Art. XXV.—*Some New Zealand Amphipoda: No. 2.**

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Apherusa translucens (Chilton). (Fig. 1, A to K.)

Panoploea translucens Chilton, 1884, p. 263, pl. 21, fig. 3 *a–c*.
Apherusa translucens Stebbing, 1906, p. 308.

This species was described from three specimens taken in 1884 in Lyttelton Harbour, but, as the description was based on the female only, the species has remained somewhat obscure. It was at first placed under the genus *Panoploea* G. M. Thomson, owing to its supposed resemblance to *P. debilis* G. M. Thomson. This species, however, has proved to be identical with *Pherusa novae-zealandiae* G. M. T., and has been placed by Stebbing in the genus *Leptamphopus*. The genus *Panoploea* has been retained for the other species described by Thomson, *P. spinosa*, which belongs to another family. The species described as *Panoploea translucens* was thus left without a genus, and Stebbing has assigned it to the genus *Apherusa* A. Walker. This genus seems somewhat ill-defined and without well-marked characteristics, but so far as they go the characters of the species now under consideration agree with those of the genus. *Apherusa translucens* seems to be somewhat rare in New Zealand, and I have very few specimens, and all of these somewhat imperfect. Among them, however, is a male, and I am therefore now about to give the characters of this sex and an amended description of the species, as follows:—

Body smooth, back without any dorsal teeth. Head without rostrum. Pleon segment 3 with postero-lateral angle scarcely produced, posterior margin smooth, straight or slightly convex, except above angle where it is slightly concave, inferior margin with 5 spinules. Eye large, oval. Gnathopods 1 and 2 similar in structure, those of the male considerably stouter than those of the female, the first in each sex slightly larger than the second. In the male the first gnathopod with propod widest at the beginning of the palm, rather more than half as broad as long, anterior margin straight, palm about as long as the hind-margin, regularly convex and fringed with rows of setules but without special defining spine; hind-margin with 5 or 6 small tufts of fine setules. In the female the basal joint of first gnathopod showing a constriction about one-third its length from the base, remaining joints much more slender than in the male.

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* For No. 1 of this series see *Trans. N.Z. Inst.*, vol. 52, pp. 1–8, 1920.

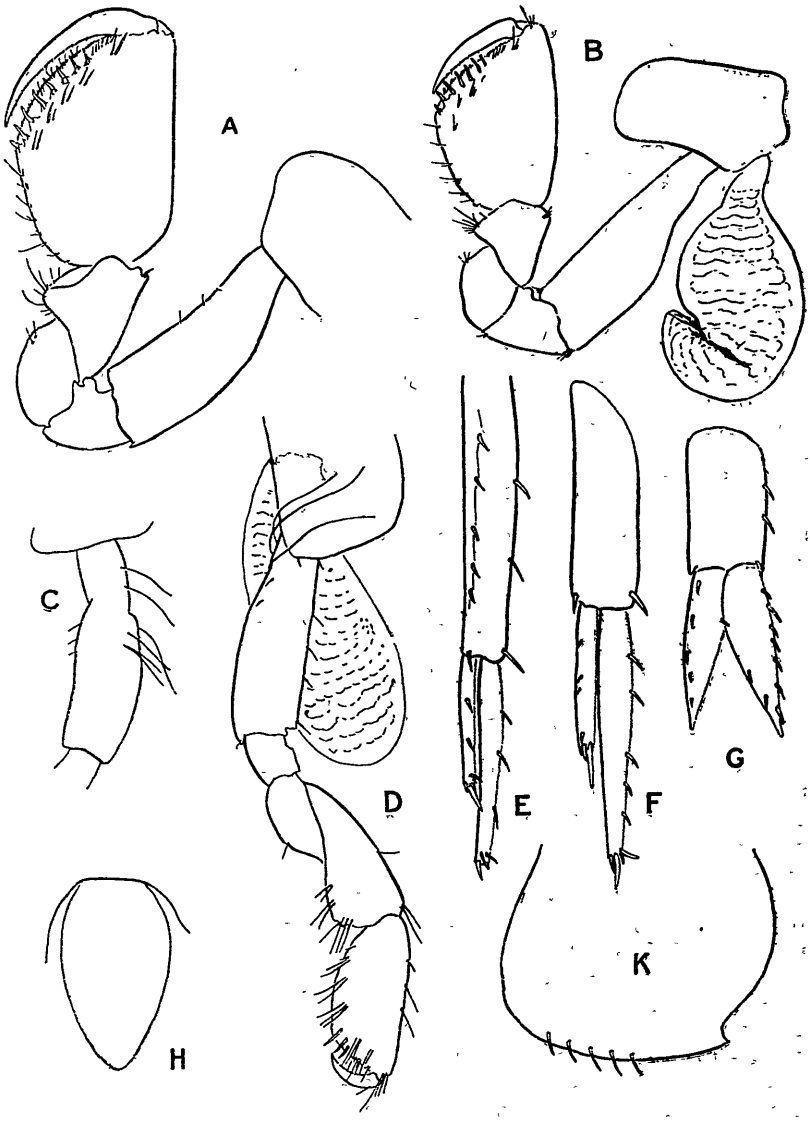

FIG. 1.—*Apherusa translucens.*

A. First gnathopod of male.
B. Second gnathopod of male.*
C. Basal joint of first gnathopod of female.
D. Second gnathopod of female.
E. First uropod.
F. Second uropod.
G. Third uropod.
H. Telson.
K. Third pleon segment.

*The branchia of this appendage has been drawn as it appeared in the preparation made. The irregularity is doubtless due to some abnormality.

