Terrestrial and Littoral Amphipods of the Genus *Orchestia*, Family Talitridae.*

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Abstract

The generic status of *Orchestia* and *Parorchestia* is discussed and *Parorchestia* is considered a synonym of *Orchestia*. Keys are given to the 14 species of New Zealand *Orchestia* here described, four of which are new to science.

Introduction and Acknowledgments

The genus *Orchestia* includes both littoral and terrestrial species of amphipods. The terrestrial species are especially interesting because of their importance in the leaf-mould fauna of the forests of New Zealand and other Pacific countries. One species of terrestrial amphipod belonging to another genus has already been recorded from New Zealand (Hurley, 1955), and it is my intention to treat the terrestrial species from a more general point of view in a subsequent paper.

I wish to thank Professor Percival and the Canterbury University College Council and library for access to the late Professor Chilton's specimens and literature. Other specimens and collections have been made available by the Dominion Museum and Canterbury Museum, and I am grateful also to those individual collectors who have donated material. As in all of these studies, I am indebted to the library staff at Victoria University College, and especially to Miss M. Wood, of the Royal Society Library I wish to thank Professor L. R. Richardson, of Victoria University College, under whose guidance and supervision this work was originally carried out. Its speedier completion has been made possible through the kind permission of Mr. J. Brodie, of the New Zealand Oceanographic Institute.

Genus Orchestia Leach.

Orchestia Leach, 1813-14: 402; Stebbing, 1906: 530.
Parorchestia Stebbing. 1899: 402; Stebbing, 1906: 557; Shoemaker, 1942: 17.

"Like *Talitrus* except that gnathopod 1 in male and female is less strongly developed and subchelate instead of simple; gnathopod 2, male, powerfully subchelate instead of feebly chelate. Maxillipeds with 4th segment of palp absent, rudimentary or small; front lobe of sideplate 5 may be as deep as sideplate 4. Notching of dactylos in peraeopod 2 seldom as sharp and decided as in *Talorchestia*."

—Adapted from Stebbing, 1906.

Stebbing (1906) defined *Parorchestia* as "Like *Orchestia* but maxillipeds with 4th joint of palp distinct, though very small, conical and having a spine on the truncate apex."

This definition was not satisfactory for long. Chilton (1909) commented:

"In *Orchestia*, however, the maxillipeds may, as Stebbing himself states, have an obscure rudiment of the fourth joint of the palp, and the presence or absence of

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this joint is therefore hardly sufficient to distinguish the two genera. At the same time, it is perhaps convenient to group the truly terrestrial species under a separate genus, and the species that I am acquainted with can, as a rule, be distinguished from species of *Orchestia* living on the sea-shore by the greater abundance of long slender spine-like setae on the antennae and the peraeopods and by the more reduced condition of the pleopods, especially the third pair."

In a later paper, Chilton's views appear to have altered slightly:

" In the maxillipeds, the fourth joint of the palp is absent altogether or represented by the merest vestige so that the species (*O. parvispinosa*) is properly placed under *Orchestia,* though in the somewhat long setae on the antennae and peraeopods and the rather slender appendages it resembles *Parorchestia;* these characters, however, are probably directly associated with the terrestrial mode of life and are of little value in classification." (Chilton, 1912.)

Far from Stebbing's statement (1906) on *Orchestia,* that " the maxillipeds seem sometimes to have an obscure rudiment of the 4th joint of the palp," I find it is present in nearly all of the species for which the maxilliped is described or figured.

Stephensen (1935) lists as *Orchestia* several species found terrestrially—e.g., *O. kokuboi* Ueno (1929) and *O. malayensis* (Tattersall, 1922). These have been classified as *Orchestia* because the fourth segment of the maxilliped palp is absent or rudimentary. There has been thus a double standard of generic qualification—morphological as above, or ecological as suggested by Chilton (1909).

Stephensen (1935, 1938) has twice listed the spination of the outer ramus of the 1st and 2nd uropods, almost certainly with a view to establishing the lack of dorsal spines, on the 1st uropod at least, as a generic distinction between *Orchestia* and *Parorchestia.* His evidence is inconclusive. If this distinction were accepted, several species described as *Parorchestia* would have to be transferred to *Orchestia* because they have the outer ramus of uropod 1 spined, and 8 of the 23 species of *Orchestia* listed by Stephensen (1935) would have to be transferred to *Parorchestia.* This would require a complete re-organisation of the genera, and I cannot see that it would represent true relationships any more correctly than the original separation.

Another possibility is some combination of these three criteria—maxilliped palp, uropod spination and habitat—in a generic diagnosis. The difficulty of such a course is emphasised by the following comparison.

Species	Uropod 1 Outer Ramus	Habitat	Maxilliped Palp 4th Segment.
O marquesana	Not spined	" In moist debris dry location, 100 yards from beach "	Present
O parvispinosa	Spined	Terrestrial	Absent
O. chiliensis	Spined	Littoral	Present

There is another characteristic which could possibly be used—the reduction and loss of pleopods as shown in several of the terrestrial species—e.g., *O rubroannulata* n. sp. It is possible that species showing signs of loss or reduction of pleopods could be gathered into the genus *Parorchestia* but this again debars some of the terrestrial species, and in view of the fact that trend to loss of pleopods has been established within at least one other closely-related genus—i.e., *Talitrus,* its generic value is somewhat doubtful.

Because of the large number of species of *Orchestia,* especially when *Parorchestia* species are included, it may be suggested that subgenera based on habitat be set up. This is possible if the lines of distinction are not drawn in too arbitrary a manner and may perhaps serve a useful purpose. There is a precedent in the case of *Talitrus*

The species here described may then be separated into the following groups.

SUPRALITTORAL (*Orchestia*)	TERRESTRIAL (*Parorchestia*)
O. aucklandiae	*O. sinbadensis*
O. chiliensis	*O. simularis*
O. bollonsi	*O. lesliensis*
O. miranda	*O. tenuis*
	O. rubroannulata
	O. maynei
	O. parva
	O. improvisa
	O. insularis
	O. patersoni

Most of the supralittoral species separated above belong to the section of the genus containing *O. mediterranea, O. gammarellus, O. chiliensis, O. miranda,* etc., in which " the male tends to differ from the female in the dilatation of the meral and carpal joints of the fifth peraeopod " (Chilton, 1916). The terrestrial species show a tendency towards loss of pleopods, and a development of slender antennae with flexible long flagellar setae. This separation, however, is not a very critical one.

In accordance with the evidence presented above, I have regarded all species coming within the category of *Orchestia* and *Parorchestia* as species of *Orchestia.* This is in accordance with the practice adopted by Ruffo (1948, p. 210) and originally formulated by Shoemaker (1942):

" It would seem, then, that there are no characters sufficiently distinct to warrant the retention of the two genera, and I therefore regard *Parorchestia* as synonymous with *Orchestia.* The characters which have been used to distinguish the two genera differ only in degree, not in kind."

KEY TO NEW ZEALAND SPECIES OF *Orchestia*

1.	Peraeopod 5 in adult male, 4th and 5th segments greatly expanded	2
	Peraeopod 5 in adult male, 4th and 5th segments not greatly expanded	4
2.	Gnathopod 2, male, palm oblique	*O. chiliensis*
	Gnathopod 2, male, palm transverse	3
3	Uropod 3, ramus has several small spines dorsally	*O. miranda*
	Uropod 3, ramus has 2 terminal spines only	*O. parva*
4.	Pleopods, one or more reduced to vestigial triangular stumps	5
	Pleopods, all present and biramous	7
5	Lower lip has small stout spine on inner distal angle of principal lobe; 3rd pleopod is reduced to vestigial triangular stump	*O. lesliensis*
	Lower lip lacks small stout spine; more than one pair of pleopods are vestigial	6
6.	Second and 3rd pleopods reduced to vestigial stumps; animal very small; Gn. 1 in both sexes strongly subchelate; Gn. 2 in both sexes feebly chelate, lacks strong peduncle spine between rami of uropod 1	*O. rubroannulata*
	All 3 pleopods reduced to vestigial triangular stumps; Gn. 2 in male strongly subchelate, Gn. 2 in female feebly chelate, strong peduncle spine between rami of uropod 1	*O patersoni*
7	Uropod 1, peduncle has long spine extending between rami; terrestrial	8
	Uropod 1, peduncle lacks long spine between rami	11
8.	Uropod 1, both rami spined dorsally; Gn. 2, male, propod large, subtriangular, widest distally	*O. sinbadensis*
	Uropod 1, outer ramus not spined dorsally	9
9	Uropod 2, outer ramus dorsally naked; telson has 1–5 long spines apically on each lobe; uropod 3 has 3 strong spines on peduncle, 3 on ramus; Gn. 2, male, propod ovate, palm convex and oblique, not excavate	*O. tenuis*

Uropod 2, outer ramus dorsally spined; telson has about 3 spines apically and 2 laterally on each lobe; uropod 3 not spined as above; Gn. 2, palm toothed proximally, more or less excavate distally 10

10. Gnathopod 2, male, palm and dactylos each have strong tooth medially; palm greatly excavate posteriorly; uropod 3 has 2 long spines on peduncle, 3 on ramus; Gn. 2, sideplate subsquare . . . . . *O. maynei*
Gnathopod 2, male, palm has tooth medially, is slightly excavate posteriorly; uropod 3, peduncle and ramus each have 1 long and 1 short spine; Gn. 2, sideplate subovate . *O. insularis*

11. Gn. 1, female, strongly subchelate, palm oblique; telson has single long spine terminally on each lobe; uropod 3 has 2 spines on ramus; epimeral plates have 2 or 3 minute spines, on posterior margin only . . . . . *O. improvisa*
Gn. 1, female, palm transverse; telson has several spines on each lobe; uropod 3 has 6 to 12 spines on ramus . . . 12

12. Adult male, peraeon segments usually ridged; sideplates, Gn. 2, Pr. 1, Pr. 2, deeper than wide, subrectangular; anterior margin of 1st epimeral plate not spined anteriorly; littoral; size up to 40 mm. . *O. aucklandiae*
Adult male, peraeon smooth; anterior margin 1st epimeral plate has 3 or 4 spines; sideplates Gn. 2, Pr. 1, Pr. 2, as wide as deep or wider than deep; terrestrial 13

13. Large, up to 30 mm.; posterodistal angle of basos in Pr. 5, male, and both distal angles of merus produced strongly downwards; uropod 3 peduncle has about 4 stout spines, ramus has about 6 dorsal and 6 end spines; telson has about 8 spines on each margin; end segment of antenna 1 tufted *O. bollonsi*
About 8 mm. in size; posterodistal angle of basos, distal angles of merus in Pr. 5, male, not produced downwards greatly, uropod 3 peduncle has 2 stout spines dorsally, one on ramus dorsally and about 6 on end; telson has about 5 spines on margin of each lobe; antenna 1, penultimate segment produced as small finger above minute terminal segment *O. simularis*

Orchestia aucklandiae Sp. Bate, 1862. (Figs. 1–23.)

Orchestia aucklandiae Sp. Bate, 1862: 17, pl 1a, fig. 3 Miers, 1876: 121. G. M Thomson, 1881: 208–212. Thomson & Chilton, 1886: 145. Della Valle, 1893: 498, pl. 57, figs. 61–62. G. M. Thomson, 1899: 201. Walker, 1908: 36. Chilton, 1909: 634. Stephensen, 1927: 347.

Orchestia ornata Filhol, 1885: 463, pl. 53, fig. 2.

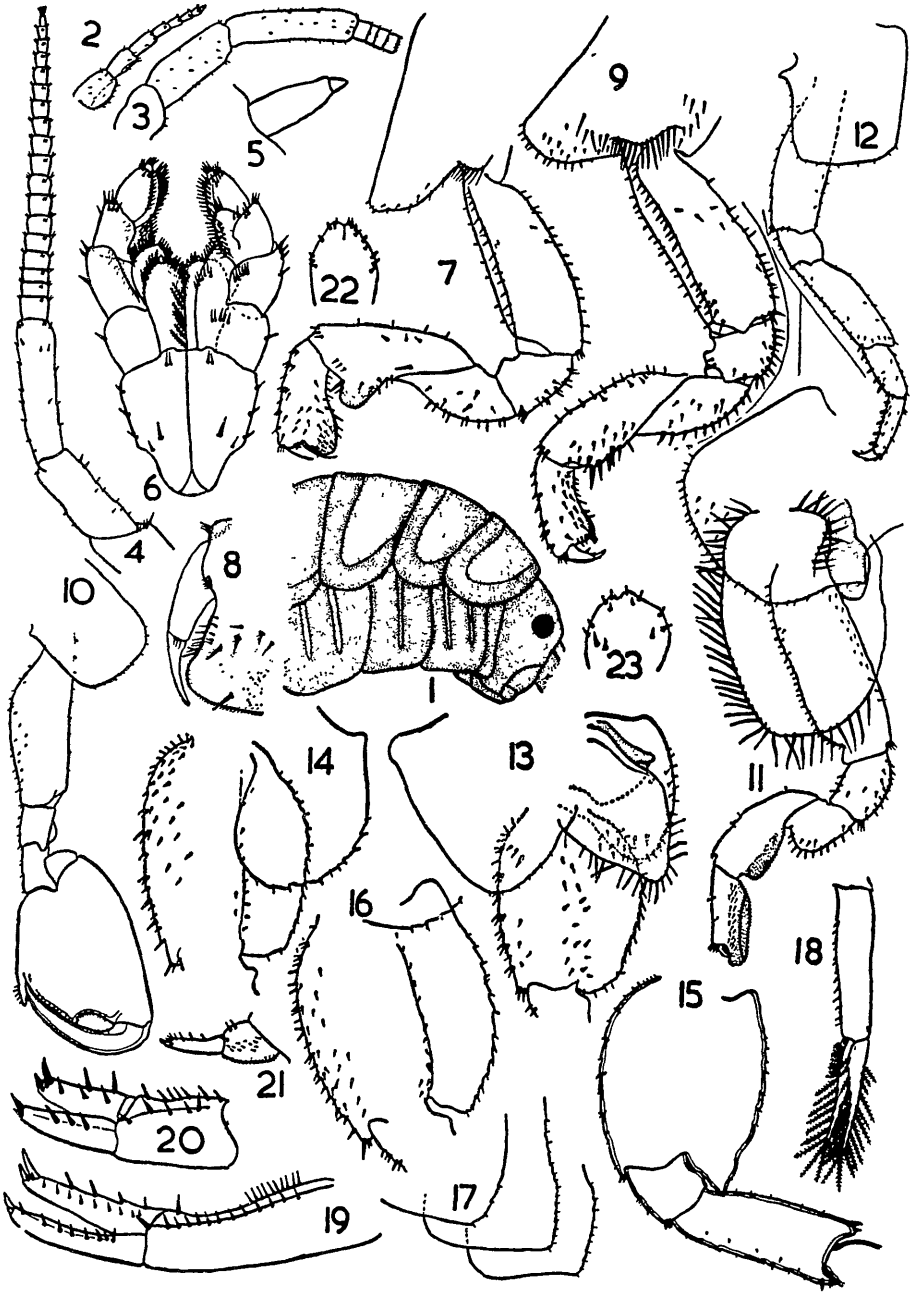
Orchestia serrulata (not Dana) Stebbing, 1906: 535. Chilton, 1909: 632, figs. Chilton, 1920: 83. Stephensen, 1927: 347 Stephensen, 1935: 9.

Orchestia (*serrulata* Dana?) Stephensen, 1938: 247.

Colour in spirit, yellowish-white. Eyes small, round, apart, diameter about ⅓ head width. Length of male (Ewing Island), 26 mm; width 7 mm; depth 5½ mm; peraeon segments with well-developed ridges. Female (Dog Island), length 24 mm; depth 4¾ mm; width 4¼ mm.

ANTENNAE. *First*: Length 3 mm, reaches almost ½ along 5th segment of antenna 2 peduncle Flagellum of 7 segments, end one dome-shaped; first 3 fused, segments have 2 groups of small setae superodistally. Peduncle segments subequal, triangular in cross-section, finely bristled; short stout spines on margins, surface of 1st segment spined. *Female*: Length 1½ mm, reaches end of 4th peduncle segment of antenna 2. Flagellum of 5 segments, as long as last 2 peduncle segments. Peduncle, 1st segment longer than subequal 2nd and 3rd, has small spines on surface and inferior margins; 2nd and 3rd have a few spines distally and marginally. *Second*: Length 13 mm, reaches 4th peraeon segment. Flagellum stout, as long as peduncle, of 22 segments, 4 pairs of equidistant small spines distally on each, end segment tufted. Peduncle, 4th segment ⅔ length 5th, twice length 3rd; all have small stout spines on margins, 4th and 5th spined on surface also. *Female*: Length 7 mm; flagellum slightly longer than peduncle, of 18 segments, segments wider than long Peduncle, 4th segment twice length 3rd and ⅔ length 5th, has about 6 spines inferodistally; a few short stout marginal spines; 5th segment has a few spines on margins and surface.

MOUTHPARTS. *Lower Lip*: Inner lobes absent, principal lobes subrectangular, distal and inner margins strongly setose. *First Maxillae*: Inner plate the shorter, margins distally bristled; outer has minute two-segmented palp. *Second Maxillae*: Inner plate slightly the shorter, long setae distally, fine bristles on inner margin of inner plate, both margins of outer plate *Mandibles*: Molar process has long plumose seta proximally, small tuft of setae distally. Left has spine row of 6 setose spines, upper and lower articles of cutting edge



TEXT-FIG 1—*Orchestia aucklandiae* Sp. Bate. 1, Head and anterior segments. 2, Antenna 1, ♀. 3, Antenna 2, ♂. 4, Antenna 2, ♀. 5, Maxilla 1 palp. 6, Maxilliped. 7, Gnathopod 1, ♂ 8, Gnathopod 1, ♂, palm and dactylos. 9, Gnathopod 1, ♀. 10, Gnathopod 2, ♂. 11, Gnathopod 2, ♀ 12, Peraeopod 1, ♀. 13, Peraeopod 3, ♀. 14, Peraeopod 4, ♀ 15, Peraeopod 5, ♂. 16, Peraeopod 5, ♀. 17, Epimeral plates 1–3. 18, Pleopod. 19, Uropod 1 20, Uropod 2. 21, Uropod 3. 22, Telson, ♂. 23, Telson, ♀.

have 5 teeth each, median has 2. Right has spine row of 4 spines, upper and lower articles of cutting edge have 7 teeth, the lower is U-shaped and has the upper edge fimbriated, the lower toothed. *Maxilliped*: Inner plate margins rounding to distal, 3 stout end teeth, 9 setulose spines on margin outside teeth; setulose spines across inner distal angle and down cleft to bases; strongly bristled outside these. Outer plate rounded, bluntly pointed, reaches ½ along carpus, outer distal margin has row of about 10 setulose spines to blunt end, continuing on inner margin of inner plate in several rows of many finer non-setulose spines; spines obliquely along inner surface from ischium level almost to end of inner plate. Basos has 3 stout marginal spines, 2 on surface proximally, a pair distally below inner plate. Ischium has stout spine on margin, group of spines below inner proximal angle of merus. Merus, carpus and propod longer than wide; somewhat concave on inner surface to enclose outer plate; merus outer margin has 3–4 spines distally, 5–6 below inner distal angle; inner surface strongly bristled. Carpus similarly bristled; outer distal angle and end margin have about 6 strong spines; inner margin a strong field of short spines. Propod subglobular, outer distal angle has several strong spines; end margin and ventral of the two inner margins have several rows of strong spines, dorsal inner margin has about 10 stout serrated-tipped spines. Dactylos very small, dome-shaped, wider than long, has several strong end spines.

GNATHOPODS. *First*: Sideplate subtriangular, numerous short spines on inner ventral surface and margin; long flexible spines above basos insertion. Basos width not ½ length, proximally constricted, triangular in cross-section, margins spined. Ischium slightly longer than wide, anterior margin slightly lobed, posterior convex, strongly spined. Merus larger than ischium, subtriangular, convex posterior margin and surface strongly spined; anterior margin contiguous with proximal ½ of carpus posterior; rest of carpus margin produced in scabrous pellucid lobe, spined at base and either side. Carpus subtriangular, ½ as long again as merus; anterior margin spined. Propod ⅔ carpus length, posterior margin widens to scabrous pellucid lobe; margins and surface strongly spined; short spines each side of base of curved dactylos which is longer than propod is wide; palm transverse has 8 or so short spines each side; surface spines bifurcated or trident-shaped. *Female*: Sideplate trapezoid. Basos width ⅓ length, U-shaped in cross-section, a few surface spines. Ischium subrectangular, length ⅓ basos, a few spines on surface. Merus length more than ½ basos. Carpus nearly as long as basos, anterior margin convex, posterior lacks lobes, has large spines on surface Propod subrectangular, widening a little distally, ½ basos length, length twice width; margins and posterior surface have many short stout bifurcate-tipped spines; posterodistal angle scabrous, palm ½ propod width, has 5 stout serrate-tipped spines each side, is not clearly defined. Stout curved dactylos reaches edge of propod; inner margin has 3 stout short spines. *Second*: Sideplate subrectangular, deeper than wide, small spines on ventral margin; excavate posteriorly, projection much more dorsal and smaller than normal in *Orchestia* Basos width ⅔ length, proximally constricted, small spines on margins and posterior surface Ischium subrectangular, longer than wide, narrower than basos, small spines on posterior margin. Merus slightly narrower, otherwise similar, carpus not ½ merus size, subtriangular. Propod greatly expanded, ½ as long again as wide; palm oblique, defined by sharp tooth on which dactylos tip impinges, excavate about ⅓, thence produced to subacute tooth, thence sinuous to outer defining tooth; many short single spines in row each side of palm, outer margin of defining tooth also spined. Dactylos long, curved, inner margin has single setules. *Female*: Sideplate subsquare, spined ventrally and posteriorly. Gills small, simple, barely reaching past sideplate. Broodplate very large, nearly basos length and as wide as sideplate, anterior and ventral margins setose. Basos, anterior margin sinuous, has many short stout spines, width more than ⅓ length; posterior surface has minute spines, group of small spines on posterodistal angle. Ischium ⅓ basos length, posterior margin convex, posterior margin and surface strongly spined. Merus as long, subrectangular, posterodistal angle rounded, posterior and distal margins strongly spined, anterior margin contiguous with proximal ⅓ of carpus posterior. Carpus piriform, length ⅔ basos, margins convex, anterior has about 3 minute spines, spines at distal angle, a few on surface; posterior free margin expanded in scabrous pellucid lobe with 2 small spines; segment sharply constricted distally. Propod ⅔ basos length, outer dactylos hinge has about 8 strong short spines, short spines from posteroproximal angle to palm, surface posterior to these produced in scabrous pellucid lobe a little past small oblique palm; about 6 short strong spines each side of palm. Dactylos stout, slightly longer than palm, aquiline-tipped, impinges on scabrous lobe

PERAEOPODS. *First*: Sideplate larger than Gn. 2; otherwise similar. Basos width ⅓ length, margins spined; proximally constricted. Ischium subsquare, as wide as basos, spined posteriorly. Merus width ⅓ length, a little wider than ischium; small stout spines on margins and surface. Carpus narrower, just over ½ merus length, small spines anteriorly, stronger ones posteriorly and on surface. Propod a little longer than carpus, similarly spined, width ½ merus. Dactylos short, stout, curved, inner margin spined. *Second*: Sideplate narrowing ventrally; otherwise like Pr. 1 but shorter. *Third*: Sideplate lobes subtriangular, anterior wider and deeper than posterior, its long straight anterior margin rounding to shorter sparsely spined posterior; anterior margin of posterior lobe rounding to longer, slightly convex posterior margin; both margins spined, spines strongest and margin serrate at distal angle. Basos ovate, margins convex, greatest width about ⅔ length; posterior margin has

about 20 single spines, is indistinctly serrated; anterior has stronger and more numerous spines, spines longitudinally down median surface *Female*: Gills not ½ size of sideplate posterior lobe. Broodplate trapezoid, as wide as and slightly less deep than posterior lobe; ventral and distal margins have long flexible setae. *Fourth*: Longer than Pr. 3. Sideplate ovate, longer than wide, reaches ⅔ length of basos, anterior margin rounds to ventral and posterior in one sweep, widens a little distally; a few spines inside anterior margin, ventral margin and distal ½ of posterior spined and serrated; posteroproximal angle distinct, almost right angled. Basos ovate, width ⅘ length, anterior margin and surface have numerous short strong spines, especially proximally, row of spines longitudinally down median surface; posterior margin has about 16 minute single spines, is indistinctly serrate. Other segments have short stout marginal spines, segments are longer and wider than in Pr. 3 except propod which is much longer but very narrow *Fifth*: Basos width ⅘ length; posterior margin slightly convex, lower angle produced downwards in acute process past ischium and slightly overlapping merus; has very small stout spines; anterior margin has stronger single and grouped spines Distal angles of remaining segments strongly spined, posterior margins have small spines Merus anterodistal angle produced slightly in inwardly curving tooth; posterior margin blunter, similarly produced. Propod comparatively wider than in Pr. 4, dactylos longer *Female*: Sideplate small, ventral and posterior margins spined and serrate. Basos ovate, nearly as wide as long, posterior margin slightly convex, has about 14 fine spines and indistinct serrations, both posterior angles, especially proximal, produced in blunt angles.

EPIMERAL PLATES. *First*: Posterior margin distally convex, has 4 or so small spines and serrations. *Second*: Subrectangular, slightly convex ventrally, posterior angle sharp, posterior margin slightly convex, has about 11 spines. *Third*: Subrectangular; almost right-angled posterodistally, posterior margin more or less straight, has about 16 spines.

PLEOPODS. All present, biramous, rami shorter than peduncle, outer peduncle margin spined and outer surface finely bristled; 2 coupling spines. Rami not obviously segmented, have long plumose setae. *Third*: Row of spines on peduncle inner surface.

UROPODS. *First*: Rami shorter than peduncle; peduncle inner dorsal margin has 9–10 long fine spines proximally, a stout spine at distal angle; outer has 13–15 short stout spines; inner ramus has about 4 long spines on inner dorsal margin; about 9 shorter spines on outer dorsal; 2 long and 2 very short end spines; outer ramus about 8 dorsal spines, 1 long and 1 short stout end spine. *Second*: Peduncle slightly longer than rami; 5 and 7 spines on dorsal margins; outer ramus has 3 dorsal spines, 1 long and 2 short end spines; inner ramus has 2 spines on inner dorsal margin, 3 on outer; 2 long and 2 short end spines. *Third*: Peduncle as long as ramus, wider, has 3 spines distally on dorsal margin, minute spines horizontally across median surface of peduncle, ventral margin finely setose. Ramus long, width ¼ length, linear, about 4 small dorsal spines; 1 long and 5 short end spines. *Telson*: Ovate, almost circular. End notched, about 7 strong bottle-shaped spines on margins and surface of each lobe.

LOCALITIES: Ewing Island, Auckland Islands, coll. R. W. Balham, "under boulders above bull kelp," 1946; Dog Island, Auckland Islands, coll. Dr. L. Cockayne, November, 1902; New Zealand (Otago); Campbell Island; Stewart Island; Little Papanui, Otago Peninsula, "washed on beach, 3 ♂♂, 3 ♀♀, up to 24 mm length, coll. E. J. Batham, 24/10/53.

DISCUSSION: The Dog Island collection includes a number of ridged males which are on the average larger than the females; however, the females appear fully mature and none shows any sign of definite ridging.

There has been considerable confusion over the synonymy of this species. Specimens have been attributed to two species, *Orchestia serrulata* Dana (1852) and *Orchestia aucklandiae* Sp. Bate (1862). At various times these species have been considered synonymous, only to be separated again by later authors. Usually, the distinction has been made on the ridging of the peraeon considered characteristic of *O. serrulata*. However neither Dana's original figures of *O. serrulata* nor Bate's original description of *O. aucklandiae* indicate any ridging—Bate indeed speaks of the peraeon being "generally very smooth, clean, and free from hairs."

