; 2 instar V, Beeman Hill, 6.XII.1961, ex *Dracophyllum*, Gressitt (BISHOP); 1 instar V, 1 instar IV, Tucker Cove, 13. VIII. 1962, ex *Dracophyllum*, Clark (WDM).

HOST PLANTS: *Dracophyllum longifolium* (J. R. et G. Forst.); *D. scoparium* Hook. f.

DISTRIBUTION: Campbell I.; Auckland Is.; South Island.

In mainland populations, the parietal lobes are not darkened, and the foreleg claws are not overshadowed by the apical 'scale', which is ovate rather than chordate, and not longer than the claw.

Genitalia of ♂♂ from Upper Hollyford, Hopkins Valley, Cobb Valley (South I.) and of *autocharis* from Mt. Ruapehu (North I.) were also examined (figs. 10–13) and in comparison with Campbell and Auckland Is. material the following differences were noted:

Table 2. Comparison of structures in *E. charidema—E. autocharis* group (♂ genitalia only).

	Ratio uncus length: saccus base length	Saccus apex shape	Aedeagus length	Valva shape
Campbell I.	1 : 1.1	broadly rounded	slightly longer than valva+saccus	elongate oval, neck pronounced
Auckland I.	1 : 1.1	ditto	ditto	ditto
Hollyford	1 : 1.3	ditto	ditto	± strap-like, no neck
Hopkins Valley	1 : 1.4	intermediate	shorter	± strap-like, no neck
Cobb Valley	1 : 1.5	sub-acute, narrowly rounded	equal	narrow elongate oval, slight neck
Ruapehu (*E. autocharis*)	1 : 1.3	sub-acute, narrowly rounded	subequal	ditto

In many respects the North I. population (*E. autocharis*) more closely resembles the Campbell and Auckland I. populations than these populations resemble South I. forms. This study indicates that there is close affinity among all populations, and, compared with the

differences between this species and others in the genus, the differences in the table are slight. I do not regard the evidence conclusive, however, since no ♀♀ were available. *E. charidema* is here regarded as including all South I. populations. As there is not enough material to determine the status of *E. autocharis*, this species is not synonymised here.

3. **Xanthorrhoe campbellensis** Dugdale, n. sp. Figs. 15, 19.

Xanthorrhoe oxyptera (*nec* Hudson) Salmon, 1956, Rec. Dom. Mus. (Wgton.) 3 (1): 63.

Holotype ♂, allotype ♀ in type collection, Entomology Division, D.S.I.R., Nelson; paratype ♂, ♀ in colln. Dominion Museum, Wellington.

♂ *genitalia* (fig. 15): Uncus elongate, apex blunt, gnathos obsolete. Valva complex, with opposed costal and saccular processes. Costal process a rounded, massive projection, minutely scobinate outwardly and apically. Saccular process a bent arm with an obscurely pronged apex; saccular arm projecting above and beyond costal process. Unsclerotised apical portion of valva blunt, sparsely setose. Annellar structures in 2 parts: juxtal region and the labides. Juxtal region with a small juxtal plate; anterior to this is a wider, paired horned structure bearing two small hairy pads. Labides extending around aedeagal orifice, apical 1/3 setose, wider than basal section. Saccus moderately narrow. Aedeagus stout, widest apically. Manica spinose, spines longest nearest aedeagus.

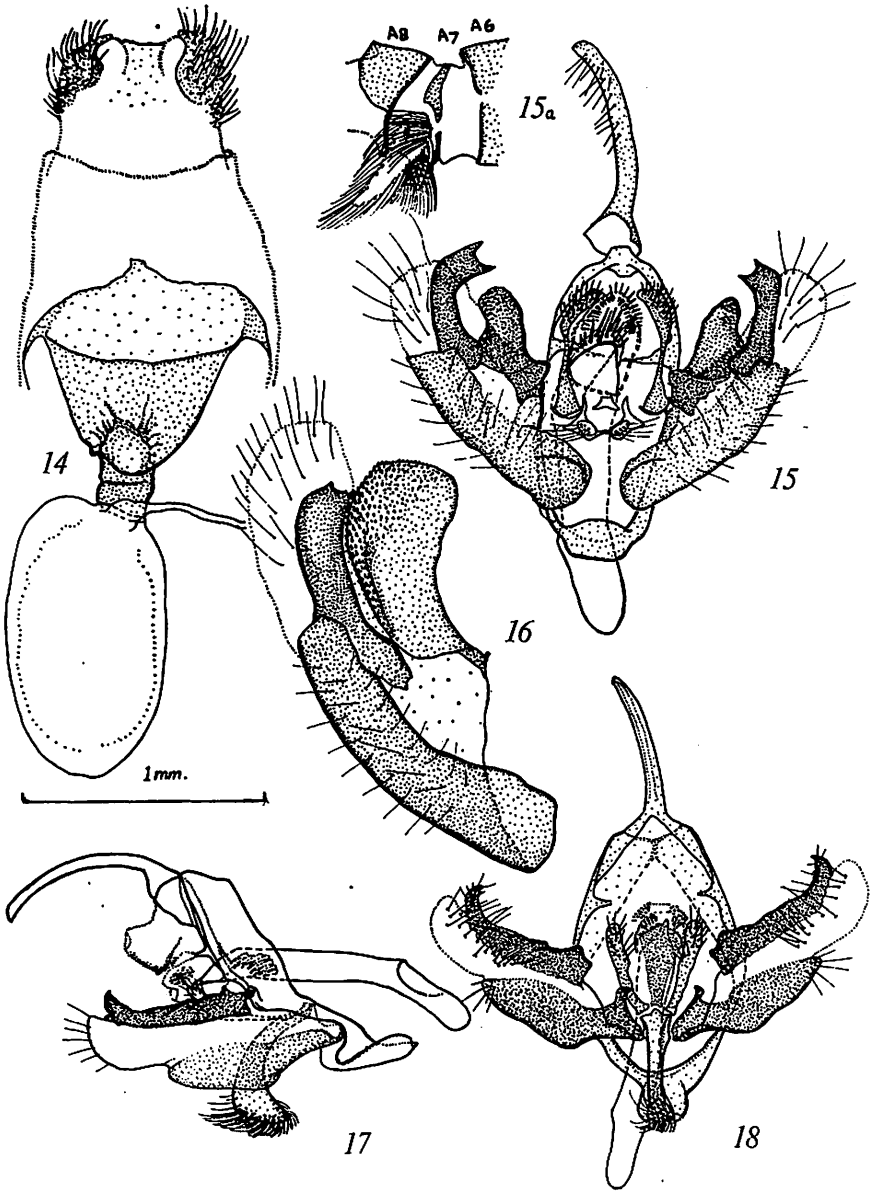
♀ *genitalia* (fig. 18): Ovipositor lobes extrusible, oval, setose. Ostiole encircled, prevaginal chamber basin-like, lamellae lightly sclerotised. Ductus bursae strongly bent on itself, not quite as wide as base of lamella. Corpus bursae globose, unornamented. Ductus seminalis apparently arising dorsally, but duct opening at side of ductus bursae on bend.

Holotype ♂, Shoal Pt., sedge/tussock by sea-elephant wallow, 7. II. 1963, K. P. Rennell. Allotype ♀, Beeman Camp, 29. VIII. 1962, Rennell.

MATERIAL EXAMINED: 2♂♂, Garden Cove, 6.IX.1962, Clark; 1♂ Courrejolles Peninsula, 200 m, 12. III. 1962, Clark; 1♂, St. Col Ridge, 250 m, 6. X. 1962, Clark (WDM); 2♂♂, Station, early X. 1959, J. Shaw; 1♂, Mt. Azimuth, 14. XII. 1961, Gressitt & Rennell; 1♂, Shoal Pt., sedge/tussock by sea-elephant wallows, 7. II. 1963, Rennell; 1♂, Lookout Bay, beach, 3.XII.1961, Gressitt; 1♂, Lookout Bay, 3. II. 1963, Wise; 1♂, *Ibid.*, 2.III.1963, Wise; 1♂, shore of Six Foot Lake, 9. II. 1963, Rennell; 1♂, Beeman Camp, 14. II. 1963, Rennell; 1♂, west slopes Mt. Dumas, 300 m, 23. XI. 1962, Rennell; 1♂, Mt. Dumas, 20. XII. 1961, Gressitt; 1♂, Northwest Bay, 5. V. 1963, Wise; 1♂, Tucker Cove, 30 m, 7. VIII. 1962, Rennell (BISHOP).

DISTRIBUTION: Campbell I.

As no ♀♀ of *X. oxyptera* were available, this new species is distinguished from *X. oxyptera* by ♂ characters. The proportions of the various parts of the costa and sacculus are quite different in the 2 species (figs. 15, 16). There are no reliable external differences. *X. oxyptera* is larger than *X. campbellensis*, but this is the general rule in the subantarctic Geometridae. One Campbell I. ♂ is comparable in size with *oxyptera*, but the genitalia are characteristic for *campbellensis*. *X. campbellensis* is very variable in the dorsal and ventral wing color patterns, the marginal shade being present or absent, the discal dot varying from strong to obsolete to absent, and the ground color varying from yellow-straw to dark fawn. The ventral discal stripe is also variable on both wings. Salmon (1956, pp. 61–62) has given an account of brachyptery in subantarctic moths, and the subject has also



Figs. 14–18. 14, *E. charidema*, ♀ genitalia, ventral view; 15, *Xanthorrhoe campbellensis* n. sp., holotype ♂, genitalia in ventral view; 15a, ♂ abd. segs. 7 & 8 (diagrammatic); 16, *X. oxyptera* Hudson holotype ♂, right valva; 17, *X. orophylloides* Hudson, ♂ genitalia, lateral view (Campbell I.); 18, *ibid.*, ventral view (Campbell I.).

been discussed above. Salmon's description of the ♀ *oxyptera* refers to *campbellensis.*

4. **Xanthorrhoe orophylloides** Hudson Figs. 17, 18, 20.

Xanthorrhoe orophylloides Huds., 1909, Subantarctic Is. of N. Zeal. **1**: 68.
Xanthorrhoe subantarctica Salmon, 1956, Rec. Dom. Mus. (Wgtn.) 3(1):80. **New Synonymy.**

Holotype ♂ in Hudson Colln., Dominion Museum, Wellington. Allotype ♀ in colln., Dominion Museum (Cape Expedition Colln.).

♂ *genitalia*: Uncus elongate, apex chisel shaped. Tegumen with a pair of inwardly projecting tapering fingers above annellar structures. Valvae with a heavy, thick, sclerotised costa; apex of costa free, upturned, unsclerotised portion of valva projecting as a lobe between costa and sacculus, apex rounded. Sacculus broad, tapering to apex. Annellar structures complex, consisting of lateral labides, broadest apically, sparsely setose on apical 1/2; a median, elongate juxtal plate, lightly sclerotised and finely scobinate; a median, ventrally projecting calcar with ± developed dorsal ridges, its apex bearing recurved dense setae. Saccus expanded. Manica with dorso-lateral groups of spines. A7 with separate, narrow tergite and sternite; and with long-haired protrusible lobes. A8 tergite long, A8 sternite fused, slender.

♀ *genitalia*: Ostiolar chamber cup-shaped; ostiole encircled, lateral arms broad. Postero-vaginal lamella long, antero-vaginal lamella short, lip formed of an emarginate unsclerotised fold. Ductus bursae somewhat narrowed in middle, wider than ostiole opening and enclosing it by lateral and dorsal 'shoulders'; sclerotised portion of ductus (?cestum) split ventrally, elongate, with pronounced lateral fold; corpus bursae unsclerotised, globose, signum absent. Ductus seminalis arising at junction of corpus and ductus bursae.

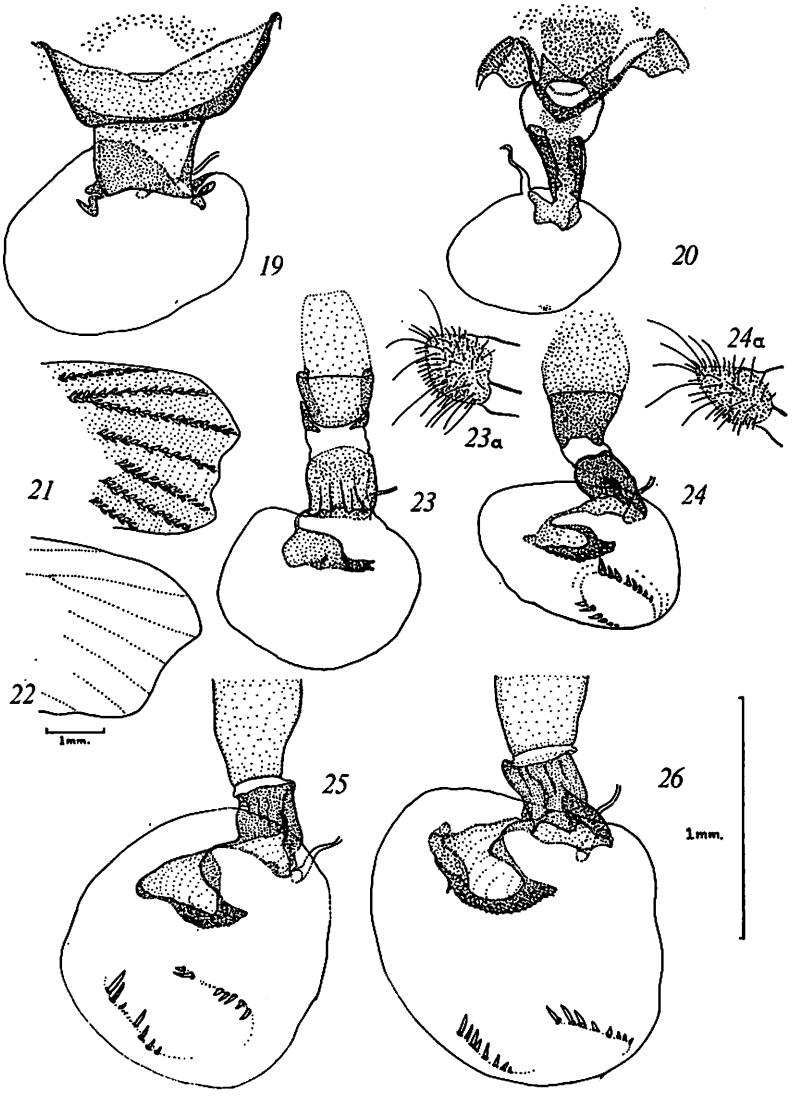
MATERIAL EXAMINED: Holotype ♂ Auckland Island (*orophylloides* Hudson); Holotype ♂ and allotype ♀ (*subantarctica* Salm.) Campbell I.; 1♂, Mt. Dumas, Campbell I., 550 m, 4. X. 1962, Clark (WDM); 5♂♂, Beeman Camp, 5–15. II. 1963, Rennell & Wise; 1♂ *Ibid.*, 22.XII.1961, Rennell; 1♂, 1.8 m Lake, 9.II.1963, Rennell; 1♂, Tucker-Station Col, ex *Carex trifida*, 30. XI. 1963, Gressitt; 1♂, Garden Cove, 27. VIII. 1962, Rennell; 1♂, Shoal Pt., ex sedge, 7. XI. 1963, Rennell (BISHOP).

DISTRIBUTION: Campbell I., Auckland I.