Gnathopod 2 similar to the first in both sexes, but slightly smaller and with basal joint straight. Basal joint of peraeopoda 3–5 moderately expanded, oval, posterior margin with minute shallow crenations or serrations. Uropods 1 and 2 slender, similar, the outer ramus much shorter than the inner, inner margin of each ramus fringed with very minute spinules. Uropod 3 stouter and shorter, branches broadly lanceolate, about as long as peduncle. Telson oval, narrowing posteriorly, margin entire or with one or two minute setules on each side of the apex.

Length, about 9 mm.

Locality.—Lyttelton Harbour.

This species shows considerable resemblance both to *A. cirrus* (Bate) and to *A. jurinei* (M.-Edw.). If differs from the first in having no dorsal teeth, in this respect agreeing with *A. jurinei*, but the shape of the third pleon segment agrees closely with that of *A. cirrus*, thus differing from *A. jurinei*. The telson agrees closely with that of *A. jurinei*. In neither of these species does Stebbing speak of any sexual differences in the gnathopoda. Walker (1912, p. 600) has drawn attention to the variation in the shape of the third pleon segment in *A. jurinei*, and to sexual differences in the antennae in that species. Unfortunately the antennae are wanting in my specimens of *A. translucens*, and I am therefore unable to say whether similar differences are to be found in it.

Apherusa levis (G. M. Thomson). (Fig. 2, A to F.)

Amphithonotus levis G. M. Thomson, 1879, p. 330, pl. 16, figs. 1–4; 1881, p. 215, pl. vii, fig. 6: Thomson and Chilton, 1886, p. 148: Stebbing, 1906, p. 741.

This species was described by G. M. Thomson in 1879, and was referred to the genus *Amphithonotus* as agreeing well with the generic characters given by Spence Bate in the *Catalogue of the Amphipoda of the British Museum*. It appears, however, that the species at that time referred to *Amphithonotus* really belong to other genera, and the genus therefore lapsed. I have had some difficulty in deciding which is the proper genus to which Mr. Thomson's species should be referred, but its resemblance in nearly all points to the preceding species, *Apherusa translucens*, is so close that I am putting it down to the same genus. The only point in which it differs from Stebbing's description of the genus (1906, p. 304) is that the telson is distinctly cleft posteriorly, though not deeply so, while he describes the telson as being "entire." I presume, however, this means "simple"—that is, not divided—and the telson of the present species could quite well come under this description. Moreover, some of the species which he ascribes to *Apherusa* have the telson distinctly toothed or serrate posteriorly, and the margin therefore not entire.

Apherusa levis agrees with *A. translucens* in having the first and second gnathopods in each sex similar, the first being very slightly larger than the second, and both pairs in the male being considerably larger than corresponding pairs in the female. It differs, however, in the presence of a well-marked rostrum and in the shape of the telson; there are also slight differences in the gnathopods. It may be re-defined as follows:—

Body quite smooth, without dorsal teeth. Cephalon produced into a distinct rostrum. Eye large, oval with anterior margin straight or slightly

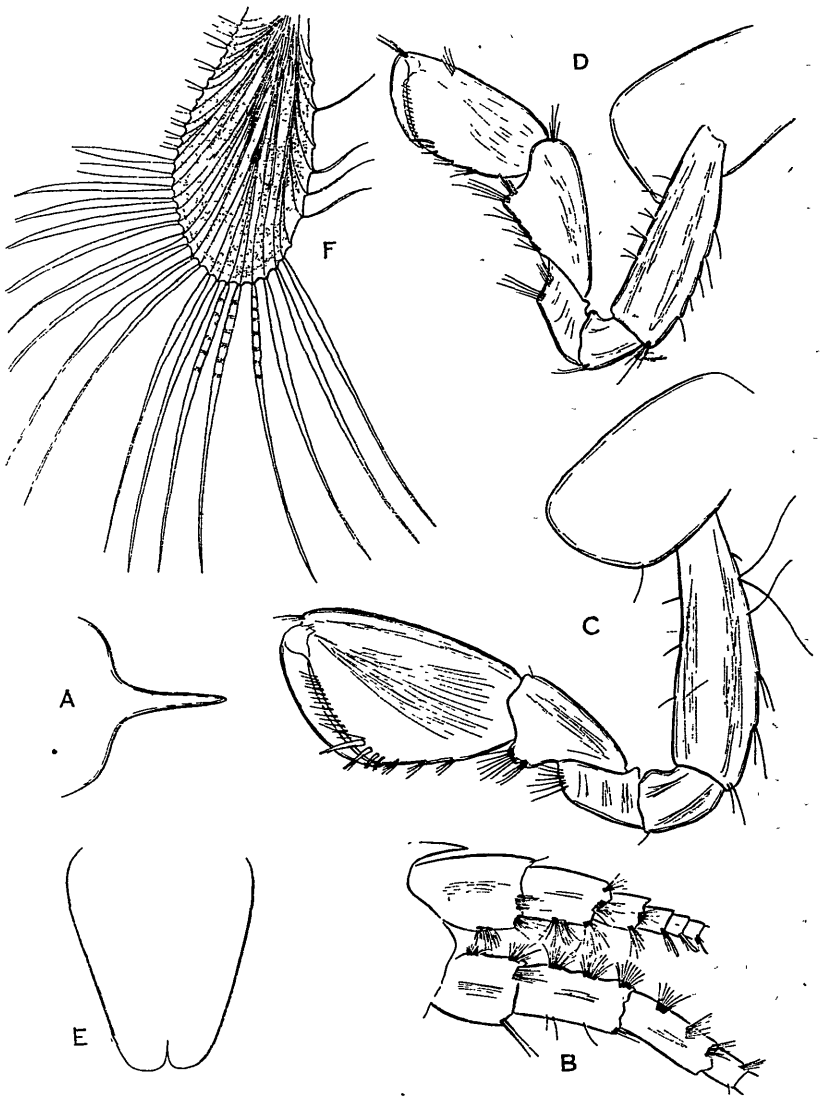

FIG. 2.—*Apherusa levis.*

A. Rostrum.
B. Peduncles of first and second antennae of male.
C. First gnathopod of male.
D. First gnathopod of female.
E. Telson.
F. Brood-plate.

