Studies on the New Zealand Amphipodan Fauna

No. 2. The Family Talitridae: The Fresh-Water Genus

Chiltonia Stebbing *

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[Read by title before Otago Branch on April 14, 1953; received by Editor, April 29, 1953.]

Summary

Keys are given to the genera of Talitridae and the New Zealand species of Chiltonia

Chiltonia mihowaka (Chilton) is re-described and figured. Two new species, Chiltonia

rivertonensis from Riverton, New Zealand, and Chiltonia enderbyensis from Enderby

Island, Auckland Islands Group, are described. The New Zealand species of this

fresh-water genus have the male first pleopod peculiarly and differently modified for

each species.

INTRODUCTION AND ACKNOWLEDGMENTS

The Family Talitridae, which is represented in New Zealand by over 30 species,

more than any other family, is not a group showing great distinction in general

facies. In fact, the species are monotonously similar. Yet species of the family

have successfully invaded both fresh-water and terrestrial habitats. As well,

there are in New Zealand a number of supralittoral (as defined by T. A. and

A. Stephenson, 1949) and inter-tidal species. The genera fall into three or

possibly four complexes which can be associated with these differing environments —the inter-tidal species, the supralittoral-terrestrial and the fresh-water species.

Within these complexes, the genera tend to intergrade morphologically, making

for systematic difficulties at the generic level. However, the sole New Zealand

fresh-water genus, Chiltonia, stands apart from the others, compact and clearly
distinguishable.

The Talitridae belong to the Sub-order Gammaridea; three sub-orders of

amphipods being represented in New Zealand. The Gammaridea are easily dis-
tinguished from the Cyamidea, comprised of the greatly modified Caprellidae and

Cyamidae (or whale-lice). The third sub-order, the Hyperiidea, embraces the

large-eyed pelagic amphipods in which the maxillipod palp is lacking.

Most representative of the family are the common sand-hoppers. Guides
to family identification are the "typical" amphipod appearance, but lack of any

accessory flagella to the antennae, and the usually uniramous condition of the

third uropod.

Keys to the sub-orders and families of South African amphipods are given

by Barnard (1940). They do not include the Family Prophliantidae (Nicholls,

1939), but are otherwise applicable to the New Zealand fauna.

I am indebted to the Canterbury University College Council and Professor E.

Percival for making available to me the late Professor Chilton's specimens and

literature; and especially to Professor L. R. Richardson, under whose super-

* This study is part of an investigation carried out at Victoria University College, Wellington,

with the aid of a New Zealand University Research Fund Fellowship.

Transactions of the Royal Society of New Zealand

Vol. 81, Part 4, pp. 563–577, 3 Text-figs., March, 1954
vision this study was carried out at the Zoology Department, Victoria University College, Wellington.

Family Talitridae Leach.
Leach, 1813-14: 432.
Stebbing, 1888: 522.
Chevreux and Fage, 1925: 209.
Schellenberg, 1942: 130.

"Head without pronounced rostrum, mouthparts strongly projecting below. Sideplates 2-4, rather large, 5th bilobed. Antenna 1 usually much shorter than antenna 2; antenna 2 with 1st segment of peduncle coalesced with the head. Upper lip large, usually distally rounded. Lower lip with inner lobes absent or rudimentary. Mandible without palp, otherwise normal. Maxilla 1 with inner plate slender, with 2 plumose setae; outer plate with 9 spines, palp more or less rudimentary or absent. Maxilla 2 with plates fairly large, inner plate with 1 large plumose seta on the inner margin. Gnathopod 2 usually very different in the two sexes. Uropod 3 in general uniramous. Telson short."

The above diagnosis is translated from Chevreux and Fage with due reference to Stebbing’s diagnosis, and includes a slight widening in definition on my part to take into account the squarish upper lip found in some Hyale and Allorchestes species, the rudimentary inner lobes to the lower lip found in some of the Orchestia species—e.g., O. improvisa (Chilton), and the absence of a palp to maxilla 1, as described by Burt (1934) for his Talitrus (Talitropsis) toplatum, and as found in Chiltonia.