Similiar in color pattern and genitalia to *Xanthorrhoe orophylla* and *X. semifissata.* There are specific differences in valva proportions, costal structure and ostiolar/ductus bursae sclerotisation. Salmon (1956) regarded *X. subantarctica* Salmon as distinct from *X. orophylloides*, but did not examine the genitalia, which show no consistent differences between specimens from the two islands (cf. *X. oxyptera*, *X. campbellensis*, above). The intensity of wing markings, especially the diagonal, is variable. As in *Chloroclystis* spp. and *X. campbellensis*, Campbell Island specimens are smaller than their Auckland Island counterparts.

5. **Chloroclystis** sp. near **suffusa** Hudson Figs. 21, 24–26, 28, 29.

Chloroclystis indicataria (*nec* Walker) Hudson, 1909, Subantarctic Is. of N. Zeal., **1**: 61, 65 (=*C. semialbata nec* Walker, *sensu* Meyrick, 1917).
Chloroclystis indicataria (*nec* Walker) Meyrick, 1909, *Ibid.*, 70.



Figs. 19–26. 19, *X. campbellensis* ♀, allotype, bursa copulatrix, ventral view; 20, *X. orophylloides* ♀ (*subantarctica* Salm. allotype), bursa copulatrix, ventral view; 21, *Chloroclystis* sp. near *suffusa*, outer margin of ♂ hind wing; 22, *C. impudicis* n. sp., *ibid.*, (scaling along veins omitted); 23, *C. impudicis* n. sp., ♀, bursa copulatrix, ventral view; 23a, ovipositor lobe, lateral view; 24, *C.* sp. near *suffusa*, ♀, bursa copulatrix, ventral view (Campbell I.); 24a, ovipositor lobe, lateral view; 25, *C.* sp. near *suffusa*, bursa copulatrix (Auckland Is.); 26, *C.* sp. near *suffusa*, bursa copulatrix (North Island).

Both sexes with labial palpi 2.0–2.4× as long as width of eye. ♂♂ with antennae ciliate laterally and ventrally, ciliae 1/2–3/4 as long as the segment is thick. Color pattern as illustrated by Hudson (1909, pl. II, figs. 20–22) for Auckland I. population, as illustrated here (fig. 29) for Campbell I. population. Male hind wings (fig. 21) with veins M_1, M_2, M_3 each ending on a 'tooth' on the margin, the M_2 'tooth' smaller than the others. Female hind wings with a pronounced 'tooth' at M_1, M_2 and M_3. All hind wing veins marked by long raised scales.

♂ *genitalia*: A8 tergite and sternite elongate, completely enclosing the genitalia; octavals slender, apices projecting a little beyond the segment, scythe shaped. Genitalia as figured. Complex annellar structures fused with a 'transtilla' formed from base of valva costa with ventral arms strap-like, sparsely setose, the lateral fusion area moderately coarsely (mainland and Auckland I.) or obsoletely (Campbell I.) scobinate. Complex labides densely setose. Aedeagus short, with at least 4 stout cornuti. Manica densely spinose; uncus short, triangular. Coremata present, densely scaled.

♀ *genitalia*: Ovipositor lobes elongate-triangular, with 4–5 very long lateral marginal setae, and 25–35 shorter setae, not less than 1/3 as long as the long setae. Ostiolar lamellae as figured, shorter than usual in Campbell I. specimens, weakly sclerotised, ostiole encircled. Ductus bursae short, its anterior margin with a small ventral scobinate flange and a large dorsal appendage, the inner margin of which bears numerous serrulations decreasing in size (mainland, Auckland I. population) or ± distinct teeth, grading into serrulations (Campbell I. population). Signum present as 2 arcs of 5–8 spines, of decreasing size. Corpus bursae globose.

MATERIAL EXAMINED: AUCKLAND I. 3♂♂, 2♀♀, Carnley Harbor, 19.XI.1907 (G. V. Hudson); 1♀, Musgrove Peninsula, in pond, 21.VIII.1941 (?collector) (WDM).

CAMPBELL I. 1♀, 'Summer, 1907/08 (Chambers & de Barres); 3♀♀, 1945, Sorensen; 1♀, in house, 6.XII.1944, Sorensen (WDM). 4♂♂, 5♀♀, Tucker Cove, ex malaise trap, 21.XI–21.XII.1961, Gressitt; 1♂, Tucker Cove–St. Col. Ridge, 30.XI.1961, Gressitt; 1♂, Middle Bay, 29.XI.1961, Gressitt; 1♂, Beeman Camp, 15 m, 29.IX.1962, Rennell (BISHOP).

NEW ZEALAND: 1♂, 1♀, State Forest 90, Kaimanawa Range, North I., 7.XII.1956, Dugdale; 1♂, Mt. Luxmore, 660 m (Lake Te Anau) 27.X.1963, Kershaw (RoFo).

DISTRIBUTION: As above.

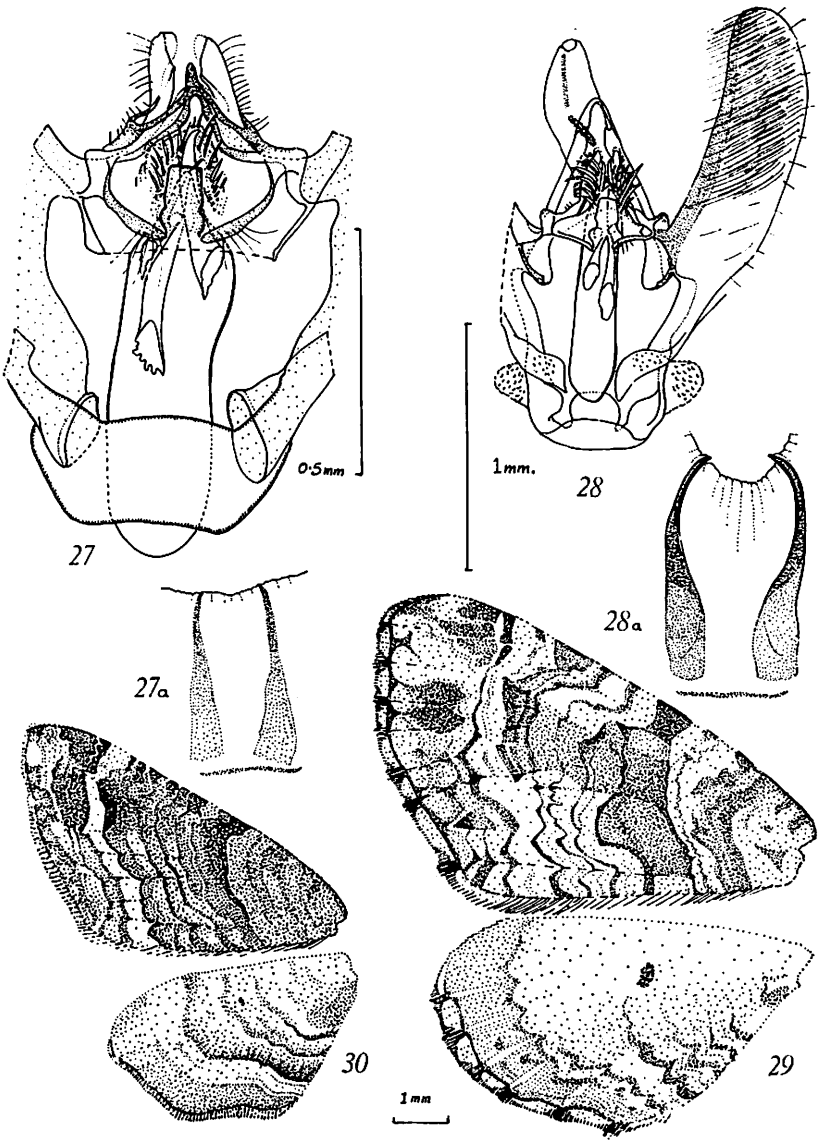
This species is the less common of the two *Chloroclystis* species collected on Campbell I. during 1961–63, being outnumbered by *C. impudicis* n. sp. by 5 : 1. It fits well into Hudson's group C of the New Zealand *Chloroclystis* species, characterised by the form of the ♂ antenna. It is not *C. semialbata*, which has octavals of a different shape, and a hairy prominence on the valva. I am indebted to Mr. D. S. Fletcher of the British Museum for preparing and sending me photographs of the *semialbata* type.

The species usually referred to as *C. semialbata* from the main islands, and figured by Hudson (1928, pl. XI, f. 5) differs from *C.* sp. near *suffusa* in the antennal structure and the length of the labial palpi, but is otherwise closely related.

6. **Chloroclystis impudicis** Dugdale, n. sp. Figs. 22, 23, 27, 30.

Chloroclystis aristias (*nec* Meyrick) Salmon, 1956, Rec. Dom. Mus. (Wgton) 3(1): 80.

Holotype ♂, allotype ♀ in coll. Entomology Division, D. S. I. R., Nelson; 2♀♀ para-



Figs. 27–30. *Chloroclystis* spp. 27, 27a, *C. impudicis*, ♂, aedeagus, annellar structures, and octavals (Campbell I.) (scale for octavals as for fig. 28); 28, 28a, *C.* sp. near *suffusa*, genitalia and octavals (Campbell I.); 29, *C.* sp. near *suffusa*, ♀, wing color pattern (Campbell I.); 30, *C. impudicis*, *ibid.*

types in coll. Dom. Mus., Wellington.

Superficially indistinguishable from the previous species, except for the ♂ (fig. 22) and ♀ (fig. 30) hind wings; in the ♂, the M2 marginal tooth is obsolete, and in the ♀, there is no well defined M3 tooth. All veins marked on the hind wing by long, raised scales.

The color pattern is shown in fig. 30, and gives the impression of being simpler than *C.* sp. near *suffusa*. Labial palpi ×2.1–3.2 eye width.

♂ *genitalia*: A8 tergite and sternite short, not enclosing the genitalia; the apical 1/4–1/3 of the valvae and coremata projecting beyond the 8th segment; corematal scales straw colored, conspicuous. Octavals obsolete, short.

The saccus is broader than in the previous species, the labides are sparsely setose, the costal process—annellus fusion area is smooth and weakly setose; the 4 aedeagal cornuti have irregular bases and the aedeagus width is approximately 1/3 its length. Valvae, coremata do not consistently differ from the previous species.

♀ *genitalia*: Ovipositor lobes stout, squared, with 8–10 very long setae and many very short setae, especially ventrally. Ostiolar lamellae as figured, moderately sclerotised. Ductus bursae short, broad, with no ventral scobinate flange; the dorsal appendage with an apical prolongation bearing 2 short spines. No signum. Corpus bursae globose.

MATERIAL EXAMINED. Holotype ♂: Tucker Cove, ex malaise trap, 16–18. XII. 1961, Gressitt; allotype ♀: same locality, 18–21. XII. 1961, Gressitt; 1♀, Campbell I., 1943, J. H. Sorensen; 1♀, *ditto*, 11. IX. 1947, Sorensen (WDM); 27♂♂, 51♀♀, Tucker Cove, ex malaise trap, 21. XI–23. XII. 1961, Gressitt; 1♂, Beeman Camp, 9. XII. 1961, Gressitt; 1♀, *ibid.*, 20. V. 1962; 1♀, *ibid.*, 29. IX. 1962, K. A. J. Wise (BISHOP).

DISTRIBUTION: Campbell I.

There were sufficient data from one locality over one season (1961) to show flight-season differences between the two *Chloroclystis* species. From 22 Nov. to 30 Nov. 20 *C. impudicis* and 7 *C.* sp. near *suffusa* were collected in a malaise trap at Tucker Cove, from 1 Dec. to 8 Dec., 45 *C. impudicis* and 2 *C.* sp. near *suffusa* were collected. From 16 Dec. to 23 Dec., 30 *C. impudicis* and 2 *C.* sp. near *suffusa* were collected. The 2 species thus appear to have overlapping flight seasons, and their peak periods are close together. Other aspects of *C. impudicis* and the preceding species have been discussed in the introduction. *C. impudicis* is derived from the Auckland I. population and reduction and simplification of genitalic structures have taken place in both sexes. No intermediate forms between these 2 species were found, so it can be assumed that they do not readily interbreed. As mentioned earlier, there is scope for work on the biology of these sibling species. This species is unique among the New Zealand *Chloroclystis* in the uncovered ♂ genitalia, hence its specific name. It is immediately distinguished in the ♂ from *C. aristias* by its lack of pectinations on the antennae. (There is no type ♀ of *C. aristias*.)

KEY TO GEOMETRID LARVAE COLLECTED BY BISHOP MUSEUM EXPEDITION 1961–63

The following key does not attempt to fix the identity of the *Xanthorrhoe* and *Chloroclystis* larvae, but is merely a convenient starting point for any future work on the subantarctic geometrids.

1. Seta SV2 absent on A1; anal shield rounded, with seta SD1 more anterior to D1 than SD2 is posterior to D1; body cuticle smooth; ocelli without a marginal dark sclerotised ring ..... **Epiphryne charidema**
   Seta SV2 present on A1; anal shield, if rounded, with SD1 posterior to D1, and body cuticle scobinate..... 2

2. Anal shield rounded, shorter than wide, and with SD1 posterior to D1; cuticle scobinate (scobinations of minute flat plates); paraprocts conspicuous, projecting beyond anal shield..... **Chloroclystis** spp.
   Anal shield of variable shape but SD1 anterior to or on a line with D1; body cuticle usually heavily pigmented but not scobinate as above; paraprocts not conspicuous 3
3. Anal shield with a ventral median pallid projection; with 4 pairs of marginal anal shield setae..... **Hydriomena similata**
   Anal shield without such a projection; with 3 pairs of marginal anal shield setae..... 4
4. Abdominal spiracles thickrimmed, small; anal shield with SD and D1 in line transversely; all shield setae on apical 1/3 ..... **Xanthorrhoe** sp. A.
   Abdominal spiracles thinrimmed, large; anal shield with SD not in line with D1; setae not concentrated on apical 1/3..... **Xanthorrhoe** sp. B.

I wish to thank Dr. J. L. Gressitt, Bishop Museum, Honolulu, and Dr. S. D. Richardson, Forest Research Institute, for permission to do this work; Mr. D. S. Fletcher, British Museum (Natural History), London, for advice, and for specimens and preparations which he so willingly provided; Dr. R. A. Falla, of the Dominion Museum, for permission to use Cape Expedition and Hudson material, and Mr. R. G. Ordish of the same Museum for his cheerful cooperation in sorting and sending the material within such a short period.

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Pacific Insects Monograph 7: 624-627 July 15, 1964

INSECTS OF CAMPBELL ISLAND. APPENDIX. COLEOPTERA: HYDRAENIDAE, LEPTODIRIDAE (LARVAE)[1]

By G. A. Samuelson

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Abstract: The larvae of *Meropathus campbellensis* Brookes (Hydraenidae), and *Paracatops campbellicus* (Brookes) (Leptodiridae) are described and illustrated.

Placement of the larvae of the hydraenid, *Meropathus campbellensis* Brookes, and the leptodirid, *Paracatops campbellicus* (Brookes) (=*Austrocatops*) was made by W. O. Steel to whom I am indebted. The material was returned for descriptions and illustrations.

Steel reported (letter of 25 March 1964) that the Campbell larva of *Paracatops* differs distinctly from those of *Catops* in lacking frayed setae. He also found the larva of *Meropathus campbellensis* to be very close to that of *M. chuni* Enderlein.