Thomson (1881) is the first to note this characteristic when he speaks of *O. aucklandiae* as having the "first five segments of the peraeon corrugated more or less", and remarks that *O. serrulata* specimens "agreed in all respects except size (they were under half an inch long) with the description (of *O. serrulata*) in the British Museum Catalogue". Obviously, he considered ridging characteristic of *O. aucklandiae* and had not observed it in regard to *O. serrulata*. Thomson & Chilton (1886) list both species separately.

Della Valle (1893) placed *O. serrulata* under *O. aucklandiae.* Until then, the matter had been reasonably clear. Stebbing (1906) reversed this decision and placed *O. aucklandiae* under *O. serrulata.* His description commences thus: "In male, peraeon segment 1 encircled by a raised edge or corrugation, segments 2–7 (Thomson & Chilton, 2–5) similarly corrugated, except that the front ridge is withdrawn from the front of the segment and sometimes a little broken; this character (not mentioned by Dana and Bate) is wanted in female or barely indicated". Walker (1908) re-established *O. aucklandiae* with the *segments of the peraeon smooth* on the grounds that Stebbing's "gnathopod 1, female, 6th joint slightly narrower at apex than base" differs from Sp. Bate's figure showing the same segment "distinctly wider at the apex"; and that Sp. Bate's specimens were "very smooth". The final result was the recognition of *O. serrulata* as the ridged species.

I have examined samples of all specimens in Chilton's collection which are labelled *O. aucklandiae* and show no peraeon corrugations and I can find no essential differences between these and ridged specimens labelled *O. serrulata.* Specimens from one locality include males 28 mm long with strongly ridged peraeon and the straighter palm in the second gnathopod attributed to *O. aucklandiae,* whilst males of 38 mm long have the mature palm illustrated by Chilton (1909) for *O serrulata* and are without sign of ridging. This would indicate that the straighter palm is the immature form, but that mature males are not necessarily ridged. It would also explain Bate's statement that *O. aucklandiae* is "very smooth". Comparison of all post-1906 descriptions of both species show that other noted differences are few and all come well within the scope of variation to be expected within the species.

The conclusion that *O. aucklandiae* and *O. serrulata* are identical is thus valid if Dana's original *O. serrulata* specimens are not taken into account. Thomson (1899) suggested that Dana's *O. serrulata* was probably *O. gammarellus* or *Talorchestia telluris.* In a latter MSS. (unpublished) he states, "I have omitted Dana's *O. serrulata.* I feel almost convinced that it is only an . . . immature form of [*O. telluris*]." Chilton (1920) comes to a different conclusion, "I think there is no doubt *O. serrulata* Dana is a synonym of *O. chiliensis,* M. Edw.". Stephensen (1927) has apparently missed this lead and lists both species, noting that "the specimens agree totally with Chilton's (1909) text and Bate's figures". In his 1935 paper, he lists *O. serrulata* and states "probably = *O. chiliensis,* possibly = *O. aucklandiae.*" An even later paper (1938) lists specimens as "*Orchestia* (*serrulata* Dana?)".

There is clearly some indication that Dana's *O. serrulata* specimens differ from all later specimens assigned to this species. The figure of the male second gnathopod in Dana's original description is utterly unlike that of *O. aucklandiae* specimens which pass from a transverse palm in immature males to a *slightly* transverse palm in mature animals. At no stage does the palm correspond with the deeply excavate one figured by Dana. Dana's figure suggests a fully mature male, and his specimens were "$9\frac{1}{2}$ lines long, approximately $\frac{3}{4}$in". Bate's *O. aucklandiae* specimens were "rather more than one inch".

For these reasons I consider the specimens described above are *O. aucklandiae* Sp. Bate, and that all records of *O. serrulata* other than Dana's original *O. serrulata* refer to *O. aucklandiae.* Dana's *O. serrulata* is to be regarded as *O. chiliensis,* M. Edw It is ruled out of *T. telluris* by the possession of a subchelate first gnathopod in the female.

Filhol (1885) says *O. ornata* has "chaque anneau . . . circonscrit par un rebord saillant continu". There is little doubt he is referring to *O. aucklandiae.*

Orchestia chiliensis Milne-Edwards, 1840. (Figs. 24–51.)

Orchestia chiliensis Milne-Edwards, 1840· 18. Stebbing, 1906: 537. Thomson, 1899: 199. Chilton, 1920: 82–86, fig. 1. Chilton, 1927: 176. Schellenberg, 1931: 224. Schellenberg, 1935. Stephensen, 1935: 4 Ruffo, 1949· 53–55, fig. 18. Paviour-Smith, 1956: 533, et. seq.

Orchestia serrulata Dana, 1852: 204.

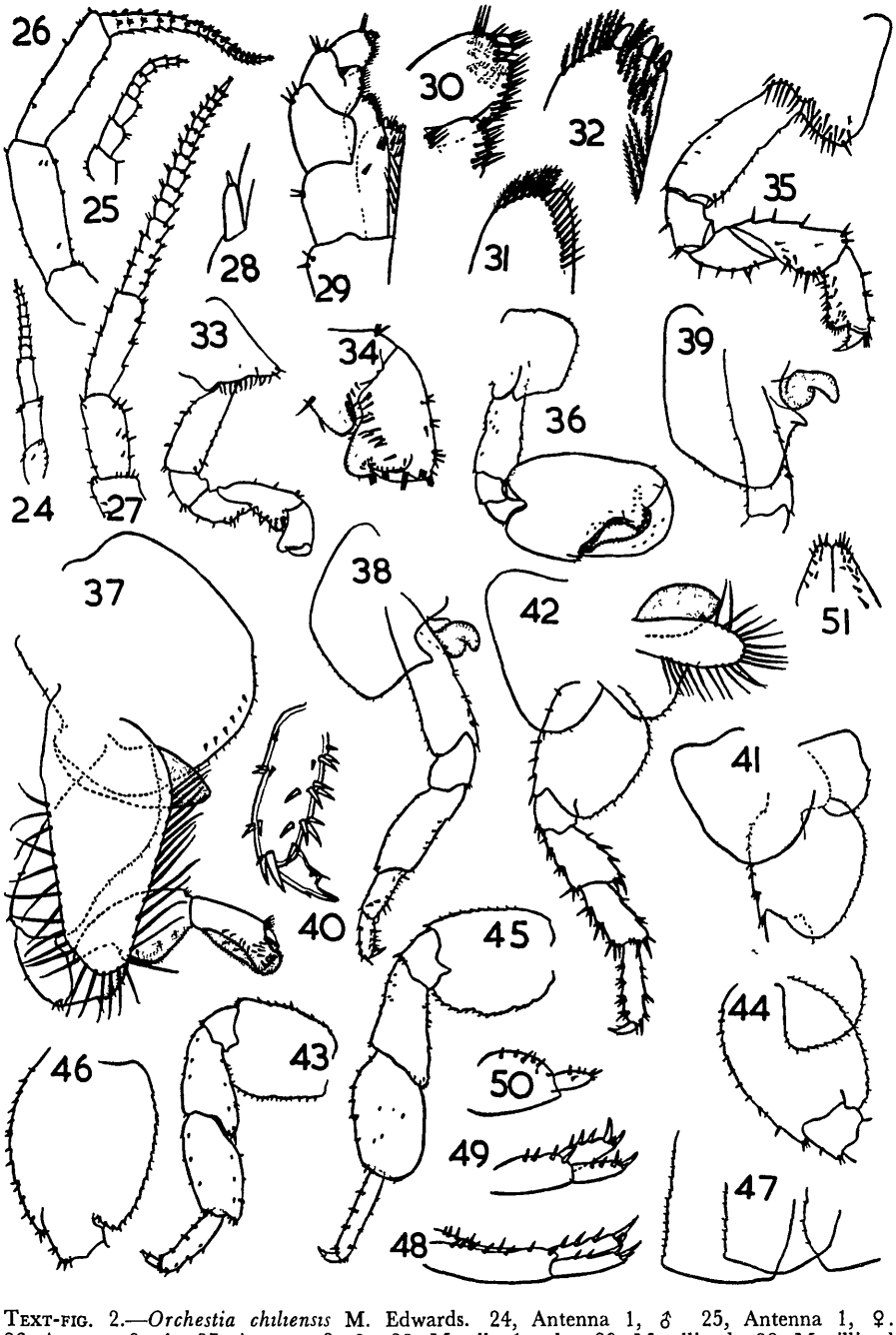
Length, male, 15¾ mm; depth 4½ mm; width 4¾ mm

Differing from *O aucklandiae* as follows:

ANTENNAE *First*· Peduncle, 1st segment width ½ length, 3 or 4 short spines superiorly, 1 or 2 inferiorly, 2nd as wide as 1st, twice its length, 3 or 4 spines at distal angles; 3rd as long as 2nd, narrower, single spine medially on ventral margin, pair on each distal angle. Flagellum ⅔ peduncle length, reaches ⅔ along 4th segment of antenna 2 peduncle, of 8 stout segments, distal angles spined, end segment setae-tufted. *Female*: Flagellum shorter than peduncle, of 6 segments, the 1st 2 fused; segments distally have 2 or so setae inferiorly and superiorly Peduncle, 2nd and 3rd segments longer than 1st, each has setae or spines on distal angles; 1st has 3 stout spines on superior margin, 3rd has single spine ½ along inferior margin. *Second*: Length, 10 mm Peduncle, 3rd segment slightly longer than wide, ⅓ length 4th, a few small spines inferodistally; 4th narrower proximally than 3rd but distally as wide, a few short spines on superior margin, stouter spines inferiorly, a few on surface; 5th segment slightly longer than 4th, similarly spined. Flagellum of 17 segments, the first few fused *Female*: Flagellum longer than peduncle, of 16 segments, 4th peduncle segment ¾ length 5th, segments not excessively stout, 5th has about 4 groups of short stout spines superiorly, 3 groups inferiorly, distal angles have pairs of very fine spines, 4th segment has several short stout spines on margins and inferior surface; 3rd has a few spines superiorly, inferodistal angle has about 5 stout spines.

MOUTHPARTS. *Upper Lip*: Setae distally and on median surface. *Maxilliped*: Inner plate has setulose spines either side of stout end teeth, between and below them and down cleft to basos Outer plate as wide, not as long, setulose spines on end and inner margin as far as end of inner plate, terminated by obliquely transverse row of 5 spines on inner margin; pair of spines set in from outer margin at level of merus base. Basos and ischium outer distal angles have pair of stout spines; merus outer margin distally lobed; carpus similar, has row of 4 spines mediodistally on carpus and on inner merus margin. Propod has 4 or 5 spines, at base of and masking dactylos; spines on inner margin, short row across propod Dactylos rudimentary, has 4 or 5 end spines

GNATHOPODS *First*: Sideplate widening anterodistally, ventral margin trilobed, has long setae. Basos width ⅓ length, a few spines anteriorly, larger spines distally, posterior margin has 4–5 stout spines, pair on distal angle Ischium small, subrectangular, posterior margin has single spine medially, 2 distally Merus little larger, small scabrous pellucid lobe medially on posterior margin, guarded by about 6 spines Carpus long, lobed posterodistally, anterior margin has 2 single spines, about 4 anterodistally; 3 or 4 spines on surface; posteriorly transverse row of 4 and another of 2 proximal to scabrous lobe; 2 long spines at base of lobe, row of 4 on carpus end margin anterior to lobe. Propod shorter, widening distally, about 5 groups of 1–6 spines on anterior margin; field of spines from dactylos inner base to posteroproximal angle, transverse row of about 5 spines at dactylos inner base. Dactylos curved, reaches ⅔ across palm, has 3 or 4 small spines medially across surface; palm has row of short spines either side, rows of 3 and 5 very short spines where dactylos impinges, about 4 spines on distal margin of lobe in same area. *Female*: Sideplate subtriangular, anterodistal angle almost right-angled, ventral margin has several long stout spines, ventral surface and basos insertion have long stout flexible setae. Basos width ⅓ length, posterior margin has 2 single spines, pair at distal angle; anterior margin has 7–8 fine spines. Ischium nearly ½ basos length, longer than wide, posterior margin has single spine medially, 2 spines at distal angle Merus longer than ischium, posterior margin convex, has about 6 stout spines. Carpus anterior margin has 3 single spines, 3 on distal angle, surface and anterior margin spined Propod as long as merus, anterior margin has 3 groups of 1–3 spines, spines and setae on distal angle; posterior margin and surface have numerous short stout spines; short strong chevron-tipped spines both sides of scabrous palm. Dactylos as long as palm, inner margin has 2 strong spines, 2 medially on surface *Second*: Sideplate spined ventrally and posteriorly Basos has sinuous posterior margin; anterior margin spined and serrate. Ischium very small, a small spine posterodistally. Merus still smaller, has similar spine. Carpus even smaller Propod has 2 very small spines anteriorly below dactylos base; palm oblique, has sharp triangular tooth near base of dactylos and then deeply excavate; recessed pocket where dactylos impinges; palm bordered either side by stout short bottle-shaped seta-tipped spines; whole cutting edge minutely corrugated as is inner margin of dactylos, dactylos has number of small spines on inner margin and surface, these irregularly situated, inner surface slightly protuberant near tip, then sharply constricted. *Female*: Sideplate barely excavate, ventral margin has fine setae, a few small strong spines anterodistally in row set back from margin Gills straplike Broodplate longer than basos, width ½ length Basos margins convex, widest proximally, width not ½ length; anterior margin has fine single setae,



TEXT-FIG. 2.—*Orchestia chilensis* M. Edwards. 24, Antenna 1, ♂ 25, Antenna 1, ♀. 26, Antenna 2, ♂. 27, Antenna 2, ♀. 28, Maxilla 1 palp. 29, Maxilliped 30, Maxilliped palp—propod and dactylos. 31, Maxilliped—end of outer plate. 32, Maxilliped—end of inner plate 33, Gnathopod 1, ♂. 34, Gnathopod 1, ♂, propod and dactylos 35, Gnathopod 1, ♀. 36, Gnathopod 2, ♂. 37, Gnathopod 2, ♀. 38, Peraeopod 1, ♂. 39, Peraeopod 2, ♂ 40, Peraeopod 2, ♂, propod and dactylos. 41, Peraeopod 3, ♂. 42, Peraeopod 3, ♀ 43, Peraeopod 4, ♂. 44, Peraeopod 4, ♀. 45, Peraeopod 5, ♂. 46, Peraeopod 5, ♀ 47, Epimeral plates 1–3, ♀. 48, Uropod 1, ♀. 49, Uropod 2, ♀ 50, Uropod 3, ♀ 51, Telson, ♀.

posterior about 3 small spines on distal ½. Ischium much narrower, width not ½ length, length nearly ½ basos, has single spine medially on posterior margin, 3 on distal angle. Merus shorter than ischium, distal ½ of posterior margin forms scabrous lobe with about 5 spines. Carpus subtriangular, almost ovate, greatest width ½ length, posterior margin scabrous Propod ½ basos length, long fine spines at dactylos outer hinge; posterior margin expanded in scabrous pellucid lobe past dactylos tip; fine spines on surface along base of scabrous area to palm, a few spines on scabrous area; palm slightly convex, has about 5 small spines Dactylos short, curved, as long as palm, inner margin has about 4 fine spines.

PERAEOPODS. *First*: Basos width ¼ length, posterior margin has 8 spines, anterior has smaller spines. Ischium small, subrectangular, has about 3 spines posterodistally. Merus almost basos size, anterior margin widens proximally, is slightly produced distally, has 2–3 short spines proximally, pair at posterodistal angle, short seta-tipped spines on posterior margin. Carpus has 2 short spines anteriorly, 2 large and several short ones posteriorly Propod narrower, anterior margin has 4 groups of 2–3 small spines, large pair distally; posterior has 4 groups of 1–4 spines, at least one large spine in each group. Dactylos simple, narrowed sharply medially with ring of at least 3 short setae. *Second*: Sideplate anterior margin oblique Dactylos somewhat excavate. Like Pr. 1 but slightly smaller *Third*: Sideplate deeper than wide, posterior lobe spined and serrate ventrally and posteriorly. Basos anterior margin has several single and paired stout spines; posterior serrate and minutely spined, not as wide as deep. Ischium small, anterodistal angle has 3 spines Merus piriform, ½ basos length; distal width ⅔ length; anterior margin has 4 groups of 1–4 stout spines; distal ones large; posterior has 2–3 single spines, 4–5 on distal angle, 2 of them very strong. Carpus is long, posterodistal angle not as pronounced, width ½ length, anterior margin has 3 prominent groups of 3–5 strong spines, posterior has 2 groups of 1–2 small spines, distal angle has at least 5 spines, 2 of them very strong. Propod slightly longer than carpus, width ¼ length, 4 groups of 2–3 small strong spines anteriorly, 4 groups of 2–4 smaller spines posteriorly. Dactylos short, stout, curved, inner margin has spine, outer has 2. *Fourth*: Basos width ⅔ depth; anterior margin has about 12 short stout single spines; posterior is minutely spined and serrate, distal angle rounds to ischium. Sideplate reaches nearly ½ down basos, anterior margin straight, ventral rounding gradually to posterior; anterodistal angle, ventral and posterior margins spined and serrate Merus as in Pr. 3, but wider and longer, other segments comparatively wider and longer than in Pr. 3, spines more numerous but smaller Carpus ovate, width ⅗ length, as long as basos; propod as long as carpus, ½ as wide. Carpus and merus more slender in female. *Fifth*: Basos slightly longer than wide; anterior margin convex, has 12–16 short stout spines; posteroproximal angle distinct; posterior margin serrate and spined; distal angle almost reaches merus, is fairly sharp in female, spines and serrations pronounced Merus expanded more distally than in Pr 4, both margins have small spines, group of spines on distal angles Carpus ovate, width ⅔ length, spined only anteriorly and distally around propod base. Propod as long as carpus, ⅓ to ¼ its width, spines very small except 2 or 3 at propod distal angle; both margins spined. *Female*: Merus and carpus more slender than in male

EPIMERAL PLATES. *First*: Ventral margin straight, distal angle sharp but not right-angled; posterior margin has about 5 minute spines and serrations. *Second*: Anterior margin rounds to ventral, posterodistally right-angled; posterior margin straight, serrate, has about 8 minute spines *Third*: Margins straight, posterior finely serrate, has about 13 minute spines

UROPODS *First* Peduncle, dorsal margins have several strong spines each, furthermost spine on inner margin much the largest; inner ramus has 3 stout dorsal spines, 1 or 2 very long and 2 or 3 short end spines; outer has 2 dorsal spines, 1 long and 2–3 stout end spines *Second*: Peduncle has about 4 dorsal spines, a few small surface spines; inner ramus has 3 dorsal spines, 3 very short and 2 long end ones, outer has 2 dorsal spines, 2 long and 2 very short end ones *Third*: Peduncle larger than ramus, has about 7 marginal spines; ramus slender, has 4 stout dorsal spines, 6 end spines *Telson*: Subtriangular, longer than wide, outer surfaces and end strongly spined

LOCALITIES: Moa Point, Wellington, coll. C. A. Bradstock, 30/7/48; under rotting seaweed, Island Bay, coll D E. H., 15/8/49; Kapiti Island, under logs on beach, coll. R. R Forster, 29/8/47; Hooper's Inlet, Otago Peninsula, coll. K. Paviour-Smith; Portobello Marine Biol Stn beach near crib, coll. R Stark, 14/10/52.

HYPOTYPES: Slides No. 19, male; female, Quail Island, Lyttelton, 10/10/1903, Chilton Collection

DISTRIBUTION: North and South Islands of New Zealand; Kapiti Island; Chatham Islands; Juan Fernandez; Chile.

DISCUSSION: This species is very common in New Zealand and is also found in South America and on Juan Fernandez Island. The New Zealand specimens are supralittoral and agree very closely with Ruffo's figures for *O. chiliensis* from Chile They are easily recognisable by the stout antennae and the greatly expanded merus and carpus of the adult male 5th peraeopod.

Chilton (1920) records a "terrestrial variety" from Juan Fernandez which he calls *O. chiliensis* var. *gracilis*. Although Chilton's figures suggest a difference in his variety in shape of the male second gnathopod from the normal *O. chiliensis* which he figures, and although the gills also seem to differ in the figures, I am not satisfied that we are here dealing with two species. This question will have to await further detailed study. I have not seen Schellenberg's 1935 paper. Miss K. Paviour-Smith (1956) records this species from a salt meadow, Hooper's Inlet, Otago Peninsula, and gives detailed ecological notes.

Orchestia bollonsi Chilton, 1909 (Figs. 52–68.)

Orchestia bollonsi Chilton, 1909: 635–636, fig 6. Stephensen, 1927: 348. Stephensen, 1935: 4. Paviour-Smith, 1956: 552.

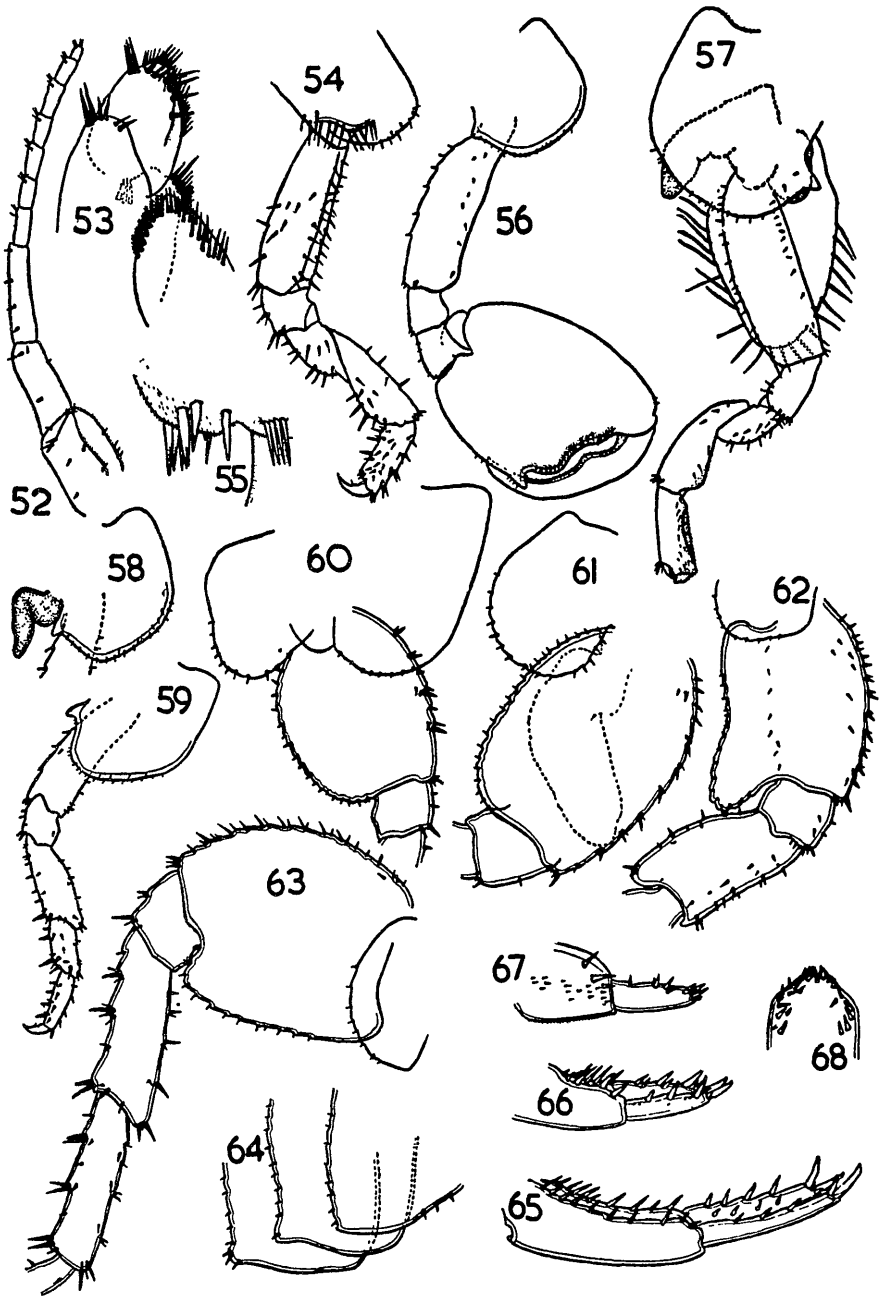
Male, length 12 mm, depth 2¾ mm, width 2½ mm Colour in spirit yellow with orange mottling.

ANTENNAE. *First*: Length 2 mm; flagellum of 7 segments in male, 6 in female, shorter than peduncle; end segment small, tufted; others have short spines distally. Peduncle segments succeedingly narrower, all have short stout spines laterally, a few on surface *Second*: Reaches 3rd peraeon segment, length 5 mm Flagellum of 18 segments in male, 16 in female, shorter than peduncle, proximal segments wider than long, distal ones longer than wide with angles more rounded. Peduncle, 4th segment twice length 3rd, as wide, ⅘ length 5th, wider; all have short stout spines inferiorly and on surface; 5th spined superiorly.

MOUTHPARTS. *Maxilliped*: Inner plate has 6 setulose spines outside end teeth, about 10 spines across inner distal angle on one side, 4–5 spines on other Outer plate has spines set back from inner distal margin in groups rather than in straight row. Basos margin has a few stout single spines. Propod has several rows of short spines on one side along distal ½ of inner margin and on end margin, masking dactylos; on other side merus has 4 or so spines on inner distal angle, carpus has median distal group of spines, spines on inner distal angle, propod has a row of 5–6 stout spines at dactylos base meeting row of about 3 stout spines a short distance down inner margin—in *O. aucklandiae* this row continues down propod much further and has as many as 9 spines

GNATHOPODS. *First*: Sideplate ventrally spined. Basos width ½ to ⅓ length, triangular in cross-section, margins spined, a few spines on surface Ischium subsquare, as wide as basos. Merus about ⅔ carpus length. Carpus anterior margin has single spines, group at distal angle; distal ½ of posterior margin produced medially in small scabrous pellucid lobe, spine on each side of lobe and on segment surface. Propod slightly shorter, a little narrower, groups of 2 or 3 spines anteriorly, posterior ½ of propod surface spined. Palm has 7 or so small spines each side, 2 stout spines at inner base of long stout dactylos which reaches end of palm, is spined on inner margin. Palm scabrous, about ½ propod width *Female*· Carpus anterior margin has about 3 single stout spines, 3 or so smaller spines on distal angle; posterior margin has about 5 stout marginal spines, a few surface spines Propod as long as merus, narrowing slightly distally, surface and margins have strong spines, palm scabrous, not distinctly defined, has 3 or 4 strong to fine spines on each side Dactylos greatly overlaps palm. *Second*: Basos width more than ⅓ length, subtriangular in cross-section, anterior margin and surface have very few small spines, posterior margin and surface have a number of very small stout spines Ischium anterior margin lobed, recessed a little to take propod when latter bent back. Merus slightly smaller than ischium, spined posteriorly and on surface, carpus smaller. Propod longer than basos, longer than wide; palm oblique, sinuous, has defining tooth pointed and prominent, tooth spined on outer margin past finger tip. Dactylos stout, swollen near base, longer than palm, fits in small recess on palm below tooth, this tooth and portion of outer propod palm masked by overlapping dactylos; very minute spines on inner minutely corrugated margin, palm minutely corrugated. *Female*· Sideplate wider than deep, angles broadly rounded, anterodistal margin finely setose Broodplate ovate, setose, almost reaching ischium, greatest width ⅔ length Basos anterior margin convex, has short fine spines, posterior has similar spines set in a little from margin; basos constricted somewhat distally. Ischium subrectangular, width ½ length, as long as merus and about ⅓ basos length; anterodistal margins and posterodistal angle spined. Merus posterior margin convex, spined Carpus has a few fine spines on anterior surface and anterodistal angle Propod about ⅔ carpus length, posterior margin scabrous and pellucid, posterior surface has fine spines; group at outer dactylos base also. Dactylos as long as palm.

