

ART. XL.—*Notes on the Callianassidæ of New Zealand.*

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Plate XVI.

THOUGH the *Callianassidæ* of New Zealand are few in numbers they have been only imperfectly described, and there has been some confusion as to the number of species found in New Zealand. This has been mainly due to the fact that, owing to their habit of burrowing in sand and mud, specimens are obtained only by some fortunate accident. Through the kindness of various friends I have now specimens of three species, and in this paper I give descriptions of these and endeavour to clear up the synonymy as much as possible. I am taking the family *Callianassidæ* as used by the Rev. T. R. R. Stebbing* to include, among others, the two genera *Upogebia* and *Callianassa*, to which our New Zealand species have been assigned, and I make no attempt to discuss the characters of the genera. Some discussion of these two genera is given in Mr. Stebbing's "South African Crustacea," part i, pp. 38-46, where those who are interested in the matter will find numerous references to other papers. *Upogebia* and *Gebia* are two names used by Leach for the same genus, the former being the earlier and therefore the one to be retained.†

* "History of Crustacea," London, 1893, p. 183; and "South African Crustacea," part i, 1900, p. 38.

† See Stebbing, "History of Crustacea," p. 185.

Upogebia hirtifrons (White).

Gebia hirtifrons, White, P.Z.S., 1847, p. 122; Ann. Mag. Nat. Hist., ser. 2, i, p. 225; List Crust. Brit. Mus. (1847), p. 71; Miers, Ann. Mag. Nat. Hist., ser. 4, xvii, p. 223; Cat. N.Z. Crust., p. 71, and Zool. "Erebus" and "Terror," Crust., p. 4, pl. iii, fig. 5; Kirk, Trans. N.Z. Inst., xi, p. 401; Ortmann, "Decapoden und Schizopoden der Plankton Expedition," p. 49; Index Faunæ N.Z., p. 253 (part); (not of Dana, U.S. Expl. Exp., xiii, Crust., part i, p. 511, nor of Haswell, Cat. Aust. Crust., p. 164).

This species was briefly described by White in 1847 from a specimen obtained during the Antarctic expedition of the "Erebus" and "Terror," but without any definite indication of habitat. Later on Dana referred specimens obtained at Bay of Islands, New Zealand, by the United States Exploring Expedition, to White's species. In 1876 Miers pointed out that this identification was incorrect, and that Dana's specimens belong to a different species, which he named *Gebia danai* (see below). In 1879 Mr. T. W. Kirk recorded the existence of a specimen of a *Gebia* in the private collection of Mr. H. B. Kirk. This specimen is no longer available, but from Mr. Kirk's description it is evident that it belongs to White's species as more fully defined by Miers in the "Catalogue of the New Zealand Crustacea," p. 71, though, curiously enough, Mr. Kirk refers it by name to Dana's species, and hence "*Gebia hirtifrons*, Kirk," was put down in the "Index Faunæ Novæ-Zelandiæ," p. 253, as a synonym of *Upogebia danai*, Miers, instead of under the present species.

The confusion was afterwards increased by Professor Haswell, who referred a *Gebia* found in the interior of sponges in Port Jackson to White's species (Cat. Aust. Mus., p. 164). It appears, however, that his specimens belong neither to *Gebia hirtifrons*, White, nor to *G. danai*, Miers, but to a third species, probably *Upogebia (Gebiopsis) bowerbankii*, Miers.

The result has been that it has long remained uncertain whether *Gebia hirtifrons*, White, occurred in New Zealand or not, though, of course, the question would have been settled in 1879 by Mr. Kirk's specimen if it had not been wrongly named. I have, moreover, recently obtained undoubted specimens of White's species from Mr. H. Suter, and also from Mr. J. Macmahon, so [that there is now no doubt that *Gebia hirtifrons*, White, and *G. danai*, Miers, are both found in New Zealand.

Specific Diagnosis.—Cephalothorax about one-half the length of the abdomen, the front hardly at all trilobed, its anterior end and lateral margins with stout teeth, smaller teeth and tufts of

setæ arranged partially in longitudinal rows on its dorsal surface, the scabrous surface thus formed reaching nearly to the cervical groove; a single small lateral tooth behind the eyes.

Abdomen with the 6th segment a little longer than the others, which are subequal; 1st segment narrow, its lateral margins nearly free from setæ; 2nd with a few setæ on lateral margin; 3rd, 4th, and 5th with dense woolly setæ along lateral margins, similar setæ extending across the dorsal surface at posterior margins of 3rd and 4th segments, and to a less extent at that of the 2nd. Dorsal surface of abdomen without carinæ or other ridges.