Acknowledgements are due to Tina Abbott and to Eugene Bojarski for preparing part of the illustrations.

Meropathus campbellensis Brookes Fig. 1.

Mature larva: mostly fuscus above; head darker than thorax, frontal sutures and ocelli pale, clypeus and labrum darkest; thorax with a thin pale median line; meso-, metanota and basal 2 abdominal segments pallid apically and forming transverse bands, with pale area of metanotum distinctly broader than those of adjacent segments; basal abdominal sternites paler than apical ones; legs pale. Dorsum with long erect submedial and sublateral setae placed subapically on each segment except last 2; abdominal sternites 2–9 clothed with shorter setae; last clothed apically with fine setae; urogomphus with basal segment bearing 5 or 6 long bristle-like hairs; legs subglabrous.

Body mostly subdepressed, but basal 2 abdominal segments subrounded in cross section and smaller in size causing body to appear constricted from dorsal aspect. *Head* 3/4 as long as broad, breadth subequal to mesothorax, surface feebly convex medially, rounded laterally, with 5 ocelli as follows: 2 placed obliquely near antenna, 1 further behind, 1 near base of mandible and 1 rather indistinct one further behind; frons triangular, anterior margin slightly concave, lateral margin sinuate, surface nearly flat, finely and indistinctly punctured; clypeus transverse, surface slightly convex and smooth; labrum slightly deeper than clypeus, anterior margin feebly rounded at middle and feebly notched at antero-lateral angle, surface broadly excavated medially; antenna 3-segmented, directed an-

1. Field work supported by National Science Foundation grants (G-18800, G-23720) from the U. S. Antarctic Research Program.

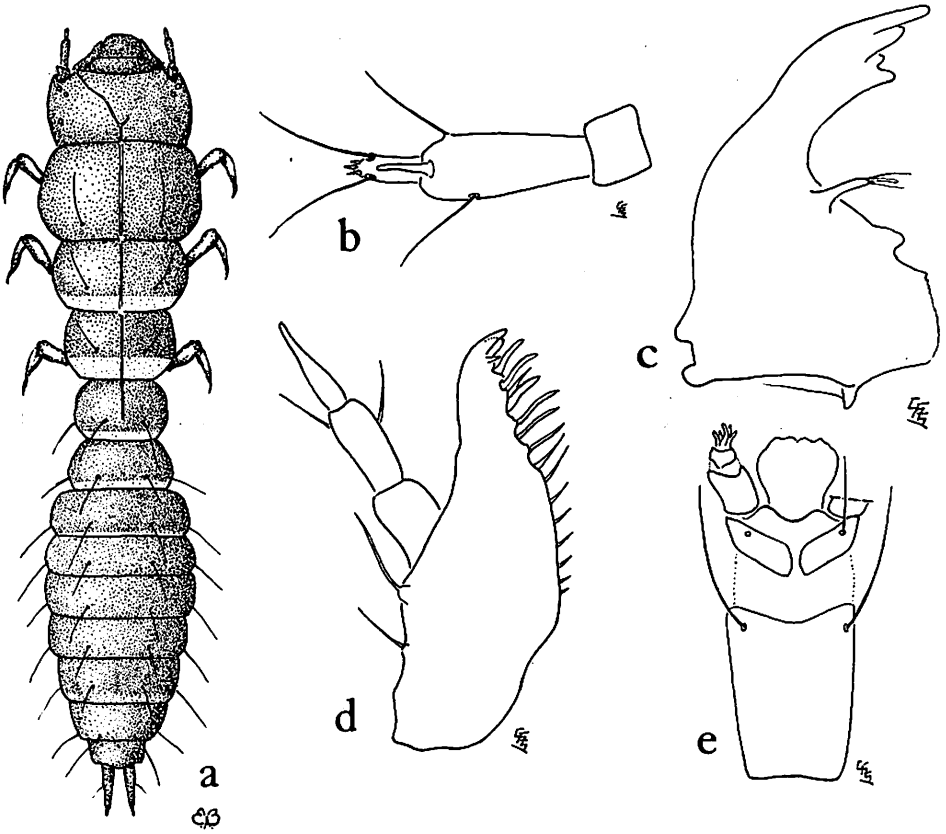

Fig. 1. *Meropathus campbellensis*: a, larva, dorsal view; b–e, larval head structures, ventral views: b, antenna, right; c, mandible, right; d, maxilla, right; e, labium, showing right palpus.

teriorad; antenna, mandible, maxilla and labium as illustrated (same scale). *Thorax* with segments apically decreasing in breadth; prothorax distinctly broader than any other part of body; propleuron with a basal swelling bearing a spiracle. *Abdomen* with segment 1 somewhat narrower than 2, 2 rather narrow, 3–8 expanded, 9–10 retractile; urogomphi arising from apex of 9, each 2-segmented with apical one minute. *Legs* long; metacoxa stout, slightly longer than femur, trochanter very short internally, femur and tibia subequal, claw simple. Length 3.9 mm; breadth 0.9.

MATERIAL EXAMINED: 5 larvae, Courrejolles Penin., 200 m, *Colobanthus*, 14. XII. 1961, Gressitt.

Paracatops campbellicus (Brookes) Fig. 2.

Mature larva: testaceous to fuscus above; head and apical abdominal tergites darker than thorax and basal abdominal segments; dorsum with thoracic segments and basal 3 abdominal tergites pale apically forming a pallid transverse band on each, and with a thin

pale median line running from pronotum to nearly basal margin of abdominal tergite 2; ventral surfaces and legs mostly pale. Body moderately clothed with mostly long erect setae of variable thickness; head with frons and anterior, lateral portions of occiput clothed with simple, slender erect setae; thoracic nota and abdominal tergites with apical or subapical transverse rows of setae, pronotum also with about 4 long hairs on anterior margin; thoracic setae generally finer than those of abdomen; basal segment of urogomphus with 1 conspicuous seta directed ventrad; legs subglabrous on coxae and femora, tibia armed with many short stout setae.

Head about 3/4 as long as broad, surface rather smooth, barely convex medially, side rounded, with 1 ocellus placed near base of antenna; frons subtriangular, broadly rounded basally, anterior margin concave medially, but not distinct, surface rather flat and smooth; clypeus transverse, side obliquely narrowed to concave anterior margin, surface smooth; labrum small, subevenly rounded from base to antero-lateral corner, anterior margin indistinctly lobed; antenna 3-segmented, fairly long, as illustrated (scale smaller than following illustrations); mandible, maxilla and labium as illustrated (same scale). *Thorax* with pro-

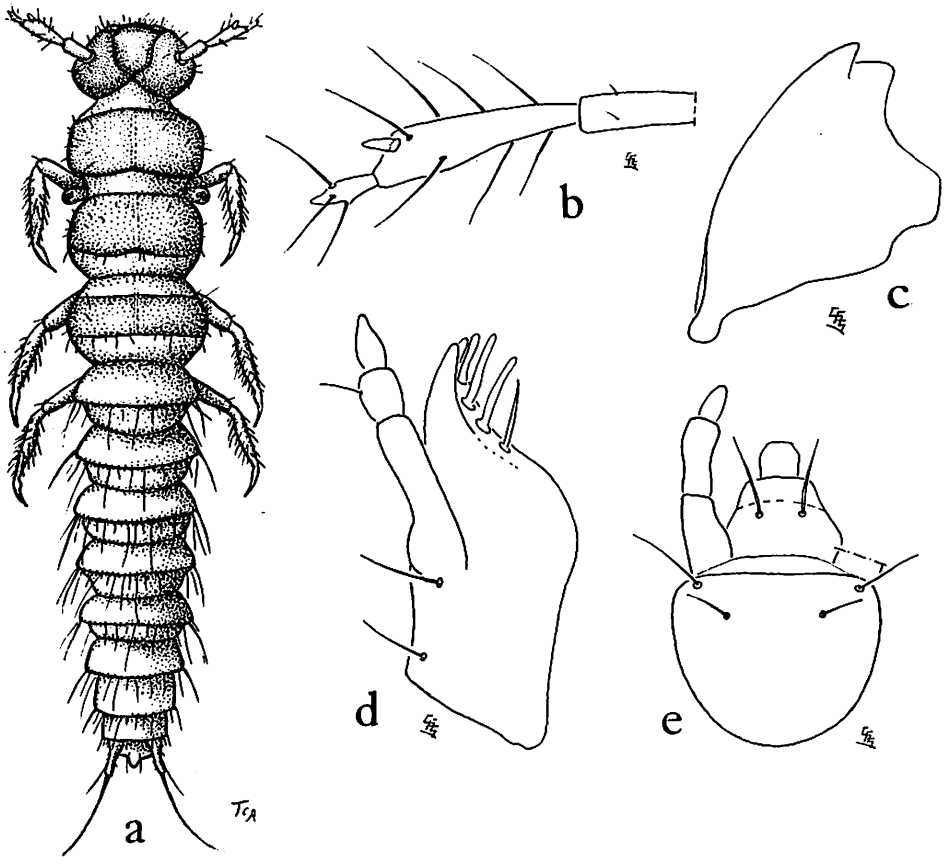

Fig. 2. *Paracatops campbellicus*: a, larva, dorsal view; b–e, larval head structures, ventral views: b, antenna, right; c, mandible, right; d, maxilla, right; e, labium, showing right palpus.

notum slightly larger than following 2 segments; propleuron with a fleshy basal projection bearing a spiracle. *Abdomen* with tergites 1–4 subequal and each slightly smaller than metanotum, 5–8 more compact, 9–10 retractile; urogomphi arising from apex of 9, 2-segmented, long and slender. *Legs* fairly long; metacoxa stout, length subequal to femur, trochanter short internally, tibia subequal to femur, claw simple. Length 4.4 mm; breadth 1.0.

MATERIAL EXAMINED: 7 larvae, S of Courrejolles Penin., 250 m, burrow of sooty shearwater, Berlese, 12. II. 1963, Wise.

Pacific Insects Monograph 7 (Supplement): 628-629 July 15, 1964

FALSE SCORPIONS (Pseudoscorpionidea) FROM THE AUCKLAND ISLANDS

By M. Beier

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Abstract: Three false scorpions from Auckland Is. are reported upon, including *Apatochernes pterodromae* which is here described as new.

Hitherto was only a single species of false scorpion known from the Auckland Islands, namely *Nesochernes gracilis* Beier. R. A. Falla, Director, Dominion Museum, Wellington, J. L. Gressitt and K. A. J. Wise, B. P. Bishop Museum, collected three other species, of which one is described as new. The two remaining species are known also from Campbell Island.

Apatochernes pterodromae Beier, n. sp. Fig. 1.

Uniformly reddish brown, abdominal tergites 2 & 3 each with a paler spot sublaterally. Carapace distinctly longer than broad, densely and evenly granulate, but metazona nearly smooth medially; both transverse furrows broad and deep, the subbasal one only a little nearer to hind border than to submedian furrow; hind border with 8 marginal bristles, which are distinctly clavate. Eye-spots wanting. Abdominal tergites divided, densely and rather coarsely granulate; each of the middle 1/2 tergites with 6 clavate marginal bristles and 1 lateral border bristles, without discal bristle. Ultimate tergite with 6 clavate bristles, without tactile bristles. Abdominal sternites nearly smooth, with simple, acuminate bristles. Pleural membrane densely and sharply granulate. Palm of chelicerae with 5 bristles only, *B* and *SB* dentate apically. Galea not forked, but with a subbasal branch and 4 short branches distally. Pedipalps rather stout, very densely granulate, the hand also. Medial vestitural bristles of femur and tibia distinctly clavate and dentate. Lateral tubercles of trochanter high. Femur, which is abruptly pedicellate, 2.6×, tibia 2.2×, hand 1.6×, the whole chela, with pedicel 2.9×, without pedicel 2.7× longer than broad. Fingers a little longer than hand without pedicel, with a relatively great number of accessory teeth (9–10 laterally and 3–4 medially each). Tactile seta *it* more than 2× as far from top of fixed finger than from *ist*, *st* of movable finger distinctly nearer to *t* than to *sb*. Tarsus of the 4th pair of legs without tactile bristle. Measurements: body, length ♀ 2 mm; carapace, length 0.85 mm, breadth 0.73 mm; pedipalps: femur, length 0.68, breadth 0.26 mm, tibia, length 0.68 mm, breadth 0.31 mm, hand, length 0.72 mm, breadth 0.44 mm, fingers, length 0.66 mm.

Holotype 1♀, Port Ross, Ocean Is., Auckland Is., ex *Pterodroma lessoni* nest, 28. XII. 1962, R. A. Falla.

This species is closely related to *A. curtulus* Beier and *A. nestoris* Beier from New Zealand. It differs from both by the tactile seta *it* being much more distant from the top of the fixed finger. *A. pterodromae* differs from *curtulus* moreover by the stouter pedipalps and the abruptly pedicellate femur, from *nestoris* by the greater measurements, by the subbasal transverse furrow of the carapace only a little nearer to the hind margin than to the submedian furrow, and by the tactile seta *st* being approximate to *t*. *A. pterodromae* is also closely related to *A. antarcticus* Beier from Campbell I. by the nearly uniform color.

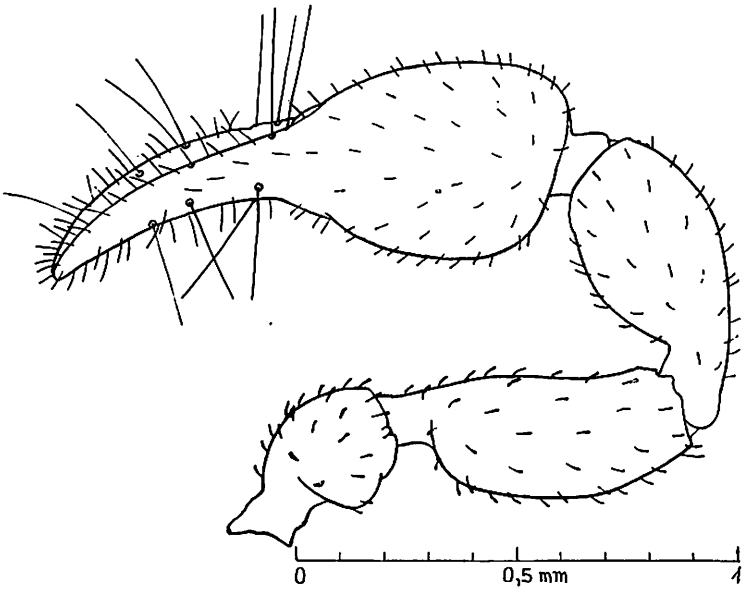

Fig. 1. *Apatochernes pterodromae* n. sp., right pedipalp of ♀.

Apatochernes antarcticus Beier

1♀, Crozier Pt., Auckland Is., under grass roots, 28. XII. 1962, Wise; 8♂♂, 7♀♀, 8 nymphs of various stages, Rose I., under dead leaves of *Carex*, rotton wood, in *Poa* mold, and in a rabbit burrow, 5, 8.I.1963, Gressitt; 2♀♀, Port Ross, Enderby I., top of W. cliff, under stones, 2. I. 1962 & 17. I. 1963, Wise; French I., *Poa*, 2. I. 1963, Gressitt.

This species and the following one hitherto known from Campbell I. only.