PERAEOPODS. *First*: Sideplate wider than deep, posterior excavation relatively distal. Ischium slightly narrower than basos Merus slightly narrower than ischium, widening distally Propod longer than carpus, narrower, anterior margin has short spines, posterior has stronger spines. Dactylos long. *Second*: Sideplate somewhat trapezoid, wider than deep. Segments shorter and wider than in Pr 1; spines stronger. *Third*· Shorter than Pr 2 Sideplate anterior lobed spined ventrally, posterior lobe spined ventrally and posteriorly Basos ovate. anterior margin has spines in groups of 2 or 3; posterior strongly convex, almost semicircular,



TEXT-FIG 3—*Orchestia bollonsi* Chilton. 52, Antenna 1, ♂ 53, Maxilliped palp and outer plate 54, Gnathopod 1, ♀. 55, Gnathopod 1, ♀, palm. 56, Gnathopod 2, ♂ 57, Gnathopod 2, ♀. 58, Peraeopod 1, ♂. 59, Peraeopod 2, ♂ 60, Peraeopod 3, ♂. 61, Peraeopod 4, ♂ 62, Peraeopod 5, ♂. 63, Peraeopod 5, ♀. 64, Epimeral plates. 65, Uropod 1, ♂ 66, Uropod 2, ♂. 67, Uropod 3, ♂ 68, Telson.

with many more single minute spines. Spines stronger on other segments than in Pr. 2, segments mostly shorter and wider. *Fourth*: Sideplate has distinct anteroproximal angle; anterior and posterior margins proximally straight but rounding distally to convex ventral, all spined. Basos width about ⅔ length, margins strongly convex, posterior has small single spines. *Fifth*: Basos as wide as Pr 4, basos is long, slightly longer than wide; anterior margin has strong short spines; posterior produced to serrated flange, with very short but strong spines; posterodistal angle produced downwards almost to merus, sharply rounded; posteroproximal angle distinct. Other segments wider and longer than in Pr. 4; merus as long as basos is wide, width more than ½ its own length, anterodistal angle not produced downwards much, posterodistal angle a little more obviously produced *Female*: Basos ovate, almost as wide as long, posterior margin has distal ⅔ serrate with small stout spines; posterodistal angle broadly rounded, projecting downwards only slightly, posterior margin almost straight Merus ⅔ basos length, width not ½ length, distal angles not projecting strongly downwards.

EPIMERAL PLATES. *First*: Subtriangular, anterior margin slightly convex, has 3 or so strong spines; posterior margin slightly convex, spined, serrated *Second and Third*: Posterodistal angle a little produced and spined; posterior margin sigmoid, spined, serrated.

PLEOPODS. Inner ramus the longer; peduncle has a few surface spines

UROPODS. *First*: Peduncle has both dorsal margins spined; short spine between rami; rami spined dorsally, both have 2 long and 2 short end spines. *Second*: Inner ramus has 2 dorsal rows of spines, outer has 2–3 dorsal spines, otherwise as in Uropod 1. *Third*: Ramus longer than peduncle, 4 spines on dorsal end of peduncle, finely bristled ventrally, surface has field of minute spines longitudinally on surface; ramus has about 5 spines dorsally, end cluster of about 5. *Telson*: Margins strongly spined

LOCALITIES: Snares Islands, leafmould, coll. R. A. Falla, December, 1947; Dog Island, Auckland Islands, L. Cockayne.

DISCUSSION: *Orchestia bollonsi* was first described by Chilton from Bounty Islands under guano, from Snares Island and from Ewing Island Stephensen does not add any new information. Amongst specimens I have examined are some collected by Dr. R. A. Falla in December, 1947, labelled " ex leaf mould ". As most of the vials of amphipods collected on this trip contain two or more species, suggesting a gathering together of material, either during field collecting or later during extraction from collected leafmould, this may be a slightly misleading habitat designation.

Chilton remarked that he described this species with great hesitation, and that immature males were difficult to distinguish from specimens he had referred to *O. aucklandiae* Bate, while specimens from Preservation Inlet and other places in the South Island of New Zealand seemed to approach *O. chiliensis* M. Edw

O. bollonsi is certainly close to *O. aucklandiae* but there are a number of differences. Most obvious are the sideplate of the second gnathopod and of the first and second peraeopods which are trapezoid and much wider than deep, and the ventral margin of the first epimeral plate which has 3 or 4 strong spines anteriorly. In *O. aucklandiae* these spines are not present, and the sideplates are subrectangular, as deep as or deeper than wide, with the posterior excavation relatively much higher than in *O. bollonsi*. Other differences are the proportionately much longer and slimmer peduncle segments in the first antennae of *O. bollonsi*, the straighter palm in the male second gnathopod, and the fact that the dactylos lies outside and over the defining palm projection instead of inside it as in *O. aucklandiae*. There are no ridges on the peraeon as in most adult male *O. aucklandiae*.

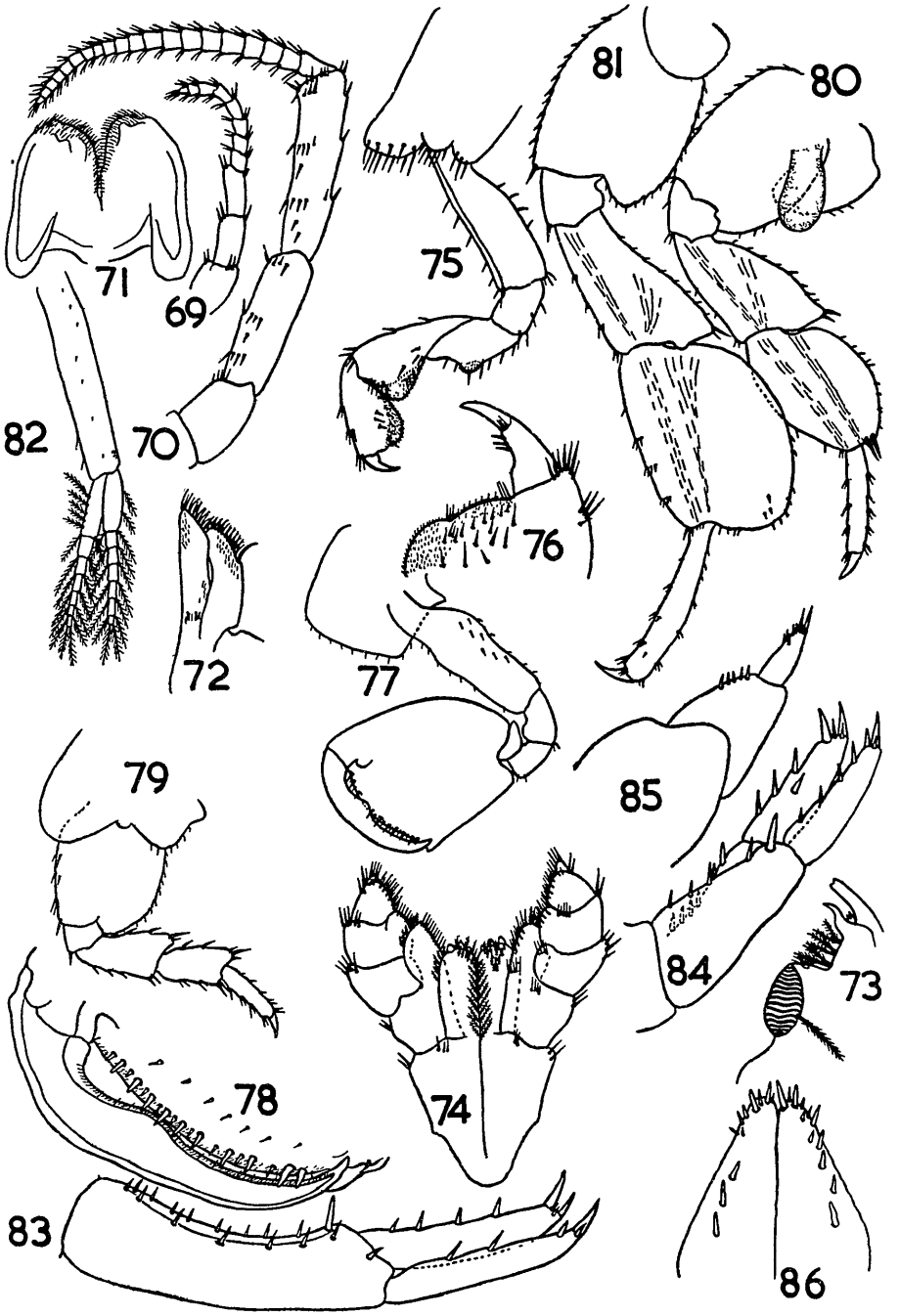
These specimens agree very well with Chilton's description of his Snares Island specimens.

Miss Paviour-Smith has recorded this species from a salt meadow in Hooper's Inlet, Otago Peninsula, occurring " on hummocks, under logs on salt meadow, and in ecotone ".

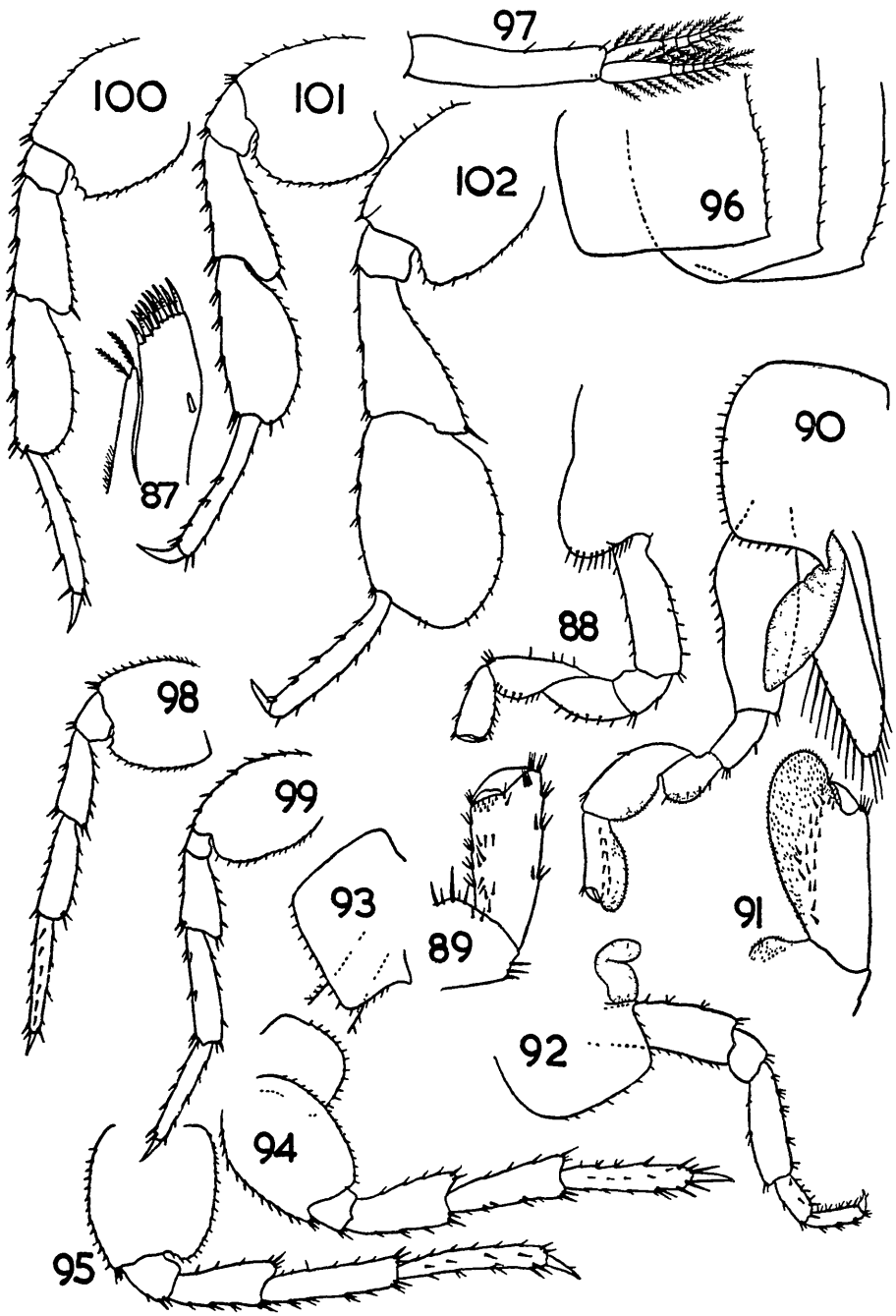
Orchestia miranda Chilton, 1916. (Figs. 69–102.)

Orchestia miranda Chilton, 1916: 354 Stephensen, 1935. 7

Colour in life yellow-grey and grey-blue; in spirit yellowish-orange with orange tinge along back, antennae and peraeopods. Male, length 17½ mm, width 3 mm, depth 4 mm, female, length 14 mm, width 3 mm, depth 4 mm (Slide 76).



TEXT-FIG. 4—*Orchestia miranda* Chilton Male. 69, Antenna 1 70, Antenna 2. 71, Lower lip. 72, Maxilla 2 73, Right mandible. 74, Maxilliped. 75, Gnathopod 1. 76, Gnathopod 1, palm and dactylos. 77, Gnathopod 2. 78, Gnathopod 2, palm and dactylos. 79, Peraeopod 3 80, Peraeopod 4. 81, Peraeopod 5. 82, Pleopod 2. 83, Uropod 1. 84, Uropod 2 85, Uropod 3. 86, Telson.



TEXT-FIG. 5 —*Orchestia miranda* Chilton. 87, Maxilla 1. 88, Gnathopod 1, ♀. 89, Gnathopod 1, ♀, propod and dactylos 90, Gnathopod 2, ♀. 91, Gnathopod 2, ♀, propod and dactylos 92, Peraeopod 1, ♂. 93, Peraeopod 2, ♂ 94, Peraeopod 4, ♀. 95, Peraeopod 5, ♀. 96, Epimeral plates. 97, Pleopod 2 98–99, Growth stages, Pr. 4, juv. male. 100–102, Growth stages, Pr 5, juv. male.

ANTENNAE *First*: Length 2 mm, reaches 5th segment of antenna 2 peduncle. Peduncle, 2nd and 3rd segments subequal, 1st slightly shorter. Flagellum of 8 segments, as long as peduncle, peduncle and flagellar segments all have small spines on distal angles, end segment tufted *Female*: Flagellum of 6 segments, antenna length 2 mm. *Second*: Length 8 mm. Peduncle, 3rd segment ⅓ and 4th ⅔ length of 5th, 3rd longer than wide, all spined inferodistally; 4th and 5th also on inferior margin and surface; 5th spined on end and superior margin also. Flagellum a little shorter than peduncle, of 19–20 segments, each with 4 equidistant pairs of short spines distally, end segment tufted. *Female*: Length 5½ mm, reaches 5th peraeon segment; flagellum of 19 segments

MOUTHPARTS. *Left Mandible*: Cutting edge has 2 non-toothed articles, lower has tuft of bristles on inner base. *Maxilliped*: Inner plate has setulose spines between and outside distal teeth, across inner distal angle and down cleft to basos. Outer plate as wide, has setulose spines on end, non-setulose spines down inner margin to end of inner plate, there terminated by obliquely transverse row of spines. Basos to propod segments have each 2 or more spines on outer distal angles. Basos to carpus segments have closely set rows of 2–5 spines on inner distal angles. Carpus inner margin somewhat lobed, has strong spines along most of margin. Propod inner margin has similar strong spines, extending over inner distal surface, partially masking rudimentary spine-tipped dactylos.

GNATHOPODS *First*: Sideplate trapezoid, ventral margin trilobed, lobes have long setae Basos width ⅓ length. Ischium small, longer than wide, anterior margin ½ length posterior, a few spines on posterior margin and angle. Merus posterior margin twice ischium length, medially produced in small scabrous lobe, has a few spines. Carpus longer than merus, a few spines on anterior margin, group on distal angle; posterior free margin produced in scabrous lobe, base of lobe and carpus distal margin spined. Propod as long as merus, widens distally, posterior margin forms scabrous lobe projecting inconspicuously beyond minutely spinose palm, palm has stronger short spines Dactylos short, inner margin has about 3 small spines, as long as palm but does not reach lobe margin. *Female*: Sideplate narrow, anterior lobe produced downwards a little Merus lacks small scabrous lobe of male; carpus, distal ½ of posterior margin spined, not produced in pellucid scabrous lobe. Propod ⅔ carpus length, margins and posterior surface have strong spines; palm slightly oblique, has small spines, palm and tip of posterodistal angle of propod scabrous. Dactylos reaches end of palm and propod. *Second*: Sideplate minutely spined posteriorly and ventrally, posteriorly acutely excavate. Basos width ⅓ length, anterior margin frequently and minutely spined. Ischium a little lobed anterodistally, posterodistal angle spined. Merus anterior margin contiguous with proximal margin of small cup-shaped carpus, 2 spines and rounded posterodistal angle. Propod as long as basos, distally almost as wide as long, margins naked, palm slightly oblique, a little convex, has alternately long and short seta-tipped spines each side. Dactylos impinges on palm, fits into small groove at end; is proximally swollen about ⅓ along, curved, has minute spines on inner margin, palm and inner dactylos margin minutely crenulate. *Female*: Sideplate anterodistal angle rounded. Basos posterior margin slightly convex; widest proximally about ⅓ along—width there ½ length; anterior margin and posterodistal angle have a few minute spines. Ischium subrectangular, width ½ length, a few spines posteriorly. Merus posterior margin expanded in scabrous lobe, lobe base spined. Carpus twice merus length, anterior margin has a few minute spines, posterior expanded in non-spined scabrous pellucid lobe. Propod shorter than carpus, anterior margin straight; row of spines along base of scabrous lobe to palm, a few small spines along palm and at its end. Dactylos short, curved, as long as palm, has a few spines at anterior base.

PERAEOPODS *First*: Basos anterior margin the more frequently spined. Ischium posterodistal angle spined Merus ⅔ basos length, narrower, has a few short stout spines on margins Carpus linear, anterior margin has a few short spines, posterior several large stout ones. Propod narrower still, longer than carpus, margins spined, distal spines very strong. Dactylos has a single spine on each margin. *Third*: Sideplate posterior lobe spined posteriorly. Basos, anterior margin has single and paired short stout spines, posterior serrate with numerous single and minute spines. Ischium small, subsquare, anterodistally spined, ⅓ merus length Merus piriform, margins spined, distal angle has larger stout spines. Carpus slightly shorter, subrectangular, margins spined, distal spines the strongest. Carpus as long as propod. Propod ⅓ carpus width, anterior margin has stronger spines than posterior. Dactylos short, stout, curved. *Fourth*: Basos and ischium as in 3rd; basos longer than wide, ischium not ½ merus length, merus widens greatly posteriorly so distal width twice proximal, margins have very small spines, 2 large spines posterodistally. Carpus ovate, greatly expanded, as long as merus and slightly wider, similarly spined. Propod ⅔ carpus length, linear, width ¼ length, margins have groups of small spines, largest spines distally. *Female*: Merus ¾ basos length, width ½ length. Carpus a little longer, width ⅓ length; both segments have stout marginal spines. *Fifth*· Basos width ¾ length; distal angle sharper than in 4th. Merus expanded, posterior margin not convex; carpus also expanded, nearly as wide as long, greatly convex posteriorly. *Female*: Carpus as long as basos. Merus ¾ basos length, width ½ length, carpus width ¼ length.

EPIMERAL PLATES. *First*: Posterior margin serrate, has about 4 minute spines, posterodistal angle slightly produced. *Second*: Posterior margin straight, serrate, has minute spines. *Third*: Anterodistal angle sharper than in 2nd, posterior margin has more spines

PLEOPODS. Rami of 6–8 segments, inner slightly the longer, peduncle outer margin sparsely spined.

UROPODS. *First and Second*: Peduncle dorsal margin has double row of short stout spines. Rami have similar spines dorsally, larger ones at end. *Third*: Peduncle and rami somewhat globular, peduncle much larger than ramus, has about 5 stout spines on end of dorsal margin, ramus has 10 or so stout seta-tipped spines on end and distally on dorsal margin. Peduncle in female as figured by Chilton. *Telson*: Longer than broad, narrowing distally, stout spines on margins and surface.

LOCALITY: Stephens Island, Cook Strait, New Zealand, gravel beach, coll. D. E. H., 1949.

DISCUSSION: Chilton described this as a new species from Stephens Island, commenting that it was very close to *O. chiliensis* and perhaps belonged to a population of the latter in which the form of the male 5th peraeopod was only an extreme development. The specimens described above are also from Stephens Island, where they were taken on a gravel beach in very great numbers. In one place, under seaweed, there were so many of these amphipods that stones the size of a golfball were moved by the seething mass of animals underneath. A large number were examined at all stages, and although the 5th peraeopod is only developed to the extent figured by Chilton in mature males, it is nevertheless distinctive for the species and has not been found in any other populations of *O. chiliensis*. For that reason, and because of other small differences, I regard *O. miranda* as a valid species, endemic to, and probably localised on, Stephens Island. Since the beaches on this island are difficult of access, I record that *O. miranda* occurs on the beach of the small bay immediately to the D'Urville Island side of the main landing stage.

Orchestia tenuis Dana, 1852. (Figs. 103–137.)

Orchestia tenuis Dana, 1852: 202. Dana, 1853 and 1855: 872, pl. 59, fig. 1. Sp. Bate, 1862: 29, pl. 4, fig. 10. Stebbing, 1899: 402 (in part).

Parorchestia tenuis Stebbing, 1899: 402. Stebbing, 1906: 557–558. Chilton, 1909: 642. Chilton, 1911: 565 Stephenson, 1935: 14. Shoemaker, 1935: 66.

Orchestia sylvicola (? non Dana) Thomson and Chilton, 1886: 145. Thomson, 1881: 212, pl. 7, fig 4. Della Valle, 1893, 510 Stebbing, 1899: 402.

Orchestia gammarellus Della Valle, 1893, 501 (in part).

Parorchestia sylvicola Stebbing, 1899: 402 (in part) Stebbing, 1906: 558. Chilton, 1911: 566. Chilton, 1927: 176. Stephenson, 1935: 14 Shoemaker, 1935, 66

Allorchestes recens Thomson, 1884: 235, pl 13, figs 2–5 Thomson and Chilton, 1886: 145. Stebbing, 1888: 1639

Parorchestia stewarti f. *brevicornis* Stephensen, 1938: 254–256, fig. 4.

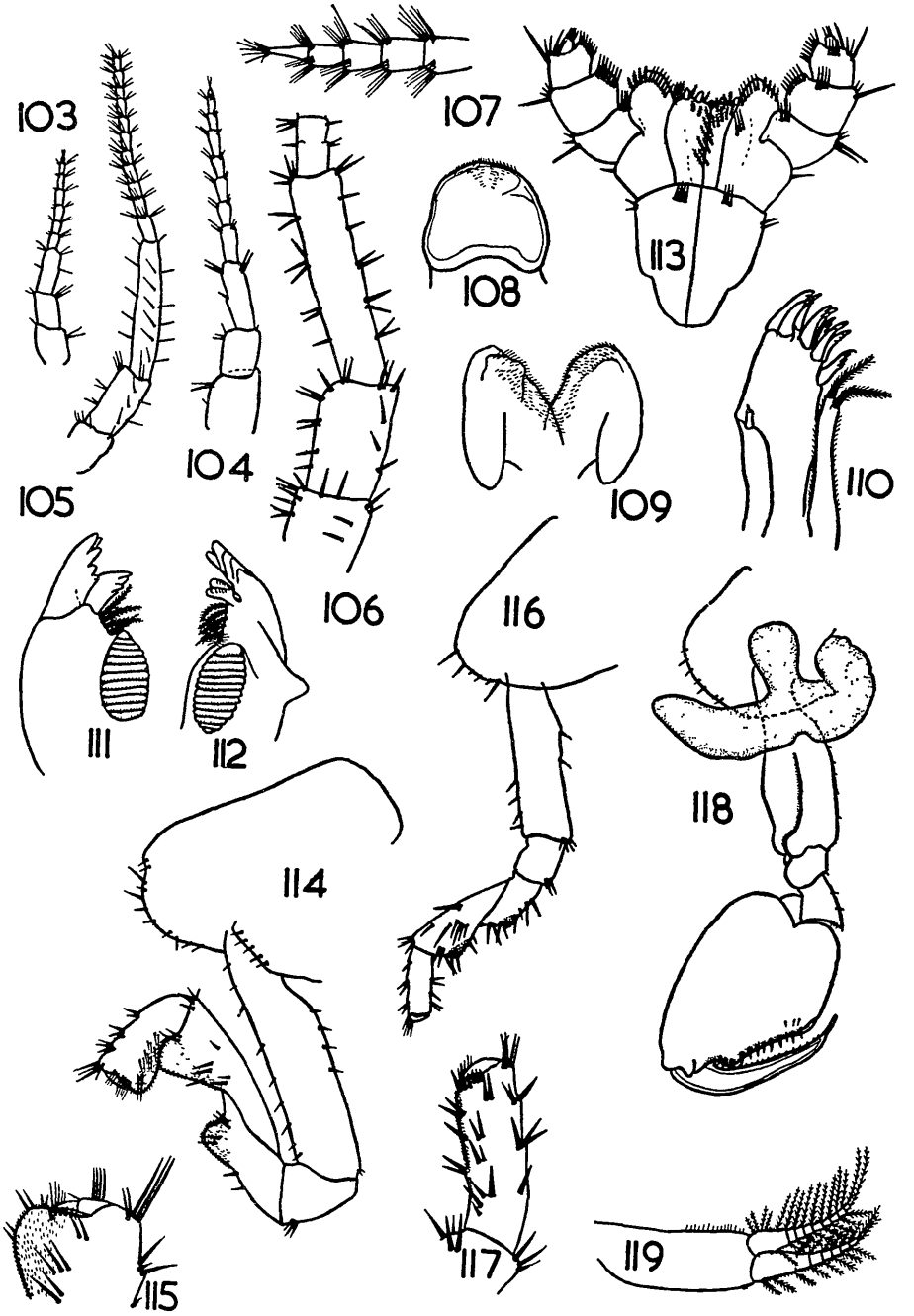
Parorchestia stewarti f. *longicornis* Stephensen, 1938: 257–258, fig. 5