Key to Genera of Talitridae

1. Uropod 3 of one segment, or at most of peduncle and one ramus; maxilla 1 without palp; gn. 2 in male, 5th segment not produced behind between 5th and 6th Chiltonia Stebbing, 1899
   These characteristics not combined; uropod 3 of peduncle and at least one ramus 2
   Maxilliped palp, 4th segment not uniform 3
   Maxilliped palp, 4th segment uniform 7
   Uropod 3 biramous 4
   Uropod 3 uniramous 5

2. Gnathopod 1, simple in male 6
   Gnathopod 1, subchelate in male 7
   Gnathopod 2, feebly chelate in male 8
   Gnathopod 2, strongly subchelate in male 9
   Gnathopod 1, subchelate in female 10
   Gnathopod 1, simple in female 11
   Gnathopod 2, 5th segment masked by 4th in male 12
   Gnathopod 2, 5th segment produced between 4th and 6th in male 13

3. Uropod 3 with minute inner ramus 14
   Uropod 3 without minute inner ramus 15
   Telson undivided 16
   Telson divided, more or less 17

4. Gnathopod 2, male, like Gn. 2, female 18
   Gnathopod 2, male, unlike Gn. 2, female 19
   Uropod 3 with minute inner ramus 20
   Uropod 3 without minute inner ramus 21

This key includes all known genera with the exceptions of Hyalolutes Schellenberg (1939) and Hyalteelopsis Sovinskij (1915). Literature for the latter is not available to me, and the generic description of Hyalolutes is not sufficiently detailed for it to be included in the key. Schellenberg gives it as follows: "Like
Hyale but gnathopod 2 carpus in male with hindlobe which intrudes between merus and propod, and uropod 2 with a small one-segmented inner ramus.” This keys Hyaloïdes out in the company of Parhyalella, Hyalella, Paravallorchestes and Allorchestes, but as the telson is not described and the female is unknown, the distinction can be taken no further.

I consider Talitroides and Parorchestia to be synonymous with Talitrus and Orchestia, and for that reason do not include them. Reasons for these decisions will be given in later papers.

Ceîna Della Valle, represented in New Zealand by Ceîna egregia (Chilton), was transferred to the Family Prohliantidae by Nicholls (1939); and although Nicholls appears to have overlooked it, Ceîmina Stephensen (1933) would seem to belong in the Prohliantidae also.

More recent generic diagnoses for most of the genera will be found in Stebbing (1906), Chevreux and Fage (1925) or Schellenberg (1942).

Genus Chiltonia Stebbing.

Stebbing, 1899: 408.
Stebbing, 1906: 555.
Barnard, 1910: 224.
Chilton, 1924: 273.

“Sideplates 1–4 deep. Antennae 1 and 2 nearly equal in length. Maxilla 1 without palp, notched at palp’s normal position. Maxillipeds, 4th segment of palp short, conical. Mouthparts otherwise normal as in the family. Gnathopods 1 and 2 subchelate in both sexes. Pleopod 1 modified in the male. Uropod 3 usually of one segment, in some species of two. Telson simple.”

Stebbing’s original generic diagnosis was founded on one species, and the discovery of other species has made some changes necessary. I have altered “Antenna 1 and 2 equal in length” as Chilton (1924) suggested; “gnathopod 2 very unlike in female and male” to include C. capensis; and “uropod 3 one-jointed” to include C. australis.

In view of their unusual modifications of the male first pleopod, something which does not seem to have occurred in the Australian species (an observation based on rather fragmentary material), it is possible that the New Zealand species may warrant generic or at least subgeneric status distinct from the Australian species, and probably from the South African species, the pleopods of which have not yet been described. At Dr. K. H. Barnard’s suggestion, I have amended the diagnosis to make reference to the modification of the pleopod. “The genotype is the New Zealand species, C. mikiwaka; therefore if any generic separation (or subgeneric division) is necessary, this will involve the Australian and/or South African species.”

One species has previously been described from New Zealand, the genotype Chiltonia mikiwaka. Examination of material ascribed to this species has led me to the conclusion that three species, two from the South Island and one from Enderby Island in the Auckland Islands, can be distinguished.

**Key to New Zealand Species of Chiltonia**

1. Sideplate of second gnathopod posteriorly excavate with noticeable triangular process; 1st pleopod in male with inner ramus very strong, terminal segment with 2 or 3 pairs of
plumose setae proximally, modified to strong dorsally-directed flagellum reaching half-way back to peduncle, tuft of setae distally on flagellum

Sideplate of second gnathopod at most barely excavate posteriorly, triangular process absent, pleopod inner ramus not as above...

2. Inner ramus of male first pleopod terminally divided into 3 very strong whip-like lashes

Inner ramus of male first pleopod terminally modified to single dorsally-directed whip-like lash

**C. enderbyensis**

**C. riveronensis**

**C. mihiwaka**

**Chiltonia mihiwaka** (Chilton), 1898 (Text-figs. 1, 2)

*Hyalella mihiwaka* Chilton, 1898: 423, t 18.