Systellochernes zonatus Beier

2♀♀, 2 Tritonymphs, Crozier Pt., Auckland Is., kelp on beach 25 & 30.XII.1962, Gressitt; 1 Deutonymph, Tucker Pt., Auckland Is., kelp, 19.I.1963; 1♀, 3 deutonymphs, Ranui Cove, Auckland Is., rata leaf mold, 3. I. 1963, Gressitt; 5♀♀, Auckland I., ex lichen on bark, 27. XII. 1962, Wise; 1♂, 2♀♀, Ewing I., *Olearia*, 4–7. I. 1963, Gressitt; 1♀, Ocean I., *Stilbocarpa*, 29. XII. 1962, Gressitt.

Pacific Insects Monograph 7 (Supplement): 630-641 July 15, 1964

LAELAPTID MITES FROM AUCKLAND AND MACQUARIE ISLANDS (Acarina: Laelaptidae)[1]

By Preston E. Hunter

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Abstract: Six species—3 new—of laelaptid mites representing 4 genera are recorded from the subantarctic Islands of Auckland and Macquarie Islands. The following species were represented: *Ayersacarus plumapilus* Hunter: *A. gelidus* n. sp.; *A. strandtmanni* n. sp.; *Leptolaelaps reticulatus* Evans *campbellensis* Hunter; *Hypoaspis evansi* n. sp.; and *Androlaelaps* (=*Haemolaelaps*) *pachyptilae* (Zumpt & Till) of which the ♂ is described for the first time. Collections were made from soil samples, ground litter, and bird nests.

The material included in this study was collected from sub-Antarctic Macquarie and Auckland Islands from 1960–1963. Collections were made by personnel from Bishop Museum, Hawaii, and the Australian National Antarctic Research Expedition (ANARE), Australia. The Macquarie Island collection was made by J. H. Calaby and K. C. Watson of ANARE and by Dr. J. L. Gressitt of Bishop Museum. The Auckland Island material was collected by Dr. Gressitt and K. A. J. Wise of Bishop Museum.

The present paper records 6 species—3 new species and 1♂ not previously known—of laelaptid mites representing 4 genera from Auckland and Macquarie Islands. Primary types are deposited with the Australian National Insect Collection (ANIC), Canberra, Australia, or with the Bernice P. Bishop Museum (BISHOP), Honolulu, Hawaii. Paratypes, when available, are deposited in the United States National Museum (USNM), Washington, D. C.; British Museum (Nat. Hist.) (BMNH), London; and Dept. of Entomology, University of Georgia (UG), Athens, Georgia.

I would like to express my appreciation to Mr. Carl Mitchell, Bishop Museum, and Mr. J. H. Calaby (ANARE) for sending me the Laelaptidae material from Auckland and Macquarie Islands.

Genus Ayersacarus Hunter, 1964

Ayersacarus plumapilus Hunter

A. plumapilus was represented from both Auckland and Macquarie and was previously recorded from Campbell I. (Hunter, 1964). Eighteen ♀♀, 9♂♂, and 13 nymphs were recorded from one or more of the following habitats from Auckland Island: rabbit burrow,

1. Partial results of field work supported by the National Science Foundation G-23720 from the U. S. Antarctic Research Program. Journal Paper No. 317 of the College Experiment Station of the University of Georgia, College of Agriculture Experiment Station.

8. I. 1963; nest of *Pelecanoides* 5.I.1963; white-headed petrel (*Pterodroma lessoni*), 2.I.1963; leaf mold and humus, 8.I.1963; and from *Dracophyllum*, 2.I.1963. All Macquarie specimens (22♀♀ and 4♂♂) of this species were collected from nest material of the dove prion (*Pachyptila desolata*), 28. II. 1961.

This species appears to represent a complex of 3 types consisting of a "Campbell Island" type (type series), a "Macquarie Island" type and an "Auckland Island" type. The Macquarie I. type ♀ and ♂ have the humeral seta only slightly longer than the adjacent dorsal setae, and in addition the ♂ has a long simple seta arising from near the base of the spur on femur IV. The Auckland I. type has the peritremal plate separated from or only weakly fused to the parapodal plate. The Campbell I. type has the humeral seta distinctly longer than the adjacent dorsal setae, the peritremal plate strongly joined to the parapodal plate, and the ♂ has a spoon-like seta arising from near the base of the spur on femur IV. In the Auckland I. material 4 of the 9♂♂ had a simple seta near the spur on femur IV (Macquarie I. type), whereas the other 5 specimens had a spoon-like seta (Campbell I. type). Otherwise the different types were restricted to the island indicated by their name.

Ayersacarus gelidus Hunter, n. sp. Figs. 1–2.

Both sexes of *A. gelidus* may be distinguished by one or more of the following characteristics: dorsal plate with fringed setae on posterior portion only; peritremal plate separate from or at most weakly joined to parapodal plate. In the ♀ the 2nd pair of setae on the genito-ventral plate and 2 pairs of ventral setae arising from the integument are simple. The ♂ has simple setae on the holoventral plate and a long simple seta arising near the base of the spur on femur IV.

In the descriptions for this species all measurements are the average of 10 specimens.

♀. Body 1121 μ long, 707 μ wide, rounded anteriorly and posteriorly. *Dorsum.* Dorsal plate covering dorsum except for a strip at posterior and lateral margins of body; surface of plate marked by scale-like striae and many small granular spots; 40 pairs of dorsal plate setae (few specimens had 1 or 2 unpaired setae between the J rows—see Costa, 1961, for setal notations), posterior setae up to 50 μ long; some setae, especially on anterior 1/2 of plate, split at tip; fringed setae (split seta with one side of inner margin fringed, fig. 1D) on posterior of dorsal plate and on integument around plate. (See Hunter, 1964, for full description of fringed setae.) Fringed humeral seta, 82 μ long, arising from integument above coxa II. *Ventrum.* Sternal plate 265 μ long on midline, 176 μ at narrowest width; striations as illustrated, ornamented by many small granules; 3 pairs of setae and 2 pairs of pores as figured. Two well sclerotized presternal plates. Tritosternum consisting of a base and 2 feathery lacinae. Metasternal seta and pore on small metasternal plate. Two small platelets behind sternal, and between metasternal plates. Strong endopodal plate medial of coxae III & IV, plate with distinct medial projection posteriorly. Three parapodal plates, a large plate partially encircling coxae IV, a small plate between coxae II & III, and the 3rd between coxae I & II weakly articulating with corner of sternal plate. Peritremal plate well developed, extending anteriorly to join dorsal plate above coxae I, posteriorly free in integument or at most weakly joined to parapodal plate behind coxa IV; peritreme extending above coxa I. Genito-ventral plate slightly widened behind coxae IV, not overlapping sternal plate anteriorly; greatest width 245 μ, 406 μ long on midline from end of sternal plate to end of genito-ventral plate; 2 pairs of setae arising from sur-

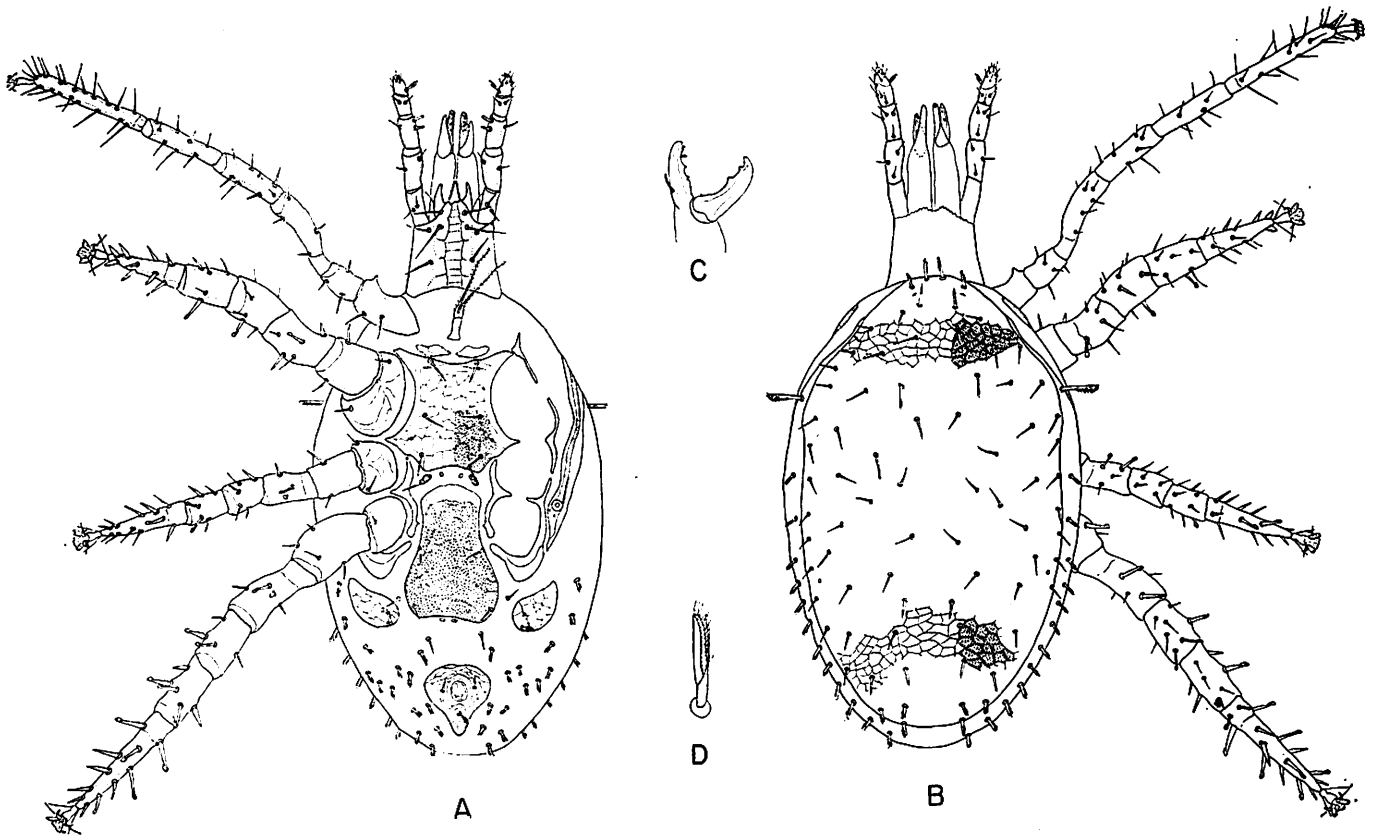

Fig. 1. *Ayersacarus gelidus*, n. sp. ♀. A, ventrum; B, dorsum; C, chelicera; D, fringed seta.

face of plate, genital setae at level of posterior margin of coxae IV, 2nd pair arising from posterolateral corners of plate (this pair simple in most specimens, but split at the tip in some); striations as shown; granular spots thickly scattered over plate. Two small rectangular platelets posterior to genital plate. Metapodal plate large, 166μ long, 83μ wide; a fringed seta (a few specimens with simple or split seta) arising from posteromedial margin; a pore-like opening on plate, other striations and shape of plate as illustrated. Ventral body setae up to 30 μ in length; one pair lateral of and one pair just posterior to genito-ventral plate simple, remaining setae fringed; position as shown. Anal plate 192 μ long, 169 μ wide; markings as shown; unpaired seta fringed, paired setae simple. *Gnathosoma.* Deutosternal groove with several rows of teeth, many teeth per row. Relative length of setae as shown. Palps with a blunt, slightly bifid seta arising from medial surface of genu; tarsus with a 2-tined seta. Chelicerae chelate, movable digit with 2 teeth, fixed digit with small spine-like pilus dentilis, several small and 2 larger teeth. Small anteriorly directed spine-like projection arising from posterior lateral margin of fixed chela. *Legs.* Legs I slender, setae simple; coxae with spine on distal margin. Legs II–IV with some setae ending in a spoon-like hyaline process; tarsi II with heavy spine-like setae; femurs III & IV with short spur-like process on ventral surface. Dorsum of femur IV with distal seta spoon-like and not distinctly longer than basal seta. All tarsi with well developed claws, distinct seta-like laterodistal elements associated with claws II–IV. Legs, including claws and coxae, measured as follows: I, 1220 μ; II, 942 μ; III, 895 μ; and IV, 1290 μ long.

♂. Body 1101 μ long, 635 μ wide. *Dorsum.* Dorsal plate covering dorsum, surface marked with striations and small granular spots; setae as in ♀, posterior setae up to 47 μ long. *Ventrum.* Ventral surface covered by a single holoventral plate 836 μ long, width 146μ at narrowest point between coxae II, 444 μ at widest point behind coxae IV; bearing 10 pairs of simple setae plus 3 anal setae, unpaired anal seta fringed; surface of plate marked by striations and granular spots. Two presternal plates between base of tritosternum and holoventral plate. Parapodal plate lateral of coxae I & II, extending medially to articulate with anterior corner of holoventral plate. Peritremal plate extends back to, but not fused to, holoventral plate lateral of coxa IV, joins dorsal plate above coxa I. Ventral body setae short, fringed. *Legs.* Leg I long, slender; coxa with spine on distal margin; tarsus with long slender setae. Leg II distinctly heavier than others; femur with a heavy spur and boss on ventral surface. Leg III with blunt spur on ventral surface of femur; some lateral and dorsal setae ending in a hyaline spoon-shaped structure. Leg IV long, with many spoon-shaped setae; trochanter with 2 bosses ventrally, proximal one with seta arising from surface; femur with a large ventral spur, strongly sclerotized at tip, a long simple seta arises from near base of spur; tibia with boss from which simple seta arises. Claws II–IV with lateral distal elements well developed. Legs, including claws and coxae, measured as follows: I, 1216 μ; II, 956 μ; III, 838 μ; and IV, 1223 μ long. *Gnathosoma.* Many deutosternal teeth per row; corniculi well sclerotized. Palpal genu with a median seta slightly bifid at tip. Chelicera chelate, long posteriorly directed spermatodactyl process arising from lateral margin of movable chela.