Colour in spirit white. Length 10½ mm, depth 2½ mm, width 2¼ mm

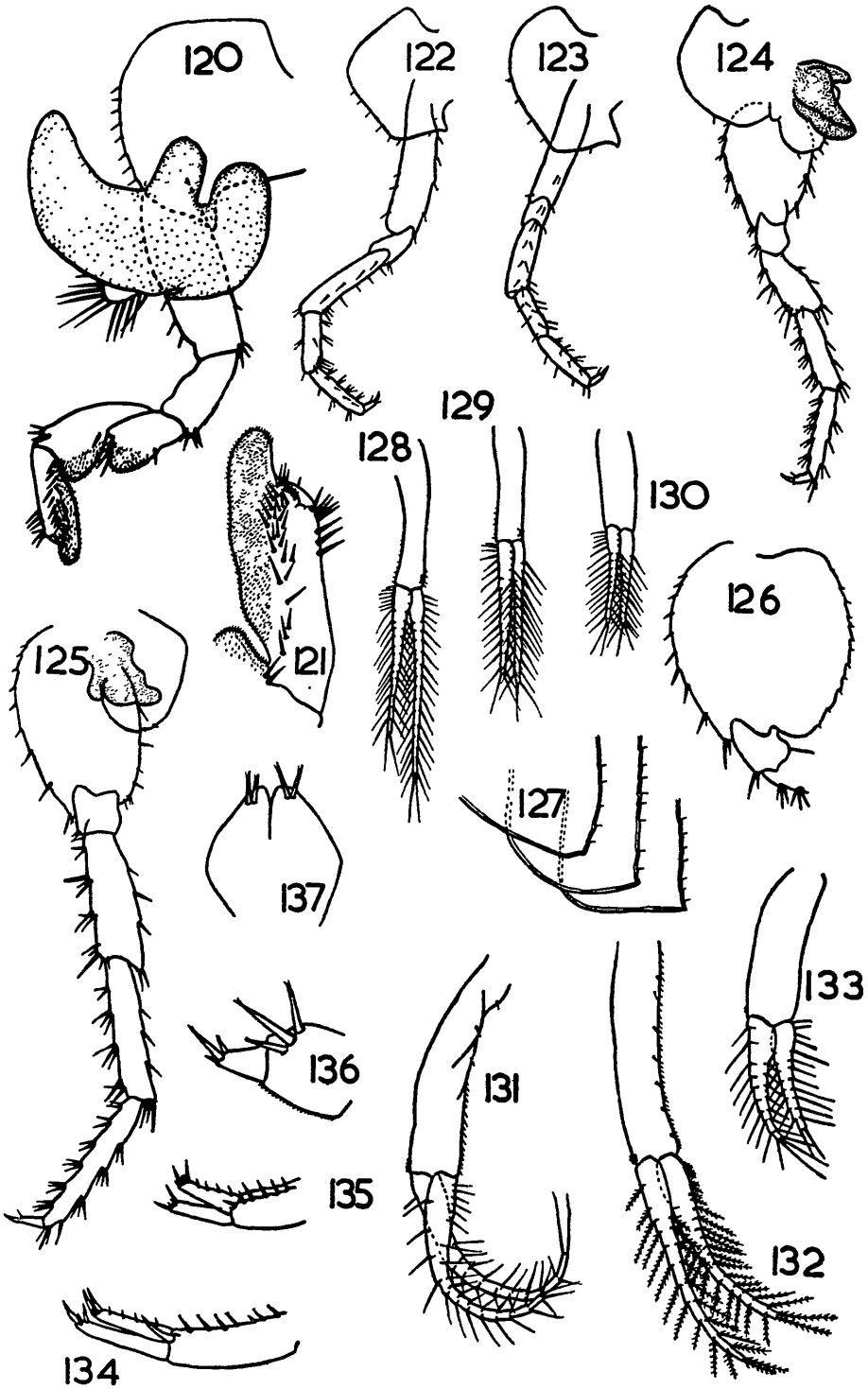
ANTENNAE. *First*: Flagellum as long as peduncle, of 7–8 segments with short setae superiorly, longer ones inferiorly. Peduncle segments successively narrower, 1st as long as 2nd, 3rd slightly longer; distal angles have a few long setae, single seta ½ along each margin of 3rd. Length 1¾ mm, almost reaches end of antenna 2 peduncle. *Second*: Flagellum longer than peduncle, of 22 segments in male, 30 in female, segments long and narrow, end one tufted. Peduncle, 5th segment slightly longer than 3rd plus 4th, all have long marginal setae, surface of 4th and 5th setose also, setae usually single

MOUTHPARTS *Mandibles*: Left spine row has 5, possibly 6, scabrous spines, cutting edge has 2 articles, the upper with 5 teeth, lower with 4. Right has spine row of 5 spines *Maxilliped*: Inner plate has setulose spines between and outside end teeth Outer plate, distal portion of inner margin has row of spines set back a little from edge and reaching end of inner plate, outer margin has distal row of 4 setose spines, spines on basos below inner plate. Basos, merus and ischium have 1–4 short and long spines on outer distal angles, also on inner distal angle of merus. Carpus and propod wider than long, inner margin produced in flange with row of spines set back a little from margin. Propod smaller, has similarly spined flange, more obviously produced, outer distal angle has about 5 very stout spines Carpus and propod have each a row of 4–5 short spines medially on end margin. Dactylos longer than wide, cone-shaped, has distinct stout end spines

GNATHOPODS. *First*: Basos width ¼ length, anterior margin has about 9 single spines; posterior about 4 single spines medially, 2–3 small spines on distal angle. Ischium about ⅓ basos length, anterior margin much shorter, posterodistal angle only spined, has 3–4 spines. Merus subrectangular, has 2 pairs of spines each side of scabrous lobe, a 3rd pair



TEXT-FIG 6—*Orchestia tenuis* Dana. 103, Antenna 1, ♂. 104, Antenna 1, ♀. 105, Antenna 2, ♂. 106, Antenna 2, ♀ 107, Antenna 2, ♀, end segments. 108, Upper lip. 109, Lower lip. 110, Maxilla 1 111, Left mandible 112, Right mandible 113, Maxilliped. 114, Gnathopod 1, ♂ 115, Gnathopod 1, ♂, palm and dactylos 116, Gnathopod 1, ♀. 117, Gnathopod 1, ♀, palm and dactylos. 118, Gnathopod 2, ♂. 119, Pleopod 3, ♂.



TEXT-FIG. 7 —*Orchestia tenuis* Dana. 120, Gnathopod 2, ♀. 121, Gnathopod 2, ♀, propod and dactylos. 122, Peraeopod 1, ♂. 123, Peraeopod 2, ♂ 124, Peraeopod 3, ♂ 125, Peraeopod 4, ♂. 126, Peraeopod 5, ♂. 127, Epimeral plates. 128–130, Pleopods 1–3, ♀, Westland 131–133, Pleopods 1–3, ♂, Westland. 134, Uropod 1, ♂ 135, Uropod 2, ♂. 136, Uropod 3, ♂. 137, Telson.

medially. Carpus has about 5 short stout spines on anterodistal angle; posterior free margin produced in scabrous pellucid lobe; greatest width distally is ½ carpus length; 2 spines at distal base of lobe, about 5 on proximal margin below merus. Propod as long as merus, much narrower proximally, distally ½ propod length; anterior margin has 4 groups of 2–5 stout spines, posterior has spines along base of scabrous area Palm not ½ propod width, about 5 short stout spines on one side, several long setae on other. Dactylos ½ propod width, has small spines ½ along outer margin. *Female*: Propod about ⅔ carpus length, much narrower, width about ⅓ length, margins parallel, 3 groups of spines on both margins, spines on posterior surface; palm short, slightly oblique, defined by stout end spine, about 5 similar stout spines between this and dactylos hinge on one side of palm; much longer and finer spines on other side; posterior margin scabrous. Dactylos slender, reaches end of palm, has 2 setae medially on surface. *Second*: Sideplate subsquare, wider than deep, spined, ventral margin rounds to posterior. Gills anchor-shaped. Basos strong, triangular in cross-section, width ⅓ length, anteriorly recessed to take propod; posterior has small single spines. Ischium small, wider than long, anterior margin recessed for propod, minute spine on posterodistal angle. Merus slightly longer, posterodistal angle acutely pointed, a few minute spines on posterior and end margins; carpus very small, wedge-shaped. Propod greatly expanded, ovate, posterior free margin not ½ propod length. Propod width ¾ length; palm oblique, more than ½ propod length, has short seta-tipped palm, end notched to take dactylos Dactylos curved, inner margin has short setae; considerably longer than palm; greatly narrowed at tip to slender process; palm produced a little in small tooth near dactylos hinge. *Female*: Broodplate long, narrow. Basos margins sinuous, a little expanded medially, a few marginal spines Ischium ½ basos length, posterodistal angle spined. Merus slightly shorter, posterior merus margin expanded to scabrous pellucid lobe, has about 4 spines. Merus ½ carpus length; carpus scabrous lobe has about 2 spines distally, 1 proximally. Propod as long as ischium, width ⅓ length, expanded past palm and dactylos, spines from propod posteroproximal angle to palm; anterior margin has about 3 single spines distally, a group at outer distal angle; dactylos short, curved, as long as palm, fitting in small pocket Palm small, oblique, spined.

PERAEOPODS. *First*: Sideplate not much wider than deep. Basos width ¼ length, anterior margin has a few single spines, posterior about 5 Ischium ovate, longer than wide, posterodistal angle only spined Merus almost basos length, narrower, long spines posteriorly and anterodistally Carpus shorter, stout spines on posterior margin, pair ½ along anterior and at anterodistal angle Propod still narrower, slightly longer than carpus, margins have about 4 groups of spines, posterior groups stronger with more spines. Dactylos comparatively long, has strong spine ½ along inner margin, shorter ones on outer. *Second*: Sideplate much wider than deep. Segments narrower and shorter than in Pr. 1. *Third*: Gills lobed and liver-shaped. Sideplate anterior lobe ovate, 2 or 3 spines ventrally, twice as wide as but slightly less deep than smaller posterior lobe which is strongly rounded ventrally, has 5 spines ventrally and posteriorly. Basos narrows evenly to ischium, is narrower than long; anterior margin has about 6 groups of 1–4 short stout spines; posterior serrate, has about 12 irregularly sized minute and strong spines, a particularly long and strong spine ½ along; distal angle not obvious. Ischium small, has strong spines anterodistally. Merus piriform, ⅔ basos length, has 3 groups of strong spines on anterior margin, 2 single spines on posterior, posterodistal angle a little produced and strongly spined. Carpus linear, slightly longer than merus, similarly spined, anterior spines much the stronger as in merus and propod. Propod similar, narrower, slightly longer; 5 groups of spines anteriorly, 4 posteriorly. *Fourth*: Much the longest. Sideplate deeper than wide, ventrally rounded, has about 3 small spines Basos ovate, width ⅔ length, margins have strong single spines, posterior has fewer long spines, interspersed with minute spines, posterodistal angle rounded, almost absent. Merus longer, proportionately narrower than in Pr. 3, dactylos longer and narrower; segments in general more strongly spined and longer, otherwise similar *Fifth*: Basos as wide as long, ovate, anterior margin has about 10 spines, distal angle about 4; posterior margin has about 12 serrations with minute spines; posterodistal angle rounded, not very prominent.

EPIMERAL PLATES. *First*: Subtriangular, distal angle sharp, has small tooth; posterior margin slightly convex, has about 5 minute spines and serrations. *Second*: Anterior margin rounds to ventral, posterodistally almost right-angled, with small tooth; posterior margin straight, has about 9 minute spines and serrations. *Third*: Anterior margin less broadly rounded than in 2nd, otherwise similar.

PLEOPODS *First*: Peduncle shorter than rami, long and narrow with fine bristles on end of outer margin, a few small spines proximally, 4 or 5 coupling spines. Rami have 9–16 superficial segments, long plumose setae marginally. *Second*: Has 3 coupling spines, spines and bristles more frequent on peduncle outer margin than in 1st, peduncle and rami subequal, otherwise like 1st *Third*: Peduncle shorter and broader, longer than rami, has about 2 coupling spines, fewer segments

UROPODS *First*: Peduncle has single dorsal row of about 8 spines, large single spine distally between rami for almost ½ their length. Inner ramus has 4 short spines dorsally, 2 short and 2 long end spines; outer lacks dorsal spines, has 1 long and 3 short end ones. *Second*: Rami and peduncle subequal. Peduncle has dorsal row of about 7 spines; inner

ramus about 4 dorsal spines, 3 short and 2 long end spines; outer lacks dorsal spines, has 2 long and 2 short end ones. *Third*: Peduncle has 3 long spines superiorly in male, 2 in female; finely bristled inferior margin. Ramus subtriangular, about ½ peduncle length, 1 long and 2 short end spines. *Telson*: Narrowing distally so almost subtriangular, 2 long spines on end of each lobe.

LOCALITIES: Bay of Islands (Dana); Stewart Island; Wellington; Chapman's Reserve, near Bold Head, Westland, coll. C. E. Foweraker, December, 1921; Kapiti Island, leafmould, coll. R. R. Forster, 29/8/47; Little Akatarawa, North Island, from *Rangiora* leafmould, coll. J. T. Salmon, 23/11/44; Kaikohe, West Coast, South Island, leafmould, coll. H. Prouse, May, 1948; Caswell Sound, coll. R. R. Forster, 18/8/49.

NEOTYPES: Slides C.1, male; C.2, female.

DISCUSSION: Barnard (1940) considers that the South African specimens previously assigned to *O. tenuis* have been wrongly identified. He considers that the *O. tenuis* of Barnard (1916) is a new species, *Parorchestia rectipalma* Barnard, and *O. tenuis* of Stebbing (1922) is *Parorchestia dassensis*. From his figures it is obvious that this decision is justified. This means that there are no truly terrestrial species of amphipods known to be common to South Africa and New Zealand.

Orchestia tenuis and *Orchestia sylvicola* were first described from New Zealand by Dana in 1852, and these descriptions were later amplified (Dana 1853 and 1855). Unfortunately, his specimens included only one male. He ascribed the male to *O. sylvicola* with the reservation that the outer ramus of the first uropod was without dorsal spines or "naked", whereas in the female the ramus had "a few spinules", and he suggested that if the male did not belong to *O. sylvicola,* then it was probably the male of *O. tenuis*. After careful examination of Dana's original figures and descriptions and of all subsequent literature, I can find only two differences on which any specific value can be placed. One is the nakedness or otherwise of the first uropod outer ramus; the other is the maxilliped palp which is spinose in Dana's figure of *O. tenuis* and relatively free from spines in his figure of *O. sylvicola*.

Terrestrial species of *Orchestia* are in most cases so similar that they may be distinguished only by a careful comparison of all appendages, especially the pleopods and uropods. In the absence of detailed descriptions and figures of these appendages, it is sometimes impossible to recognise some characteristic which is so pronounced and unlike its corresponding appendage in any other species that there is no likelihood of a mistake. However, a characteristic of this kind may sometimes be provided by the male second gnathopod. Because of this, where species have been based on female types insufficiently described to define the species from the female alone, the only sure way of correct identification is in associating a male with the female. The descriptions which Dana gives of the female *O. tenuis* and *O. sylvicola* could each equally well apply to several species of terrestrial amphipods. It is therefore necessary, if possible, to identify the male with one of these two females.

Of the two points of differences noted between the females, the maxilliped is of no value in deciding the affinities of the male since Dana did not describe the male maxilliped. It does support Dana's belief that the females belonged to different species.

The nakedness or otherwise of the uropod is of more value. Stephensen (1938) gives a table showing the presence or absence of dorsal spines on the uropod rami in species of *Parorchestia*. Although he was not able to document all of the species fully, his facts suggest that it is normal for male and female to agree on this point. It is reasonable to infer that the ramus in Dana's *O. tenuis* female was naked from his remark that if the male was disqualified from *O. sylvicola* because of its naked ramus then it probably belonged to *O. tenuis*.

Stebbing (1922) rejected this possibility but advanced no evidence except that implied in his description of a male *O. tenuis* from South Africa, for which he figured

a gnathopod very different from that given by Dana. Since Barnard (1940) has shown Stebbing's specimens to be *P. dassensis* Stebbing's remarks are no longer relevant.

Spence Bate (1862) repeats Dana's description and figure of *O. tenuis*. He describes a male *O. sylvicola* collected by the "Erebus and Terror" Expedition from New Zealand which comes closer to meeting the few known specifications for a male of *O. sylvicola*. It has a spined uropod ramus so far as can be seen from the figure given. If it is possible to identify any species with Bate's *O sylvicola* male, then Bate may be regarded as first revisor and his male as the type male for *O sylvicola* Otherwise, I consider *O. sylvicola* must be regarded as a *nomen dubium*.

Thomson (1881) reviewed the species of *Orchestia* then known from New Zealand and concluded that *O. sylvicola*, *O. tenuis* and *O. novae-zealandiae* should be united under *O. sylvicola*. He assumed that *O. sylvicola* had two forms of adult male Whether or not this is so, and on present evidence I am not inclined to accept the "polymorphic male" thesis, there seems no doubt of the validity of Thomson's arguments that most of the specimens described by authors after Dana belong to one species and not to three. However, this does not touch the central problem of the identify of Dana's two females.

Stebbing (1906) rescribed both species in somewhat fuller detail than had Dana, apparently from new material. If Stebbing's descriptions are compared, it will be found that the differences are remarkably slight, and although it is possible that they are genuine specific ones correlated with more striking differences not recorded by Stebbing, they also come well within the range of individual variation described by Thomson for one species, with the possible exception of the 2nd segment in Pr. 3–5.

P. tenuis.	*P. sylvicola*
Ultimate joint of peduncle of antenna 2 a little longer than penultimate	Penultimate joint of antenna 2 more than half as long as ultimate.
Gnathopod 2, male, palm nearly straight, slight sinuosities, fringed with spines, well defined but not by tooth	Gnathopod 2, male, palm spinulose, very oblique, slightly convex, not defined by any tooth, a very small excavation near the hinge, finger with a corresponding thickening, the rest of its inner margin slightly sinuous
Gnathopod 1, female, finger reaching exactly to end of palm and of apical margin.	Gnathopod 1, female, finger a little overlapping the palm.
Peraeopod 3–5, 2nd joint expanded well, as broad below as above.	2nd joint (Pr. 4) piriform, with scarcely any free corner.

On the basis of these written descriptions, it is not practicable to separate two species.

In 1884, Thomson described *Allorchestes recens* from a stream in Wellington. This species was referred to the new genus *Parorchestia* by Stebbing (1899) who considered it identical with *P. tenuis*. Thomson's figures show a male second gnathopod corresponding reasonably well with Dana's male *sylvicola*, and a feebly chelate female second gnathopod which excludes the specimens from *Allorchestes*. Thomson himself (1899) considered his *A. recens* to be *O. gammarella* but the subchelate female 1st gnathopod precludes that. Stebbing's decision appears correct

Chilton's collection includes specimens from Rona Bay, Wellington, labelled *O. tenuis*. These have the characteristic peraeopod form and short stiff antennae of the *Allorchestes* complex and cannot be accepted as *O. tenuis*.

No other references in the literature, either to *O. tenuis* or *O. sylvicola*, are of value to this discussion. Mr. C. R. Shoemaker informs me that Dana's types are destroyed It would appear then that the only solution to the problem lies in identifying new specimens with either or both of the type specimens. It is possible to identify specimens from various localities as *O. tenuis* if Dana's male *sylvicola* and female *tenuis* are regarded as co-specific, and I have given my reasons for considering this justified.

It then becomes possible to accept as *O. tenuis* specimens of terrestrial amphipods of a species apparently common throughout New Zealand. I can see no essential difference between the species which I have described as *O. tenuis,* those described by Dana, and most of the specimens since described by other authors as *O. tenuis* or *O. sylvicola.*

Stephensen (1938) described a new species and two new forms of *Parorchestia* from Stewart Island, *P. stewarti* f. *brevicornis* and *P. stewarti* f. *longicornis.* I consider these co-specific with the specimens described above as *O. tenuis.* Judging from the material which I have examined the two forms are extremes of intra-specific variation. Material from Chilton's collection labelled *P. sylvicola* taken from Stewart Island at 100 feet altitude corresponds fairly well with *f. brevicornis* but varies in antennal segment numbers. It should be noted that Stephensen had only 2 adult females of *f. brevicornis* and one adult female of *f. longicornis* leaving him little option but to describe them as two forms. They may possibly represent sub-species of *O. tenuis.* The following variations were noted in Stewart Island specimens from the typical form of *O. tenuis*: the third epimeral plate is produced a little more posteriorly and the posterior margin is more concave than usual; the third uropod has 2 end spines in the male; the telson has 1 pair of spines.

Thomson (1881) has also listed *O. sylvicola* from Stewart Island.

Specimens from Kapiti Island (and elsewhere) show some minor differences which may be representative of geographical races or sub-species. Apart from differences in the number of telson spines (up to 5) and pleopods (which may have plumose setae or very fine short bristles along the peduncle margin), the gnathopod of the female may approach the simple condition through a combination of slight lengthening of dactylos and slight reduction of palm. However, close agreement on other points makes it difficult to concede these as specific differences, particularly when they are, in fact, little more than differences in proportion.

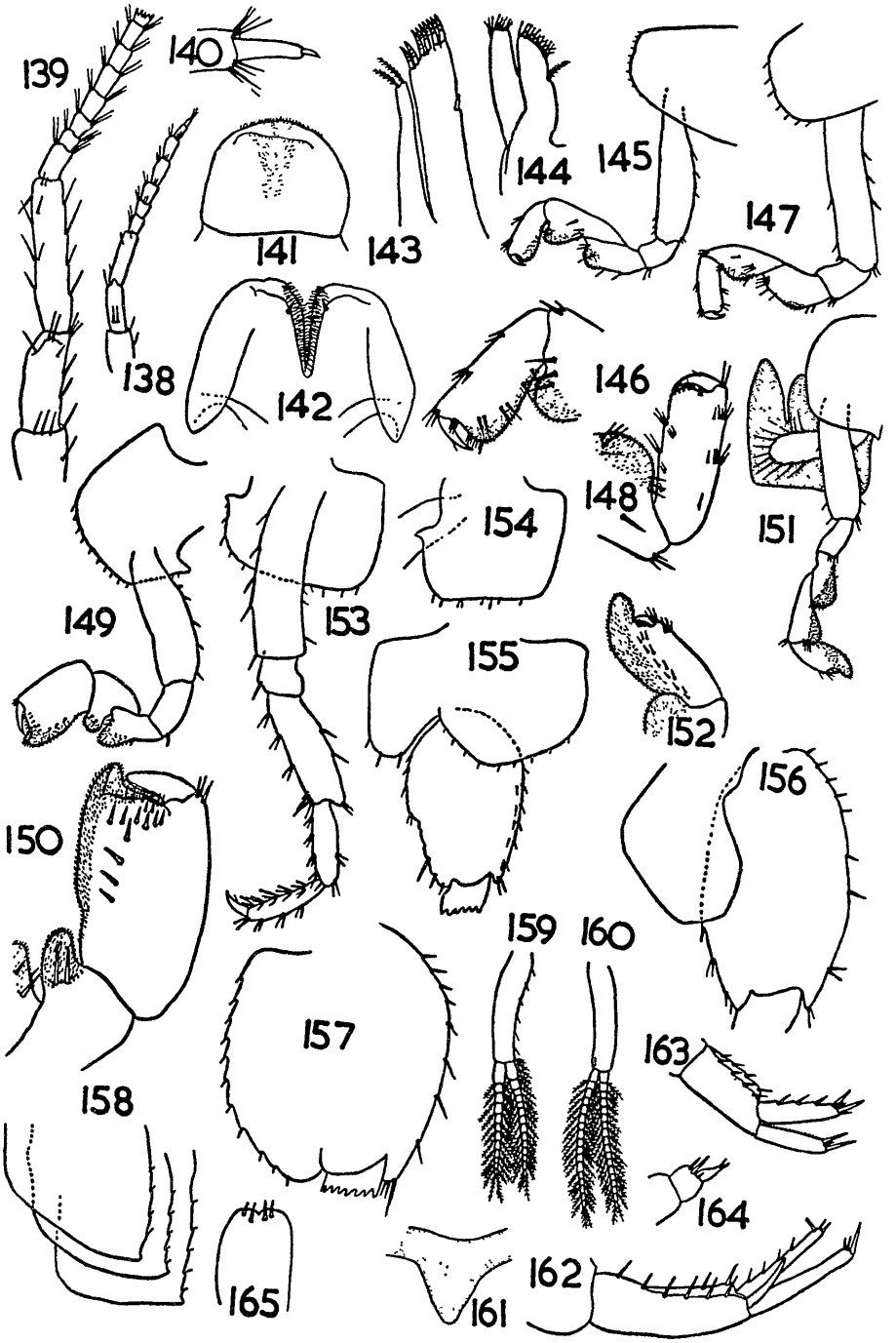
Orchestia lesliensis, n. sp. (Figs. 138–165, 370–374.)

Male, length 11 mm, depth 2¼ mm, width 2 mm. Female, length 14½ mm, depth 2½ mm, width 2¾ mm. Colour in spirit orange mottled.

ANTENNAE *First*: Length 2 mm. Flagellum slightly longer than peduncle, of 7 segments, segments have 2 pairs of setae superodistally, end segment very small, has 2 end setae Peduncle, 3rd segment slightly longer than 2nd, narrower, a few small spines superiorly and distally; 2nd slightly longer and narrower than 1st, a few minute spines on each. *Female*: Length 2 mm, reaches ½ along 5th segment of antenna 2 peduncle; flagellum of 8 segments, peduncle rather broader than in male. *Second*: Length in male 4¾ mm, in female 5 mm. Flagellum longer than peduncle, of 19 segments, end segment a thin narrow spined finger; peduncle 4th segment ½ length 5th and twice length third, 5th narrower than 3rd and 4th, long fine single and paired spines on margins.

MOUTHPARTS. *Lower Lip*: Inner distal angle of each lobe has a small stout spine. *Mandibles*: Left has upper spine of cutting edge bifurcate, 3 teeth on upper fork, 4 on lower, spine row of 4 spines, one bifurcated. *Maxilliped*: Inner plate has about 11 setulose spines on one side across inner distal angle and ½ down cleft; about 4 setulose spines on other side. Outer plate has row of spines on inner surface set back from margin, a few spines on margin of outer distal angle, group of 3 or 4 on inner margin at ischium level. Palp segments succeedingly shorter and narrower, single or paired long spines on outer distal angles; several short spines on inner distal angles, those on propod masking the minute rudimentary dactylos; propod inner margin setose.

GNATHOPODS. *First*: Sideplate subovate. Basos width ¼ length, a few short spines on posterior margin and both distal angles Ischium subsquare, posterodistal angle spined. Merus subrectangular, posterior margin medially scabrous, a few spines at base and each side of lobe Carpus twice merus length, a few spines on anterodistal angle; posterodistal expanded in scabrous pellucid lobe with long slender spines at base and either side Propod narrower, widening slightly distally, anterior margin has 3 groups of 3–4 long fine spines; scabrous posterior margin has 6–8 long slender spines set back from margin on each side; palm ½ propod width, has about 6 long spines each side, 3 at dactylos base, dactylos almost reaches palm edge, has short spine ½ along inner and outer margins. *Female*: Merus and carpus slightly longer than in male, scabrous lobes not as well developed, merus lobe almost absent. Propod about ⅔ carpus length; anterior margin has 3 groups of 2–4 spines, 3 smaller single spines set in from margin, posterior has 2 marginal groups of 2–3 longer stouter spines Palm transverse, ½ propod width, scabrous, 2 stout spines each side of dactylos base, 4 stout short spines defining end of palm *Second*: Basos width ⅓ length, has a few single spines



TEXT-FIG 8.—*Orchestia leslıensıs* n.sp 138, Antenna 1, ♂. 139, Antenna 2, ♂. 140, Antenna 2, ♂, end segments 141, Upper lip. 142, Lower lip. 143, Maxilla 1. 144, Maxilla 2 145, Gnathopod 1, ♂. 146, Gnathopod 1, ♂, propod and dactylos. 147, Gnathopod 1, ♀ 148, Gnathopod 1, ♀, propod and dactylos 149, Gnathopod 2, ♂ 150, Gnathopod 2, ♀, propod and dactylos 151, Gnathopod 2, ♂ 152, Gnathopod 2, ♀, propod and dactylos 153, Peraeopod 1 154, Peraeopod 2. 155, Peraeopod 3. 156, Peraeopod 4 157, Peraeopod 5. 158, Epimeral plates. 159, Pleopod 1. 160, Pleopod 2. 161, Pleopod 3. 162, Uropod 1. 163, Uropod 2. 164, Uropod 3. 165, Telson.

posteriorly. Ischium about ⅓ basos length, posterodistal angle spined. Merus subrectangular, anterior margin contiguous with proximal ⅔ of carpus posterior; merus posterodistally produced in scabrous pellucid lobe, spined both sides. Carpus slightly longer than merus, anterior margin convex, posterior expanded in scabrous lobe with spined base. Propod anterior margin convex, only anterodistal angle spined; posterior, scabrous, produced distally past palm in pellucid lobe, thus defining corrugated palm. Palm transverse, ½ propod width, has about 6 short spines each side; a parallel stouter row on propod immediately below, longer and finer spines from palm diagonally to posteroproximal angle. Dactylos short, thick, has strongly hooked tip; inner margin has 5–6 small spines set back a little, giving margin ridged appearance. *Female*: Broodplates lanceolate, have long fine marginal setae. Basos margins spines. Ischium narrower, about ⅓ length, about 6 spines on posterodistal angle. Merus posterior margin produced in scabrous pellucid lobe, slender spines each side and at base. Carpus subtriangular, about twice merus length, anterior margin convex, anterodistal angle spined; long flexible spines at distal base of scabrous pellucid lobe. Propod not as large as carpus, palm oblique and scabrous, slender spines from posteroproximal angle to palm, 4–5 spines on palm. Dactylos short, curved, has spine on outer margin.