*Chiltonia mihiwaka* Stebbing, 1899: 408

Stebbing, 1906: 555

Chilton, 1909: 644.

Chilton, 1909a, 57


Stephensen, 1927: 348-349

**DESCRIPTION OF MALE**

Eyes very small, apart, about \( \frac{1}{3} \) width of head. Body length, 5 mm; depth, 2 mm; width, 1¼ mm.

**ANTENNAE.** First: Length, 1½ mm.; nearly as long as 2nd. Flagellum of 11 segments, as long as peduncle, segments longer than wide, tufts of setae distally. Peduncle, 3rd segment \( \frac{3}{4} \) length of 2nd; 2nd \( \frac{1}{2} \) length of 1st; all with a few setae distally. Second: Length, 2 mm. Flagellum of 10 segments (9 in female), segments as above. Peduncle, 3rd segment \( \frac{1}{2} \) length 4th; 4th \( \frac{1}{4} \) length of 5th; all with a few setae distally, 3rd with 2 stout spines on inferodistal angle; 5th with a few pairs of marginal setae.

**MOUTHPARTS.** First Maxilla Inner plate reaching palp site on outer; outer without palp but margin notched as though palp broken off. **Maxilliped:** Inner plate slightly shorter than outer, subrectangular, 3 stout teeth distally, 4 scabrous setae on rounded outer angle, 2 or 3 between or below teeth, about 4 down cleft. Outer plate reaching \( \frac{1}{2} \) along carpus, narrow, outer margin convex, double row of long setae terminally and down inner margin to merus level. Basos, ischi um, merus and carpus with 1 or 2 long spines on outer distal angle. Merus, distal margin concave, convex outer margin more than twice length inner; 3 strong setae on inner distal angle. Carpus large, as wide as inner margin is long, inner margin \( \frac{1}{4} \) length merus outer margin and \( \frac{1}{3} \) inner merus margin, carpus inner margin produced as strong flange, double row of long setae on distal \( \frac{1}{2} \) and angle. Propod width \( \frac{1}{2} \) length, as long as carpus outer margin, distal angles with strong tufts of setae, 5 or so strong fine-combed spines across dactylos base. Small conical dactyls \( \frac{1}{2} \) propod length, long seta on outer margin; 1 to 3 strong terminal setae, usually one, with 3 smaller setae immediately below.

**GNATHOPODS.** First: Sideplate deeper than wide, subrectangular, ventral angles rounded, ventral margin convex and spined, triangular process not obvious, not excavate posteriorly. Basos very narrow proximally, width \( \frac{1}{4} \) length, a few long setae posteriorly, single seta on anterodistal angle and on posterodistal angle of subrectangular ischi um, ischi um less than \( \frac{1}{2} \) basos length. Merus basically subrectangular, as large as ischi um, anterior margin and proximal \( \frac{1}{4} \) of carpus posterior margin contiguous; posterior margin rounding to distal angle with
TEXT-FIG. 1—Chitonia mhbana (Chilton) 1—Antenna 1, ♂ 2—Antenna 2, ♂ 3—Maxilla 1 4—Maxilliped 5—Maxilliped palp 6—Gnathopod 1, ♂ 7—Gnathopod 1, ♂, palm and dactylos 8—Gnathopod 1, ♀ 9—Gnathopod 2, ♂ 10—Gnathopod 2, ♀ 11—Peraeopod 2, sideplate, ♂ 12—Peraeopod 5, ♂ 13—Pleopod 2, ♂ 14—Pleopod 2, plumose seta from ramus 15—Pleopod 1, ♂ 16—Pleopod 1, tip of inner ramus, ♂ 17—Uropod 1, 18—Uropod 2 19—Uropod 3, 20—Telson.
TEXT-FIG. 2.—*Chitonella mikiwaka* (Chilton). Male. 1—Pereopod 1. 2—Pereopod 3. 3—Pereopod 4. 4—Epimeral plates. *Chitonella rivertonensis*, n.sp. Male. 5—Gnathopod 1. 6—Gnathopod 2. 7—Pereopod 1. 8—Pereopod 1, posterior margin of carpus. 9—Pereopod 4. 10—Pereopod 5. 11—Pleopod 1. 12—Uropod 3. 13—Telson.
several strong setae. Subtriangular carpus $\frac{3}{4}$ basos length, anterodistal angle produced as slight spur with strong tuft of long setae; posterior free margin more or less straight with row of about 15 increasingly longer fine-combed setae. Propod subrectangular, $\frac{3}{4}$ basos length; single seta medially on anterior margin, group on distal angle; posterior margin with long setae medially, several near distal angle; posterodistal angle produced as small thumb-like lobe with seta and strong spine; palm transverse, with a few small setae; numerous long setae on surface below palm; curved dactylos as long as propod is wide, impinging on palm below distal lobe and against small stout spine at lobe base. Second: Sideplate subrectangular, angles rounded, ventrally spined, depth nearly twice width, without triangular process or posterior excavaion. Basos and ischium as in Gn 1; merus as long as ischium, L-shaped, about 3 small setae on rounded posterodistal angle; anterior margin contiguous with proximal margin of sub-rectangular naked carpus. Propod large, subrectangular, attached to carpus by small stalk anteroproximally, anterior margin as long as basos, slightly shorter posterior rounding to convex proximal margin which is mostly free; palm transverse, slightly convex, with small distally produced lobe. Curved dactylos as long as propod is wide, suggestion of small lobe on inner margin near dactylos base.