Chelipeds subequal; merus about as long as propod, its lower inner margin with well-marked fringe of long hairs but without teeth; a small tooth on upper margin near distal end; carpus about half as long as propod, a well-marked tooth on upper inner margin and a smaller one (or sometimes two) on inner surface, the one on lower margin nearly or quite obsolete; propod slender, narrowing slightly towards distal end, surface marked with slight longitudinal ridges and furrows, upper margin roughened, lower margin not denticulate, numerous hairs on the lower outer surface, some along upper margin, and a well-marked row on inner surface near upper margin. Fixed finger short, stout, curved, reaching only slightly beyond the end of propod. Dactyl much longer than fixed finger, about half as long as propod, very hairy. 2nd pereopod large, broad, somewhat compressed, and very hairy towards distal end.

Telson rectangular, distinctly broader than long, its posterior border straight with angles slightly rounded, fringed with long hairs; outer branch of uropods a little longer than telson; the inner branch slightly shorter than telson; inner branch with a median ridge, outer with two ridges near middle.

Length, about 70 mm. (cephalothorax, 22 mm.; abdomen, 48 mm.).

Hab.—Auckland and Manukau Harbours (*H. Suter*); Kene-puru (*J. Macmahon*).

Remarks.—Miers (Zoological Collections of H.M.S. "Alert," p. 281) says, "*Gebia carinicauda* is nearly allied to, and may prove to be identical with, *G. hirtifrons*, White, which Mr. Haswell mentions as commonly occurring in sponges at Port Jackson"; but he proceeds to point out that "in the latter species the spine of the lower margin of the hand (which exists in adult examples of *G. carinicauda*) is absent." I have not access to Stimpson's description of *G. carinicauda*, but if we are to consider his specific name *carinicauda* as descriptive, the two species differ in this respect also, for there is no carina either

on the abdomen or telson of *G. hirtifrons*, White; indeed, the telson may be marked by a narrow depressed median line.

In making the comparisons quoted above Miers appears to have been relying on the type specimen of *G. hirtifrons*, White, in the British Museum; Mr. Haswell's specimens from sponges at Port Jackson, as already stated, do not belong to White's species. I am indebted to the trustees of the Australian Museum for several specimens from Port Jackson, and they are certainly quite distinct from White's species, being easily distinguished, in addition to other points of difference, by the fingers of the chelipeds being subequal and the chelipeds therefore perfectly chelate, so that the species comes under the genus or subgenus *Gebiopsis* as defined by A. Milne-Edwards; the authorities of the Australian Museum consider the specimens as probably belonging to *Gebiopsis bowerbankii*, Miers.

Mr. Stebbing has directed attention to the character of the 1st pleopods in the genus *Upogebia* as previously described by De Haan and Boas—viz., that in the male these appendages are absent, while in the female they are present but quite different from the four following pairs (see "South African Crustacea," part i, p. 45). This is also true of my specimens, the Kenepuru specimen being a male with the 1st pleopods absent, the other two being females with small uniramous 1st pleopods. The one from Auckland Harbour bears eggs: these are attached to the small 1st pleopod, to the inner branch of the 2nd, and to both branches of the 3rd and 4th pleopods.

Mr. J. Macmahon, to whom I have been indebted for various specimens of *Crustacea* at different times, thus describes the capture of the Kenepuru specimen. It was, he says, "taken alive at the entrance of a hole about half an inch wide in sand near low-tide mark; this hole was well formed, and went some depth into the sand, over which fresh water ran on its way to the sea, much of it percolating down the hole."

Upogebia danai (Miers).

Gebia danai, Miers, Ann. Mag. Nat. Hist., ser. 4, xvii, p. 223; Cat. N.Z. Crust., p. 70; Index Faunæ N.Z., p. 253. *Gebia hirtifrons*, Dana, U.S. Expl. Exped., xiii, Crust., part i, p. 511, pl. xxxii, fig. 2; Filhol, "Mission de l'Île Campbell," p. 428 (not of White, P.Z.S., 1847, p. 122, nor of Kirk, Trans. N.Z. Inst., xi, p. 401).

Specific Diagnosis.—Cephalothorax about two-thirds the length of the abdomen; the front distinctly trilobed, lobes triangular, acute, middle one the largest; the scabrous portion of the front not reaching half-way to the cervical groove, except the lines of minute spines extending backwards from the outer

margin of lateral lobes, which reach nearly to the cervical groove. No lateral tooth behind the eyes. Abdomen with 1st segment narrow, the 6th segment the longest, the 1st the shortest, the others subequal. Lateral margins of the segments mostly free from setæ but with some on the 3rd, 4th, and 5th segments. Dorsal surface smooth.

Inner antennæ with the flagella shorter than the last joint of the peduncle. Outer antennæ about as long as the abdomen, the peduncle a little longer than the peduncle of inner antennæ.