PERAEOPODS. *First*: Basos, anterior margin concave, width ¼ length, several single bifurcate-tipped spines marginally. Ischium small, posterodistal angle spined; merus almost as long as basos, narrower, strong spines on margins. Carpus has 2 groups of short spines on anterior margin, 4–5 groups of paired longer spines on posterior Propod longer and narrower, anterior margin has 4 pairs of short spines, posterior has 4–5 groups of 3 long spines. Dactylos long, both margins spined *Second*: Basos expanded a little anterodistally. Carpus anterior margin spined only on distal angle *Third*: Shorter than Pr. 2, sideplate lobes spined ventrally. Basos greatly expanded proximally, strongly spined, spines on anterior margin paired; posterior margin narrowing very irregularly distally. *Fourth*· Basos ovate, margins spined. *Fifth*: Longer than Pr. 4; carpus, propod and dactylos especially elongated Basos ovate, anterior margin strongly spined, posterior spined and serrated

PLEOPODS. *First and Second*: Peduncle has group of small coupling spines; rami segmented, with plumose setae. *Third*: Vestigial triangular lobe represents peduncle, has no apparent spines.

EPIMERAL PLATES. *First*: Anterior margin rounds convexly to ventral, posterior slightly convex, minutely spined *Second and Third*: Posterior margins straight, minutely spined and serrated.

UROPODS. *First*: Peduncle inner dorsal margin has 2–3 spines distally, outer has about 6 stout spines; between the rami a large curved spine ½ their length; both rami have 1 long and 2 short end spines, the inner has 4 dorsal spines *Second*· Peduncle as long as rami, dorsal margins each have about 4 stout spines; inner ramus has 3 short spines dorsally, 2 long and 3 short end spines, outer ramus has minutely serrate dorsal margin, a few short spines on lower surface. *Third*· Ramus much smaller than peduncle, has 1 long and 1 short end spine; peduncle has 3 stout seta-tipped spines *Telson*: Has 2 spines each side of apical notch.

LOCALITIES: Leslie Valley Track, Nelson, in beech forest, coll. R R Forster, 23/1/48; Blue Mountains, Silverstream, Wellington, coll. J. T. Salmon, 18/8/48; West Longwood Range, Southland, coll G C Weston, 14/3/48

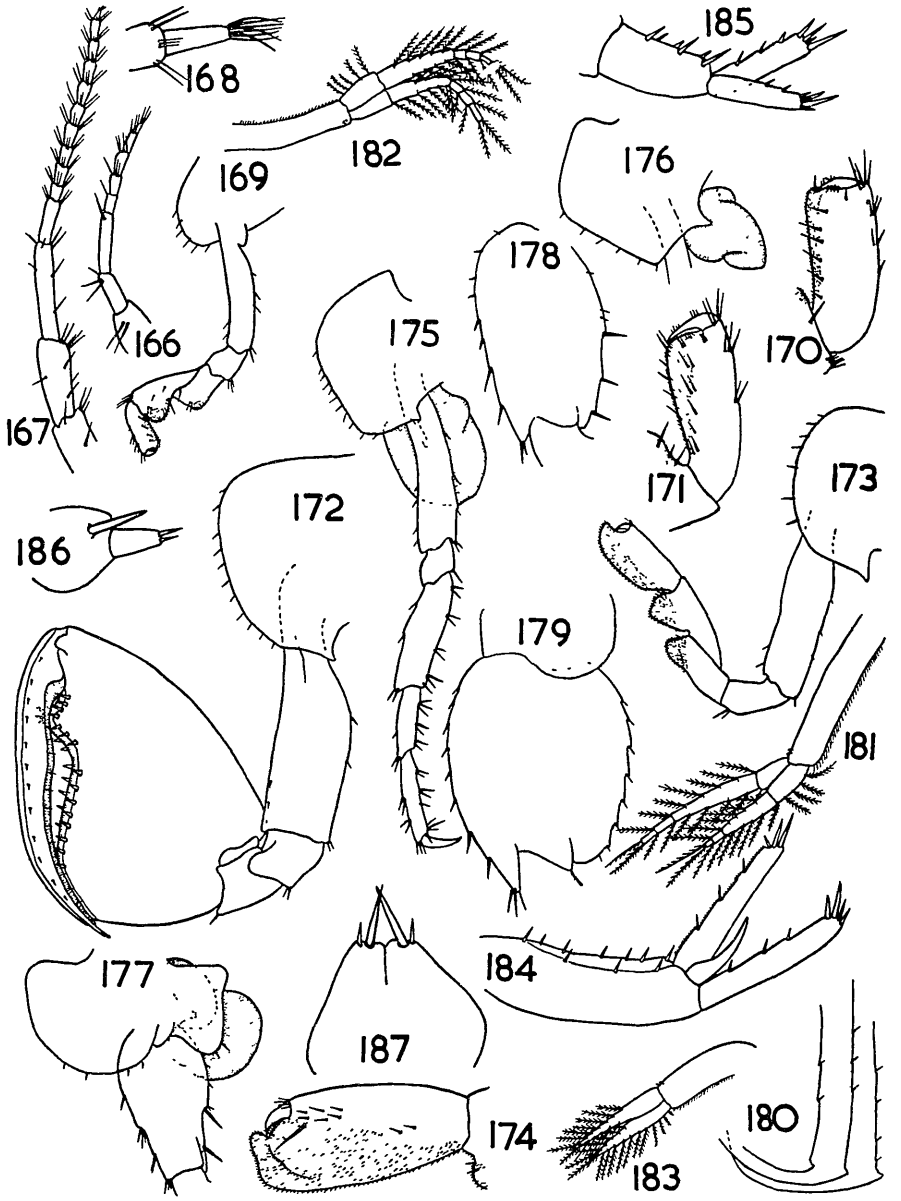
TYPES: Slides 26, male; 28, female (Leslie Valley); Dom Mus. Collection

DISCUSSION: This is one of the several leafmould species showing reduction of the pleopods. Here, the third pleopod is reduced to a single-segmented vestigial triangular stump. Other characteristic features are the subrectangular shape of the propod of the male second gnathopod, and the scabrous defining angle of the propod; the stout spine on the distal angle of the lower lip; and the shape of the 3rd peraeopod basos. The appearance of a spine on the lower lip is simulated in some of the other species of *Orchestia,* notably the supralittoral ones, by some of the skeletal thickenings of the lip. However, *O. lesliensis* is the only species in which I have yet seen a definite spine.

Orchestia sinbadensis, n. sp. (Figs. 166–187, 365–369.)

Colour in spirit, yellow with orange-red blotches on dorsum. Male, length 9 mm, width 2 mm, depth 1¾ mm, female, length 13 mm, depth 2½ mm, width 2½ mm

ANTENNAE. *First*: Length 1¾ mm, reaches ⅔ along 5th peduncle segment of antenna 2. Flagellum as long as peduncle, of 5 segments, each with pairs of long setae on end margins, end segment has 3 long terminal setae Peduncle, 1st segment as long as 2nd, wider, ⅔ length 3rd, 3rd narrower, segments have a few long setae distally. *Female*· Reaches ½ along 5th peduncle segment of antenna 2. Flagellar setae slightly longer than in male. *Second*: Length 3 mm, reaches 3rd peraeon segment Flagellum of 11 segments, slightly longer than peduncle, last one long, tapering; peduncle segments have a few long slender setae, mainly on inferior margins and surface. *Female*: Of 26 segments.



TEXT-FIG. 9.—*Orchestia sinbadensis*, n.sp. 166, Antenna 1, ♂. 167, Antenna 2, ♂ 168, Antenna 2, ♂, end segments. 169, Gnathopod 1, ♂ 170, Gnathopod 1, ♂, propod and dactylos 171, Gnathopod 1, ♀, propod and dactylos. 172, Gnathopod 2, ♂. 173, Gnathopod 2, ♀ 174, Gnathopod 2, ♀, propod and dactylos 175, Peraeopod 1 176, Peraeopod 2 177, Peraeopod 3. 178, Peraeopod 4. 179, Peraeopod 5. 180, Epimeral plates. 181, Pleopod 1 182, Pleopod 2. 183, Pleopod 3 184, Uropod 1 185, Uropod 2. 186, Uropod 3 187, Telson

MOUTHPARTS. *Mandibles*: Left, upper article of cutting edge has 3 teeth, median is bifurcated, lower has 4; right, upper has 3 teeth, median is birfurcate, lower is U-shaped. *Maxilliped*: Inner plate has 4 setulose spines outside end teeth, several across inner distal angle and ½ down cleft, to basos, rest of cleft finely bristled. Outer plate reaches end of carpus, has row of spines on inner surface set back from margin. Basos to propod segments all have 1–2 spines on outer distal angle; propod, carpus and merus of equal length; carpus as wide as merus, propod narrower. Propod, carpus and merus have fine bristles on inner surface; propod has also 3 long stout spines on one side of small dactylos, is strongly spined on other side thereby masking dactylos. Merus has 2 short spines on inner distal angle; carpus has 2 mediodistally, fairly dense short stout spines on inner distal angle; dactylos has 3 end spines.

GNATHOPODS. *First*: Basos width ¼ length, sparsely spined anterodistally and posteriorly. Ischium subsquare, as wide as basos, lobed slightly anteriorly, posterodistally spined. Merus subrectangular, posterior scabrous lobe has 2 long slender spines Carpus longer than merus, anterodistal angle spined; posterior margin distally expanded to scabrous pellucid lobe, with a few long slender spines. Propod subrectangular, shorter and narrower than carpus; anterior margin has 4 groups of stout spines, the last at base of short curved dactylos, posterior scabrous; palm scabrous, ½ propod width, 4–6 short and medium slender spines each side; row of long slender spines on posterior surface, dactylos has spine on outer margin, impinges on palm. *Female*: Propod not as wide as in male, dactylos longer, palm reaches posterior edge of segment; spines on posterior margin stronger and paired. *Second*: Sideplate spined ventrally and posteriorly. Basos width ⅓ to ¼ length, margins have a very few small spines, basos and ischium triangular in cross-section with depression between anterior margins for bent-back propod. Ischium slightly narrower, subsquare, minute spines on posterodistal angle Merus posterodistal angle produced downwards a little. Carpus very small, outlines difficult to see. Propod subtriangular, anterior margin as long as basos plus ischium, as wide as long, narrowing greatly proximally. Palm slightly oblique, longer than posterior margin, has strong tooth near base of dactylos, rest of palm sinuous, grooved for dactylos, both sides have stout bifurcate-tipped spines. Dactylos has slight bulge outside palm tooth, impinges on palmar groove but spatulate finger extends beyond palm; dactylos inner margin corrugate, spined, medial surface has row of spines. *Female*: Sideplate a little more ovate than in male. Basos width ¼ to ⅓ length, margins have very few and small spines Ischium width more than ½ length, posterodistal angle spined. Merus, posterior pellucid lobe has a few spines. Carpus subtriangular, scabrous lobe very sparsely spined Propod as long and wide as carpus, subovate; row of spines from inner base of short curved dactylos well down segment; palm has 8 or so short spines each side. Dactylos has spine on inner margin

PERAEOPODS. *First*: Basos width ¼ length Ischium subrectangular, spined posteriorly Merus slightly narrower, ½ basos length, anterior margin has 2 spines, 2 distally; posterior has 4–5 pairs Carpus about ¾ merus length, anterior margin has spine ½ along, 2 distally, posterior has 3 groups of long strong spines. Propod slightly longer than carpus margin has 2–3 stout spines, a single spine posterodistally. Dactylos long, margins spined *Second*· Shorter, fewer spines on anterior margins *Third*: Slightly shorter than Pr. 2 Sideplate anterior lobe spined ventrally, posterior spined posterodistally Basos greatly expanded, but sharply constricted distally, anterior margin has several groups of short stout spines, posterior has a few minute and 2 very long spines. Merus wider than in Pr. 2; carpus and propod longer, spines seta-tipped, much stouter and longer, particularly those on merus and carpus anterodistal angles *Fourth*: Basos expanded, width more than ½ length, not narrowing as sharply distally as in Pr. 3, margins have strong single spines. *Fifth*: Basos ovate, as wide as long, anterior margin has strong single spines, posterior margin serrate, has minute spines, other segments missing.

PLEOPODS Rami longer than peduncle, inner ramus longer than outer, end of pleopods only showing signs of segmentation, first pleopod peduncle has 3 coupling spines, others have 2; peduncle outer margins finely bristled, 3rd pleopod smaller than others but not greatly reduced.

EPIMERAL PLATES Anterior margins round convexly to ventral; posterior margins serrate and minutely spined; sigmoid in 1st, straight in 2nd and 3rd; posterodistal angles produced slightly backwards

UROPODS *First*· Peduncle, both dorsal margins spined, long spine extends between rami ½ their length: inner ramus has 3–4 dorsal spines, 2 long and 2 short end spines, outer similar, both spined minutely and serrate, spines seta-tipped *Second*: Peduncle as long as rami, both dorsal margins spined; rami spined terminally, inner has 1 medium, 3 short and 1 long spine, outer has 3 short and 1 long spine, both dorsally spined *Third*: Peduncle much larger than ramus, has 1 dorsal spine; ramus has 1 long and 1 short end spine. *Telson*: Subtriangular, 1 short and 1 long seta-tipped spine on end of each lobe

LOCALITY. Sinbad Gully, Milford Sound, South Island, N.Z, coll. R. R. Forster, 29/8/46.

TYPES. Slides 56, ♂ ; 55, ♀ ; Dominion Museum.

DISCUSSION. In this leafmould species, the pleopods are normal but the propod of the adult male second gnathopod has a very characteristic triangular shape. The basos of the 3rd peraeopod is like that of *O. lesliensis.*

Orchestia simularis, n. sp (Figs. 188–211, 375–379.)

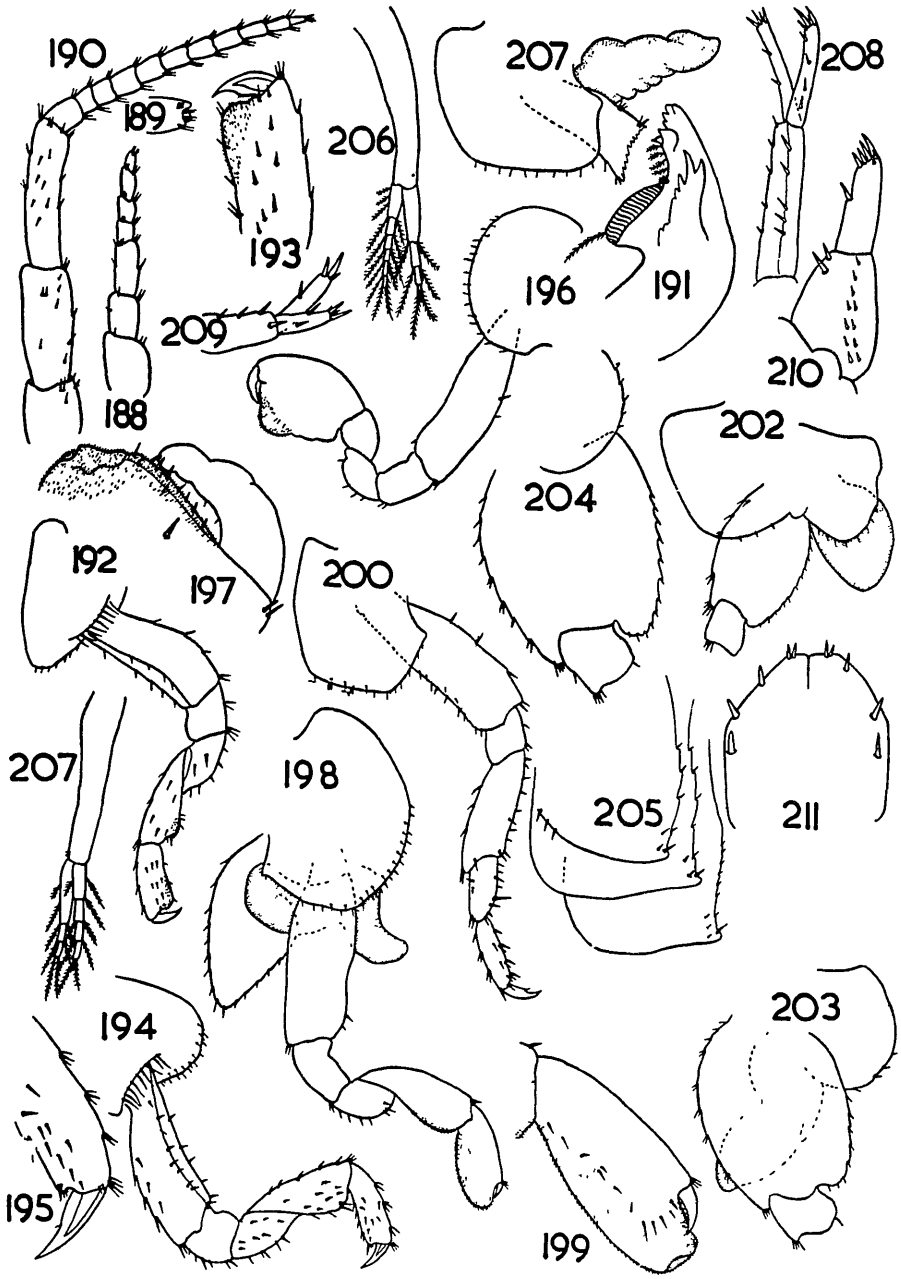
Colour in spirit, yellowish-white. Male, length 7¾ mm, depth 2 mm, width 1¾ mm, female, length 8 mm, depth 2 mm, width 2¼ mm.

ANTENNAE *First*: Length 1 mm; reaches end of 4th peduncle segment of antenna 2. Flagellum shorter than peduncle, of 5 segments, 2 small spines inferodistally on each, 4 smaller spines superodistally; rudimentary 5th segment is masked by and bears small spines; 4th is somewhat produced superodistally. Peduncle, 1st segment longer and wider than rest, small spines on distal angles, single spines on margins *Second*: Length 2½ mm, reaches 3rd peraeon segment Flagellum of 11 segments; peduncle 3rd segment ½ length 4th; 4th slightly shorter than 5th; each has small spines inferiorly and on surface, 5th spined superiorly *Female*: Reaches 3rd peraeon segment; flagellum has 13 segments

MOUTHPARTS *Lower Lip*: Inner lobes small *Mandibles*: Left has spine row of 5 setose spines; upper article of cutting edge has 3 teeth, lower has very coarsely corrugated upper edge. *Maxilliped*: Inner plate has about 7 setulose spines on one side between end teeth and across on inner distal angle; 6 setulose spines on end margin outside teeth; on other side about 3 setulose spines below inner teeth, row down cleft almost to basos Outer plate has row of spines set in a little on end and inner margins; 5–6 spines on inner margin just above merus level. Basos has stout spine below inner plate, strong spines on margins and surface; ischium, merus and carpus have 1–2 strong spines on outer distal angles; on one side ischium has 3–4 spines below merus inner proximal angle, similar groups on merus distal and carpus mediodistal margins. Merus as large as carpus, propod slightly smaller and globular, carpus and propod have stout spines ½ down inner margin from distal angle, propod spines mark very rudimentary spine-tipped dactylos; about 5 stout spines at dactylos base on other side of propod; dactylos not clearly marked off from propod.

GNATHOPODS *First*: Basos width not ½ length, margins spined, 2 spines on posterodistal angle. Ischium as wide, subsquare, posterior margin spined. Merus no longer than ischium, posterior margin as long as propod, about ¾ length carpus anterior margin, has several single spines, a few on surface. Carpus anterior margin spined sparsely, posterior has median scabrous lobe with long spines, a few spines on surface. Propod anterior margin has single spines, groups of spines distally around dactylos base, posterior margin and surface scabrous, have short stout spines; palm ½ propod width, scabrous, has a few short spines. Dactylos stout, inner proximal margin scabrous. *Female*: Carpus subtriangular, anterior margin 1½ times merus length, margins and surface spined; scabrous lobes lacking. Propod shorter than carpus, narrower, 3 groups of 3 or more short stout spines on anterior margin, several fine slender spines at anterior dactylos base; surface and posterior margin have stout single spines; very short transverse palm defined by spine, inside it a group of fine slender spines. Dactylos much longer than palm. *Second*: Sideplate subsquare, almost ovate, spined posteriorly and ventrally. Basos width ¼ length, posterior margin and distal angles have a few minute spines Ischium has minute spines on posterodistal angle Merus a little smaller than ischium, a few small spines on convex posterior margin Carpus slightly larger, subovate, not spined Propod more than twice carpus length, width about ¾ length; posterior margin sinuous, posterodistal angle scabrous; palm has small spines, is not defined posteriorly. Dactylos short stubby, ¾ propod width, a few minute spines on inner margin, a slightly larger spine at tip; margins somewhat sinuous *Female*: Broodplates large, lanceolate, width nearly ½ length, length about ¾ basos, setae-fringed. Sideplate strongly spined ventrally Basos has a few fine marginal spines distally. Ischium width about ½ length, posterodistal angle spined. Merus as wide as ischium, little shorter, posterior margin convex, has a few spines Propod ⅔ carpus length, a few fine spines at outer base of dactylos, subovate Dactylos short, curved; palm poorly defined with a few short spines, longer fine spines from dactylos inner base to posteroproximal angle.

PERAEOPODS. *First*· Basos anterior margin has numerous short stout spines, posterior has a few single longer spines, 2 on posterodistal angle. Ischium slightly narrower, subsquare Merus ⅔ basos length, narrower, piriform, posterior margin the more strongly spined. Carpus subovate, width not ½ length, posterior margin the more strongly spined. Propod a little longer than carpus, a little more than ½ carpus width, anterior margin has pairs of short stout spines, posterior has spines in 3's *Second*: Sideplate wider and shallower than in Pr. 1; segments shorter and wider; posterior spines much stouter; otherwise similar *Third*: Longer than Pr 2. Sideplate anterior lobe spined ventrally, posterior spined ventrally and posteriorly Basos expanded, width more than ⅔ length; anterior margin has about 5 groups of 1–4 short stout spines, posterior has many small spines. Carpus subrectangular, almost linear Other segments proportionately wider than in Pr 2 except for longer propod. *Fourth*: Basos width about ¾ length *Fifth*: Basos greatly expanded, nearly as wide as long; anterior margin as in Pr. 3,



TEXT-FIG. 10.—*Orchestia simularis* n.sp. 188, Antenna 1, ♂. 189, Antenna 1, ♂, end segments. 190, Antenna 2, ♂. 191, Right mandible. 192, Gnathopod 1, ♂. 193, Gnathopod 1, ♂, propod and dactylos. 194, Gnathopod 1, ♀ 195, Gnathopod 1, ♀, propod and dactylos. 196, Gnathopod 2, ♂. 197, Gnathopod 2, ♂, palm and dactylos 198, Gnathopod 2, ♀. 199, Gnathopod 2, ♀, palm and dactylos 200, Peraeopod 1, ♂. 201, Peraeopod 2 202, Peraeopod 3. 203, Peraeopod 4. 204, Peraeopod 5. 205, Epimeral plates. 206, Pleopod 1, ♂. 207, Pleopod 2, ♂. 208, Uropod 1. 209, Uropod 2. 210, Uropod 3. 211, Telson.

posterior serrate, has minute spines; posterodistal angle produced ½ along ischium. Longer than Pr. 4; segments proportionately longer.

EPIMERAL PLATES. First has 3 stout spines anteriorly; posterior margins of each sinuous, serrate, with 5–8 stout short spines; all have row of 2–3 spines set in from margin on posterodistal angle; posterodistal angle produced backwards a little.

PLEOPODS. Each ramus appears to have 3–5 segments, but segmentation may be only superficial—it is very hard to make out; outer ramus slightly the longer.

UROPODS. *First*: Peduncle dorsal margins each have about 5 spines, inner ramus has 4 dorsal spines; outer has 2; both have 2 long and 2 short end spines. *Second*: Peduncle has about 3 spines on outer dorsal margin; inner has 1 distally; outer ramus has 1 spine dorsally, 2 long and 1 short end spines; inner has 2 spines dorsally, 2 long and 2 short end spines. *Third*: Ramus shorter than peduncle, narrower, cylindrical, has stout spine dorsally, 6 short and long end spines; peduncle has 2 stout dorsal spines distally, several short fine spines on lower surface. *Telson*: Each lobe has 2 end and 3 marginal stout spines.

LOCALITY. Leafmould, Snares Island, coll. Dr. R. A. Falla, 6/12/47.

TYPES. Slides 68, male; 70, female; Dom. Mus.

DISCUSSION. *Orchestia simularis* shows intermediate characteristics between *Orchestia* and *Talorchestia* in the shape of the female 1st gnathopod. The palm is sufficiently indicated, I consider, to justify placing it in *Orchestia,* particularly since the maxilliped dactylos is present although small. The pleopods are not degraded. The shape of the male second gnathopod suggests that this is an immature male or intersex, but from the end segment of the male and female first antennae it is clear that the species has not previously been recorded from New Zealand or its surrounding islands.

O. simularis may be recognised by the end segment of the 1st antenna in combination with the male 2nd gnathopod (if this is a mature male), the epimeral plates, and possibly the female broodplates.

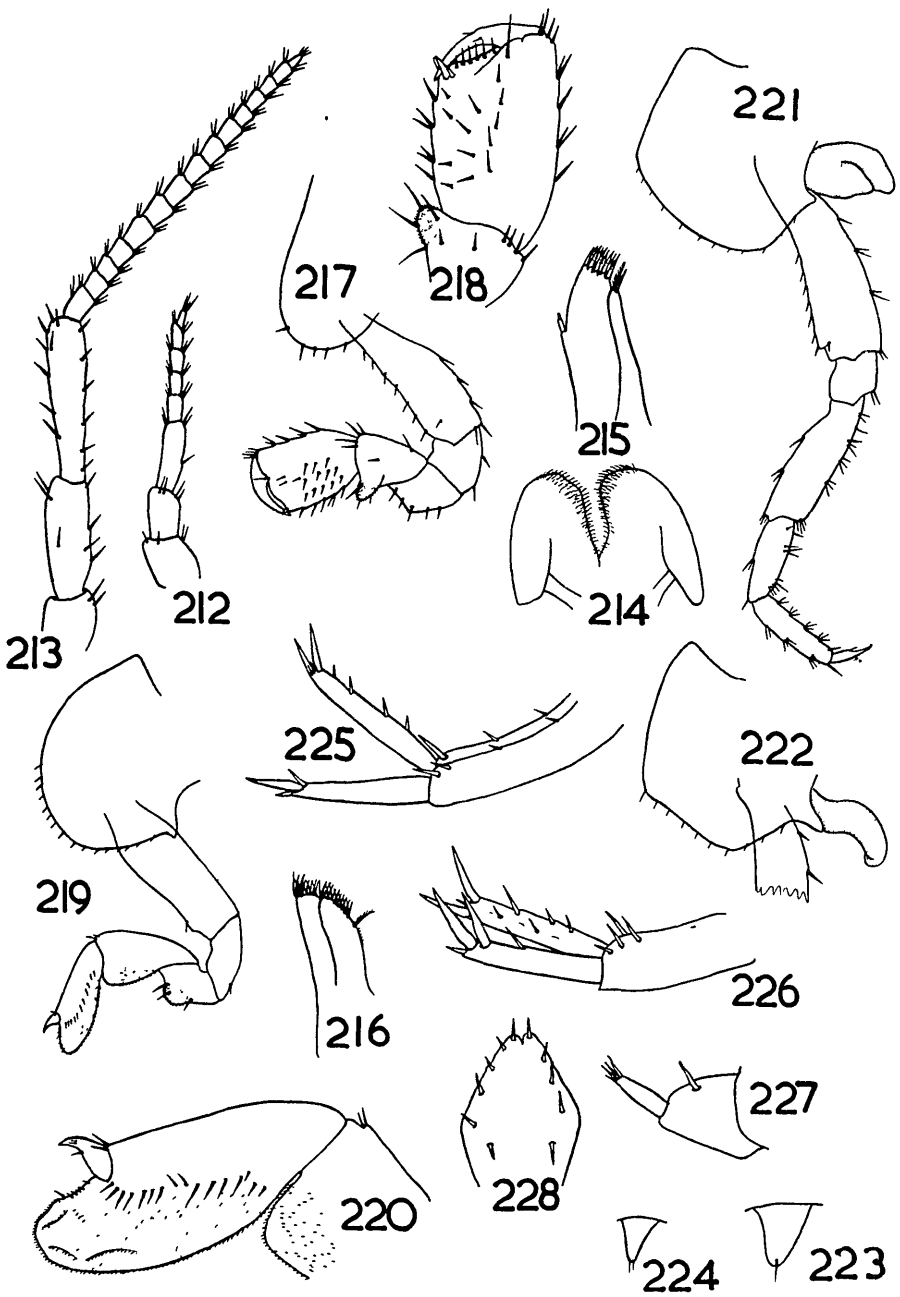
Orchestia rubroannulata, n. sp. (Figs. 212–240.)