concave. Superior antenna slightly longer than the inferior, both slender, with many-jointed flagella. In the male the peduncle of each antenna bears many tufts of very fine short hairs, as shown in fig. 2B. These are not present in the female. The gnathopods of the male considerably larger than those of the female, and the first gnathopod larger than the second in each sex; in the male the propod is large, widest at the commencement of the palm, which is defined by 3 or 4 stout setules; in the female the propod is smaller and narrower and not widened distally. Telson narrowing posteriorly, extremity with a shallow cleft dividing the posterior position into two rounded lobes, margins quite entire and without setae.

Length, about 8 mm.

Localities.—Otago Harbour; Blueskin Bay; Akaroa.

The brood-plates of the female in this species are characteristic and form an easy mark by which the species may be recognized. They are oval in shape, widening somewhat distally, and the margins towards the apex bear a number of very long setae, longer than the whole joint. These setae show, on the basal portion, alternate light and dark bands, as indicated in fig. 2F, in which only some of the setae are put in and only three of them filled in in detail.

Atyloides serraticauda Stebbing.

Atyloides serraticauda Stebbing, 1906, p. 362 : Chilton, 1909, p. 627 ; 1912, p. 497. *A. calceolata* Chilton, 1912, p. 497, pl. ii, figs. 21–23.

Atyloides serraticauda is a species widely distributed in Antarctic and Subantarctic seas, and some specimens belonging to it were taken at Auckland Islands in 1907. Large specimens are well marked by the distinct serrations on the anterior side-plates, the side-plates of the segments of the pleon, and on the posterior margins of the lobes of the telson. In smaller specimens these serrations are much less distinct. The species described by me from the South Orkneys under the name of *A. calceolata* proves to be without doubt a male of *A. serraticauda*. As stated in the original description, it resembles that species in nearly all characters, but differs in the presence of calceoli on the lower surface of the peduncle of the first antenna and on the upper surface of the peduncle of the second antenna; the gnathopods are also slightly stouter, and differ a little in shape from those of the female. The arrangement of the calceoli on the antennae of the male is similar to that described by Walker (1912, p. 600) for *Apherusa jurinei* (M.-Edw.).

Lembos philacantha Stebbing.

Lembos philacantha Stebbing, 1906, p. 598; 1910, p. 605.

This species was taken by the "Challenger" Expedition in Bass Strait at a depth of 71 metres, and described by Stebbing in the report of that expedition. It has been taken since at different places on the Australian coast. It has not hitherto been recorded from New Zealand, but I have one specimen from the Chatham Islands that agrees well with Stebbing's description and must be referred to his species. The relation of this species to others of the genus found in the Southern Hemisphere requires investigation.

Photis brevicaudata Stebbing. (Fig. 3, A to E.)

Photis brevicaudata Stebbing, 1888, p. 1068, pl. 108; 1906, p. 606; 1910, p. 648.

Several specimens that certainly belong to this species were obtained near the Gannet Islands, off the west coast of Auckland, in January, 1915, at a depth of about 50 metres. The species were originally described from specimens obtained by the "Challenger" Expedition off Melbourne, Australia, at a depth of 60 metres, but only the female was then taken.

My specimens agree well with Stebbing's description and figures of the female; in the first gnathopod the palm is slightly concave, as shown in his detail figure. The male specimens differ from the female in the size and shape of the second gnathopod, but particularly in the great elongation of the fourth peraeopod. The second gnathopod of the male has the shape in general like that of the female described by Stebbing, but the propod is larger, the palm much more excavate, and the angle defining it much more marked. The fourth peraeopod in the older males is very greatly enlarged, being much larger and broader than the fifth, as will be seen by comparing figs. 3D and 3E. The basal joint is broad, narrowing distally, the meral joint is greatly elongated, being longer than the carpus and propod together; the details as to the proportions of the joints can be best learnt from fig. 3D. The other appendages agree well with the description given by Stebbing.

In the male specimen from which fig. 3B of the second gnathopod was taken the first gnathopods were unsymmetrical. One, shown in fig. 3A, is practically the same as that of the female. The one from the other side (fig. 3C) has the propod similar to that of the second gnathopod, though rather smaller, but the carpus is much longer than in the second gnathopod, and therefore more like that of a normal first gnathopod.

The great enlargement of the fourth propod in this species recalls the somewhat similar development of the same appendage in *Eurystheus crassipes* (Haswell).

Stebbing describes the telson as "very short, much broader than long, apex rounded," and figures it without setules. In the specimen I have examined the apex is less rounded, and bears setules on either side as in *P. macrocarpa* Stebbing and other species of the genus.

Jassa falcata Montagu.

Cancer (*Gammarus*) *falcatus* Montagu, 1808, *Trans. Linn. Soc.*, vol. 9, p. 100, pl. 5, fig. 2. *Podocerus validus* Thomson and Chilton, 1886, p. 143. *Jassa pulchella* and *Jassa falcata* Stebbing, 1906, pp. 654, 656. *J. falcata* Sexton, 1911, p. 212; Chilton, 1912, p. 511; Stebbing, 1914, p. 371.