Peraeopods. First: Sideplate subrectangular, angles rounded, ventrally convex and spined; depth twice width, triangular process absent not excaveate. Basos slightly shorter than sideplate depth, several long setae posteriorly, width $\frac{1}{2}$ length. Ischium as long as basos is wide, subrectangular, posterodistally spined. Merus piriiform, length more than twice width, $\frac{1}{2}$ basos length, single group of setae mid-anteriorly, strong group on downwardly produced distal angle; 4 strong setae-tufts on posterior margin, spines on distal angle. Carpus narrower, slightly shorter, tuft of setae on anterodistal angle, 4 tufts on posterior margin. angle spined. Propod as long as merus, width $\frac{1}{2}$ length, setae on anterodistal angle, 7 single or paired spines on posterior margin. Curved dactylos $\frac{1}{2}$ propod length, seta on inner margin. Second: Sideplate deeply excavated, L-shaped, ventral margin spined, rounding broadly to distal margin; otherwise as Pr. 1. Third: Anterior sideplate lobe smaller than posterior; strong convex posterior margin of latter serrate, minutely spined. Basos ovate, slightly longer than wide, single short spine proximally on anterior margin, 6 or so on distal $\frac{1}{2}$, group on angle, convex posterior margin serrate and minutely spined. Ischium subrectangular, $\frac{1}{4}$ basos length, anterodistal angle spined Merus piriiform, 3 groups of 1 or more stout spines on serrate margins, slightly produced downwards posterodistally; posterior margin $\frac{1}{2}$ basos length, width $\frac{1}{2}$ length. Carpus narrower, as long as merus posterior margin; 3 groups of strong spines on anterior margin, small seta mid-posteriorly, angles strongly spined. Propod as long as carpus, width $\frac{1}{2}$ length, 6 single or paired spines anteriorly, seta mid-posteriorly, tuft on angle. Fourth: Two pairs of small spines on carpus posteriorly; propod anteriorly with 5 spine groups; otherwise like Pr. 3. Fifth: Basos anterior margin with tuft of long setae proximally, 7 strong single spines on anterior margin, anterodistal angle strongly spined; as wide as anterior margin is long; posterior margin greatly convex, serrate and minutely spined Propod anterior margin with 4 spine-groups; otherwise like Pr. 4.

Epimeral Plates. First: Subtriangular, anterior margin straight, posterior slightly convex with about 3 minute spines and serrations, angle acute.
and Third: Subrectangular tending to trapezoid, angles sharp, posterior with 5 or 6 minute spines.

Pleopods. Biramous, rami longer than peduncle, inner shorter than outer, 2 coupling spines; outer ramus of about 10–12 segments, each with plumose setae, inner with about 6 segments. Plumose setae of all pleopods peculiar in being apparently solid halfway along for short distance with different refractive index. Male first pleopod with inner ramus terminally modified to long backwardly and outwardly bent whip-like lash. This was not observed in female.

Uropods First: Rami as long as peduncle, outer with 2 or 3 stout dorsal spines, inner with 4 or 5, about 4 terminal spines on each; peduncle with 5 dorsal spines on inner margin, one on outer. Second: Peduncle as long as rami, about 5 strong dorsal spines distally. Inner ramus with 5 dorsal and 3 terminal stout spines; outer with 2 dorsal and 4 terminal. Third: One segment, somewhat taperingly globular, about 3 long terminal setae and a stout short spine; on upper margin medially 1, then 3 or 4 strong setae; 3 or 4 smaller setae on surface. At least one specimen shows marked suture across one uropod posterior to the medial group of spines, although it is not obvious on the other uropod of pair; this suture, if present, is masked in the type slides by the osmic acid preparation. Telson: Subrectangular, distal angles rounded, appears cleft at most for about 1/4 length.