This species was described from a series of over 75♀♀ and over 25♂♂, all taken from Macquarie I. Specimens were collected from the following habitats: *Stilbocarpa polaris* (Araliaceae) litter; sheep dung; gentoo penguin (*Pygoscelis papua*) rookery soil; moss and soil; and nest material of dove prion (*Pachyptila desolata*), wandering albatross (*Diomedea exulans*), light-mantled sooty albatross (*Phoebetria palpebrata*), and sooty shearwater (*Puffinus*

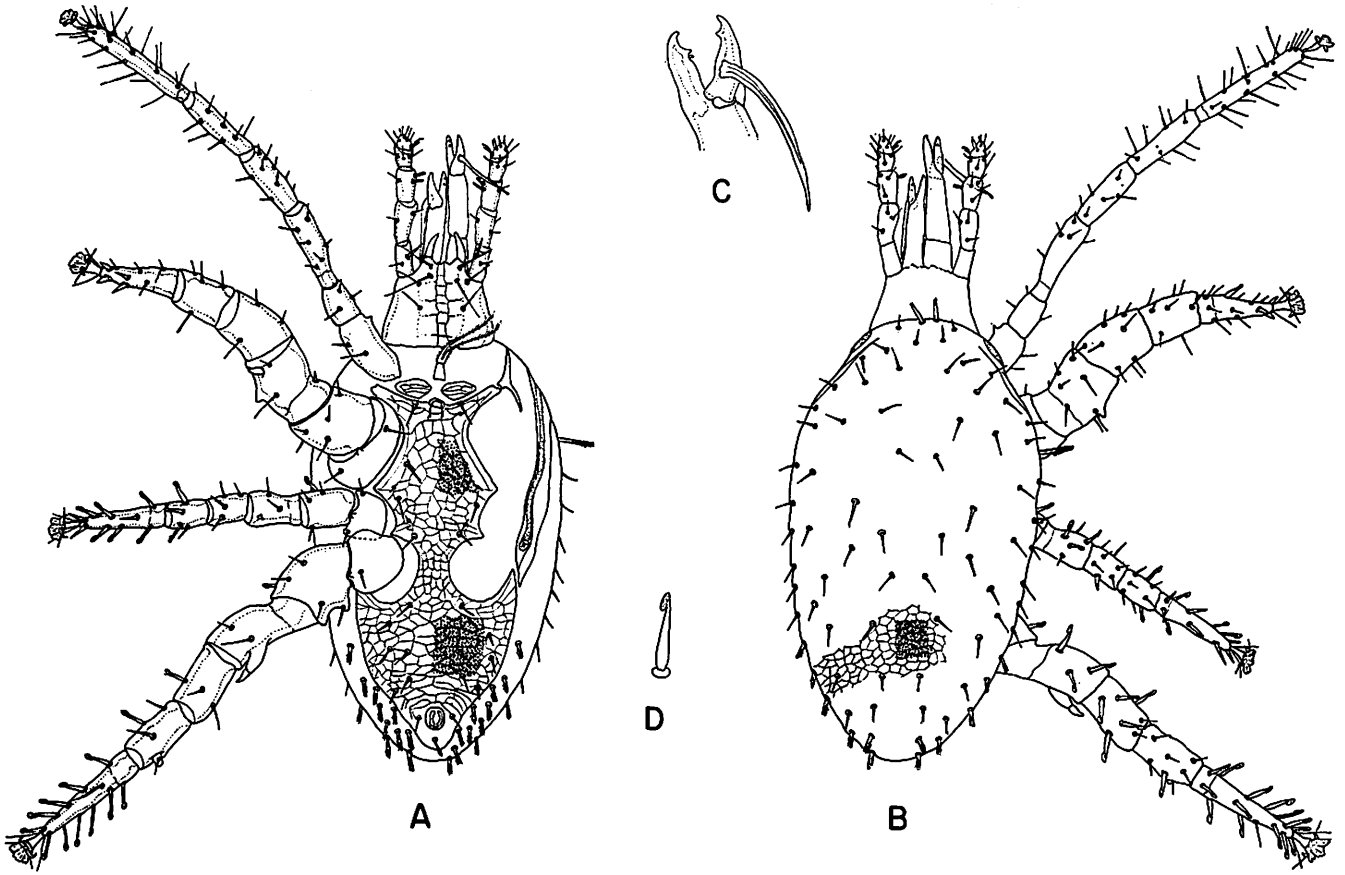

Fig. 2. *Ayersacarus gelidus*, n. sp. ♂. A, ventrum; B, dorsum; C, chelicera; D, spoon-shaped leg seta.

griseus). Specimens were collected from all months of the year.

Holotype ♀ (ANIC), Lambing Gully, Macquarie I., ex *Stilbocarpa polaris* litter, 30. IX. 1961, J. Calaby & K. Watson. Allotype ♂ (ANIC), Gadget Gully, Macquarie Island, ex litter nr. light-mantled sooty albatross, *Phoebetria palpebrata*, nest, 7. III. 1961, Calaby & Watson. Paratypes: 10♂♂♀♀ (ANIC); 4♀♀, 2♂♂ (USNM, BMNH); 6♀♀, 4♂♂ (BISHOP, UG).

Ayersacarus strandtmanni Hunter, n. sp. Fig. 3.

Both sexes of this species may be differentiated by their long simple dorsal plate setae, peritremal plate not fused to parapodal plate, and dorsum of femur IV with distal setae simple and 2× as long as other dorsal femoral setae. The ♀ has long simple setae on the metapodal and genito-ventral plates. The ♂ has the paired setae on the holoventral plate simple and a long simple seta arising near the base of the spur on femur IV.

♀. Body rounded anteriorly and posteriorly, 1031 μ long, 592 μ wide (all measurements are the average of 6 specimens). *Dorsum.* Dorsal plate covering most of dorsum; dorsal setae simple, up to 80 μ long; humeral seta simple, 98 μ long; surface of plate marked by scale-like striations and few scattered granular spots. Posteriorly, some long fringed setae arising from integument. *Ventrum.* Sternal plate similar to *gelidus* except sternal setae longer and granular spots thinly scattered or absent. Sternal plate 228μ long, width 143 μ at narrowest point between coxae II. Two very small platelets in integument behind sternal plate. Sclerotized presternal plates present. Metasternal plate with pore and seta. Genito-ventral plate bearing 2 pairs of simple setae; plate 180μ at greatest width, 334 μ from end of sternal plate to posterior of genito-ventral plate; striations as shown. Two small platelets in integument behind genito-ventral plate. Metapodal plate 128 μ long, 73 μ wide; seta long, simple; striations and pore-like structure as shown. Anal plate 163 μ long, 148 μ wide; unpaired seta fringed, paired setae simple. Endopodal plate well developed, free in integument between coxae III & IV. One parapodal plate surrounding coxa IV and posterior part of III, a 2nd smaller plate between coxa I & II abutting on corner of sternal plate. Peritremal plate not fused to parapodal plate. Ventral body setae up to 66 μ long, of type and position as illustrated. *Legs.* Leg I slender, coxa with anterior distal spine; proximal coxal seta long. Leg II heaviest, tarsus with some spine-like setae; femur, and trochanter with some long setae; posterior coxal seta about 2× length of anterior seta. Leg III with spine-like setae on ventrum of tibia and genu, femur with 1 long ventral seta. Leg IV with small, round boss-like structure on femur; spoon-like setae on femur, genu, and tibia; tarsus with long heavy setae. Claws II–IV with lateral distal elements. Legs including claws and coxae, measured as follows: I, 913 μ; II, 770 μ; III, 717 μ; and IV, 1045μ long. *Gnathosoma.* Palpal genu with a medial seta slightly divided at tip. Relative lengths of setae of gnathosoma and palps as illustrated. Chelicerae chelate, dentate; fixed digit with small pilus dentilis and spine-like lateral process; movable digit bidentate.

♂. Idiosoma 880 μ long, 460 μ wide. *Dorsum.* Dorsal setae up to 70 μ long, type of setae and striations of dorsal plate as in ♀. *Ventrum.* Holoventral plate 670 μ long, width 135 μ at narrowest point between coxae II, 340 μ at widest point behind coxae IV; bearing 11 pairs of simple setae including paired anal setae, unpaired anal seta fringed; surface of plate with striations as shown. Sclerotized presternal plates present. A single free parapodal plate articulating with anterior corner of holoventral plate. Peritremal plate

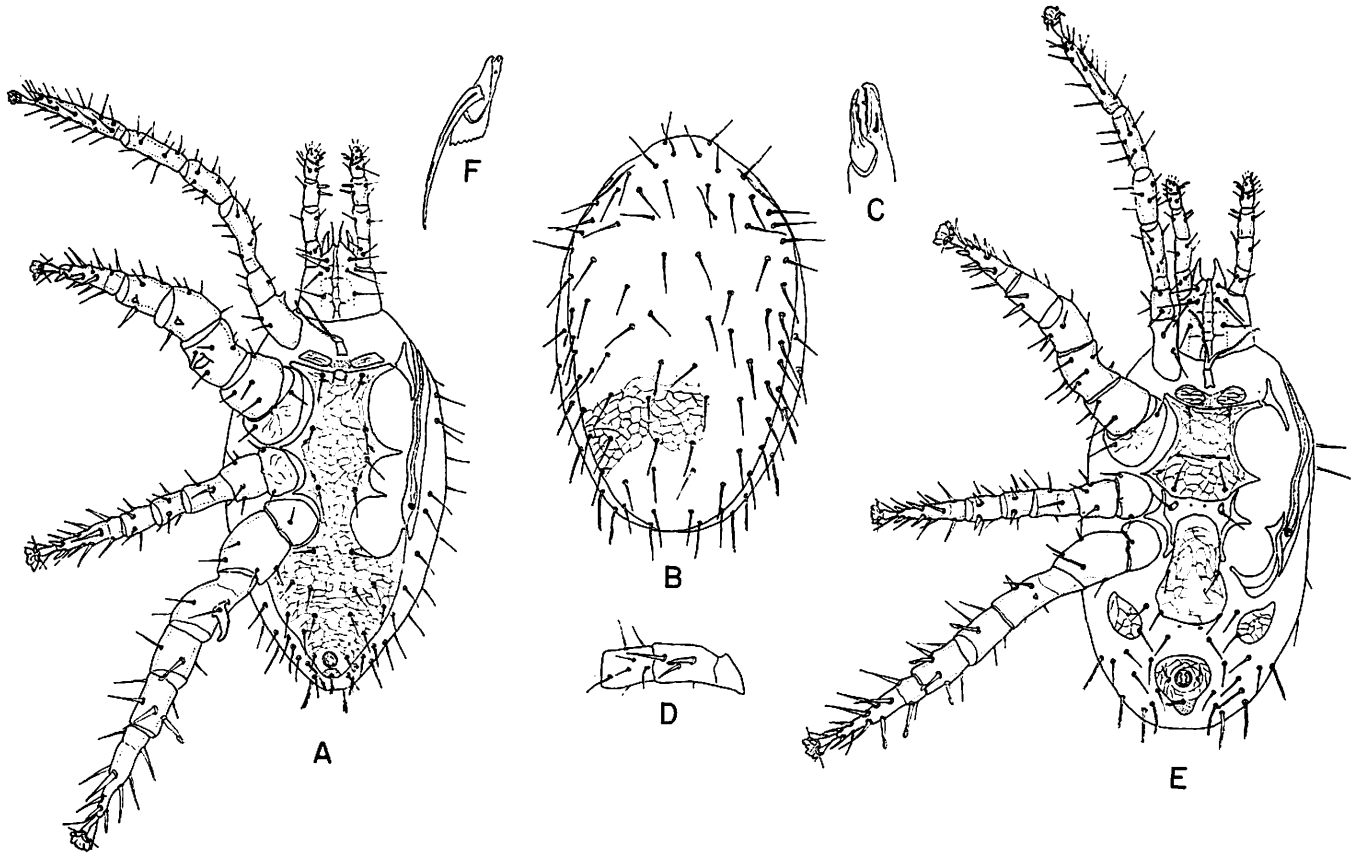

Fig. 3. *Ayersacarus strandtmanni*, n. sp. A, ventrum of ♂; B, dorsum of ♀; C, ♀ chelicera; D, dorsum of genu and femur IV, ♀; E, ventrum of ♀; F, ♂ chelicera.

wide, not fused to holoventral plate, fused to dorsal plate above coxa I. Some ventral body setae fringed. *Legs.* Leg I slender, coxa with spine as in ♀. Leg II heavy, strong spur on femur, boss-like structure on genu and tibia; tarsus with heavy spine-like setae. Leg III as in ♀ except tarsal setae appear to be slightly longer. Leg IV with strong curved spur on femur, a simple seta arising from base of spur; some spoon-like setae on tibia and genu; tarsal setae spine-like; trochanter without boss-like process on margin. Legs, including claws and coxae, measured as follows: I, 870 μ; II, 680 μ; III, 620 μ; and IV, 890 μ long. *Gnathosoma.* Palps as in ♀, genu with slightly divided medial seta. Chelicera chelate; spermatodactyl process 165 μ long, arising from lateral surface of movable digit.

This species was described from 6♀♀ and 1♂. All specimens have the following collection data: Mt. Elder, Macquarie Island; from dove prion (*Pachyptila desolata*) nest material, 28. II. 1961, colls. J. Calaby & K. Watson.

Holotype ♀, allotype, 2 ♀ paratypes (ANIC); 1♀ paratype (USNM, BMNH, UG).

In addition to the 3 species of *Ayersacarus* listed above, a 4th species, *A. gressitti* Hunter, has been described in this genus. These species are quite similar morphologically and apparently occur in much the same general type of habitat. The similarities and differences for some of the more easily seen characters that appear most distinctive for these 4 species are given in Table 1.

Table 1. Comparison of specific characteristics of *Ayersacarus* species.

Characteristic	Species of *Ayersacarus*			
	plumapilus	*gressitti*	*gelidus*	*strandtmanni*
Body shape	ovate	elongate	elongate	elongate
Dorsal plate setae	all fringed	all fringed	fringed posteriorly	all simple
Fusion of peritremal and parapodal plates	strongly fused	moderate fusion	not fused	not fused
Type and length of distal seta on dorsum femur IV	spoon-like; all equal	spoon-like; all equal	spoon-like; all equal	simple; 2× length of other setae
Metapodal plate	fringed seta and pore	seta and pore absent	fringed seta and pore	simple seta and pore
2nd pair of setae on genito-ventral plate	fringed	simple	simple	simple
Setae on holoventral plate	2-5 pairs fringed	2 pairs fringed	paired setae simple	paired setae simple
Type seta near base of spur, femur IV, ♂	spoon-like	simple	simple	simple
Collected from	Campbell I. Auckland Is. Macquarie I.	Campbell I.	Macquarie I.	Macquarie I.

Genus **Leptolaps** Berlese, 1918

Leptolaps reticulatus Evans **campbellensis** Hunter

This subspecies was originally collected from Campbell Island (Hunter, 1964). In the present material, 2♀♀ of this subspecies were taken from Auckland I., one from leaf mold, 8.I. 1963, and one from the nest of *Pelecanoides*, 5. I. 1963. Both specimens were collected by Dr. Gressitt. This species was not represented in the Macquarie I. material.

Genus **Hypoaspis** Canestrini, 1885

Hypoaspis evansi Hunter, n. sp. Fig. 4.

This species is described from a single ♀ which is distinct in having 1 pair of lance-shaped setae on the anterior margin of the dorsal plate and a 2nd pair arising from the integument above coxae II, remaining dorsal setae simple; metasternal setae arise from well developed plates; and anteriorly the hypostome is divided into 2 deeply serrated, sclerotized spoon-like structures.