This species had been collected in New Zealand by Thomson about the year 1885, and identified with Dana's *Podocerus validus* from Rio de Janeiro. About the same time I had obtained numerous specimens from a buoy in Lyttelton Harbour, and had figured both male and female forms. The species has proved to be specifically identical with *Jassa falcata*, originally described by Montagu from the south coast of England, and now known to be very widely distributed both in northern and southern seas. There are probably two forms of the male, both different from the female, and the immature stages in the development of the adult male characters have led to much confusion and multiplication of species. Fuller accounts will be found in Mrs. Sexton's paper quoted above and in my report of the Amphipoda of the "Scotia" Expedition (1912, p. 351).

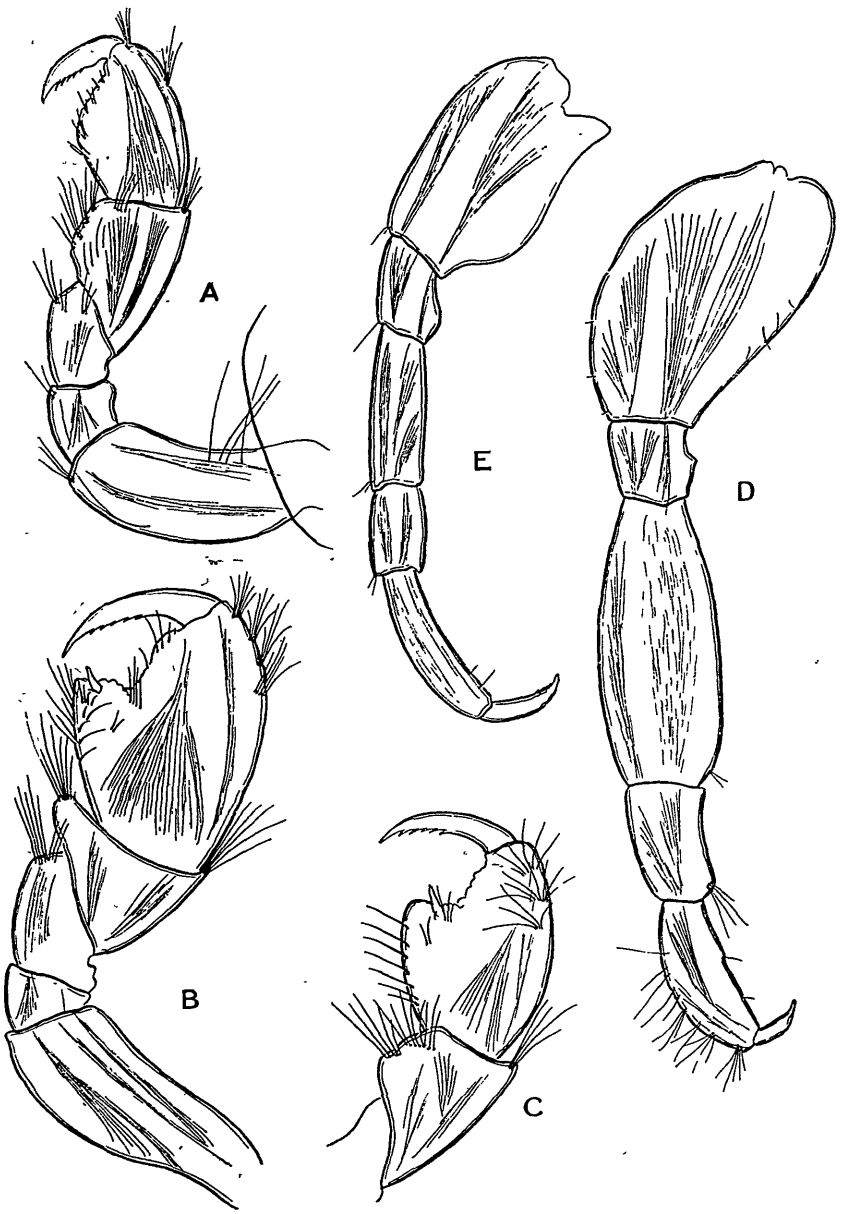

FIG. 3.—*Photis brevicaudata* Stebbing.

A. First gnathopod of male.
B. Second gnathopod of male.
C. First gnathopod (abnormal) of male.
D. Fourth peraeopod of male.
E. Fifth peraeopod of male.

Jassa frequens (Chilton). (Fig. 4, A to D.)

Podocerus frequens Chilton, 1883, p. 85, pl. 3, fig. 2. *P. latipes* Chilton, 1884, p. 258, pl. 19, fig. 2 *a–d*. *Jassa frequens* Stebbing, 1906, p. 656.

This species was described under the name *Podocerus frequens* in 1883 from a number of small specimens obtained in Lyttelton Harbour, and although male and female were described it is probable that none of them were quite fully developed. In the following year other specimens similar in general character but differing somewhat in the second gnathopods, and particularly in the greatly broadened character of the fourth peraeopod, were obtained from the same locality and were named *Podocerus latipes*, it being suggested, however, that they might prove to be only a variety of *P. frequens*. In 1906 Stebbing combined these two species under the name *Jassa frequens*, regarding the form described as *P. latipes* as the male.

The species is fairly common in Lyttelton Harbour at the roots of *Macrocystis* and other seaweeds above low-water level, and I have numerous specimens and can therefore add something to the descriptions previously given. I am not certain about the generic position of this species, but on the whole it seems to come within the characters of *Jassa*, the name now adopted for the genus *Podocerus*, except that I cannot find upturned teeth on the outer ramus of the third uropod, both rami being apparently free from these teeth. The broadened character of the fourth peraeopod proves, however, not to be confined to the male, but to be present also, sometimes apparently even to a greater degree, in the female. The differences between the two sexes in the second gnathopod are not greatly marked, but in the female the palm of the propod is slightly concave and the basal part of the propod is not produced into a distinct process as it is in the male; in the male this process is stout and truncate at the end, but the whole gnathopod is not greatly larger than in the female. One or two specimens, however, which, from the shape of the second gnathopod, would be considered males, bear brood-plates on some of the peraeopoda.