Description of Female

Gnathopods First: Like male; carpus posterior margin with about 12 fine-combed spines; anterodistal angle not so markedly produced. About 4 spines on merus posterior margin. Propod, palm straight, transverse, posterodistal angle not produced but defined by stout spine, a few marginal setae on palm; setae on both margins of dactylos. Second: Like Gn. 1, male; posterodistal angle of merus sharper, with 4 long spines. Carpus subtriangular, less than 1/3 basos length; posterior margin distally convex with about 6 fine-combed spines; 2 long fine setae on surface, pair on anterodistal angle. Two setae on dactylos inner margin, fewer marginal and surface setae on propod.

Localities: Mt. Mihiwaka, near Port Chalmers, heights up to 1,000 feet; Mt. Cargill, Dunedin.

Types: Tray 44, Slides 11–16, Chilton Collection.

Discussion

Chilton described this species from specimens from Mt. Mihiwaka. Later (1924) he described a form from Riverton, New Zealand, which he considered to belong to this species and which I redescribe in full as a new species. He also described specimens from Enderby Island, Auckland Islands Group (1909) which he attributed to C. mihiwaka, but these have proved to be a third species from the New Zealand region, described below as Chiltonia enderbyensis.

Chiltonia mihiwaka is distinguished by the shape of the male and female gnathopods, the third uropod which appears to be one-segmented but shows traces of a second segment; the shape of the telson; and the male first pleopod.

Stephensens's specimens (1927) are probably C enderbyensis, but for lack of information they are here left as C. mihiwaka.
Chiltonia rivertonensis, n.sp. (Text-fig. 2, Figs. 5–13).
Chiltonia mihiwaka Chilton, 1924: 271-273 (partim). Fig. 1.

DESCRIPTION OF MALE

Gnathopods First: Basos shorter and broader than in C. mihiwaka, merus posterodistal angle sharper. Carpus posterior free margin forming subsquare lobe, about 15–17 long fine-combed spines on margin; with 1 length, length 2 basos. Propod subtriangular, convex anterior margin more than twice length of free posterior margin, which is straight, has 2 tufts of long setae distally; propod 1 3 basos length; width more than 1 3 its own length; single seta medially on anterior margin, group anterodistally. Palm straight, oblique, defined posteriorly by 2 stout spines, one each side; posterodistal angle sharp but not produced, row of fine setae on palm, further setae below palm and across surface. Daetyslos barely shorter than palm, comparatively slender and slightly sinuous, single seta on both margins proximally. Second: Sideplate very slightly emarginate posteriorly. Propod much more oval than in C. mihiwaka, width about 3 length as opposed to 3 in C. mihiwaka; palm convex, oblique, similarly spined. Daeylos much stubbier, well defined inner tooth near base, stout short spine outside tooth on inner margin.

Pereaeopods First: Sideplate depth nearly twice width, slight triangular projection posteriorly; basos width 1 length; several fine setae on margins. Merus width slightly less than 1 length, length 1 basos, anterior margin with 3 and posterior with 4 tufts of fine and strong setae. Carpus width less than 1 1 length, length 3 merus, tufts of strong setae on distal angles; row of 10 strong downward-pointing spines on posterior margin each accompanied by 1 or 2 small setae. Propod as long as carpus, slightly narrower, margins slightly convex, anterior free except for small anterodistal tuft of setae; posterior with 10 spines like carpus, each with small seta alongside. Daetyslos less than 1 3 propod length, 2 spines on inner margin. Second: As Pr. 1, sideplate as in Pr. 2, C. mihiwaka Third: Basos more subrectangular than in C. mihiwaka; other segments proportionately shorter and stouter, otherwise not much different. Fourth: Like Pr. 3; basos margins relatively straight. Fifth: Carpus anterior margin with 4 groups of spines, propod with 8; segments comparatively wider and shorter than in C. mihiwaka; otherwise similar.

Pleopods. First: Outer ramus normal, of several segments or superficial segments, each with pair of plumose setae; inner ramus much stouter, outer margin with a few fine plumose setae; inner margin with 4 very strong and stout plumose setae; ramus terminally divided into 3 very strong whip-like lashes, each with setae along one margin; lashes more than 1 2 length of main portion of ramus, all 3 bent backwards forming hooks.