Colour in spirit, yellow with orange-red stripes on head and body. Length of male, 6½ mm; depth 1¼ mm, width 1½ mm.

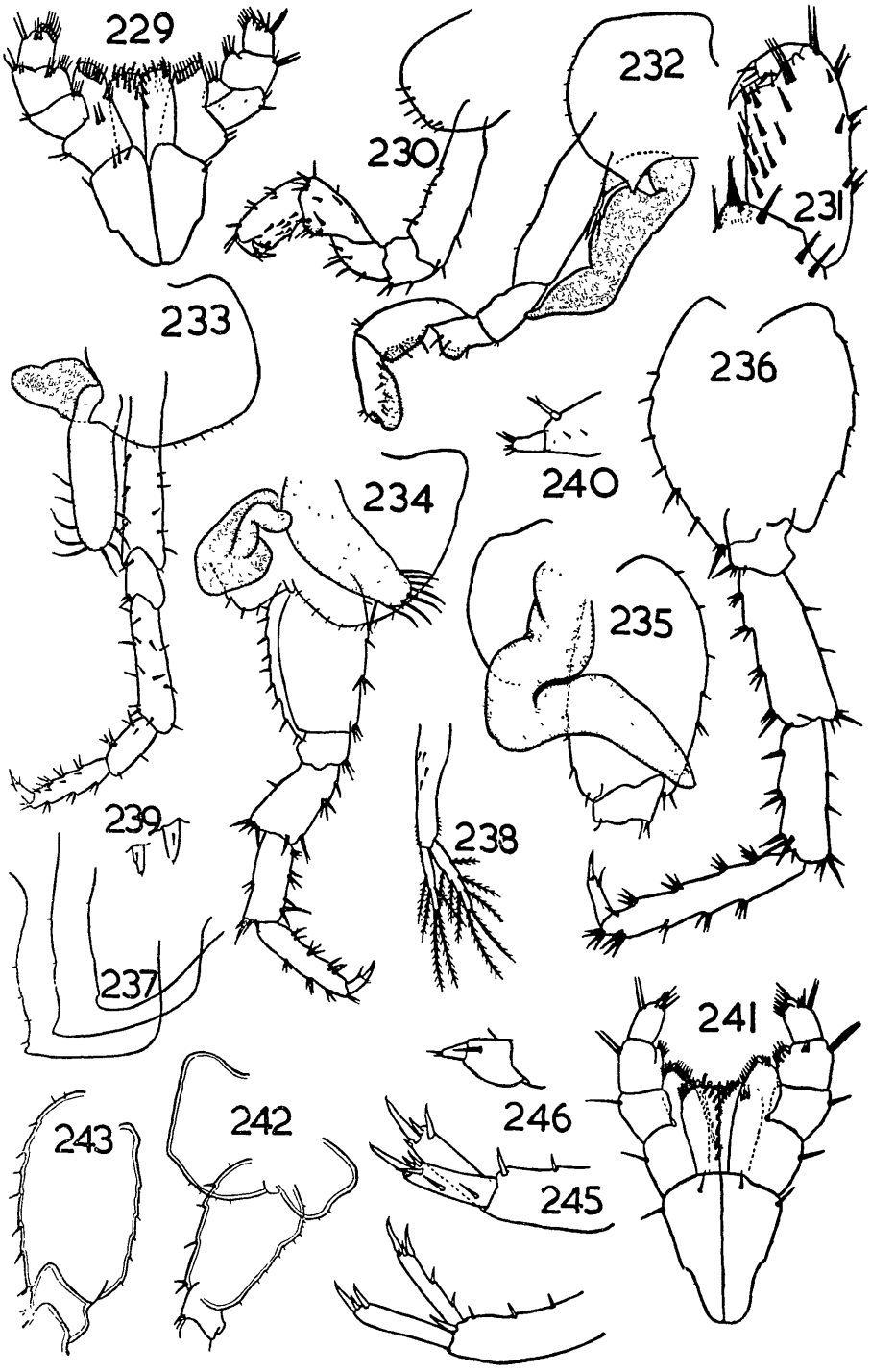
ANTENNAE. *First*: Length 1 mm. Flagellum shorter than peduncle, of 5 segments, last one tufted, others have pair of small spines superodistally, longer ones inferodistally. Peduncle, 1st segment as long as 2nd, 2nd narrower; 3rd 1½ times length 2nd, narrower; inferior and end margins have a few spines. *Female*: Flagellum of 4 segments. *Second*: Length 2¾ mm; flagellum longer than peduncle, of 15–16 segments in male, 12 in female. Peduncle segments have long slender spines on margins and surfaces; 4th segment about ⅔ length 5th.

MOUTHPARTS. *Mandibles*: Left, spine row has 5 setose spines; upper article of cutting edge has 3 teeth, lower has 4 poorly defined teeth. Right, upper article has 4 teeth, lower is bulb-headed with fimbriated margin; molar process proximally bristled. *Maxilliped*: Inner plate has about 9 setulose spines on one side between distal teeth and ½ down cleft, about 4 setulose spines on end margin outside teeth; setulose spines across inner distal angle. Outer plate almost reaches end of carpus, has row of spines across inner surface a little in from margin, about 3 similar spines on inner margin at mid-merus level, 2–3 on surface below merus inner proximal angle; 1–2 spines on outer distal angles of basos, ischium and merus; 2 long stout spines on carpus outer distal angle. Immediately inside groups on merus and carpus are 2 small spines; 5 stout spines on propod end margin. On other side, merus inner distal angle and carpus mediodistal margin have groups of 2 or so small spines. Carpus and propod inner distal angles have short spines, in propod masking tip. There seems to be no distinct segmentation into propod and dactylos, although propod is produced terminally like a rudimentary dactylos.

GNATHOPODS *First*: Sideplate ventrally rounded and spined. Basos width ⅓ length. Ischium subrectangular, posteriorly spined Merus as long as ischium, spined posteriorly, has small apical non-scabrous lobe. Carpus anterior margin as long as merus posterior, spined mainly on anterodistal angle; posterodistally produced in scabrous lobe with a few long spines. Propod longer than carpus, subrectangular, anterior margin has about 5 groups of long slender spines, outer dactylos base has several fine spines; posterior margin and most of surface have stouter, stronger spines; palm a little oblique, ½ propod width, defined posteriorly by a long stout spine each side of dactylos plus a shorter stout spine on one side; palm has about 6 short to long slender spines each side. Dactylos overlaps end of palm a little, is distally slender, has spines on outer margin and surface. *Female*: Like male but less well developed. Carpus a little longer proportionately; free hind margin larger and less "pinched off". Propod not as broad, anterior margin has about 3 groups of 2–3 spines; outer and inner bases of dactylos have 2 or 3 long setae; inner surface of propod has stout seta-tipped spines in triangular field from dactylos inner base to propod posteroproximal angle; palm almost



TEXT-FIG. 11—*Orchestia rubroannulata* n.sp., male. 212, Antenna 1. 213, Antenna 2 214, Lower lip. 215, Maxilla 1. 216, Maxilla 2. 217, Gnathopod 1. 218, Gnathopod 1, palm and dactylos. 219, Gnathopod 2. 220, Gnathopod 2, palm and dactylos 221, Peraeopod 1. 222, Peraeopod 2. 223, Pleopod 2 224, Pleopod 3. 225, Uropod 1. 226, Uropod 2. 227, Uropod 3. 228, Telson.



TEXT-FIG. 12.—*Orchestia rubroannulata* n.sp. 229, Maxilliped. 230, Gnathopod 1, ♀. 231, Gnathopod 1, ♀, propod and dactylos 232, Gnathopod 2, ♀. 233, Peraeopod 1, ♀. 234, Peraeopod 2, ♀. 235, Peraeopod 4, ♀. 236, Peraeopod 5, ♀. 237, Epimeral plates 238, Pleopod 1, ♀. 239, Pleopods 2–3, ♀. 240, Uropod 3, ♀. *Orchestia parva* (Chilton), Male. 241, Maxilliped. 242, Peraeopod 3. 243, Peraeopod 4. 244, Uropod 1. 245, Uropod 2. 246, Uropod 3.

transverse, ½ propod width, 2 stout spines on propod outer margin, 2 short narrow spines on palm. Dactylos long, overlaps palm, inner margin has short stout forwardly projecting spine medially; 2 setae medially on surface. *Second*: Feebly chelate. Sideplate ovate, spined ventrally and posteriorly. Basos width ⅓ length, margins sinuous, a small spine near anterodistal angle. Ischium anterior margin ⅓ length posterior, feeble spine on posterodistal angle. Merus as large as ischium, subtriangular, anterior margin contiguous with proximal ⅓ of carpus posterior; posterior has spined scabrous pellucid lobe. Carpus anterodistal angle has feeble spines, posterior margin produced in scabrous pellucid lobe, anterior margin 4/3 length merus posterior. Propod as long, narrower, posterior scabrous lobe produced past oblique palm and finger; short stout spines from posteroproximal angle to dactylos inner base; dactylos stubby, spined, as long as poorly defined palm, has further small spines at outer base; palm has 4 or so short spines. *Female*: Like male. Gills long and narrow, taper at apex, reach ischium.

PERAEOPODS. *First*: Basos width ¼ length, margins spined. Ischium sub-square, ⅓ merus length, posterodistally spined. Merus narrows a little distally. Carpus has spined margins Propod longer than carpus, narrower, has strongly spined margins Dactylos long *Second*: Sideplate wider and shallower; basos anterior margin widens sharply distally, almost lobed, segments proportionately wider, spines longer, segments shorter than but otherwise like Pr. 1. *Third*: Sideplate anterior lobe spined ventrally. Basos width about ⅔ length, posterior margin has small single spines, anterior has 3–4 groups of 1–3 larger stouter spines. Ischium spined strongly anterodistally. Merus subtriangular, margins and distal angles have long stout spines, distal width ½ length. Carpus subrectangular, slightly shorter than merus, about ½ merus width, strongly spined anteriorly and distally, pair of spines on posterior margin Propod a little longer than merus, linear, narrower than carpus, distally only as wide as short spined dactylos; strongly spined with rings each of 6 short spines. *Fourth*: Gills long and lanceolate. Basos width ½ length, anterior margin has stout single spines, group distally; posterior has single, less robust spines. Merus and carpus posterior margins have a few spines, group distally; remaining segment margins excepting anterior ischium have groups of 2 or more stout spines *Fifth*: Basos subovate; as wide as long, anterior margin has stout single spines, group on distal angle; posterior serrate and minutely spined.

EPIMERAL PLATES *First*: Subtriangular, posterior margin sigmoid, has minute spine medially. *Second and Third*: Posterior margins more or less straight, have 2–5 minute spines, serrate; posterodistal angle of all plates produced a little.

PLEOPODS. *First*: Biramous, spined proximally, outer margin may have a few minute setae; rami not segmented, margins have long plumose setae. *Second and Third*: Vestigial triangular stumps, may have 1 or 2 small end spines

UROPODS. *First*: Peduncle, both dorsal margins spined; inner ramus dorsally spined, has 4 short and 2 long stout end spines; outer ramus dorsally naked, has 1 long and 3 short end spines *Second*: Peduncle as long as rami, both dorsal margins spined; inner ramus has several short stout spines dorsally, 2 long and 2 short end spines; outer ramus has 1–2 dorsal spines, 2 long and 1 short end spine. *Third*: Peduncle much larger than ramus, has stout spine dorsally, a few very small spines on ventral surface; ramus has 4–5 end spines. *Telson*: Slightly longer than wide, apical lobes narrow, subtriangular, about 6 spines on each margin.

LOCALITIES. Karewa Island, Bay of Plenty, from leafmould, coll. R. A. Falla, 29/2/49; Stephens Island, leafmould, coll. R. R. Forster, 14/5/50; Kapiti Island, coll. J. T. Salmon, 1950; Little Barrier Island; Te Araroa, East Coast, North Island, leafmould, January, 1951 (D. E. H.); Omaio, East Coast, N.I., January, 1951, coll. D. E. H.

TYPES. Male, slide 71 (Karewa); female, slide 86 (Stephens), Dom. Mus.

DISCUSSION. This species is easily recognisable in spirit collections by its combination of small size and numerous distinct red annulations or stripes on all parts of the body, extending even to the peraeopods These stripes are not very noticeable in life, but in specimens preserved in alcohol they are in most cases so distinctive as to suggest the species name. Specimens from Little Barrier Island are not as distinctly striped as the type specimens, but others from Karewa, Stephens and Kapiti Islands show that the stripes are normally present.

Other, more valuable, systematic characteristics are the reduction of the 2nd and 3rd pleopods to vestigial triangular stumps; the 4th peraeopod gills which are larger than those of other segments, long and lanceolate; and the first gnathopod which is strongly subchelate in both sexes. The shape of this last places the species very close to Chilton's *Orchestia improvisa* (1909). Chilton mentions an undescribed species from the North of Auckland as being similar to *O. improvisa*—possibly he was

dealing with *O. rubroannulata.* The species differs from most *Orchestia* in having a feebly chelate second gnathopod in the male. I prefer to follow Chilton in placing this species in *Orchestia* with *O. improvisa* rather than create a new genus for it.

O. rubroannulata was found to be a major constituent of leafmould fauna from Stephens Island in numbers and especially in bulk, a cubic foot bag of leafmould yielding enough specimens to half-fill a 2-ounce jar.

The distribution of the species is interesting. Four of the six known localities are islands on which there are colonies of burrowing seabirds, in particular the muttonbird, *Puffinus griseus.* The soil on Little Barrier and Stephens Island, and at least on part of the other islands, is known to have a high phosphate content due to bird droppings and constant soil overturn through burrowing. The Kapiti specimens were taken near the muttonbird colony at the top of the island, and one lot of East Coast specimens under a grove of old pohutakawa trees near the sea where birds, especially shags, would be likely to roost. It is possible to theorise that amphipods, particularly gravid females, caught up in the feathers of birds burrowing or scuffling through the leafmould, have been transported from one island to another. Segerstrale (1954, *et. al.*) has reported geographical and experimental evidence supporting his theory that this is a possible and even probable means of amphipod distribution. It may also be suggested that, independently of bird transport, there is some correlation between high phosphatic soils and the markedly sporadic distribution, so far known, of this amphipod However, the simplest explanation, which must be accepted unless contradicted by further evidence, is that the distribution of *O. rubroannulata* is the distribution of a relict fauna, although not necessarily an ancient one. For example, the tuatara, *Sphenodon punctatus,* occurs on Stephens and Karewa Island. The distribution of *O. rubroannulata,* as presently known, is what would be expected of a relict fauna with remnant populations around the fringes of the mainland. Furthermore, the East Coast area has been within recent time faunistically isolated from the rest of the North Island by widespread volcanic activity in the central area of the island. Lee (1951) has used this fact to explain the distribution of two earthworm sub-families. These are found in North Auckland and the East Coast of the North Island, south of the volcanic area in the southern North Island, and throughout the South Island.

The terrestrial isopod, *Cubaris suteri* Chilton, is also known to me at present from Kapiti and Stephens Islands, from Auckland (the type locality) and from the East Coast of the North Island. Here, as with *Orchestia rubroannulata,* wider collecting may fill in the gaps, but the general pattern seems more than coincidence.

Orchestia improvisa (Chilton), 1909. (Figs. 247–273.)

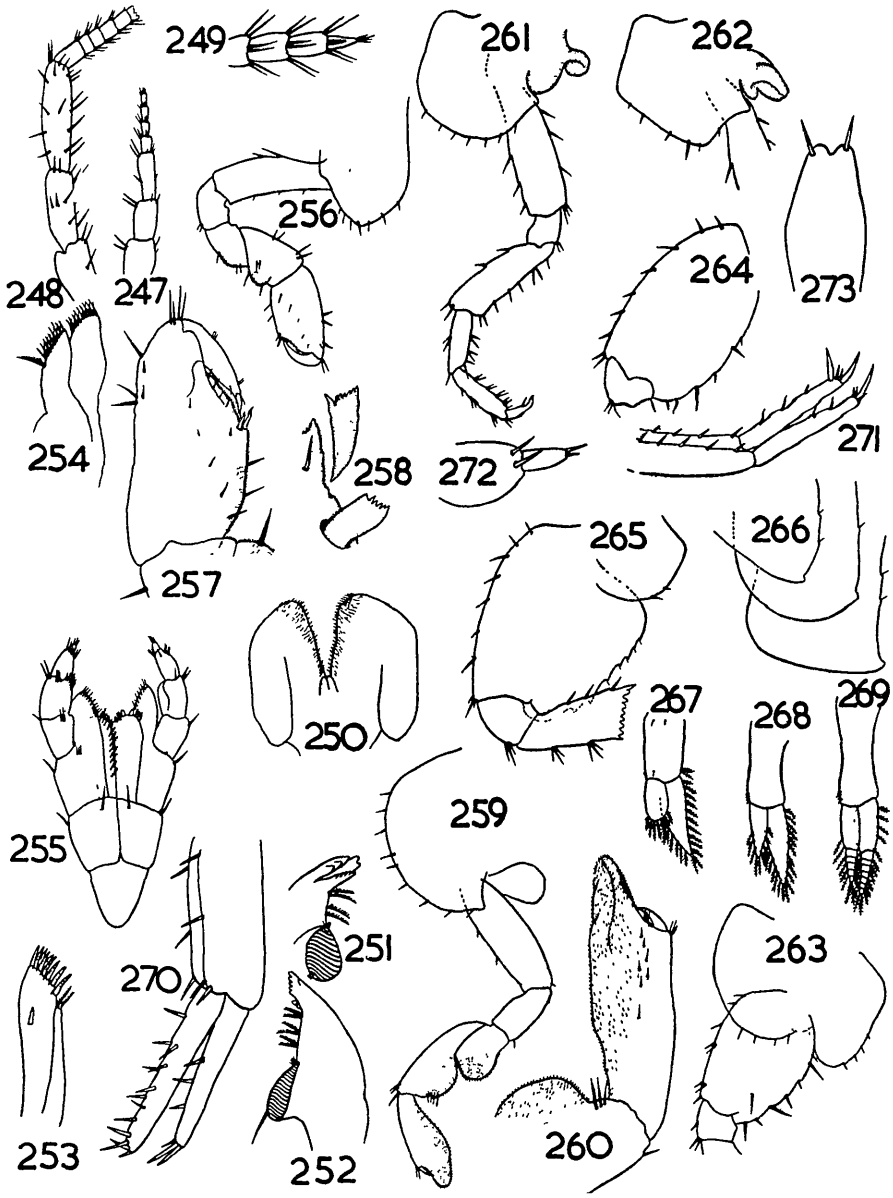
Parorchestia improvisa Chilton, 1909: 641, fig. 10. Shoemaker, 1935: 66. Stephensen, 1935: 13. Stephensen, 1938: 251–252.

Female, length 6⅓ mm; depth 2 mm; width 1½ mm. Colour in spirit yellowish-white

ANTENNAE. *First*: Length 1¼ mm Flagellum shorter than peduncle, of 5 segments, end one tufted, all have long pair of spines inferodistally, 4 or so small spines mediodistally. Peduncle, 1st segment as long as 2nd, 3rd slightly longer; segments slender, each has 2 long spines inferodistally, a few short ones superodistally. *Second*: Length 5 mm, varies in length from 3rd peraeon to almost body length. Flagellum of 28 segments. Peduncle, 4th segment ¾ length 5th, all have long spines, particularly on inferior surface and margin.

MOUTHPARTS. *Maxilliped*: Inner plate has 7–8 setulose spines on one side across inner distal angle, row down cleft almost to ischium; on other side 3 spines outside end teeth, about 3 below inner teeth. Outer plate almost reaches end of carpus, row of spines set back from inner distal margin, 3 or so spines on outer margin at merus level, slightly more distal group on inner margin. Basos, ischium and merus outer distal angles have each a long stout spine, 2–3 on carpus and propod. Other side of merus inner distal angle has about 3 small spines, carpus has group mediodistally. Capus inner distal angle produced in small lobe, has small spines, similar spines on propod masking dactylos. Propod has 2 groups of smaller spines below small dome-shaped dactylos, dactylos has about 3 end spines. Carpus, merus and ischium of equal length, propod narrower than carpus and merus.

GNATHOPODS. *First*: Sideplate subtriangular, has long slender spines ventrally. Basos width about ⅓ length, a few short spines anteriorly, longer ones posteriorly. Ischium slightly



TEXT-FIG. 13.—*Orchestia improvisa* (Chilton), Female. 247, Antenna 1. 248, Antenna 2 249, Antenna 2, end segments. 250, Lower lip. 251, Left mandible. 252, Right mandible 253, Maxilla 1. 254, Maxilla 2. 255, Maxilliped. 256, Gnathopod 1. 257, Gnathopod 1, propod and dactylos. 258, Gnathopod 1, portion of propod and dactylos. 259, Gnathopod 2 260, Gnathopod 2, propod and dactylos 261, Peraeopod 1. 262, Peraeopod 2. 263, Peraeopod 3. 264, Peraeopod 4. 265, Peraeopod 5. 266, Epimeral plates. 267, Pleopod 1. 268, Pleopod 2. 269, Pleopod 3. 270, Uropod 1. 271, Uropod 2. 272, Uropod 3 273, Telson.

narrower than basos, posterodistally spined. Merus has very small scabrous posterior lobe with about 4 spines at base and each side. Carpus has a few single and paired spines, length nearly twice merus width, slightly wider, has scabrous posterior lobe. Propod longer than carpus, posterior margin ½ length anterior, anterior has long spines distally, 2 groups of 3–4 long spines each side of dactylos base; row of small stout single spines from dactylos to postero-proximal angle, 2 long single spines on posterior margin Palm oblique, about ⅔ propod width, serrate, particularly near 3 stout defining spines where dactylos impinges; about 4 short spines each side of scabrous palm. Dactylos as long as palm but impinges on it inside defining spines, about 4 flexible spines on inner margin and surface. *Second*: Sideplate spined posteriorly and ventrally. Basos width about ⅓ length, 2–3 single spines anteriorly Merus shorter than ischium, ½ carpus length, posterior margin produced distally in scabrous pellucid lobe. Carpus posterodistal angle spined below scabrous lobe, anterior margin convex, anterodistal angle spined. Propod slightly shorter than carpus, distally produced in pellucid lobe; palm very short, has about 3 medium and 4 short spines, scabrous, oblique; short dactylos impinges on palm, outer base has 4 spines; row of spines from dactylos impingement down propod halfway to posterodistal angle.

PERAEOPODS. *First*: Basos has 3–4 large single spines on each margin. Ischium slightly lobed anteriorly, spined posterodistally. Merus about ⅔ basos length, convex anterior margin widens distally, margins have long stout spines, especially posterior. Carpus about ½ merus width, has 2 long spines medially on anterior margin, short ones at distal angle; about 3 pairs of long spines on posterior margin. Propod about ½ as long again, narrower, similar spines posteriorly, about 4 pairs of medium-length spines anteriorly. Dactylos long. *Third*: Shorter than Pr 1 and 2. Sideplate anterior lobe spined ventrally, posterior lobe spined posteriorly Basos has pairs of short to long spines anteriorly, single short and long spines posteriorly Ischium and merus wider and shorter than in Pr. 1 and 2; other segments longer. *Fourth*: Basos width about ⅔ length, strong and mostly single spines on margins; spines on propod posterior margin in 3's; all spines much longer than in Pr. 1–3. *Fifth*· Basos nearly as wide as long; anterior margin has single spines except on distal angle; posterior margin serrate and minutely spined; other segments more or less linear especially propod, longer and narrower than in Pr 4; spines anteriorly in 3's.

EPIMERAL PLATES. *First*: Anterior margin rounds convexly to ventral, posterior slightly sigmoid. *Second and Third*: Posterior margin straight, posterodistal angle slightly produced backwards; all 3 plates have only 1 or 2 minute spines on posterior margin.

PLEOPODS. Only 1st has segmented rami; all have plumose setae on rami; 3rd has plumose setae on distal end of peduncle, spines on peduncle surface, 3 coupling spines; others have 4; inner rami shorter than outer.

UROPODS. *First*: Peduncle has 4–5 spines on each dorsal margin; inner ramus has about 3 dorsal spines, 2 long and 2 short end ones; outer has 2 dorsal spines, 1 long and 3 shorter end ones *Second*: Peduncle has 2 dorsal rows of 3 or 4 spines; inner ramus has about 10 dorsal spines, 2 long and 2 short end ones; outer has 3 dorsal spines, 2 long and 1 shorter end spine *Third*: Peduncle much longer and wider than ramus, has 2 long spines dorsally, ramus has 1 short and 1 long spine. *Telson*: Length nearly twice width, 1 long spine on each lobe.

LOCALITIES. Snares and Stewart Island (Chilton, 1909); Stewart Island (Stephensen, 1938); Snares Island, coll. R. A Falla, December, 1947.