♀. Idiosoma 1070 μ long, 600 μ wide. *Dorsum.* Dorsal plate narrowing posteriorly, not extending to lateral margins of body; surface with striations and stippling. Dorsal

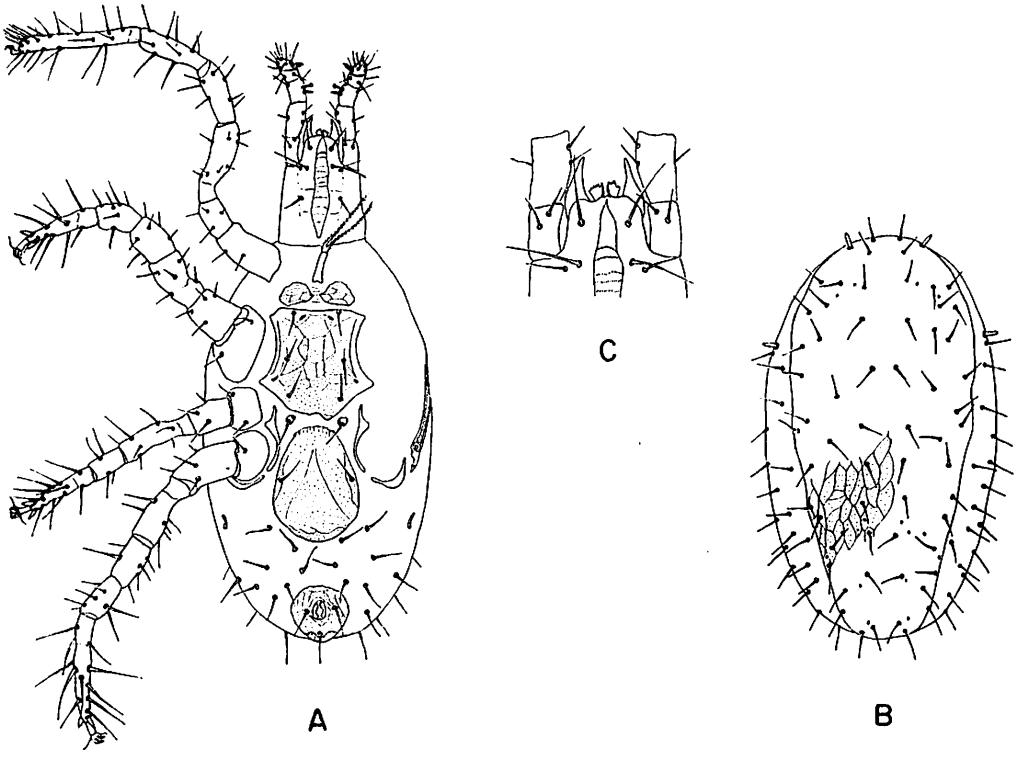

Fig. 4. *Hypoaspis evansi*, n. sp. ♀. A, ventrum; B, dorsum; C, ventrum of gnathosoma.

setae simple, up to 60 μ long except for 2 pairs of lance-shaped setae 30 μ long in positions as indicated above. *Ventrum.* Two well developed presternal plates. Sternal plate 290 μ long on midline, 220 μ at narrowest point between coxae II; without anterolateral projection between coxa I & II; setal length and position as indicated; surface with relatively sparse striations and stippling. Metasternal setae arise from small, distinct plates. Genito-ventral plate 300 μ long, 230 μ at greatest width; not reaching sternal plate, ending well short of anal plate; shape as shown; genital setae arise from weakly differentiated lateral sclerites at margin of genito-ventral plate; striations and stippling as shown. Anal plate round, 150 μ long, 110 μ wide; margins of plate slightly irregular in outline; setae slightly longer than ventral body setae; markings on plate as shown. Peritremal plate narrow, extending dorsally to join dorsal plate; peritreme extending dorsally to area above coxa I. Single parapodal plate posterolateral of coxa IV. Metapodal plates bacilliform. Eight pairs of ventral body setae, 3 pairs between genito-ventral and anal plates. Ventral integument strongly striated. *Gnathosoma.* Palps with chisel-like seta arising from median surface of genu. Chelicerae chelate, both digits with teeth (from position of chelicerae it was not possible to determine exact number). Hypostome divided anteriorly between corniculi to form 2 sclerotized, serrated spoon-like structures. *Legs.* Legs II–IV with distinct lateral distal elements associated with claws; tarsal setae long, spine-like. Legs I without lateral distal elements, setae slender. Legs, including claws and coxae, measured as follows: I, 1050 μ; II, 850 μ; III, 720 μ; and IV, 1000 μ long.

Holotype ♀ (ANIC), Green Gorge, Macquarie I., 4. XII. 1960, Calaby.

This species would probably have been placed in the genus *Gaeolaelaps*; however, Till (1963) recently synonymized *Gaeolaelaps* with *Hypoaspis* on the similarities of the ♂ chelae and the ♀ sternal plate and pilus dentilis.

Genus **Androlaelaps** (=**Haemolaelaps**) Berlese, 1903

Androlaelaps pachyptilae (Zumpt and Till)

The Auckland I. material contained 25♀♀, 4♂♂, and 3 immatures of this species. The Macquarie I. collection contained a single ♀ specimen. Previously only the ♀ of this species was known and the ♂ is described and recorded here for the first time.

♂. Shape as in ♀; idiosoma 525 μ long, 317 μ wide (all measurements the mean of 4 spp.). *Dorsum.* Covered by dorsal plate. Dorsal setae much longer than in ♀, of about equal length over entire dorsum, up to 70μ long; position of setae as in ♀; 2–3 accessory setae between J setae (the number of accessory setae ranged from 2–4; few ♀♀ taken with these ♂♂ also showed accessory setae); surface of plate marked by reticulation pattern; setae J_5 with 2–3 minute spines. *Ventrum.* Holoventral plate strongly enlarged behind coxae IV, bearing 10 pairs of setae plus 3 anal setae; all setae simple; reticulations of plate and position of setae and pores as shown; plate measured 417 μ long, 105 μ at narrowest width between coxae II and 217 μ wide behind coxae IV. Presternal plates present (presternal plates also present in the ♀♀). Ventral body setae as shown, 2 pairs nearest anal area with 2–3 minute spines per seta. Two small, rounded metapodal plates in integument behind coxa IV. *Legs.* Legs II heavy. Ventral setae on all legs heavier than dorsal setae (some legs in a lateroventral view in illustration); claws well developed. *Gnathosoma.* Similar to ♀. Movable digit of chelicera with a strongly curved spermato-

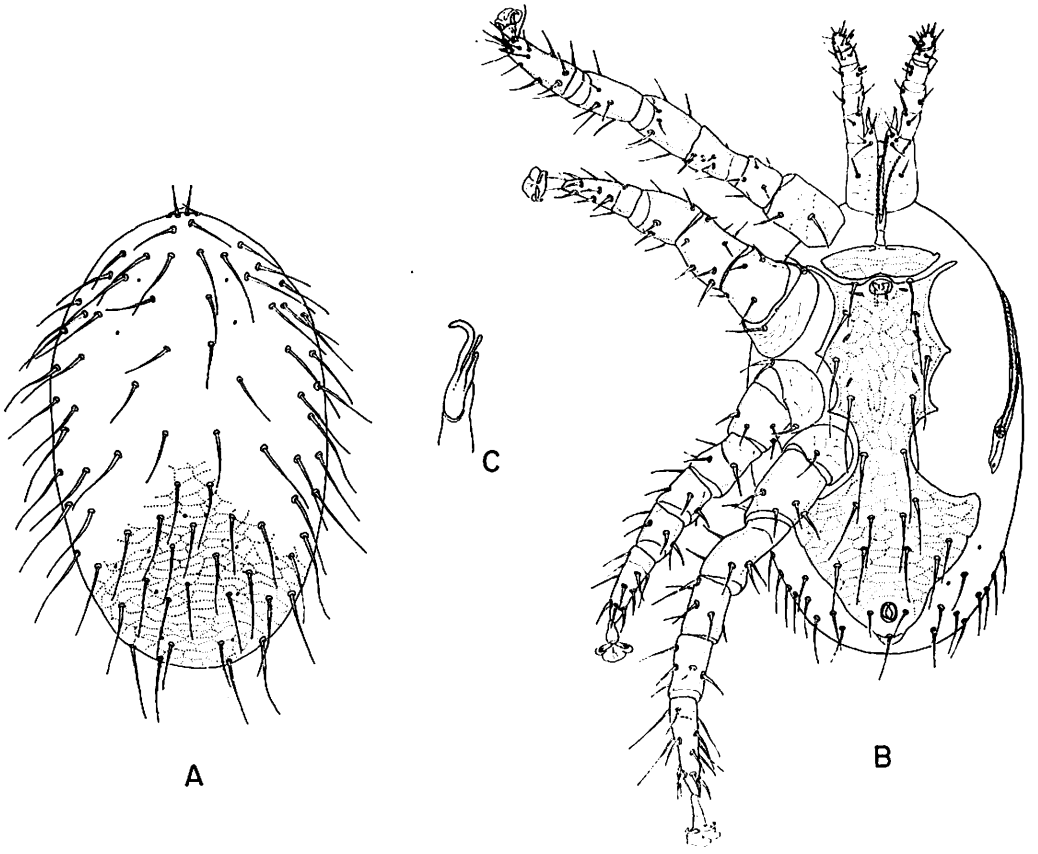

Fig. 5. *Androlaelaps pachyptilae* (Zumpt & Till). ♂. A, dorsum; B, ventrum; C, chelicera.

dactyl process and an inflated pilus dentilis; pilus dentilis does not appear as pointed as in ♀; fixed digit reduced, about 1/2 length of movable digit.

Allotype ♂ (BISHOP), Auckland I., from nest of *Pelecanoides*, 5. I. 1963, J. L. Gressitt. Paratypes: 2, same data; 1, same data but from white-headed petrel, 2.I.1963, Gressitt (BISHOP, BMNH).

Females were collected from Auckland I. from the following habitats: burrow of diving petrel, *Pelecanoides*, 24.XII.1962; *Pterodroma lessoni*, 29. XII. 1962; shag nest, 31. XII. 1962; and white-headed petrel, 2. II. 1963. The Macquarie I. specimen was taken from sooty shearwater nest material, 7.III.1961. The immature stages were collected from the burrow of diving petrel, 24.XII.1962 on Auckland I. Female specimens are deposited as follows: 2 (BMNH, USNM, UG); 3 (ANIC); remaining material in Bishop Mus.

Androlaelaps pachyptilae has been previously recorded from two islands in the Antarctic area. The species, originally described as *Haemolaelaps pachyptilae* (Zumpt & Till, 1956), was first collected from Heard I. (Zumpt & Till. 1956) and later from Campbell I. (Hunter, 1964).

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PYEMOTIDAE (Acarina: Tarsonemoidea) FROM MACQUARIE ISLAND

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The material upon which this paper is based was collected by Mr. K. C. Watson during a 1961 survey of the terrestrial arthropods of Macquarie Island. The survey was made under the auspices of the Australian National Antarctic Research Expeditions.

The collection consisted of 12 samples taken largely from a variety of plants and plant litter, soil, and penguin debris. Five species of the pyemotine genus *Neopygmephorus* (see below) were found to be present, only one of which was new. The presence of the four remaining species, all known previously only from temperate regions, indicates the amazing vagility of at least some of the mites of this family.

Terminology throughout is that used by Cross in a previous publication (Univ. Kansas Sci. Bull., *in press*). All measurements are in microns. Except where noted elsewhere, all specimens were returned to the Australian National Insect Collection, C. S. I. R. O., Canberra.

In the above paper, I divided the tribe Neopygmephorini into four new genera: *Acinogaster*, *Parapygmephorus*, *Pseudopygmephorus*, and *Neopygmephorus*. Acquisition of new material since then indicates that this grouping is probably unjustified, and that it is more realistic to join at least *Pseudopygmephorus* and *Neopygmephorus*. This course is followed herein, with other modifications dependent upon further study.

KEY TO THE MACQUARIE ISLAND SPECIES OF NEOPYGMEPHORUS

1. Hind margin of posterior ventral plate tripartite, the 3 lobes large and distinct (fig. 1)...2
   Hind margin of posterior ventral plate entire..... 3
2. Apodemes III curving posteriorly at sides to meet margin of coxal foramina III; tarsi II & III each with a stout spine ..... **sellnicki**
   Apodemes III straight, not distinctly developed at sides, not meeting margins of coxal foramina III ..... **tripartitus**, n. sp.
3. Internal caudal setae of segment V greatly enlarged, at least 2× length and 3× basal width of either of other 2 caudal pairs; claw I stout, with basal enlargement; small thumb opposite claw I ..... **pannonicus**
   Internal caudal setae of segment V less than 2× as long and 3× as wide, basally, as 2 remaining pairs; claw I simple, without basal enlargement or thumb..... 4
4. With 2 pairs of caudal setae; trochanter IV long and thin, about 3× as long as wide; external ventrals II elongate, spiniform..... **arvorum**
   With 3 pairs of caudal setae; trochanter IV only slightly more than 2× as long as

wide; external ventrals II short, setiform ..... **togatus**

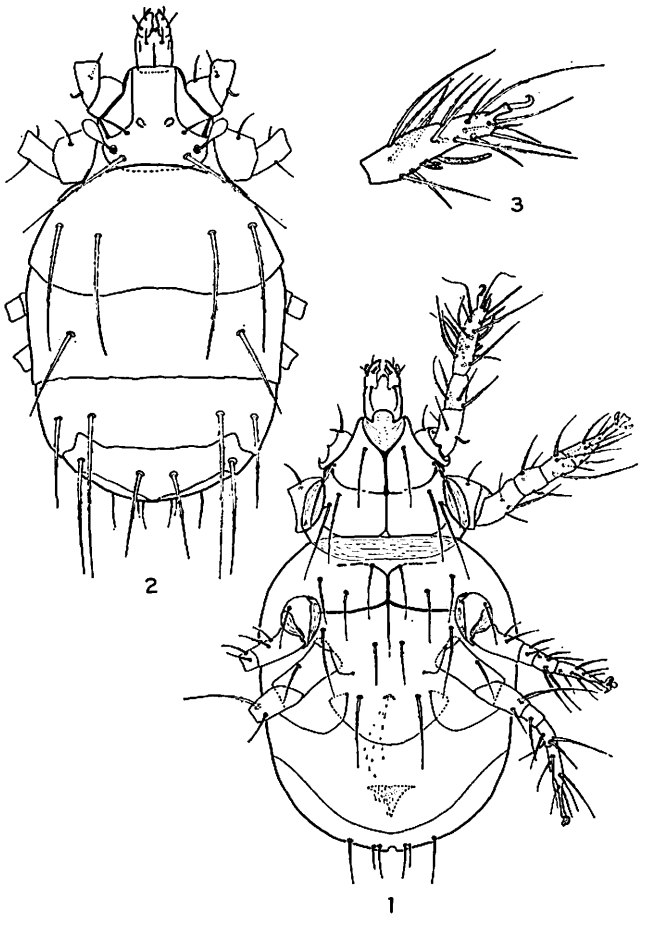
Neopygmephorus tripartitus Cross, n. sp. Figs. 1–3.

This was the most common form collected, being present in 9 of 12 samples and constituting about 90 % of all specimens examined. Especially abundant in 3 samples of litter of *Stilbocarpa* sp. (Araliaceae) which also contained penguin feathers.

Diagnosis. Separable from all other members of the genus by the following combination of characters: hind margin of posterior ventral plate tripartite; apodemes III indistinct laterally, not joining margins of coxal foramina III; areoli of external caudals I contiguous with those of internal caudals and well separated from those of external caudals II; solenidium 3 of tibiotarsus I small, arising only slightly distad to origin of solenidium 4; palpal solenidium 2 elongate, subcylindrical, palpal solenidium 1 enlarged, subequal in length to 2 and much thicker than it.