Uropods Third. Of one segment, about 7 small spines along dorsal margin medially, 1 small spine and several setae terminally. Telson: Subrectangular, entire; posterior margin straight, even a little concave; a few small setae on surface at posterodistal angles.

DESCRIPTION OF FEMALE.

Gnathopods: As in C. mihiwaka, female.

Pereaeopods. First and Second: Six or 7 spines on carpus and propod posterior margins.

Uropods Third: More compact than in male, 3 spines only medially.
Locality. Freshwater stream, Riverton, Southland.

Types: Slides R1-R5 (male) and R1'-R4' (female), Tray 136, Chilton Collection.

Discussion

Chilton (1924) described and figured the second gnathopod of this species. He considered it merely a variant of *Chiltonia mihiwaka*.

I am describing these specimens as a new species on the shape of the male second gnathopod which is not as close to *C. mihiwaka* as Chilton figured; the male first gnathopod, in particular the comparatively broader propod; the carpus and propod of the first and second pereaeopods which have distinct regular rows of 10 spines each in the male and 6 in the female; the basos of the 3rd and 4th pereaeopod which is more rectangular than in *C. mihiwaka*; the third uropod and telson which show lesser differences; and the male first pleopod which has the inner ramus ending in three distinct whip-like lashes as distinct from *C. mihiwaka*, which has only one lash.

Chilton’s figure of the male second gnathopod (1924, Fig. 1) deserves comment. His collection includes slides of the original two specimens taken in coitus in 1922, together with a male taken in the same locality in 1924. The figure appears to be a combination of the palm of the latter (and, I judge, immature) male and the dactylos of the original male, thus giving the propod an appearance intermediate between what I take to be the mature form in each species. I would note, moreover, that none of the immature stages of the specimens collected from Mt. Mihiwaka have the posterodistal angle broadly rounded—in all of them it appears quite as definite as in the adult.

The species description is based on male and female specimens taken in coitus in a small freshwater stream. “It was low tide at the time, and the water in which the animals were living was quite fresh, but the sea-water would reach the place at high-tide” (Chilton, 1924).

*Chiltonia enderbyensis*, n.sp (Text-fig. 3.)

(non) *Chiltonia mihiwaka* Chilton, 1909. 644, fig. 11.

Chilton, 1909a. 57.

Chilton, 1924. 271-273 (putatim).

? Stephensen, 1927. 348-349.

Description of Male

Length, 8 mm; width, 13 mm; depth, 1.5 mm. Colour in spirits, white. Eyes small, black, apart, 1/3 width of head.

Antennae. First: Longer than second antennae; length, 4 mm. Flagellum twice peduncle length, of 19 segments. Peduncle segments subequal in length. Second: Reaching 7 along flagellum of first antennae; length, 31/2 mm. Peduncle, 2nd segment with conical protuberance and duct of antennal gland obvious; 3rd segment 1/4 length of 4th, 4th slightly more than 1/2 length 5th; numerous setae distally, 4th and 5th with groups of marginal setae. Flagellum longer than peduncle proper, 11-13 segments longer than wide, distally setose.