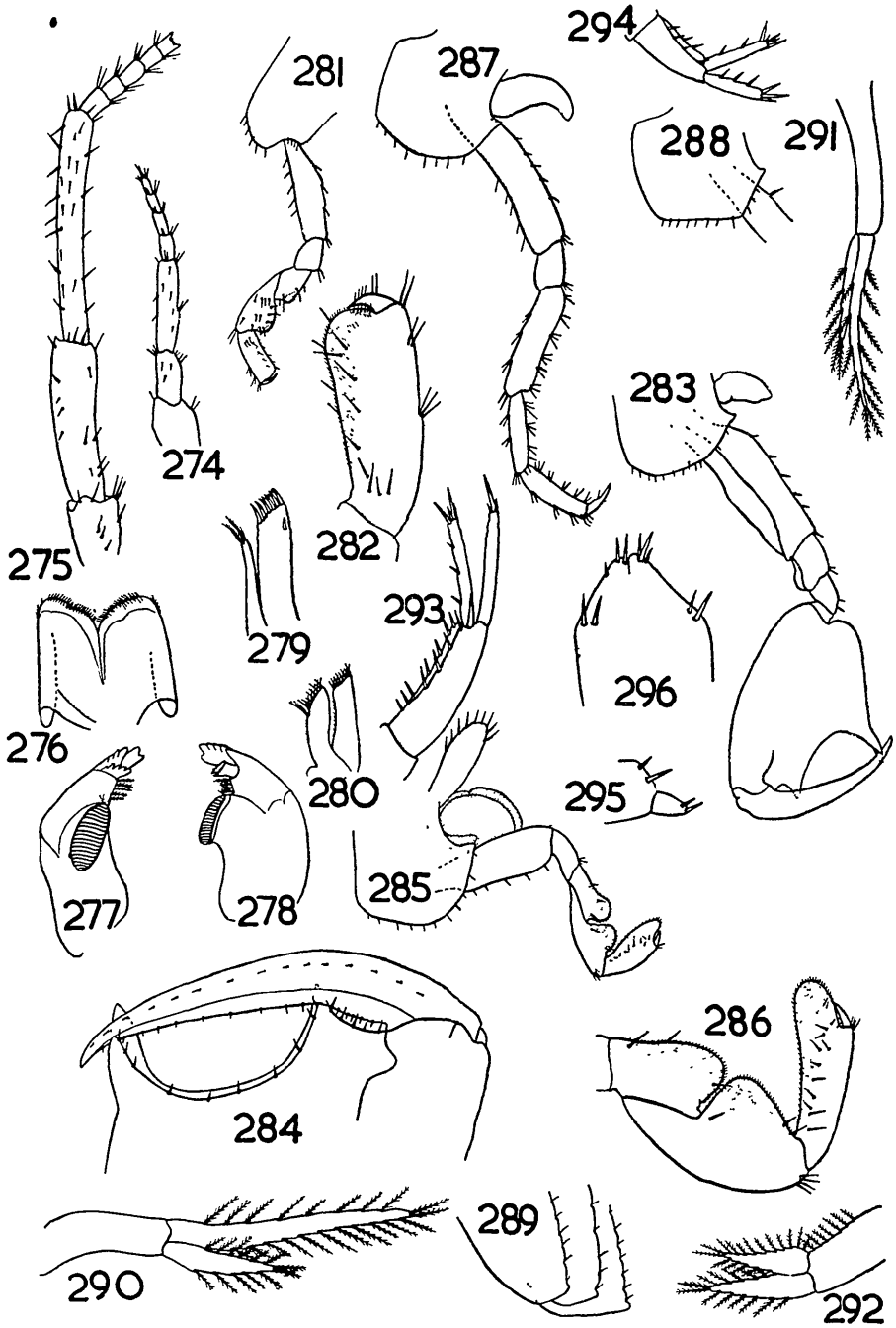
HYPOTYPES. Slide 62, Dom. Mus.

DISCUSSION. Chilton describes the body, antennae, gnathopods and peraeopods of this species and says that the uropods and telson are of the "usual form". Stephensen (1938) describes more fully, but from an undissected specimen, the side-plates, epimeral plates, pleopods, uropods and telson.

So far, only the female is known. The first gnathopod, as in *O. rubroannulata,* is very different from the usual form in *Orchestia* It is strongly subchelate, relatively large and well-developed. The similarity to *O. rubroannulata* suggests that the male of *O. improvisa* is also probably very like the female.

Stephensen described his specimens as having marginal spines only on the inner ramus of the 1st and 2nd uropods. The specimens described above have dorsal spines on the outer ramus of both uropods..

O. improvisa is a terrestrial leafmould species. These specimens were included in a vial of *Orchestia patersoni* also taken from leafmould.



TEXT-FIG. 14—*Orchestia insularis* (Stephensen). 274, Antenna 1, ♂. 275, Antenna 2, ♂. 276, Lower lip. 277, Left mandible. 278, Right mandible. 279, Maxilla 1. 280, Maxilla 2 281, Gnathopod 1, ♂. 282, Gnathopod 1, ♂, propod and dactylos. 283, Gnathopod 2, ♂. 284, Gnathopod 2, ♂, palm and dactylos. 285, Gnathopod 2, ♀. 286, Gnathopod 2, ♀, propod and dactylos. 287, Peraeopod 1, ♂. 288, Peraeopod 2, ♂. 289, Epimeral plates. 290, Pleopod 1 291, Pleopod 2. 292, Pleopod 3 293, Uropod 1. 294, Uropod 2. 295, Uropod 3 296, Telson.

Orchestia insularis (Chilton), 1909. (Figs. 274–296, 380–387.)

Parorchestia insularis Chilton, 1909: 639–640, figs. 8a, b, c Stephensen, 1927: 349–350. Shoemaker, 1935: 66. Stephensen, 1935: 13.

Parorchestia insularis var. Stephensen, 1927: 350, fig 23.

Colour in spirits white Male, length 10½ mm; depth 2¼ mm, width 3 mm. Female, length 12 mm; depth 2½ mm; width 2¼ mm.

ANTENNAE *First*: Length 1½ mm, almost reaches end of the 4th peduncle segment of antenna 2. Flagellum slightly shorter than peduncle, of 5 segments, end one very small, terminally setose, other 4 segments each have 2 pairs of setae distally. Peduncle segments successively narrower, 2nd slightly longer than 1st and ½ length 3rd; margins and surface spined. *Female*: Length 1½ mm. *Second*: Length 7 mm, reaches 3rd peraeon segment, longer than peduncle. Flagellum of 25 segments, end one long and tapering. Peduncle 4th segment ⅔ length 5th, wider; 3rd about ⅓ length 4th, narrower; all have fine spines inferiorly and distally, 5th spined superiorly. *Female*: Length 5½ mm.

MOUTHPARTS. *Maxilliped*: Inner has about 10 setulose spines on one side across inner distal angle, 5 outside distal teeth; about 6 on other side down cleft almost to basos. Outer plate has row of spines on inner surface set back from margin, 4–5 on end of outer margin, spine groups on outer margin at ischium level and a little more distally on inner margin. Basos spined below outer plate insertion, basos, ischium, merus and propod all have long paired spines on posterodistal angle. Merus as long as carpus and propod, carpus widest. Inner distal margins of carpus and propod densely spined, group of 4 spines on carpus margin mediodistally, propod spines mask small terminally-spined dactylos, dactylos has row of 5–6 spines.

GNATHOPODS *First*: Sideplate ventrally and posteriorly spined Basos width ¼ length, has short spines anteriorly and distally. Ischium subsquare, as wide as basos, posterodistally spined. Merus as long as ischium, posteriorly produced in small scabrous pellucid lobe, margin and lobe base spined Carpus scabrous lobe has a few long spines; surface spined; anterior margin convex, anterodistal angle spined Propod slightly shorter than carpus: anterior margin has 3 groups of long spines; posterior expanded slightly in scabrous pellucid lobe, row of long spines on surface set back from margin. Short stout dactylos does not reach end of palm, palm ½ propod width. *Second*: Sideplate subsquare, spined ventrally and posteriorly. Basos posterior margin sparsely spined, widens sharply to about ⅓ length Basos and ischium subtriangular in cross-section, the anterior surface grooved to take bent-back propod. Ischium subsquare, anterior margins both lobed Merus as long as ischium, ½ its width, posterodistal angles of both spined. Carpus very small. Propod greatest width about ¾ length, almost as long as basos plus ischium; anterior margin convex, posterior has projecting tooth defining end of palm; tooth bifurcated to take dactylos between its forks Stout dactylos has minutely spined medial surface and inner margin; palm has 2nd and sharp tooth ⅓ along from finger hinge; tooth divides palm into two concave depressions, and impinges on outer dactylos surface; both sides of palm margin and teeth fringed with short stout spines; dactylos tip extends past end of palm. *Female*: Basos anterior margin and posterodistal angle spined. Ischium slightly longer than wide, spined posterodistally. Merus posterior margin has scabrous pellucid lobe with a few spines each side and at base. Carpus larger, posterior scarbous lobe spined as in merus, anterodistal angle spined. Propod slightly shorter and narrower than carpus, widening distally, posterior margin scabrous, produced beyond vertical palm Outer base of dactylos has 4–5 slender spines, palm has several short spines continuous with row across propod to posteroproximal angle Broodplates· width about ⅓ length, short setae on ventral and posterior margins.

PERAEOPODS. *First*: Sideplate subrectangular. Basos width ¼ length, margins have short single spines. Ischium subrectangular, anterior margin slightly lobed, posterodistal angle spined. Merus as wide as ischium, about ⅔ basos length, groups of 2–3 spines on margins. Carpus narrower, ⅔ merus length Propod slightly narrower, about ¾ merus length. Spines seta-tipped. *Third*· Longer than Pr. 1. Sideplate, anterior lobe spined ventrally; posterior spined posteriorly. Basos width ½ length, margins have several short single spines, those on posterior the stronger Merus shorter and wider, carpus and propod longer than in Pr. 1–2. *Fourth*: Basos width slightly more than ½ length, not narrowing noticeably throughout length but posterodistally rounding Merus, carpus and propod stouter and longer than in Pr. 3 *Fifth*: Sideplate ventrally convex, has 2 minute marginal spines Basos almost as wide as long, anterior margin has about 6 single stout spines; posterior is serrate, has about 12 minute spines; otherwise like Pr 4.

EPIMERAL PLATES Anterior margin of 1st and 2nd rounds convexly to ventral; posterior margins serrate and minutely spined, 2nd slightly sigmoid, 1st and 3rd straight.

PLEOPODS. Outer ramus shorter than inner, none of rami completely segmented, all have plumose setae; inner ramus of each longer than peduncle; 3rd much the shortest, peduncle of 3rd has plumose setae.

UROPODS. *First*. Peduncle, both dorsal margins spined; long spine between rami, inner ramus has 3 dorsal spines, 2 short and 2 long end spines; outer ramus dorsally naked, has 1 long and 3 short end spines. *Second*: Peduncle, both dorsal margins spined; both rami spined dorsally; outer has 2 short, 1 medium and 1 long end spine; inner has 2 short, 2 long end spines. *Third*: Peduncle much larger than ramus, has 1 short and 1 long spine dorsally, ramus has 1 short and 1 long end spine. *Telson*: Subtriangular, has about 3 seta-tipped spines on each apex, 2 on each side.

SYNTYPE SPECIMENS: Male, length 9 mm; depth 2½ mm; width 2 mm Female, length 10¼ mm; width 2 mm; depth 2½ mm Female with 6 ova.

GNATHOPODS *First*: Dactylos slightly shorter than palm in male, slightly longer in female. Sides perhaps more parallel in female propod than in male, otherwise similar. *Second*: Male propod like Stephensen's variety, but dactylos rests on palm, does not overlap it; median tooth a little blunter; excavation between tooth and end of palm much shallower, almost straight; dactylos tip rests between 2 shallow, blunt, knob-like projections.

PERAEOPODS. *Third*: Anterior lobe of sideplate almost semicircular, has 3 small ventral spines; posterior lobe has slightly excavate posterior margin, 2 large and 1 minute spine Basos long and narrow, greatest width ⅔ length *Fourth*· Sideplate ovate, 3 minute marginal spines ventrally, sideplate reaches ⅔ down ovate basos

LOCALITIES. Campbell Island (Chilton, Stephensen) "under wood or stones"; Auckland Island, Adam's Island (Stephensen); Campbell Island. "Mt Stream Collection," moss and lichens. coll. J. H Sorensen, 24/2/47

SYNTYPES. Slides CM1, CM2, Canterbury Museum.

TOPOTYPES Slides 47, 48.

DISCUSSION This species was first described by Chilton from specimens taken on Campbell Island "up to the top of the highest hills"

Chilton described only the male gnathopods. Stephensen (1927) described a variety based on a male with a different second gnathopod. Without further examination of the type material, I would have rated this as a distinct species. However, after examining varietal specimens and comparing them with the type material, I can find no essential differences apart from those already described, further confirming the suspicion that these are only older males than the type specimens and those which Stephensen attributes to Chilton's original species. Both forms are found on both Campbell and Auckland Island, as far as I can ascertain in the same populations Because of this similarity, I have based the above description on specimens of the "varietal" form which I encountered first in this work, and I have listed differences and additional details from the syntype material.

The male pleopods are somewhat longer and the first 2 pairs show a greater discrepancy in length between outer and inner rami than in the female, but generally there is little difference, particularly in regard to the comparatively short and squat 3rd pleopod peduncle.

The female first gnathopod is not as angular as in Stephensen's figure, and the dactylos appears longer and less stubby

Distinctive features of this species are the telson, pleopods, uropods, epimeral plates, and basos and sideplates of peraeopods 3–5

Orchestia parva (Chilton), 1909. (Figs. 241–246, 297–315.)

Parorchestia parva Chilton, 1909· 640–641, fig. 9 Stephensen, 1927· 350. Stephensen, 1935: 14. Shoemaker, 1935. 66. Stephensen, 1938: 259–260

Colour in spirit yellowish. Male, length 8½ mm, depth 2¼ mm, width 2 mm Female, length 4½ mm, width 1 mm; depth 1½ mm.

ANTENNAE *First*: Length 1 mm Peduncle longer than 5-segmented flagellum Flagellum segments have small spines inferodistally, setae superodistally, end segment tapering and tufted Peduncle segments succeedingly longer and narrower, single spines on superodistal angles, smaller spines inferodistally. *Second*: Length 3 mm, reaches 2nd peraeon segment. Flagellum longer than peduncle, of 13 segments. Female, length 2 mm, flagellum of 10 segments Peduncle, 4th segment ½ length 5th, all have long slender spines inferiorly, superiorly on 5th

MOUTHPARTS. *First Maxillae*: Palp bristled *Mandibles*: Left cutting edge, upper article has 4 teeth, lower is coarsely fimbriated, spine row has 5 setose spines. Right cutting edge, upper article has 4 teeth. *Maxilliped*: Outer plate has a few setulose spines on outer distal margin, continuous with row of non-setulose spines down inner margin; lobe distally produced a little to terminal knob. Inner plate has about 10 setulose spines on one side across inner distal

angle, 5 similar spines outside end teeth; 8–9 setulose spines on other side in row from inner teeth down cleft almost to basos; field of bristles as far as basos parallel to and outside these. Merus inner distal angle and carpus mediodistal margin have similar groups of spines; carpus and propod inner margins have spines on distal ½ Outer distal angles of all segments have 1–2 long spines, 3 further spines on propod across end margin. Propod barely longer than carpus and merus, ½ their width, the latter two wider than long Dactylos rudimentary, not well-defined.

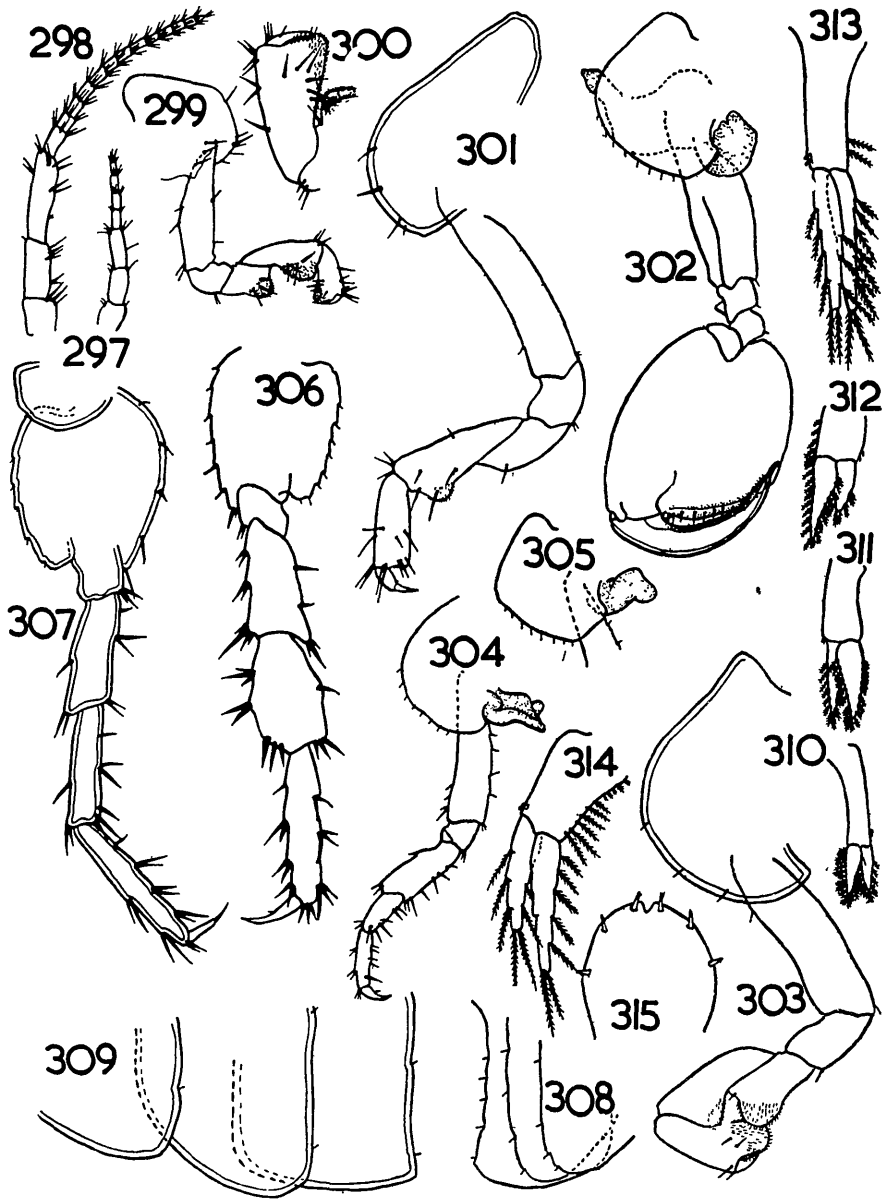
GNATHOPODS *First*: Sideplate subovate Basos width ⅓ to ½ length, margins have a few long single slender spines. Ischium subsquare, posterodistally spined. Merus posterior margin has a few long spines at base of scabrous lobe. Carpus anterior margin has a long spine medially, group on distal angle; posterior more than twice merus length, scabrous lobe has long spines at base. Propod widens distally, as large as merus, anterior margin has 3 groups of long spines, posterior produced in scabrous lobe distally, a few long slender spines on surface, mainly posteriorly. Long dactylos impinges on end lobe; palm transverse, scabrous, ½ propod width, has about 6 short spines; group on dactylos inner base, spine on dactylos outer margin. *Female*: Sideplate ventrally rounded, has a few strong spines Basos width ⅓ length, 1–2 spines on distal angles. Ischium slightly wider, subsquare, 1–2 spines on distal angle. Merus ½ basos length, posterior margin convex, has 1 spine. Carpus subtriangular, ⅔ basos length, a few spines on anterior margin and angle, scabrous lobe has about 4 long spines Propod as long as merus, margins have 2–3 spines each medially, distal angles have 2–3 spines; palm transverse, irregular and scabrous, ½ propod width; dactylos slightly overlaps palm. *Second*: Sideplate subovate Basos triangular in cross-section, small spine on anterior and posterior margin, also on basos, merus and ischium posterodistal angles. Ischium subsquare, both anterior margins distally lobed, as large as merus Carpus about ½ merus size. Propod subovate, as wide as long; palm only spined, has 9 or more short stout spines each side, oblique, minutely corrugate, dactylos longer than palm, impinges on palmar groove, tip spatulate, inner margin corrugate and minutely spined *Female*· Sideplate ovate, distal angles rounded broadly, 2–3 spines ventrally, posteriorly excavate, as wide as deep Basos, ischium and merus have spine on distal angle Basos width ⅓ length; ischium subrectangular, nearly ½ basos length, merus ½ basos length, posterior margin has large scabrous pellucid lobe Carpus subtriangular, ¾ basos length, anterior margin convex, posterior a scabrous lobe Propod nearly as long as carpus, posterior scabrous lobe expanded past small oblique spine-guarded palm, a pair of spines below palm and at outer dactylos hinge Dactylos as long as palm.

PERAEOPODS. *First*: Basos width ¼ length Ischium narrower, a little longer than wide, posterodistal angle spined Merus width ½ length, widens a little distally, a few strong spines on anterior margin, more strongly spined posteriorly, spines stout and long, anterodistal angle produced downwards a little. Carpus width ½ length, anterodistal angle spined, long stout spines on posterior margin. Propod narrower still, width ⅓ length, margins spined *Second*· Segments shorter and wider, spines stronger and longer; otherwise like Pr. 1. *Third*: Sideplate anterior lobe spined ventrally, posterior spined posteriorly. Basos width proximally is ⅔ length, narrows to ⅓ distally; anterior margin has a few short stout spines; posterior a very few small single spines, margin serrate. Other segments stouter than in Pr. 1; merus proportionately much shorter, piriform. *Female*: Sideplate posterior lobe a little more triangular in shape than male. *Fourth*· Basos narrows slightly distally; width about ⅔ length, anterior margin has strong single spines; posterior has about 6 small spines, margin serrate Other segments much stouter than in Pr 3, spines very long and strong. Long narrow dactylos barely curved. *Fifth*: Basos anterior margin has strong spines, posterior has very small spines, strongly serrate, posterodistal angle only slightly produced. Merus subtriangular, very long strong spines on margins. Carpus as long, width ⅔ length, subglobular, strongly spined anteriorly, posterior margin may have single spine medially, posterodistal angle spined Longer than but otherwise like Pr 4. *Female*: Carpus about ¾ basos length, slightly longer than merus, width ⅓ length, margins more or less parallel.

EPIMERAL PLATES *First and Second*: Anterior margin rounds sharply to ventral, ventral to posterior Posterior margins of all 3 plates have a few minute spines set well apart, margins between spines not serrate. *Third*: Posterior margin slightly concave *Female*· Posterior margins straighter than in male, have only 1–2 minute spines; 3rd more rectangular.

PLEOPODS. Only superficially segmented, inner ramus the shorter, 2nd pleopod longer than 3rd, rami as long as peduncle, peduncle narrower; 1st still longer, peduncle much longer than rami, rami shorter than in pleopod 3 and peduncle narrower *Female*. First and 2nd, peduncle as long as subequal rami; rami have about 5 superficial segments with plumose setae, not as lanceolate as in male, peduncle outer distal angles have 1 (1st) and 2 (2nd) plumose setae. 3rd, peduncle greatest width ¾ length, outer margin has about 6 plumose setae, several plumose bristles; inner ramus the shorter, about 4 superficial segments

UROPODS *First*· Peduncle, both dorsal margins spined, large end spine between rami, only inner ramus spined dorsally, has 3 short and 1 long end spine, outer has 1 long and 3 short end spines *Second*: Peduncle dorsal margin spined, inner ramus has 2 dorsal spines,



TEXT-FIG 15—*Orchestia parva* (Chilton). 297, Antenna 1, ♂ 298, Antenna 2, ♂ 299, Gnathopod 1, ♂. 300, Gnathopod 1, ♂, propod and dactylos. 301, Gnathopod 1, ♀, juv. 302, Gnathopod 2, ♂. 303, Gnathopod 2, ♀ (very young). 304, Peraeopod 1 305, Peraeopod 2. 306, Peraeopod 5, ♂. 307, Peraeopod 5, ♀. 308, Epimeral plates, ♂ 309, Epimeral plates, young female. 310, Pleopod 1, ♂ 311, Pleopod 2, ♂. 312, Pleopod 3, ♂. 313, Pleopod 1, ♀. 314, Pleopod 3, ♀. 315, Telson.

3 end ones; outer ramus has end spines only, 2 long and 2 short. *Third*: Peduncle much larger than ramus, has 1 dorsal spine; ramus has 1 short, 1 long end spine. *Telson*: Each margin has 3 equidistant large stout spines.

LOCALITIES. Norman's Inlet, Auckland Island (Chilton); Auckland Island and Adam Island (Stephensen); "from trunks of rata trees," Musgrave Peninsula, Auckland Island, coll. J. H. Sorensen, 13/4/47.

TOPOTYPES. Male, Slides 69; female, slides CM. 6, Canterbury Museum.

DISCUSSION. Originally only the antennae, gnathopods and peraeopods of this species were described and there have been no later amplifications Distinctive marks of the species are the short antennae, second gnathopod, and the dilated merus and carpus of the adult male 5th peraeopod. In this last respect it is similar to the supralittoral species of *Orchestia,* in most of which one or more of the 4th and 5th peraeopod segments are enlarged.

The male pleopods are somewhat shorter and broader than is usual in the genus. Chilton says the merus of the 5th peraeopod lacks spines on the posterior margin except for 2 distally. In the specimen I have figured, one of the 5th peraeopods possessed and the other lacked a medial spine on the posterior margin, showing variation does occur.

The female was difficult to locate. The syntype specimens from the Canterbury Museum (Subantarctic Islands Collection) proved to be a male *O. parva* and a female, supposedly *parva.* However, the uropods of the female, particularly the 3rd pair, differed considerably from the male *O. parva* and the female appeared to be *O maynei.* One of the tubes in the Chilton collection, however, yielded a number of small females which I am almost certain are *O. parva,* although because of their small size they may differ a little from adult females. I should expect the adult female gnathopods to be a little more spinous; but in general these agree reasonably well with the male. As in *O. maynei,* the pleopods differ slightly from the male, being somewhat longer and proportionately narrower, and having a number of plumose setae on the peduncle outer margin.

Orchestia maynei (Chilton), 1909. (Figs 316–335).

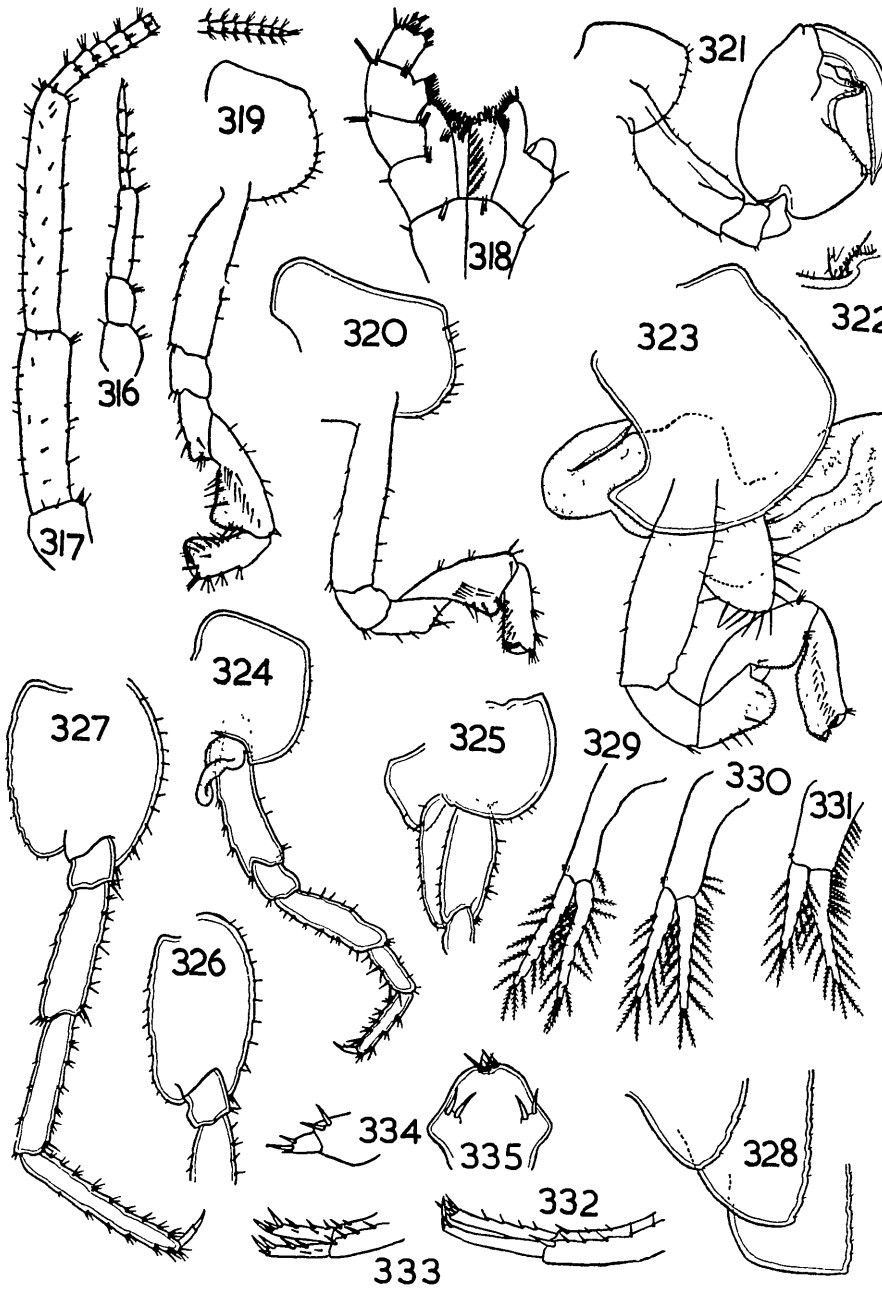
Parorchestia maynei Chilton, 1909: 637–638, fig. 7, a–g. Stephensen, 1927· 349. Stephensen, 1935: 13–14 Shoemaker, 1935: 66. Stephensen, 1938: 259–260.