Non-gravid ♀. Length, 258 (255–315, $\bar{x}$=280); width between anterior sternocoxal condyles III, 85 (81–102, $\bar{x}$=86); body moderately sclerotized, punctate throughout, other integumental markings lacking. *Gnathosoma.* Length[1], ($\bar{x}$=31); width, 22 (19–22, $\bar{x}$=20); internal dorsals stout, arising barely behind line drawn between palpal bases; external dorsal indistinct, if present, areoli not visible; palpal solenidium 1 thin, elongate, slightly attenuate; palpal solenidium 2 well behind and laterad of 1, large, subequal in length but much thicker than 1 (fig. 1). *Propodosoma. Dorsum*: Distance between internal pseudostigmatal sockets, 39 (34–44, $\bar{x}$=38); peritremes guttate, distance between their centers, 21 (19–22, $\bar{x}$=20). *Venter*: All setae similarly elongate and sparsely plumose, 28–50 long; margins of circumgnathosomal foramen not greatly thickened to form collar; apodemes II broadly recurved; secondary transverse apodemes present only laterally behind areoli of external ventrals II (or lacking entirely). *Hysterosoma. Dorsum*: All dorsal setae stout, elongate, sparsely plumose; dorsals I posterior to line drawn through laterals I by about 1 areolar diameter; dorsals I 72 (58–77, $\bar{x}$=68) long, 57 (52–69, x=59) apart; laterals I subequal to dorsals I in length and width; hind margin of segment I weakly emarginate medially; dorsals II 50 (42–54, $\bar{x}$=49) long, 75 (70–81, $\bar{x}$=78) apart; dorsals III 78 (69–88, $\bar{x}$=80) long, 62 (57–72, $\bar{x}$=63) apart; laterals III, 48 (39–55, $\bar{x}$=49) long, on a line with dorsals and well laterad of them; posterior margin of segment III with pronounced, linear, median excavation which deepens (sometimes abruptly) at sides; dorsals IV 41–52 long, 22 (20–26, $\bar{x}$=23) apart; laterals IV 62 (48–67, $\bar{x}$=58) long, 75 (67–89, $\bar{x}$=77) apart, arising well in front of dorsals; setae of segment V much shorter and thinner than those of other segments, sparsely plumose, arising along ventral margin of segment; internal caudal 19 (15–24, $\bar{x}$=20) long, distinctly longer than external caudal I, areoli of these 2 contiguous; external caudal II longest of caudals, 25 (22–31, $\bar{x}$=26), arising well laterad of external caudal I; posterior genital sclerite triangular, flap-like. *Venter*: All setae of posterior ventral plate stout, sparsely plumose, about 22–43 long, internal poststernals shortest, external poststernals longest; external presternals arising well in front of apodemes IV and distinctly laterad of internal presternals; internal presternals about as far apart as internal poststernals (or poststernals slightly farther apart); distance between external

1. Measurement not obtainable from holotype.



Figs. 1-3. Holotype ♀ of *Neopygmephorus tripartitus*, n. sp. 1, ventral aspect; 2, dorsal aspect; 3, left tibiotarsus I, ventral aspect.

presternals distinctly greater than that between external poststernals; apodemes III not bending posteriorly at sides to meet margins of coxal foramina III; apodemes IV complete (or nearly so), joining coxal foramina III anterior to their centers; hind margin of posterior ventral plate distinctly tripartite; opisthosomal venter entire. *Legs. Length*: Leg I, 90 (80–100, $\bar{x}$=88); leg II, 90 (88–93, $\bar{x}$=90); leg III, 88 (80–92, $\bar{x}$=87); leg IV, 130 (114–148, $\bar{x}$=131). *Width*: Leg I, 13 (12–14, $\bar{x}$=13); leg II, 14 (13–17, $\bar{x}$=15); leg III, 14 (13–16, $\bar{x}$=14); leg IV, 10 (10–14, $\bar{x}$=13). *Segment lengths*: Tita I, 41 (38–47, $\bar{x}$=42); fege III, 11 (10–12, $\bar{x}$=11); ta III[2], 30 (28–33, $\bar{x}$=30); cx IV, 40 (37–49, $\bar{x}$=42); tr IV, 32 (27–36, $\bar{x}$=31); fege IV, 11 (10–13, $\bar{x}$=11); ta[2] IV, 42 (37–46, $\bar{x}$=41). *Setation*:

2. Measurement includes pretarsus.

Leg I: cx 1T; tr 2T+1 modified; fege 4T; tita, 10T+10S[3]. Leg II: cx 1T; tr 3T; fege 3T; ti 4T+1S; ta 6T+1S. Leg III: cx 1T; tr 2T; fege 2T; ti 4T+1S; ta 6T. Leg IV: cx 1T; tr 2T; fege 1T; ti 4T; ta 6T.

Tip of modified seta *c* of trochanter I sharply proflexed; solenidium 4 of tibiotarsus I stout, elongate, gradually attenuate, not reaching base of elongate sense rod *l*; solenidium 3 tiny, clavate, well median of but only slightly apical to 4; solenidia 1 & 2 small, clavate, similar to 3 in size, solenidium 2 ventrad of 1 and distinctly larger than it; claw I slender, simple, hook-like, thumb lacking; distinct pinnaculum lacking; tibiotarsus I elongate, slender, about 3.4× as long as wide, its width subequal to that of femurogenu I; tibial solenidia of legs II & III clavate, arising about 1/4 distance to apex of segment; solenidium of tarsus II thick, bullet-shaped, 10–12 long; coxa IV subrectangulate, ratio of length to width about 1.8–2.1, basal constriction poorly developed; lateral seta of trochanter IV not nearly reaching claw IV; ratio of length of femurogenu IV to tarsus IV, 3.4–4.0.

Habits: Nothing is known of the habits of this species.

DISTRIBUTION. Known only from type locality.

Holotype ♀, 8♀ paratypes from Macquarie I., Antarctica, K. C. Watson. Further details as follows: Holotype, paratypes 1–2, 5, 7–8, all collected at Nuggets Point, ex *Stilbocarpa* litter, 15. IX. 1961. Paratypes 3–4 collected Scoble Lake, ex *Stilbocarpa* litter and soil, 9. VI. 1961. Paratype 6 collected Wireless Hill, ex *Puccinella macquariensis* (Graminae) and *Cotula plumosa* (Compositae) on coastal rocks, 5. VI. 1961. Holotype and paratypes 1–4 to be deposited in the Australian National Insect Collection, Canberra; paratype 5 in Bishop Mus., Honolulu; paratype 6 in U. S. National Mus., Washington; paratype 7 in British Museum (Nat. Hist.), London; paratype 8 in Zoological Institute, Univ. of Erlangen, Germany.

SPECIMENS EXAMINED: 29♀♀, Nuggets Point, ex *Stilbocarpa* litter, 15. X. 1961; 7♀♀, same, 13. X. 1961; 6♀♀, Wireless Hill, ex *Stilbocarpa polaris* litter, 5. VI. 1961; 3♀♀, Nuggets Point, ex *Stilbocarpa* litter, 26. XI. 1961; 1♀, Camp Hill, ex *Colobanthus muscoides* (Caryophyllaceae), 12. X. 1961; 1♀, Mt. Hamilton, ex *Azorella selago* (Umbelliferae), mosses, soil 27. X. 1961; 1♀, North Head, ex *Poa hamiltoni* (Graminae) from penguin rookery, 16. X. 1961. I have retained 3 of the above specimens.

Neopygmephorus sellnicki (Krczal)

Pygmephorus sellnicki Krczal, 1958, Stat. Växtsklt.-Meddn. **11**: 69, figs. 23–26.

One of the most cosmopolitan of all pyemotids, this species was reported by Krczal (1958, 1959) from western and northern Europe and Japan. I (*op. cit.*, in press) found it in much of the United States as well. Its habitats are many, including lily bulbs, commercial mushroom beds, various other plant situations, and from the nests and fur of a variety of small mammals. The single Macquarie I. specimen falls well within the range of variability mentioned by Krczal (1959) and is more typical of his description and drawings than many North American specimens presumed to be conspecific.

SPECIMENS EXAMINED: 1♀, First Gulley, ex *Stellaria media* (Caryophyllaceae), 4. IV. 1961.

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3. Setae designated as sensory include solenidia 1–4 and rod-like setae c, k, l, m, n, and j (nomenclature after Krczal, 1959).

Neopygmephorus arvorum (Jacot)

Pygmephorus arvorum Jacot, 1936, Canadian Ent. **68**: 82.

Originally described from eastern United States, was reported by Krczal (1959) in western Europe. In these localities, the species is usually found in the soil. The 2 Macquarie I. specimens agree well with a German specimen kindly loaned to me by Dr. Krczal.

SPECIMENS EXAMINED: 1♀, Scoble Lake, ex *Stilbocarpa* litter and soil, 9. VI. 1961; 1♀, Mt. Hamilton, ex *Azorella selago*, mosses, and soil, 27. X. 1961.

Neopygmephorus togatus (Willman)

Pygmephorus togatus Willm., 1942, Abh. Nat. Ver. Bremen **32**: 175.

This form has been reported previously only from western Europe, where it was taken from wet moss and from mole tunnels.

SPECIMENS EXAMINED: 1♀, Mt. Hamilton, ex *Azorella selago*, mosses, and soil, 27. X. 1961.

Neopygmephorus pannonicus (Willmann)

Pygmephorus pannonicus Willm., 1951, SB. Öster. Akad. Wissftn., Mathem.-Naturw. Kl., Abt. 1, Bd. **160**: 132.

The two Macquarie specimens seen by me agree in most respects with the sketches of Willmann. Their determination must be regarded as tentative. *N. pannonicus* is known previously only from marsh meadow soil in Austria.

SPECIMEN EXAMINED: 1♀, Mt. Hamilton, ex *Azorella selago*, mosses, and soil, 27. X. 1961; 1♀, no data.

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Pacific Insects Monograph 7 (Supplement): 647-652 July 15, 1964

ANDACARUS WATSONI, N. SP. (Acarien, Oribate) DE L'ILE MACQUARIE

par Joseph Travé

LABORATOIRE ARAGO, BANYULS-SUR-MER, FRANCE

Résumé: Description d'une espèce nouvelle de Palaeacaroïde, appartenant au genre *Andacarus* et récoltée dans l'ile Macquarie. Cette espèce est la deuxième espèce connue appartenant à ce genre. L'espèce type a été récoltée en Amérique du Sud. Elles se distinguent facilement par la forme de leur sensillus.

Monsieur Keith C. Watson a bien voulu me confier l'étude d'une espèce de Palaeacaroïde qu'il a récoltée en 1961 au cours de l' "Australian National Antarctic Research Expedition (ANARE)" à l'ile Macquarie.

Il s'agit d'une espèce nouvelle du genre *Andacarus* Grandjean 1958 dont la description fait l'objet de la présente note.

Andacarus watsoni Travé, n. sp.

Généralités, tailles, forme: J'ai reçu de cette espèce deux préparations microscopiques contenant l'une 1♂, l'autre 1♀, ainsi qu'un tube d'alcool avec 37♀♀, 7♂♂ et 1 larve. Les indications communiquées par M. Watson sur le prélèvement sont les suivantes: M/ 61/Z/ 226; 29.XI.1961, Wireless Hill, Macquarie Island. Wind-exposed rock, 91 m above the western beach. From moss (Berlese funnel extraction).

Le nombre des ♀♀ est nettement supérieur à celui des ♂♂, sans que ces chiffres, portant sur une seule population puissent nous permettre d'affirmer qu'il en est toujours ainsi. La plupart des espèces de Palaeacaroïdes ont les ♂♂ aussi nombreux que les ♀♀ et nous ne connaissons pour l'instant qu'un seul genre parthénogénétique, *Palaeacarus*.

Les tailles sont trés voisines chez les ♂♂ et chez les ♀♀, ces dernières étant à peine un peu plus grandes que les ♂♂. Les mesures sont variables suivant l'état de dilatation des tissus chez ces Oribates à peau molle, beaucoup plus déformables que les adultes des Oribates supérieurs par exemple. J'ai mesuré des individus placés pendant 72 heures dans l'acide lactique dilué (2/3 d'acide lactique, 1/3 d'eau distillée) froid. Les ♂♂ mesuraient de 415 à 425 μ, les ♀♀ de 415 à 450 μ. Ces conditions me paraissent les plus proches de la réalité. Dans l'alcool les animaux sont trop contractés et dans l'acide lactique pur ils sont trop gonflés et bien souvent leur région ano-génitale éclate. Ces tailles ne comprennent pas les mandibules qui ne dépassent généralement pas en position dorsale, le contour apparent. Elles sont pratiquement perpendiculaires à l'orientation générale du prodorsum.

Les ♀♀ ovigères portent un ou 2 oeufs de 150 μ environ. Les 2 oeufs d'une ♀ étaient réunis par une anse de forme comparable à celle que Grandjean signale chez *A. macfar-*

lani (1957 p. 217, fig. 2F). Par contre cette anse n'était pas colorée en brun chez les exemplaires de *A. watsoni* que j'ai observés, mais incolore, difficile à voir.

Les boulettes digestives de plusieurs individus étaient formées de petits éléments minéraux et de dépouilles de petits animaux pigmentés en bleu (Collemboles ?).

En lumière directe, sous la loupe binoculaire, l'animal a l'aspect habituel des Palaeacaroïdes avec ses poils et son sensillus fortement colorés en noir. Le prodorsum et surtout les pattes sont nettement jaunes.

Les sclérites sont à peine visibles mais on les remarque lorsqu'ils sont éclairés favorablement.

Les mors des mandibules et les poils bulleux des ♀♀ apparaissent en noir, et avec un grossissement de 80 on peut séparer facilement les ♂♂ des ♀♀ grace aux poils bulleux.

Prodorsum: Les nervures chitineuses décrites par Grandjean chez *Stomacarus tristani* (1952, p. 363) sont présentes. Mais, en plus des fausses lamelles et de la fausse translamelle on remarque la présence de nervures secondaires formant un quadrillage à l'intérieur du carré formé par les nervures principales (fig. 1a).

Le naso est bien développé. Il recouvre nettement la partie renflée des mandibules. Les poils sont raides ou ne présentent qu'une légère courbure. Le poil exobothridique *xs* est plus court que chez *Macfarlani*. Il en est de même du poil interlamellaire *in* qui est d'ailleurs plus court que le poil lamellaire *le*.

Le sensillus (fig. 1c) est caractéristique de cette espèce puisqu'il est terminé par une massue en forme de pépin d'orange. C'est le premier Archeonothridae connu n'ayant pas un sensillus filiforme.

Région gastronotique: Elle ressemble beaucoup à celle de *macfarlani*. Comme chez cette espèce on ne distingue pas de striation dans la peau molle. Le cérotégument est également formé d'une couche mince, hérissée de pointes coniques, étroites peu serrées, déjà décrites chez. *S. tristani*. Ce cérotégument est absent sur les sclérites.

Les seules différences avec *macfarlani* sont les suivantes: Le poil *h1* est nettement plus épais et long que *ps2*. Les poils *f1* et *f2* sont tantôt sur un seul et même sclérite comme chez *macfarlani*, tantôt sur 2 petits sclérites séparés. Les poils *h1* et *h2* sont toujours sur des sclérites séparés, celui de *h2* étant petit comme ceux qui entourent les poils *ps3*, *ps4*, les poils adanaux et les poils anaux. Par contre *ps1* et *ps2* sont sur un seul et même sclérite comme chez *macfarlani*. Les différences entre les 2 espèces sont donc très faibles dans la région gastronotique.

Région anogénitale: La chaetotaxie anale est normale avec 3 paires de poils anaux et 4 paires d'adanaux. Un exemplaire avait 5 poils adanaux d'un côté. Il y a 9 paires de poils génitaux et 2 paires de poils aggénitaux. L'organe génital ♂ est identique à celui de *macfarlani* avec les 11 paires de poils eugénitaux figurés chez cette espèce. L'ovipositeur est également identique et présente en particulier la petite marque *kr* qui serait d'après F. Grandjean un reste de la racine d'un poil eugénital.