Ischyrocerus anguipes Kröyer.

Podocerus cylindricus Kirk, 1879, p. 402. *Wyvillea longimana* Haswell, 1879, p. 337, pl. 22, fig. 7; Stebbing, 1906, p. 648. *Podocerus longimanus* Chilton, 1884, p. 255, pl. 17, fig. 2 *a–e*. *Ischyrocerus anguipes* Sars, 1894, p. 588; pl. 209; Stebbing, 1906, p. 658.

This species was first recorded from New Zealand by T. W. Kirk in 1879 from specimens collected at Worser Bay, Wellington, which were by him identified as *Podocerus cylindricus* Say, the identification, however, being subsequently questioned by Miers (1880, p. 125). In the same year Haswell had described *Wyvillca longimana* from Port Jackson, establishing for it the new genus *Wyvillea*. In 1884 I identified specimens taken at Lyttelton as being the same as Haswell's *Wyvillca longimana*, and pointed out that his generic description had apparently been based on a misinterpretation of the terminal uropods, and that the animal in question was the same as the specimens referred by Kirk to *Podocerus cylindricus*, which I had been able to examine. Owing, however, to Miers's doubt as to the possibility of an Arctic species being found also in New Zealand, I adopted Haswell's specific name, and therefore named the species *Podocerus longimanus*. In 1888 Stebbing in his notice of Haswell's paper says, "The

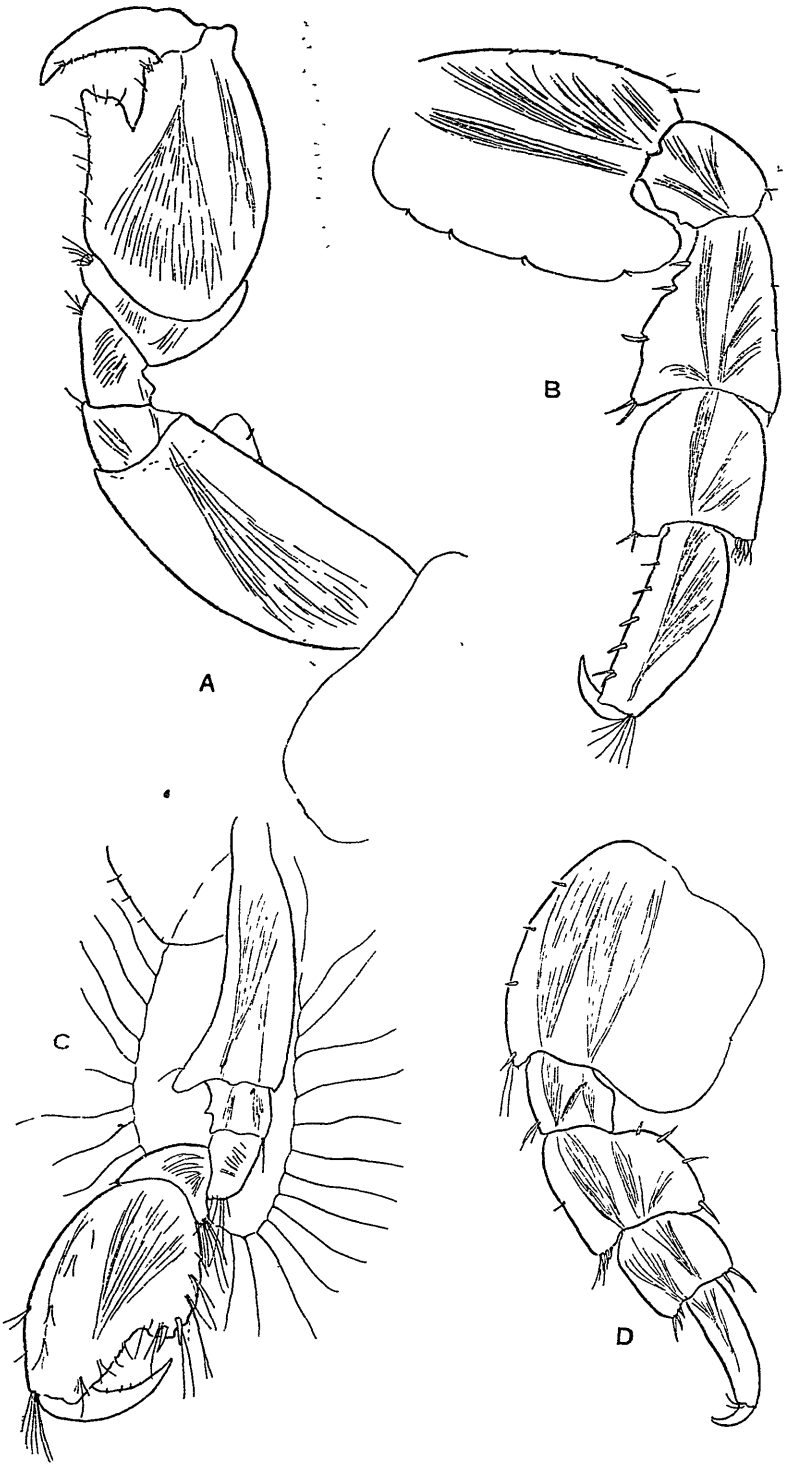

FIG. 4.—*Jassa frequens* (Chilton).