Male, length 12 mm; depth 3½ mm; width 3½ mm (supplementary specimen). Female, length 13 mm; depth 3¾ mm; width 2¾ mm (supplementary specimen).

ANTENNAE Flagellum shorter than peduncle, of 5 segments, segments longer than wide, setae on end margins Peduncle, 1st segment as long as 2nd, ½ length 3rd; antenna reaches past 4th peduncle segment of antenna 2; 1st 2 segments spined distally, 3rd twice as long, has a few single spines on margins and end. *Second*: Flagellum as long as peduncle, of 31 segments in male, 26 in female, segments longer than wide Peduncle 3rd segment about ⅓ length 4th; 3rd spined distally; others have small marginal and surface spines.

MOUTHPARTS. *Maxilliped* (Not entire in type). Inner plate, end margin slightly oblique and slanting inwards; about 5 setulose spines outside end teeth, a few setose spines between inside teeth; a strong field of setose spines down cleft almost to basos Outer plate distally rounded, 3 or 4 setose spines on end of outer margin, inner margin has strong field of spines just past end of inner plate; transverse row of about 4 spines set apart a little lower Basos to carpus segments have 1–3 medium to long spines on outer distal angle; 2 on ischium below merus inner angle Merus and carpus inner distal angles have 3 spines; carpus much wider than deep, inner margin expanded in wide strongly spined flange. Propod has similar, less pronounced flange, also distally spined Outer distal angle has 1 long and 2 short strong spines; 4 strong short spines singly across dactylos base on one side, on other a row of 4 long close spines. Dactylos distinct, conical, has 4–5 end spines.

GNATHOPODS. *First*: Sideplate ovate, distally rounded, has strong spines Basos width ¼ length, a few single spines on margins. Ischium small, subsquare, posterodistally spined. Merus subrectangular, not ½ basos length, posterior margin produced distally in scabrous lobe, has several spines Carpus ¾ basos length, anterior margin slightly convex, has a few single spines, group on distal angle, surface strongly spined, posterior scabrous lobe marked off by long spines Propod subrectangular, ½ basos length, distal width ½ length, anterior margin has 4 groups of spines, posterior scabrous lobe has about 6 long spines along base. Palm small, slightly oblique, has short spines, overlapped by stout aquiline-tipped dactylos; dactylos has 2 small stout spines near inner base *Female*: Sideplate subovate, deeper than wide, ventrally and



TEXT-FIG 16.—*Orchestia maynei* (Chilton) 316, Antenna 1, ♂ 317, Antenna 2, ♂ 318, Maxilliped 319, Gnathopod 1, ♂ 320, Gnathopod 1, ♀. 321, Gnathopod 2, ♂ 322, Gnathopod 2, ♂, palmar and dactylos teeth 323, Gnathopod 2, ♀, composite drawing 324, Peraeopod 1 325, Peraeopod 3 326, Peraeopod 4 327, Peraeopod 5 328, Epimeral plates, ♂ (not from type specimen). 329–331, Pleopods 1–3 (not from type specimen). 332, Uropod 1. 333, Uropod 2. 334, Uropod 3. 335, Telson.

posteriorly spined, ventrally convex. Merus posterior margin has 5–6 long spines, slightly lobed but not scabrous. Carpus ⅔ basos length, distal width ½ length, anterior margin has 4 pairs of spines; scabrous lobe has 4–5 long spines near margin, 6 or more at base of scabrous area. Propod posterior margin very straight, scabrous, has long spines; palm transverse, not clearly defined; has numerous spines, particularly posteriorly, some stout. Dactylos in type specimens not as long as palm, in others slightly longer; 2 spines on inner margin near hinge. *Second*: Sideplate almost rectangular, but ventral margin rounds to posterior excavation. Basos width ⅓ length, a few small spines on margins. Ischium small, subsquare, distal angle spined. Merus similar, smaller. Carpus very small and indistinct. Propod ovate, as long as basos plus ischium, slightly longer than wide Margins convex, posterior ½ length anterior. Palm somewhat oblique, fairly broad, strong acute tooth near dactylos hinge, thence strongly excavate, tooth spined marginally; tooth posterior margin and remaining ⅔ of palm almost right-angled; palm margins form small ridges, the inner one spined, dactylos fitting in shallow depression between ridges Dactylos stout, end spatulate, fine setae on inner margin; projecting boss on dactylos near hinge; boss impinges against anterior margin of palmar tooth. *Female*: Sideplate large, ventral angles rounded, ventrally spined. Gills very long and sinuous. Ischium subrectangular, nearly ½ basos length Merus posterior margin expanded in scabrous pellucid lobe, lobe has about 6 long spines. Carpus subtriangular, ⅔ basos length, anterior margin convex, spined distally, posterior scabrous lobe spined distally. Propod ½ basos length, anterodistal angle spined; posterior scabrous area expanded past small oblique spine-guarded palm; short spines along base of scabrous area to palm; dactylos as long as palm

PERAEOPODS *First*· Sideplate wider than deep. Gills small, simple. Basos slightly concave, width ¼ length. Ischium small, subrectangular, distally spined. Carpus length nearly 3 times width. Propod narrower, ¾ merus length, anterior margin has about 4 groups of small spines, posterior has 6 pairs of larger spines Dactylus ⅓ propod length, inner margin has seta. *Third*· Sideplate, ovate anterior lobe much wider, slightly deeper than subtriangular posterior lobe, ventral margin spined; posterior lobe has barely concave posterior margin, 2 small spines Basos width ⅔ length, anterior margin has groups of short stout spines; posterior has smaller single spines, is slightly angular, not serrate; a 3rd spined margin down middle forming thin raised ridge or carina so basos y-shaped in cross-section. *Fourth*: Sideplate (female) extends ¼ down basos, a single seration and minute spine ventrally. Basos width ⅔ length, margins convex, about 12 single spines on each, stronger on anterior. Other segments as in Pr. 5. *Fifth*· Basos as wide as long, margins convex, anterior has short single spines; posterior serrate and minutely spined Ischium small, subsquare; anterodistal angle spined Merus width ⅓ length, ¾ basos length; margins more or less parallel. spined, anterior spines more numerous Carpus narrower, slightly longer, otherwise like merus. Propod narrower, linear, as long as basos, anterior margin has about 9 and posterior about 7 groups of 2–3 stout spines. Dactylos long, slender, ¼ propod length.

EPIMERAL PLATES *First*· Subtriangular, ventral margin rounds to slightly convex posterior margin, latter has about 4 minute spines, is convex rather than serrate between spines *Second*: Anterior-ventral margin convex; posterior more or less straight, has 9 minute spines, small marginal convexities between spines. Fewer minute spines in female, posterior margin straighter *Third*· Subsquare, anterodistal angle bluntly rounded, posterodistal right-angled, ventral margin straight, posterior has about 8 minute spines, serrated.

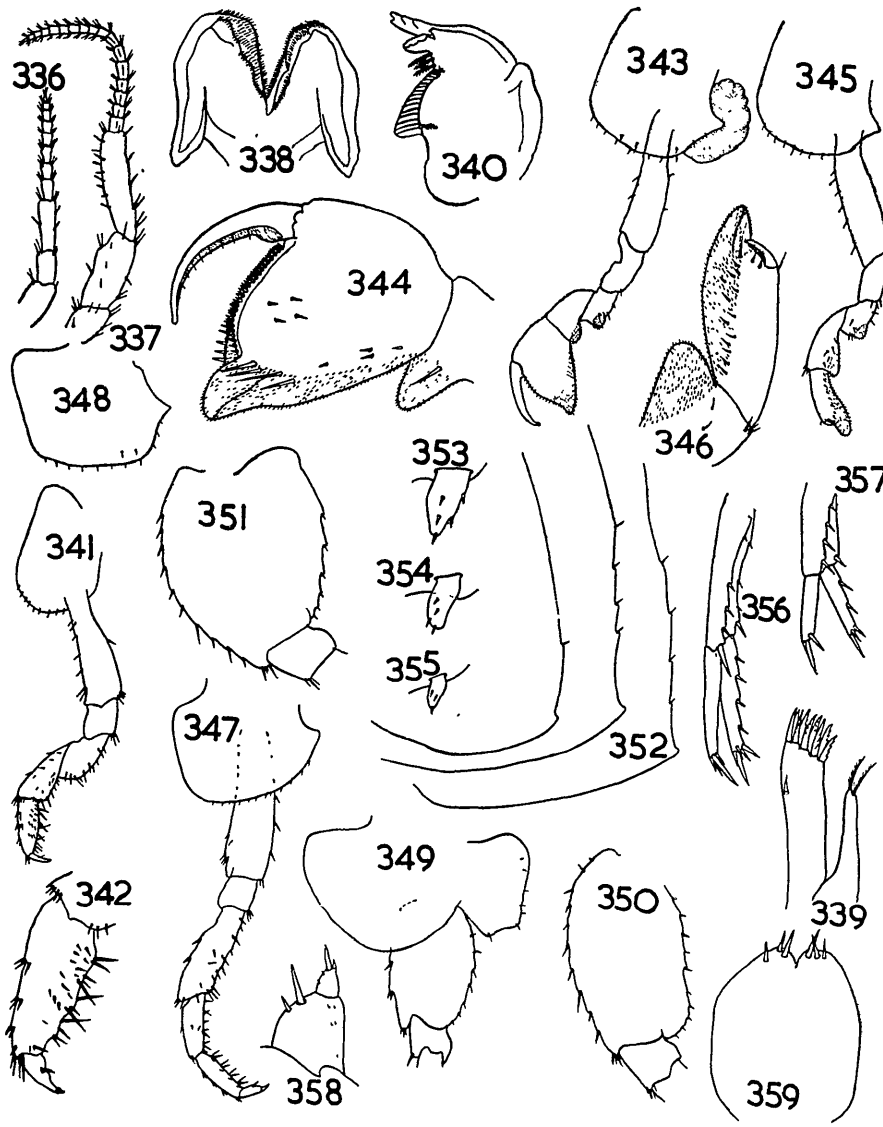
PLEOPODS *First*· Peduncle has single plumose seta on outer distal angle; rami subequal, slightly shorter than peduncle, of about 7 superficial segments in male, 9 in female, margins finely bristled; outer ramus, 1st segment has about 3 plumose setae on outer margin; rest have pair of plumose setae each. *Second*: Shorter, thicker, rami have about 6 superficial segments in male, 10 in female, peduncle has 3 plumose setae on outer distal magin. *Third*: Inner ramus as long as peduncle, has about 6 superficial segments in male, 8 in female, outer slightly longer; peduncle width ⅔ length, outer peduncle margin has about 10 plumose setae.

UROPODS *First*: Peduncle dorsal margins spined, strong spine between rami, outer ramus has about 4 end spines only, inner has about 4 dorsal, 4 end spines *Second*: Peduncle dorsal margins spined, rami have about 4 dorsal spines, 4 end spines *Third*: Peduncle twice length of small conical ramus, 2 large spines dorsally on peduncle, 2 large and 1 small end spine on ramus *Telson*: Almost diamond-shaped; 3 large spines on each apex, 2 large spines proximally on surface near margin.

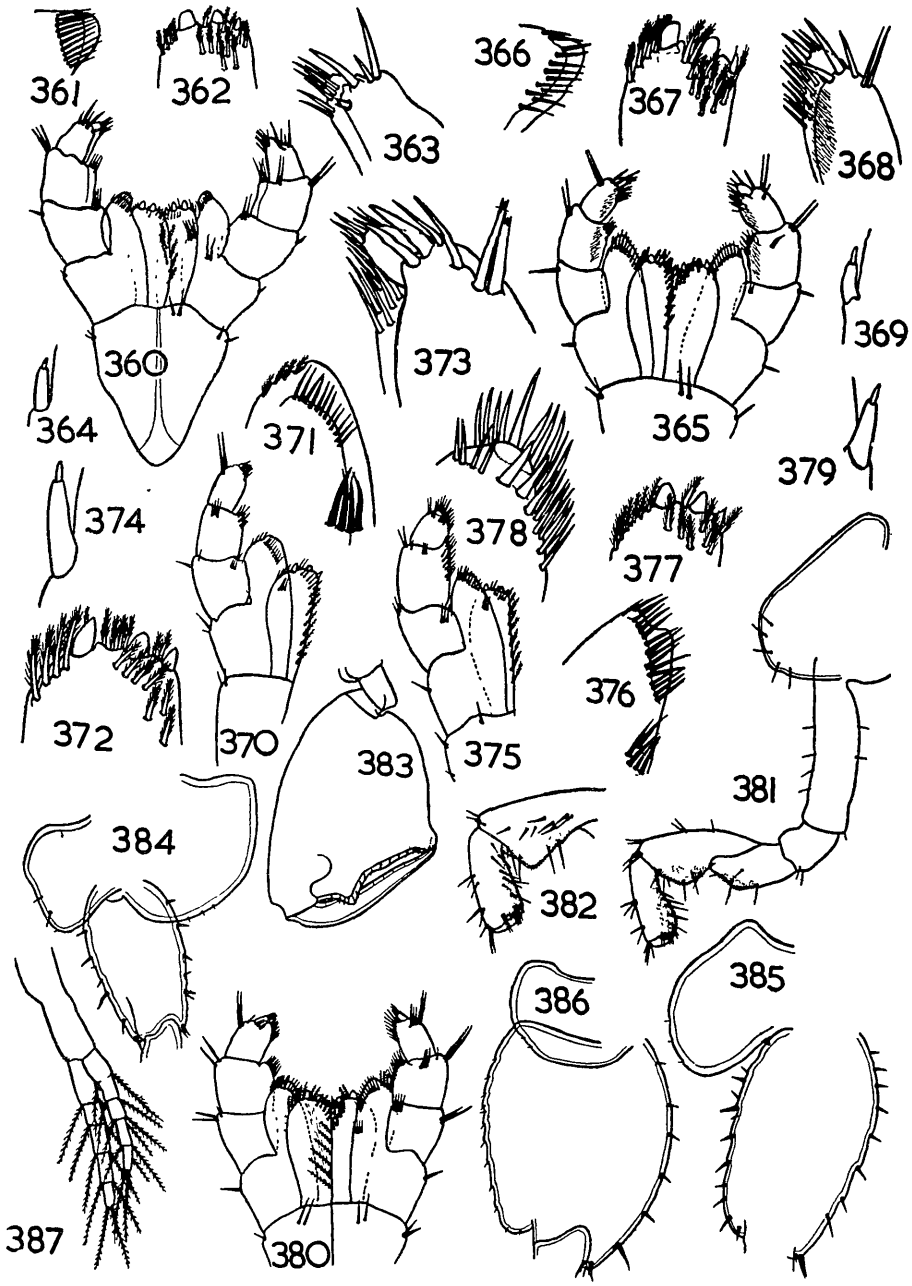
LOCALITIES. Norman's Inlet (Chilton's types), coll. J. B. Mayne, 27/11/07; Disappointment Island (supplementary males), coll W. R B. Oliver, November, 1907

TYPES. Chilton collection. *Syntypes*: C 22, C 23, Chilton collection

DISCUSSION. The descriptions and figures are from the type slides, supplemented where necessary from a male specimen from Disappointment Island and a female from Norman's Inlet.



TEXT-FIG. 17.—*Orchestia patersoni* (Stephensen). 336, Antenna 1, ♂ 337, Antenna 2, ♂ 338, Lower lip. 339, Maxilla 1. 340, Right mandible. 341, Gnathopod 1, ♂. 342, Gnathopod 1, ♂, propod and dactylos. 343, Gnathopod 2, ♂ 344, Gnathopod 2, ♂, propod and dactylos. 345, Gnathopod 2, ♀. 346, Gnathopod 2, ♀, propod and dactylos. 347, Peraeopod 1. 348, Peraeopod 2. 349, Peraeopod 3. 350, Peraeopod 4. 351, Peraeopod 5. 352, Epimeral plates 1–3. 353–355, Pleopods 1–3. 356, Uropod 1. 357, Uropod 2. 358, Uropod 3 359, Telson.



TEXT-FIG 18.—*Orchestia patersoni* (Stephensen) 360, Maxilliped. 361, Maxilliped outer plate. 362, Maxilliped inner plate. 363, Maxilliped palp 364, Maxilla 1 palp *Orchestia sinbadensis* n sp. 365, Maxilliped 366, Maxilliped outer plate. 367, Maxilliped inner plate 368, Maxilliped palp. 369, Maxilla 1 palp *Orchestia leslieensis* n.sp 370, Maxilliped. 371, Maxilliped outer plate 372, Maxilliped inner plate 373, Maxilliped palp. 374, Maxilla 1 palp *Orchestia simularis* n sp 375, Maxilliped 376, Maxilliped outer plate 377, Maxilliped inner plate. 378, Maxilliped palp. 379, Maxilla 1 palp. *Orchestia insularis* Chilton (Type material) 380. Maxilliped. 381, Gnathopod 1, ♂. 382, Gnathopod 1, ♀. 383, Gnathopod 2, ♂ 384, Peraeopod 3. 385, Peraeopod 4 386, Peraeopod 5 387, Pleopod.

The male has a distinctive second gnathopod. Other features are the well-developed 4th segment of the maxilliped palp, the marked carina on the basos median surface of the 3rd peraeopod, the spination of the telson, and the absence of dorsal spines on the outer ramus of the first uropod.

Orchestia patersoni (Stephensen), 1938. (Figs. 336–364.)

Talorchestia patersoni Stephensen, 1938: 247–251, fig. 1, 2.

Colour in spirits white, with dorsal red patches and irregular bands. Male, length 8 mm; depth 2½ mm; width 2 mm. Female, length 8½ mm; depth 2 mm; width 1¾ mm.

ANTENNAE. *First*: Length 1¼ mm, reaches end of peduncle of antenna 2. Segments each have at least 2–3 long setae inferodistally; 1–4, usually 4, short setae superodistally. Flagellum of 8 segments. Peduncle, 1st segment ⅔ length 2nd, 2nd about ⅔ length 3rd, 3rd has large spine ½ along inferior margin, 2 spines superiorly. *Female*: Length 1¼ mm, reaches ½ along 5th peduncle segment of antenna 2. Flagellum of 7 segments, last tufted. *Second*: Length 2½ mm, reaches 3rd peraeon segment. Flagellum of 17 segments, segments somewhat 3-sided. Peduncle, 3rd segment ½ length 4th, 4th ⅔ length of 5th; 3rd has a few short spines on distal and superior margins, 1–2 on surface; 4th similar, spine also ½ along inferior margin; 5th has 5 groups of 1 and 2 spines superiorly, similar double row inferiorly, a few very short spines on surface. *Second*: Length 2½ mm, reaches 3rd peraeon segment, flagellum of 14 segments.

MOUTHPARTS. *Lower Lip*: Inner lobes rudimentary. *Mandibles*: Left, spine row has 3 setose spines, 2 smaller spines on molar process immediately below *Maxilliped*: Inner plate has 2 stout teeth distally, 3rd smaller tooth just below inner inner distal angle, about 4 setulose spines outside teeth, about 6 diagonally across angle below inner teeth; on other side, larger triangular area of setulose spines down cleft almost to ischium, surface has 3 groups of 2–4 spines, group on outer margin, 2 groups on inner. Outer plate narrow, reaches just past merus, narrows to inwardly-projecting blunt lip, fine setae fringe base and define lip. Merus, carpus and propod subequal in length, succeedingly narrower. Merus outer distal angle has at least 1 short, 1 long spine; carpus has 1 short, 2 long spines; propod has a number of long stout end spines, 2 groups of fine setae, mainly on inner distal margin; 2 groups on carpus inner distal angle, group on merus inner distal angle. Ischium outer distal angle has 2 spines. Dactylos absent.

GNATHOPODS. *First*: Sideplate subovate. Basos width ⅓ length, anterior margin has single spines, posterior has strong bifurcated spine ½ along, 3–4 spines on angle. Ischium subsquare, posterodistal angle spined Merus almost as long as carpus Carpus anterior surface has a number of smaller spines, posterior margin strongly spined distally, also distal angle, a few short to long surface spines. Propod shorter than carpus, narrower, subovate, anterior margin has 4 groups of 3–4 spines, posterior surface has short bifurcate-tipped spines, those nearest margin the longest. Short dactylos has small spine on posterior margin; palm extremely short and poorly defined or absent. *Female*: Merus about ischium size. Carpus about twice merus size. Propod almost as long as carpus, narrows distally to posteriorly spined and curved dactylos. Propod anterior margin has a few spines, posterior margin and surface strongly spined, palm negligible. *Second*: Sideplate ventrally convex Basos as in Gn 1, fewer spines Ischium longer and narrower than in Gn 1 Merus as wide as ischium but shorter, anterior margin contiguous with proximal ½ of carpus posterior; posterior margin convex, median scabrous lobe has single spine at base, 2 spines proximally on margin above Carpus slightly longer than merus, anterior margin slightly convex, lacks spines; posterior margin distally produced in scabrous lobe with spine at base. Propod widens distally; anterior margin convex, naked, forms semicircle with closed dactylos; posterior margin straight, produced in scabrous pellucid lobe almost to carpus Dactylos long, curved, has about 9 small spines on minutely corrugated inner margin, tip slightly spatulate. Palm transverse, has rows of short stout bottle-shaped spines each side, giving place posteriorly to a few longer more slender spines around and below small pocket on lobe base into which dactylos tip fits, a few short spines from dactylos pocket to posterodistal angle of carpus, a few on surface below palm. *Female*· Basos anterior margin has a few spines, posterodistal angle has 1. Ischium width ½ length Merus smaller, subsquare, pellucid lobe has a few small spines at base and sides Carpus at least twice merus size, a few spines on anterodistal angle and base of posterior scabrous lobe. Propod as long, not as wide, anterior margin has 1 spine at dactylos base, posteriorly expanded in pellucid setose lobe beyond dactylos and oblique, minutely-setose palm Palm has about 5 short spines, row of 3 longer ones below; row of spines along lobe base to posteroproximal angle. Dactylos, short, curved, impinges slightly on lobe.

PERAEOPODS *First*: Basos slightly wider than in Gn. 1, a few spines anterodistally, notably 3 a little above angle, 3–4 large single spines posteriorly. Ischium like Gn 1 Merus almost as long as basos, a few spines anteriorly, especially on distal angle, a number on posterior surface and margin. Carpus has 2 small spines anteriorly, several stout spines on posterior

margin and surface Propod narrower and slightly longer, anterior margin has about 3 pairs of short spines, distal angle has 3; posterior has 4 groups of 3 stout spines Dactylos posterior margin has spine. *Second*: Shorter than Pr. 1. *Third*: About as long as Pr. 2. Sideplate anterior lobe wider and deeper than sparsely spined posterior. Basos expanded, anterior margin has a few single and paired short stout spines, single ones on posterior. Otherwise as in Pr. 1, segments longer, narrower except for merus which is shorter and wider. *Fourth*: Longer than Pr 3, basos more strongly spined; other segments longer than in Pr. 1, generally similar. *Fifth*: Longer than Pr. 4; basos posterior margin not as strongly spined, distally more serrate, other segments larger than in Pr 1, otherwise similar

EPIMERAL PLATES. *First*: Ventral and posterior margins convex, posterior has 1 small spine in male, 2 in female. *Second and Third*: Anterior and posterior margins parallel, latter serrate, with 4 spines in male, 3rd has 5 in female.

PLEOPODS. *First*: Vestigial, minute, one-segmented, with 4 small surface spines and an end spine *Second*: Slightly smaller, has 4 spines. *Third*: Even smaller, has 3 spines.

UROPODS *First*: Peduncle inner dorsal margin has a few spines, spine at posterodistal angle, outer dorsal margin has a few minute spines anteriorly, 3 medium spines posteriorly, large stout spine on posterodistal angle Rami, surface minutely spined, inner ramus has 4 spines dorsally, 2 large and 3 smaller end spines, minutely serrate between spines and in places setose; outer has dorsal margin minutely setose anteriorly, 3 small and 1 large end spine. *Second*: Peduncle slightly shorter than rami, inner dorsal margin has one posterodistal spine, outer has 4; rami minutely spined on surface; inner has 1–2 dorsal spines, 2 long and 3 short end ones; outer has minutely setose and serrulate dorsal margin, 2 long and 2 short end spines. *Third*· Peduncle much larger and longer than ramus; peduncle has 2 medium bifurcate-tipped spines, several very small spines on ventral surface; ramus has 1 medium and 1 small bifurcate-tipped end spine, a few minute surface spines. *Telson*: Subovate, 3 bifurcate-tipped spines each side of end notch, a few minutes spines on surface.

LOCALITIES. Paterson Bay, Stewart Island, 8/2/24 (Stephensen); Snares Island, leafmould, coll. R. A Falla, 1947; Bench Island, Foveaux Strait, leafmould, coll. A. J. Lindsay, 9/7/48; Stewart Island, garden mould, coll. R. R. Forster, 20/11/46; Solander Island, leafmould, coll. R. A. Falla, 4/12/47.

TOPOTYPES. Slide 44. *Hypotypes*: Snares Island, Slides 30, male; 28, female. Bench Island, Slides 42.

DISCUSSION. Stephensen considered this terrestrial species "without doubt . . . . belonged to the genus *Talorchestia,*" a conclusion with which I must reluctantly disagree. Gnathopod 1 in the male has "an oblique palm, about ½ as long as the distal end is wide" according to Stephensen; this is so in some specimens. At the same time, the palm is not well defined, and in Snares Island specimens it is even less obvious, so much so as to be almost simple. It is reasonably certain from the general facies that the specimens belong in either *Talorchestia* or *Orchestia,* not *Orchestoidea.* The point on which Stephensen decided it was a *Talorchestia* appears to be the female first gnathopod which he describes as "without a real palm". This is again in agreement with the specimens he figures and also with Bench Island specimens. However, in the Snares Island specimens already mentioned the male gnathopod is almost exactly the same as the female. It would seem then that the amount of variation in this particular species is sufficient to negate the value of the first gnathopods for generic diagnosis. And, as Stephensen himself says, "the species is very different from the previous three (*Talorchestia*) found in New Zealand."

The general appearance is much like the terrestrial *Orchestia.* More important, the second peraeopod does not show the characteristic "spurred" dactylos of the other species of *Talorchestia*—like the first peraeopod, it has a slender seta instead of a strong spine on the inner margin of the dactylos, and there is a much less pronounced "bite" out of the dactylos. Possibly the Snares Islands specimens are a geographically isolated race differing slightly from the Stewart and Bench Island specimens. The variation is not of specific status, certainly not of generic rank. Thus, the Snares specimens provide a connecting link between the Stewart Island specimens and species of terrestrial *Orchestia.*

The species is particularly easy to recognise by the distinctive shape of the second gnathopod male, the maxilliped outer plate, and the three vestigial pleopods. It is the common terrestrial species found on Stewart Island, and has been present

in almost every sample of leafmould I have seen from the Island. The reduction of the pleopods makes the females easily identifiable. The shape of the second gnathopod, in its similarity to one of the developmental stages figured by Chilton (1921) for *Talorchestia bottae* (Chilton's *T. martensii*), suggests that the male described is an immature stage, but the similarity to *T. bottae* goes no further, and the males, which are reasonably numerous, have not been found to have a more advanced stage.

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