Chelipeds subequal, merus about as long as the propod, its lower margin bearing 5 or 6 small teeth on the proximal portion; carpus about half as long as merus, triangular, lower surface produced distally into a sharp tooth; propod fairly broad, with outer surface smooth, lower margin with a row of small teeth, the fixed finger somewhat stout and incurved, arising at some little distance from the distal end of the propod and scarcely projecting beyond it, some long hairs on the upper margin of propod, on the upper part of the inner surface and along the lower margin; dactyl slender, more than half as long as the propod, and covered with dense rows of long hairs.

Telson broader than long, its posterior margin rounded and fringed with setæ. Both branches of uropods longer than the telson, the outer longer and broader than the inner, which is subtriangular in outline; the posterior margins of both fringed with setæ; both branches with a median ridge, a small tooth on the base of this ridge on the outer branch, and another small tooth on the basal joint just over the proximal end of the ridge of the inner joint.

Length of specimens examined, about 25 mm. Dana gives the length of his specimen as "nearly 2 in."

Hab.—Bay of Islands (*Dana*); Auckland Harbour (*Suter*); Plimmerton (*H. B. Kirk*); Stewart Island (coll., Canterbury Museum).

Remarks.—The history of this species has already been given along with that of the preceding species. Judging from the specimens I have seen, it is much smaller than that species, and may be readily distinguished from it by the trilobed front and by the characters of the chelipeds.

In my specimens (sex uncertain) there are no pleopods on the 1st segment of abdomen; the 2nd, 3rd, 4th, and 5th segments bear pleopods of the usual type.

In his description, as quoted by Miers, Dana says, "Caudal segment not broader than long"; but in the two specimens that I have been able to examine closely it is appreciably though not greatly broader.

Callianassa filholi, A. Milne-Edwards. Plate XVI,
figs. 1 to 5.

Callianassa filholi, A. Milne-Edwards, Bull. Soc. Philomathique Paris, 7^{me} ser., tome iii, p. 112; "Mission de l'Île Campbell," p. 429 and p. 491; Index Faunæ N.Z., p. 253.

This species was originally briefly described by A. Milne-Edwards from specimens gathered by Filhol at Stewart Island. I have seen several specimens, including one from the type locality, that evidently belong to it, and I am therefore able to give a somewhat fuller description than has hitherto been done. In the "Mission de l'Île Campbell" Filhol gives only an abstract of Milne-Edwards's original description, but adds figures of the antennæ and the chelipeds. The "*Callianassa*, sp. ind.," mentioned by Mr. T. W. Kirk in the "Transactions of the New Zealand Institute," vol. xi, page 401, but not described, probably belongs to this same species, which is the only one of the genus at present known from New Zealand.

Callianassa ceramica, recently described by Messrs. Fulton and Grant from Port Phillip and Western Port, Victoria,* is evidently very closely related to the New Zealand species, and may indeed ultimately prove to be identical with it. For the sake of comparison I have therefore based the following description on theirs.

Specific Diagnosis.—The cephalothorax is about one-fifth the total length of the body, and is somewhat laterally compressed. Rostral point short but acute; the lateral angles between the ocular peduncles and external antennæ only faintly indicated. A groove on the dorsal surface runs parallel with the front, extends laterally as far as the base of the external antennæ, then joins the line on each side defining the branchial region. This line extends to the posterior margin, and is joined about midway by the cervical groove, the dorsal portion of which is about one-fourth of the length of the cephalothorax from its posterior margin. Cephalothorax otherwise smooth.

Abdomen flattened dorso-ventrally towards posterior end, 1st segment narrow, the 2nd segment slightly longer than the 5th and 6th, which are about equal in length, and longer than the others; 1st segment with lateral margin free from setæ, 2nd with a very few setæ towards posterior end, 3rd, 4th, and 5th with posterior portion of margin fringed with setæ, and with a tuft on the side nearer the anterior end of the margin; 6th segment with a few very short setæ on the margin. Dorsal surface of all segments free from carinæ or spines.

* Proc. Roy. Soc. Victoria, 19 (n.s.), p. 12, plate v.

The whole integument of body imperfectly calcified, the cephalothorax and anterior portion of abdomen being more or less membranous, posterior part of abdomen more calcified, but the great chelipeds the only parts thoroughly calcified.

Eye peduncles flattened, triangular with outer margin convex, inner margins contiguous and produced anteriorly into a short spine projecting upwards and forwards. Eyes round and generally well pigmented.

The 1st antennæ about as long as the cephalothorax; peduncle longer than flagellum, its 1st joint short, a little longer than the eye-lobes, 2nd longer, 3rd as long as 1st and 2nd together, the two flagella equal in length. 2nd antennæ slender, fully twice as long as cephalothorax; peduncle a little shorter than that of the inner; flagellum very slender.