Gnathopods. First. Sideplate subovate, anterior margin slightly concave, distal angles absent, ventrally rounded; bare indication of triangular process posteriorly, anterior and ventral margins minutely spined. Basos width nearly 1/2 length, several long fine setae on posterior surface and margin. Ischium 3 basos length, very strong setal tuft on posterodistal angle. Merus posterior margin rounding broadly to free distal margin, which has 8 or so long, strong
Text-fig 3—*Chiltonia eadybyensis*, n.sp. 1—Antenna 2. 2—Gnathopod 1. ♀ 3—Gnathopod 1, ♂ 4—Gnathopod 2, ♂ 5—Gnathopod 2, ♀. 6—Organisms on grills 7—Peraeopod 1, ♂. 8—Peraeopod 1, posterior end of propod 9—Peraeopod 2, ♀, subplate. 10—Peraeopod 3, ♀. 11—Peraeopod 4, ♂. 12—Peraeopod 5, ♂ 13-15—Epimeral plates 16—Pleopod 1, ♂ 17—Uropod 1 18—Uropod 2 19—Uropod 3, ♂ 20—Uropod 3, ♀ 21—Telson.
setae; length more than twice greatest width, nearly \( \frac{1}{3} \) basos length; anterior margin contiguous with proximal \( \frac{4}{3} \) of carpus posterior. Carpus anterior margin \( \frac{3}{4} \) basos length, width \( \frac{1}{4} \) length; posterior free margin expanded between merus and propod as squarish lobe, a few surface setae; about 20 fine-combed spines on margin, some in double row. Propod subtriangular, anterior convex margin nearly as long as basos, 3 times length of free posterior margin; length twice greatest width, about 3 long setae medially on anterior margin, strong series on distal angle; posterior interrupted near distal angle by series of more than 6 strong fine-combed spines; distal angle defined by 2 stout short spines; setae on straight, slightly oblique palm; palm as long as posterior free margin, several long fine setae on outer side of propod surface, short spines on inner. Aquiline-tipped dactylos as long as palm, impinging between defining spines. Second. Small subovate sideplate slightly deeper than wide, anterior and ventral margins minutely spined, distal angles absent, posterior margin excavate, noticeable triangular process. Basos proximally constricted, length more than twice width, several short fine single spines anteriorly, long fine setae posteriorly, a few on posterior surface. Ischium subrectangular, much narrower than basos, length \( \frac{1}{4} \) basos, pair of small setae on distal angle. Merus V-shaped, widening slightly distally, posterior margin rounding to distal with a few setae on angle, length \( \frac{2}{3} \) basos, narrower than ischium. Carpus subrectangular, barely longer than ischium. Propod ovate, tending to triangular, convex anterior margin as long as basos, convex free posterior margin about \( \frac{2}{3} \) length anterior; greatest width \( \frac{1}{4} \) length; oblique barely convex palm as long as free margin, with long setae. Dactylos longer than and overlapping palm, tip fitting into small pocket formed and protected by small oblong raised "shield" or plate-like flap.

Peraeopods. First: Sideplate deeper than wide, narrowing distally, anterior and ventral margins minutely spined; posterior with triangular process very high up. Gills simple, pendulous, in these specimens covered with remains of globe-like animals, probably testaceans. Basos width nearly \( \frac{1}{3} \) length, a few small single setae anteriorly, short setae on basos and ischium postodistal angles. Merus piriform, \( \frac{3}{4} \) basos length, small tufts of short setae on margins and distal angles. Carpus narrower, \( \frac{1}{4} \) merus length, anterior margin with 3 tufts of small setae, 12 or so irregular spines and a few setae on posterior. Propod slightly shorter than merus, 2 tufts of short fine setae anteriorly, strong tuft on distal angle, more or less regular row of 9 spines with setae posteriorly; strange chitinose structure, probably glandular, at inner dactylos base, like small capsule surmounted distally by thickened wrinkled rosette, possibly small spine below that; occurs on all pereaoepods in both sexes. Dactylos not \( \frac{3}{4} \) propod length. Second: Sideplate shovel-shaped, proximally as wide as deep, distally narrowing, minutely spined margins, ventral angles rounded, posteriorly excavate without distinct triangular process. Propod posterior margin with row of 11 spines. Third Sideplate lobes subequal, anterior subovate, posterior tending to subrectangular, posterior margin markedly serrate distally, posterior and dorsal margins minutely spined. Basos, tuft of long setae proximally, single and paired short stout spines on rest of anterior margin; greatly convex and crenulate-serrate posteriorly. Ischium sub-square, \( \frac{3}{4} \) basos length, group of spines medially on anterior margin and on distal angle. Merus length \( \frac{3}{4} \) basos, less than twice width, margins with 4 sets of single or grouped spines. Carpus slightly shorter, 4 sets of single or grouped spines anteriorly, 2 single spines and a few setae posteriorly. Propod as long as merus,
3 or 4 sets of small fine setae on margin, anterior with 7 single or grouped sets of spines; dactyls ½ propod. Fourth: Sideplate subrectangular, width twice depth, posterior margin serrate, sharp posterodistal angle, minutely spined. Basos ovate, greatest width ⅓ length. Carpus and merus more spinous than Pr. 3, propod less so; segments proportionately longer and narrower, otherwise like Pr. 3. Fifth: Posterior margin of small sideplate serrate and minutely spined. Basos widest medially, as wide as long, anteriorly straight, greatly convex posteriorly; otherwise like Pr. 4.

Epimeral Plates. First: Sharply subtriangular, posteriorly somewhat serrate, 2 serrations and spines distally on anterior margin. Second and Third: Deeper than wide, subrectangular, posterior margin serrate and minutely spined; anterodistal angle of second rounded; angle rounded but margins at right-angles in 3rd.