A. Second gnathopod of male.
B. Fourth peraeopod of the same
C. Second gnathopod of female.
D. Fourth peraeopod of same.

figure which Mr. Haswell gives much resembles *Ischyrocerus* (*Podocerus*) *anguipes* Kröyer. Mr. Chilton supposes that the description given of the pleopoda [uropoda] is the result of an oversight, and that the genus must be cancelled in favour of *Podocerus*. It must, however, be observed that Mr. Haswell's description of the maxillipeds is quite inconsistent with this conclusion." In *Das Tierreich* Stebbing (1906, p. 648) retains the genus *Wyvillea* Haswell, describing the maxillipeds as "exunguiculate, inner and outer plates rudimentary, palp three-jointed," and to this genus he ascribes two species—viz., *W. longimana* Haswell and *W. haswelli* (G. M. Thomson). This description of the maxillipeds must, I think, be based on Haswell's original description, which was apparently incorrect. In the specimens from Lyttelton, which I feel sure are rightly referred to Haswell's species,* the maxillipeds are normal and closely resemble the figure given by Sars for *Ischyrocerus anguipes*. I have also been able to compare my specimens with an Arctic one from Davis Strait sent to me by Dr. W. T. Calman, and have no hesitation in identifying them both as belonging to the one species. I have already pointed out (1920, p. 6) that the other species, *Wyvillea haswelli* (G. M. Thomson), is a species of *Eurystheus*. In this the maxillipeds are also normal. Consequently the genus *Wyvillea* must be finally dropped.

The Lyttelton specimens are all rather small, the largest about 6 mm. long; but those examined by Kirk were very much larger, the second gnathopod (now in my collection) of one specimen being itself 5 mm. long. Stebbing gives the length as varying from 4 mm. to 15 mm. The Davis Strait specimen that I have examined is about 12 mm. in length.

The differences between the male and female, as pointed out by me in 1884 from New Zealand specimens, closely agree with those described and figured by Sars in 1894. The special characters of the second gnathopod of the male are only acquired when the animal is fully adult, the immature stages being at first similar to those of the female. I have one immature male specimen in which the gnathopod closely resembles the figure given by Sars of *Ischyrocerus minutus* Lilljeborg, a species which Stebbing considers a synonym of *I. anguipes* Kröyer.

Ischyrocerus anguipes has been recorded from South Africa by Barnard, and is another example of an amphipod first described from northern seas which proves to be also widely distributed in the Southern Hemisphere.

Corophium crassicorne Bruz.

Corophium contractum Stimpson, 1855, *P. Ac. Philad.*, vol. 7, p. 383. *C. contractum* G. M. Thomson, 1880, p. 6; 1881, p. 220, pl. 8, fig. 9: Thomson and Chilton, 1886, p. 142. *C. crassicorne* Thomson and Chilton, 1886, p. 142; Sars, 1894, p. 615, pl. 220; Stebbing, 1906, p. 690. ? *C. bonellii* Sars, 1894, p. 616, pl. 221, fig. 1; Stebbing, 1906, p. 691; Walker, 1914, p. 559.

In 1880 Mr. G. M. Thomson (1880, p. 6) obtained by the dredge in Dunedin Harbour two specimens of a species of *Corophium* which he identified as *C. contractum* Stimpson, a species described from Japan. Both Mr. Thomson's specimens were stated to be adult females. In a paper published in the following year (1881, p. 220) he repeated the observations and description which he had given of his specimens, and added a figure

* Since this was printed specimens quite similar to those from Lyttelton have been sent to me from Coogee, close to Port Jackson, New South Wales, the type locality for *Podocerus longimanus* Haswell.

of the whole animal. Shortly after this I collected in Lyttelton Harbour specimens that agreed with the description given by Mr. Thomson, and I therefore identified them as *C. contractum*. At the same time, and in association with these specimens, I collected others similar in most characters but differing in the form of the second antenna. These specimens appeared to be closely similar to the descriptions and figures given of *C. crassicorne* Bruz. in Spence Bate's *Catalogue of the Amphipoda in the British Museum* and in Bate and Westwood's *British Sessile-eyed Crustacea*, and were accordingly named *C. crassicorne*. Since the specimens identified as *C. crassicorne* were associated with those identified as *C. contractum* and apparently were males—at any rate, not bearing eggs—I concluded from the general resemblance between the two that they were male and female of the one species. As *C. crassicorne* was recorded from Europe, I looked up the works mentioned above to see if there was any mention of a form similar to *C. contractum* to represent the female of *C. crassicorne* in Europe, and found that *C. bonellii* Milne-Edwards appeared to be very similar to the New Zealand specimens I had identified as *C. contractum*, and I concluded therefore that it was probably the female of *C. crassicorne*. On writing to the Rev. T. R. R. Stebbing asking for information as to whether this conclusion was correct or not, he replied that some authorities considered *C. crassicorne* and *C. bonellii* to be male and female of the one species, while others, including Sars, considered them as distinct species.

In view of this difference of opinion, and in the absence of specimens from Europe, or sufficiently detailed descriptions to investigate the matter fully, the question was for the time left an open one, and in the list of the Crustacea Malacostraca of New Zealand, published in 1896 by Mr. G. M. Thomson and myself, the two species *C. contractum* Stimpson and *C. crassicorne* Bruz. were included with the following note after the last-named: "This species is taken along with *C. contractum*, and it is probable that they are only male and female of the same species. *C. bonellii* (Milne-Edwards) is probably the same as *C. contractum*.—C. C." (1886, p. 142).

For various reasons I was unable to give further attention to this particular question for many years, though on several occasions when specimens of *Corophium* were collected at different parts of the New Zealand coast both forms—*i.e.*, "*C. contractum* Stimpson" and "*C. crassicorne* Bruz."—were taken together, thus fully confirming my opinion that these were male and female of the same species, whatever might be the case with the *C. crassicorne* Bruz. and *C. bonellii* in Europe.