Third maxillipeds with the ischium and merus much swollen and rounded, line of junction wide and straight, the two joints together being subglobose; on their inner face a longitudinal row of small spines runs along the middle of the ischium in the direction leading to the insertion of the carpus; on the merus it is represented only by a line of long setæ. Inner margins and part of the outer surface fringed with long setæ. Three terminal joints slender.

Chelipeds unequal, either the right or the left may be the larger. The larger cheliped much expanded and flattened, outer surface slightly convex, integument much calcified, the whole appendage probably serving as an operculum to close the opening of the burrow in which the animal lives. General shape and proportions of the joints much as *C. ceramica*, but the upper and lower margins of the carpus and propod more produced into thin flat crests, the upper margin of carpus being produced proximally into a small rounded lobe, and the lower margin produced downwards into a large rounded lobe towards the distal end.

The smaller cheliped with a small spine on lower margin of merus. Remaining pereopods of usual shape.

Telson a little longer than the branches of uropods, somewhat narrowed posteriorly, posterior margin rounded, fringed with long setæ, dorsal surface smooth; branches of uropods with posterior margins rounded and fringed with long setæ, dorsal surface of outer branch with slight median ridge.

Length—Cephalothorax, 13 mm.; abdomen, 42 mm.: total length of body, 65 mm.

Colour (*in spirit*), dull white.

Hab.—Stewart Island (*Filhol* and *H. B. Kirk*); Oamaru (*T. Forrester*); Timaru (specimens in Canterbury Museum, collected by *A. Haylock*).

Remarks.—From the description given above it will be seen

that this species comes very close to *C. ceramica* of Victoria, Australia. It appears to differ in the possession of a small spine on the ocular peduncles, in the greater development of the crest-like expansions of the greater chelipeds, and perhaps also in the proportions of the abdomen and of the telson and branches of the uropods, and in other minor details. None of these differences are of very much importance, and some of them may be due to differences in age and sex. Mr. Stebbing has described two species, *C. kraussi* and *C. rotundicaudata*, from South Africa, but both of them appear to differ considerably from the Australian and New Zealand species. A. Milne-Edwards describes the chelipeds of *C. filholi* as being almost equal in the specimens he examined, but in all the specimens I have seen one is much larger and broader than the other. The figures of the chelipeds given by Filhol do not appear to be particularly accurate.

In the few works at my disposal I have been unable to find much information about the pleopods, more particularly as regards the 1st and 2nd and their modification in the two sexes. Mr. Stebbing briefly described these appendages in *C. kraussi*, but does not figure them nor mention which sex he is describing; in *C. rotundicaudata* there is, he says, no trace of pleopods on the first two segments of the pleon.

In most of the specimens of *C. filholi* that I have seen there is no appendage on the 2nd segment of the pleon, and only a small one on the 1st: this is only 4 mm. long, and consists of a slender basal joint followed by a second joint of about the same length, but stouter, and bearing two or three simple setæ. (See Plate XVI, fig. 3.) In one specimen both 1st and 2nd pleopoda are present, and they are much better developed. In the 1st (fig. 4) the basal joint is long and bent into a curved or boomerang shape; it bears a dense tuft of long setæ, most of which are plumose, at the bend of the joint, and tufts of similar setæ at the distal end. Some of these setæ are irregular towards the end and appear covered with some mucilaginous substance; the basal joint bears only a single branch, of which the 1st joint is a little longer than the 2nd; both bear numerous long setæ, most of which are plumose. The 2nd pleopods (fig. 5) are large and biramous, the basal joint is stouter than in the 1st pleopod but similarly bent and supplied with setæ; the outer branch is composed of two joints, the 1st of which is about half as long again as the 2nd; the inner branch is rather longer than the outer and consists of two subequal slender joints. Dense tufts of plumose setæ are found at the bend and distal end of the basal joint, and at the distal end of the 1st joint of the outer branch; the other parts bear numerous long simple setæ as shown in the figure.

I presume, on the analogy of *Gebia*, that the specimen bearing the well-developed 1st and 2nd pleopods is a female, and that the others are males, but I am unable to find any well-marked external sexual characters to confirm this supposition. The large chelipeds are found in both.

EXPLANATION OF PLATE XVI.

- Fig. 1. *Callianassa filholi*: large cheliped (from left side of specimen);
 $\times 2\frac{1}{2}$
 Fig. 2. *Callianassa filholi*: small cheliped (from right side of same specimen); $\times 2\frac{1}{2}$.
 Fig. 3. *Callianassa filholi*: 1st pleopod (? of male); \times about 7.
 Fig. 4. " 1st pleopod (? of female); \times about 7.
 Fig. 5. " 2nd pleopod (? of female); \times about 7.