Pleopods. Rami of about 13 segments. First pleopod in male with inner ramus very strong, of 5 segments each with pair of short plumose setae; last segment with 2 or 3 pairs of plumose setae proximally, modified to strong bent dorsally-directed flagellum reaching halfway back to peduncle; flagellum near tip with strong tuft of setae giving cow's tail appearance, but with terminal portion of flagellum naked, surface scabrous, slightly hooked and terminally pointed.

Uropods. First: Rami only ½ peduncle length, each with 4 strong dorsal spines, 1 long spine terminally; peduncle outer dorsal margin with about 12 strong spear-headed seta-tipped spines, 4 on inner. Second: Peduncle, 5 strong spines on outer dorsal margin, 2 smaller ones on inner; rami shorter than peduncle; outer with 2 strong spines distally, 2 smaller ones dorsally; inner with 4 strong terminal spines, 1 medially, 1 or 2 small dorsal spines. Third: Small, one globular segment, 4 strong spear-headed spines dorsally; 3 or 4 smaller spines and 1 or 2 long setae terminally. Telson: Ovate, distally rounded, about 3 setae distally on outer margin.

Description of Female.

Length, 6–7 mm.; depth, 1⅓ mm.; width, 1⅓ mm.

Gnathopods. First: Like Gn. 1, male, except: fewer spines on carpus posterior lobe; propod 3 basos length, several spines on one surface, long setae on other; posterior interrupted by 3 fine-combed spines. Second: Sideplate like Gn. 2, male; propod ⅔ basos length, palm ⅔ length propod posterior free margin; propod oblong-ovate rather than triangular; posterior margin slightly convex; otherwise like Gn. 1, female.

Uropods. Second: Inner ramus with about 5 long spines, outer with 3. Third: Two strong, 1 very small spine dorsally.

Locality. Freshwater pool, not very far from sea, Enderby Island, coll. W. H. Benham, 1907.

Types. Slides C.34 (male) and C.35 (female); Chilton Collection.

Discussion

Chilton described these specimens from Enderby Island as being almost identical with South Island specimens, "differing only in having the palm of both gnathopods slightly more oblique than in the New Zealand specimens," and he identified them as C mihiwaka Stephensen's Auckland Islands speci-
mens agree with Chilton's Enderby Island (Auckland Islands Group) in having the first antennae longer than the second. They are no doubt the same species. On close examination, the Enderby specimens have proved to differ in so many points apart from those differences noted by Chilton that they must be considered a distinct species.

The shape of the sideplates is distinctive, those of the second gnathopod and the first and second pereaeopods having a distinct triangular process; the first uropod rami are only half the peduncle length; the telson is distally convex, the third uropod is distinctive; the male first pleopod inner ramus is uniquely modified; and the epimeral plates are subrectangular, not trapezoid.

Undoubtedly, the most interesting feature of this genus is the unique series of modifications of the male first pleopod. To my knowledge, this is the only genus in the whole of the Order Amphipoda in which the pleopods are actually modified as distinct from reduced or degenerate. "The pleopods... are perhaps less subject to variation throughout the two groups (Hyperidea and Gammariden) than any other part of the organism" (Stebbing, 1888). Wherever the pleopods are aberrant, other than in Chiltonia, it is by reduction or degeneration, not by a drastically new structural development as here.

That this happens only in the male, as far as can be seen, is analogous to the condition in the Isopoda where the male first pleopod is modified as a penis. There is, too, some similarity in the shape and ornamentation of the ramus to that in the isopods, suggesting possibly that the modification serves the same purpose. Williamson (1951) points out that "in the Talitridae the copulation positions make it impossible for the male to inject sperm directly into the female genital apertures. The male bears two short lateral penes on the ventral surface of the last thoracic segment..." Is it possible that this freshwater genus has modified pleopods to obviate this difficulty? But perhaps this is attributing too much to what may prove to be merely a peculiarity of shape.

Specimens of the Australian species which I was able to examine show no signs of this modification, but a more complete appraisal and description than they have hitherto been given is warranted. Particularly useless for systematic purposes is Sayee's statement (1902) that C subtilissimus differs from C mikiwaka by the more slender body and the larger head and eyes. Barnard's description (1916) of the South African species does not mention the pleopods. Should the male pleopods be normal in these specics, as seems likely, it may be necessary to raise them to subgeneric or even generic rank.

Literature Cited


*Since this paper was submitted for publication, D. K. H. Barnard has advised me that there are no modifications of the pleopods in his South African material.*