In the meantime many important works on the Amphipoda have been published which contain more or less direct evidence on the point at issue: *e.g.*, Sars in his great work on the Amphipoda of Norway in 1894 still keeps the two species separate, and describes forms which he considers to be male and female of *C. crassicorne*, the female form being different from the specimens which he refers to *C. bonellii*. Of this latter species he describes no male, saying, "It is very strange that I have never met with males of this form, though I have collected the species in several different places. Perhaps the sexual difference is so very slight as to escape attention" (1894, p. 617). In *Das Tierreich Amphipoda*, Stebbing (1906, p. 690), apparently following Sars, describes male and female forms of *C. crassicorne*, and considers *C. bonellii* a separate species, of which only the female is known.

I do not propose to go into the history of the various opinions that have been expressed as to the relation of *C. crassicorne* Bruz. and

C. bonellii M.-Edw. It is evidently a difficult question, and probably will not be thoroughly settled till we know more of the life-history and sexual differences of these animals. The latest discussion with which I am acquainted is given in a paper by Walker (1914, p. 559), where he points out that *C. acherusicum* Costa is a synonym of *C. bonellii*, and in which he regards this species as distinct from *C. crassicorne* Bruz. He had previously (1909, p. 343) recorded *C. bonellii* from the Indian Ocean, but at that time had evidently been in considerable doubt about the identification, for in the copy of his paper forwarded to me he had altered the printed name *C. bonellii* to *C. crassicorne*. In 1914 he says the name *C. bonellii* should be left as printed.

I shall content myself with a statement of the facts of the New Zealand species as they appear to me. The male specimens have the very large stout second antennae corresponding precisely with the figures given by Sars for *C. crassicorne* Bruz., and in other points the animals appear to agree closely with his description and figures except for the slight difference in the third uropod which is mentioned below. The female specimens also seem to agree closely with the description he gives for the female of *C. crassicorne*, though there appears to be some variation in the second antenna, the number of spines on which does not always agree precisely with the figure, and in some specimens these appendages agree more closely with his figure of *C. bonellii*. These two forms have been constantly found together in New Zealand, and I feel certain that they must be looked upon as male and female of the one species. Doubtless, as in other species, the adult characters of the second antenna in the male are only gradually attained, and the immature stages more or less closely resemble the female form. In an attempt to settle the question I got specimens some years ago, through the kindness of Mrs. Sexton, Plymouth, from the Dutch coast, sent by Dr. Hoek as "*C. crassicorne*," and others from the laboratory at Plymouth labelled "*C. bonellii*." The Plymouth specimens were apparently all females—at any rate, I have not found an adult male among them; but those from the Dutch coast contained both males and females, the males agreeing closely with Sars's description of *C. crassicorne*. After careful comparison of both sexes of these specimens with the New Zealand forms I have failed to distinguish any character that I consider of specific importance, and I am therefore labelling and recording the New Zealand specimens as *C. crassicorne* Bruz. I have also specimens from Port Jackson, New South Wales, agreeing minutely with the New Zealand forms.

Sars says that that *C. bonellii* is distinguished by (1) the absence of a rostrum, (2) the rounded lateral angle of the head (not sharply acute as in *C. crassicorne*), and (3) the character of the second antenna of the female. In all the specimens that I have examined for this particular point—viz., from New Zealand, "*C. crassicorne*" from the Dutch coast, and "*C. bonellii*" from Plymouth—the rostrum is present. The lateral angle of the head is, as Walker states, difficult to see, but as far as I can make out it varies, in some cases being somewhat rounded, as described by Sars for *C. bonellii*, and in others more acute. With regard to the third point, as already stated, I find considerable variation in the antennae of the females, and the New Zealand forms agree, some with the figure given by Sars for *C. crassicorne*, others with that for *C. bonellii*.

The only point in which the New Zealand specimens differ from the European ones that I have examined appears to be in the third uropods, which are slightly broader both in the peduncle and in the ramus, and have the two rami usually directed slightly towards the median line, instead of

projecting directly backwards as shown by Sars for *C. crassicorne*. The difference is, however, not great, although it is easy to make considerable difference in the figure, and the general appearance of the end of the pleon is very near to that figured by Sars for *C. bonellii*.*

Although the fully adult males and females in this species appear to be readily distinguished from one another by the characters of the second antenna, it is probable that the sexual relations are not always quite so simple. For example, I have a specimen, now mounted permanently as a micro-slide, in which the second antennae are stout and have on the under-surface a stout tooth which corresponds to the tooth found in the adult male, though not so pronounced; this specimen I should without hesitation consider as an immature male, but unfortunately on the appendages of the peraeon there are brood-pouches similar to those in the female. In the two species *C. spinicorne* Stimpson and *C. salmonis* Stimpson from the Pacific, which were redescribed in 1908 by Bradley, the adult females, as figured by him, have the characters of the second antennae of the adult male, though these are not developed to quite the same extent.

It is well known that *C. crassicorne*, like other species of the genus, is frequently found in brackish and sometimes even in perfectly fresh water. As far as I am aware, the New Zealand species has been taken in salt water only, though the allied form *Paracorophium excavatum* Thomson is found in brackish and fresh water. Stebbing has described from the brackish water of Lake Negombo, in Ceylon, a species, *C. triaeonyx*, which appears to me to be very close to the New Zealand forms, but differs in having the third uropods much less broadened. Similarly, in 1912, Wundsch described *C. devium* from fresh water near Berlin, a species which, from his figures, seems to agree very closely with Stebbing's species in the characters of the terminal uropods.

