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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,

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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.

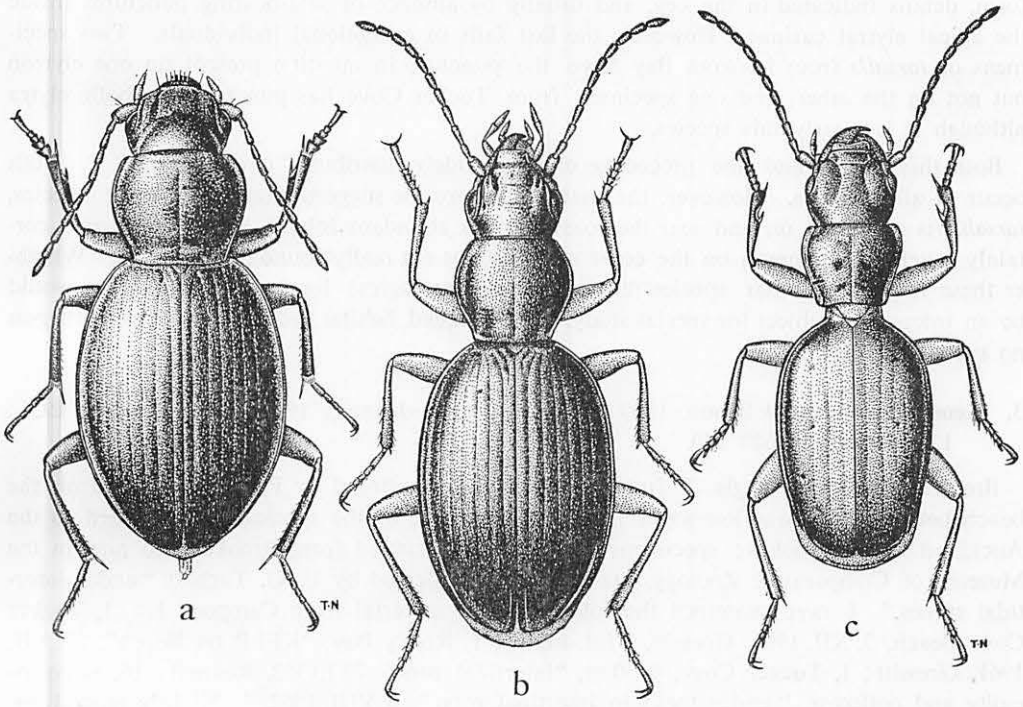

Fig. 1. a, *Pseudoopterus marrineri* (Broun); b, *P. tarsalis* (Broun); c, *Kenodactylus capito* Broun.

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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