Région épimérique: La formule (4–3–4–5) et la structure de la région épimérique sont identiques à celles de *S. tristani* (Grandjean, 1952, fig. 1B).

Palpe: La formule du palpe (0–2–1–3–18) est identique à celle de *S. tristani*. Il en est de même de sa forme. Au tarse, les eupathidies sont lisses comme chez *A. macfarlani* alors

que les poils sont bruns et rugueux.

Mandibule: La mandibule ressemble beaucoup à celle de *A. macfarlani*. Les dents du

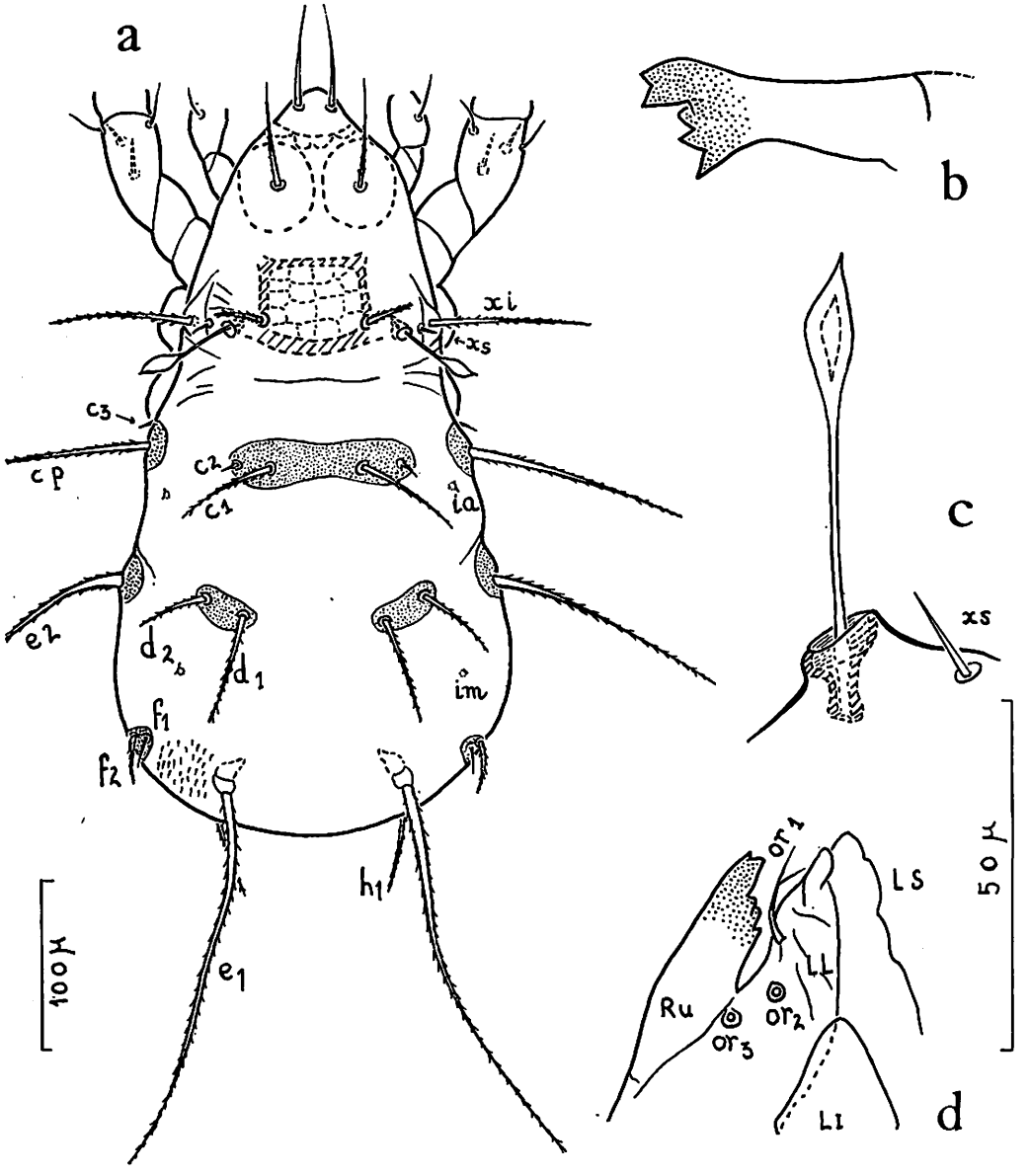

Fig. 1. *Andacarus watsoni* n. sp. a, vue dorsale d'une ♀. La microsculpture n'a été figurée que sur une petite partie du notogaster, à gauche du poil *el*; b, rutellum gauche en vue latérale; c, bothridie et sensillus gauche, vus de devant et orientés de façon à ce que le sensillus soit vu à plat; d, partie droite de l'infracapitulum en vue ventrale (LI=lèvre inférieure; LL=lèvre latérale; LS=labre; Ru=rutellum; *or1*, *or2*, *or3*,=poils adoraux).

mors supérieur sont assez variables d'un individu à l'autre, à pointes plus ou moins mousses. La figure de la mandibule de *A. macfarlani* (Grandjean 1957, fig. 2E) aurait parfaitement convenu à plusieurs exemplaires de *A. watsoni.*

Infracapitulum: Sa forme générale est celle de *S. tristani* avec une lèvre inférieure de même développement. Les poils sont identiques, à l'exception de *or1* qui est muni d'un cil comparable à celui signalé par Grandjean chez *Acaronychus trägardhi* fig. 1d).

Le rutellum (fig. 1b) a des dents plus prononcées que celles de *S. Tristani.* Cette forme des dents est constante et ne diffère pratiquement pas d'un individu à l'autre. Son extrémité distale est fortement colorée tout comme celle de la mandibule.

Pattes: Elles sont rigoureusement identiques par la forme comme par leurs formules chaetotaxiques et solénidionales à celles de *S. macfarlani.* Les figures 1b et 1c de cette espèce (Grandjean, 1957) conviendraient parfaitement bien à *A. watsoni.*

Larve: Dans le matériel qui m'a été confié les stases immatures n'étaient représentées que par une seule larve. Je la décris rapidement en la comparant à celle de *Acaronychus trägardhi* (Grandjean, 1954, p. 224, figs. 9 A–F). Des Palaeacaroïdes dont nous connaissons le développement, cette espèce est en effet la plus proche d'*A. watsoni.*

Longue de 180 μ la larve est plus trapue que les adultes (fig. 2a) et est recouverte du même cérotégument.

Comme chez *A. trägardhi,* le naso est un peu différent de celui de l'adulte. Chez ce dernier il est largement arrondi alors qu'il est terminé par une pointe chez la larve. Par contre, cette pointe est beaucoup plus courte que chez la larve de *A. trägardhi* et elle n'est visible que lorsqu'on observe la larve de face. Les nervures principales existent ainsi que les nervures secondaires mais elles sont à peine visibles, non colorées. Les nervures secondaires ne sont d'ailleurs visibles que lorsque l'animal a été fortement chauffé dans l'acide lactique. Le sensillus a la même forme que chez l'adulte.

Les grands poils de la région gastronotique (*cp, e1* et *e2*) ont la même allure que chez l'adulte, mais l'apophyse laminiforme interne du poil *e1* est plus difficile à voir que chez l'adulte. Le poil *c2* est nettement plus grand chez la larve que chez l'adulte. Les poils *f1* et *f2* sont également plus grands et nettement séparés (fig. 2a).

Je n'ai pas pu mettre en évidence de sclérites dans la région gastronotique malgré une coloration au bleu d'Unna. Pourtant il m'a semblé que le cérotégument manquait aux endroits ou normalement chez l'adulte se trouvent des sclérites.

Dans la région sternale, la formule épimérique est (2–1–2). L'organe de Claparède et son écaille protectrice sont comme chez *A. trägardhi* (Grandjean, 1954, p. 225, figs. 9B et 9D). La région anale ressemble également beaucoup à celle de cette espèce. Il y a 5 paires de poils *ps* et 4 paires de poils *h* (fig. 2b). Les 2 bosses *te,* situées en arrière de la région épimérique et qui, selon Grandjean, seraient les restes des coxas IV larvaires, semblent plus développées que chez *A. trägardhi.*

Le palpe a la formule normale de *A. trägardhi* (0–1–1–3–11) avec 2 eupathidies.

A l'infracapitulum le rutellum à la même forme que chez l'adulte. De même, le poil *or1* est cilié; *or3* est absent, ce qui est normal. Les lobes des lèvres latérales sont plus trapus que chez l'adulte.

Aux pattes les formules des poils sont les suivantes: I (0–2–3–5–17–1); II (0–3–3–5–16–1); III (0–2–2–4–15–1).

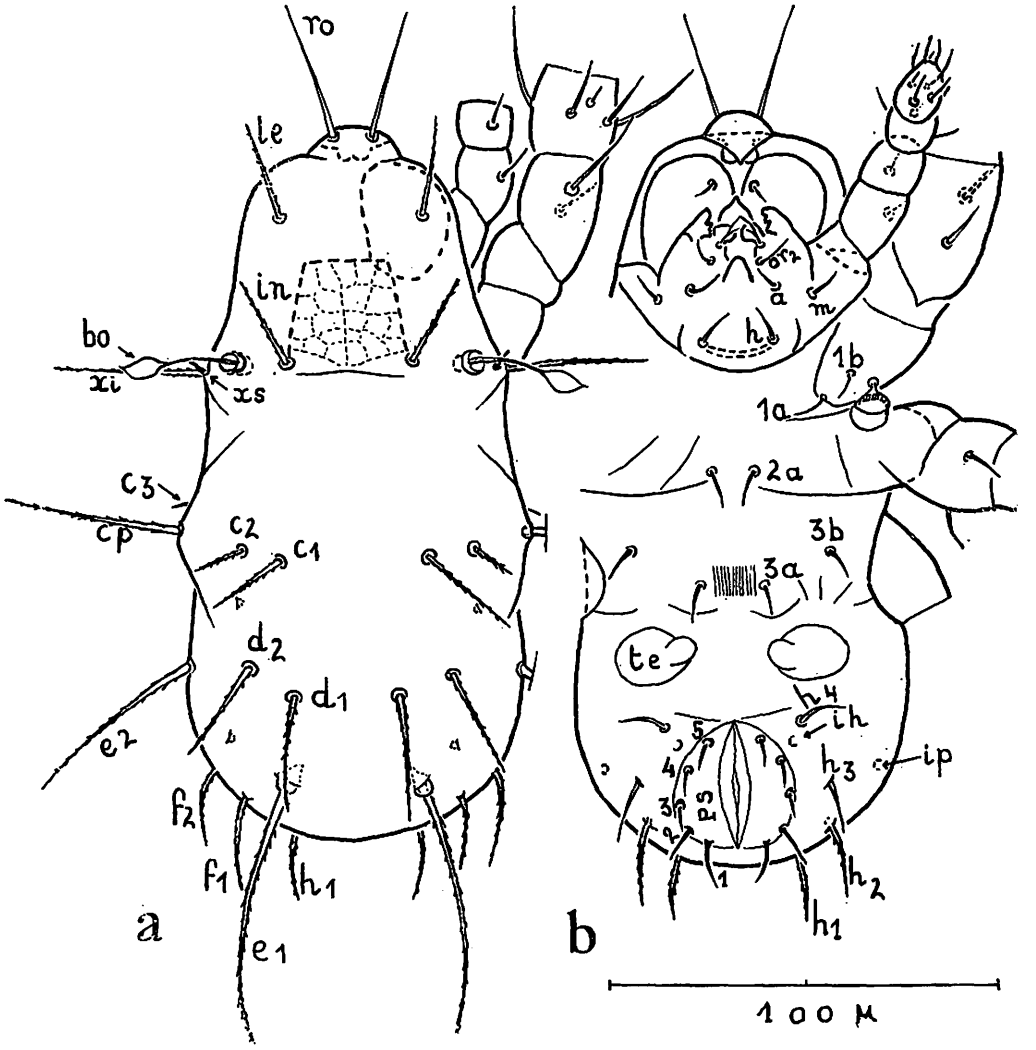

Fig. 2. *Andacarus watsoni* n. sp. a, larve, en vue dorsale. Les poils ventraux dépassant le contour apparent ne sont pas figurés sauf *h1*; b, larve en vue ventrale. Les poils dorsaux dépassant le contour apparent n'ont pas été figurés.

Les formules des solenidions sont, du génual au tarse: I (2–2–1); II (1–2–1); III (1–1–0).

Par rapport à la formule de *A. tragardhi*, il n'y a qu'une seule différence, la présence de 16 poils au tarse II. Ce poil supplémentaire est le famulus, très petit, signalé par Grandjean chez l'adulte de *A. macfarlani* et nommé *ex*. Ce famulus est donc larvaire comme le famulus du tarse I. Les griffes sont monodactyles et je n'ai pas vu d'épines insérées sur l'ambulacre.

Affinités, Justification: L'attribution de cette espèce au genre *Andacarus* ne pose aucun problème. Parmi les Palaeacaroïdes, seuls les représentants de la famille des Archeonothridae ont un naso à protubérence infère.

Les Archeonothridae sont eux mêmes divisés en deux sous-familles, les Archeonothrinae et les Acaronychinae. La première se distingue de la deuxième par sa bouche à grande lèvre inférieure et d'autres caractères que nous retrouvons chez *A. watsoni* (Grandjean, 1954, p. 196, et 1958 p. 82).

Les Archeonothrinae comprennent pour l'instant les 4 genres *Archeonothrus* Trägardh 1906, *Stomacarus* Grandjean 1952, *Zachvatkinella* Lange 1954 et *Andacarus* Grandjean 1957. Les différences entre *Archeonothrus*, *Stomacarus* et *Andacarus* sont données par Grandjean (1958, p. 82). *Zachvatkinella* est assez proche d'*Andacarus*, mais il en diffère par le sclérite qui unit les poils *e1*, par le fait que le poil *f1* est éloigné de *f2*, par la forme spécialisée du poil *ps3*, par la présence de 3 paires de poils aggénitaux, par l'absence de poils bulleux eugénitaux chez les ♀♀ etc...

Dans l'ensemble cette nouvelle espèce est très proche de *A. Macfarlani* et elle a en particulier tous les caractères du genre *Andacarus*. Elle se reconnait du premier coup d'oeil grace à son sensillus. Parmi les autres caractères distinctifs, moins apparents, citons, la nervation secondaire de la zone interbothridique, la présence de 2 boucliers distincts portant les poils *h1* et *h2*, la forme du rutellum et la présence d'un cil au poil *or1*.

Cette nouvelle espèce nous oblige à modifier légèrement la diagnose des Archeonothridae (Grandjean, 1954, p. 196). Le sensillus n'est pas en effet toujours du type filiforme comme nous le montre *A. watsoni*.

Le genre *Andacarus* n'était connu que par son type, récolté près de Tucuman en Argentine. La présence d'une deuxième espèce dans l'ile Macquarie, près de l'Australie n'a rien de surprenant en soi car les faunes d'Amérique du Sud, des iles de l'Antarctique et de Nouvelle Zelande ont de nombreux points communs.

Il m'est agréable de remercier M. K. C. Watson de m'avoir confié l'étude de cette espèce que je lui dédie avec grand plaisir.

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