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* Stebbing (1914, p. 372) records *Corophium cylindricus* (Say) from the Falkland Islands, saying, "The figures and description of the female supplied by Dr. S. J. Holmes leave no doubt that Mr. Vallentin's specimens belong to this species." He quotes *C. cylindricus* Paulmier (1905, p. 167, fig. 37) as a synonym, and suggests that *C. quadriceps* Dana (2 mm. long) from Rio de Janeiro, and *C. contractum* Stimpson, 1855, from Japan, and the specimens from New Zealand recorded under this name by G. M. Thomson also belong to the same species. He gives no description of the Falkland Islands specimens except that they measure only 3 mm., as compared with 3–4 mm. given by Holmes, and 5 mm. by Paulmier, "probably with reference to a male specimen which he figures in full." I agree with Stebbing that the Falkland Island specimens are probably the same as those from New Zealand, but I do not know why he assigns them to *C. cylindricus* rather than to *C. crassicorne*. In *Das Tierreich Amphipoda* (1906, p. 692) he classes *C. cylindricus* among the "obscure" species, but in the appendix (p. 740) gives references to the description and figures given by Paulmier and Holmes.

I can find nothing in Holmes's description and figures inconsistent with the supposition that the species he describes is the same as the European *C. crassicorne*, and certainly the figures he gives of the second antenna both of male and female apply well to the New Zealand forms that I have referred to *C. crassicorne*. Similarly, the description and the figure of the male given by Paulmier apply equally well to the New Zealand forms. Neither Paulmier nor Holmes makes any reference to or comparison with other species.

Barnard (1916, p. 272) records *C. acherusicum* Costa from Durban Bay. Stebbing (1906, p. 692) give this species among the "obscure" species, with the remark, "perhaps identical with *C. bonellii*." Walker (1914, p. 559), after comparing specimens of each, definitely united *C. acherusicum* with the older *C. bonellii*, to which he also referred *C. crassicorne* Hoeck (1879, p. 115).

It seems to me that these facts, which I had not paid special attention to when writing the remarks given above, show that all the forms to which these varied names have been given are so alike that they cannot be distinguished even by experts, and the conclusion I had already come to in the text receives additional confirmation.

It seems evident that a good deal more work must be devoted to the genus *Corophium* before the various problems indicated above can be solved. Probably we are dealing with a widely distributed form which is in the process of development but has not yet differentiated into distinct species, and some of the differences recorded may be associated with the character of the water in which it lives.

The telson appears to be practically the same in all the specimens—European, Australian, and New Zealand—that I have examined. It is broadly triangular, with the posterior margin truncate or slightly convex, and it bears on the dorsal surface, towards the posterior margin, two ridges diverging anteriorly and each bearing about four minute blunt spines projecting upwards. These ridges do not appear to be described or figured

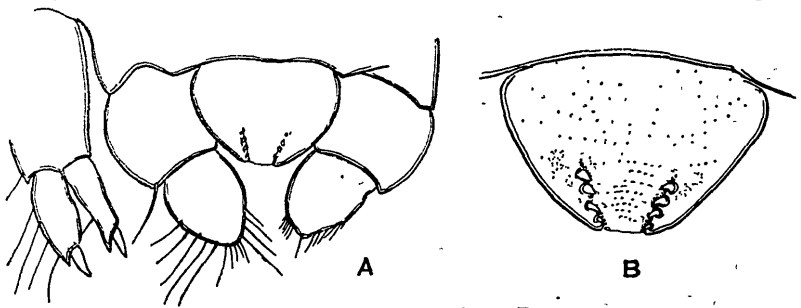

FIG. 5.—*Corophium crassicorne* BRUZ.
A. Telson with second and third uropoda.
B. Telson (more highly magnified).

by Sars or Stebbing, though they are indicated in Sars's figure of the telson of *C. bonellii* (1895, pl. 22, fig. 1, *t*), and apparently in that of *C. affine* (*l.c.*, fig. 2, *t*). The telson shows different appearances according to its precise position when mounted. My specimens, which are all mounted permanently in Canada balsam, have become transparent enough to show the two ridges pretty clearly. In a specimen of *C. triaeonyx* Stebbing from Ceylon the terminal portion of the telson appears to have become doubled underneath, and consequently the two anterior spines extend clearly beyond the visible margin. In another specimen of the same species from Chilka Lake, however, the other spines could be clearly made out.

Phronima sedentaria Forskal.

Phronima sedentaria Bovallius, 1885, p. 354. *P. novae-zealandiae* Powell, 1875, p. 21, figs. 1, 2; Stebbing, 1888, p. 1356, pl. 161B; Chilton, 1912A, p. 131.

This species is frequently washed up on the coast of New Zealand, and I have specimens also from the Chatham Islands. It was described by Powell as a species peculiar to southern seas, but there is no doubt that Bovallius is right in referring it to the northern species *sedentaria*. A very full description and discussion of the synonyms is given by Bovallius in the reference quoted above. The animal is pelagic, and is invariably found in its "house," which is supposed to be the "test" of a salp or of some tunicate. The young in various stages of development are frequently found in the "house" with the female, but so far as I am aware nothing is known of the way in which they obtain a "house" for themselves. Males are very rare; I have not seen one among the New Zealand specimens.

Euprimno macropus Guérin Memeville.

Euprimno macropus Bovallius, 1885, p. 400, pl. xvii, figs. 23–40, and pl. xviii, figs. 1, 2. *Primno latreillei*, Stebbing, 1881, p. 1445.

This species was recorded from the neighbourhood of New Zealand by Stebbing in the "*Challenger*" *Reports* under the name of *Primno latreillei*. Bovallius unites *P. latreillei*, *P. menevillei* Stebbing, and *P. antarctica* Stebbing with *Euprimno macropus*. I have a specimen washed up on the Ocean Beach of Dunedin that agrees with the description given by Bovallius, and also with that given by Stebbing of *P. latreillei*, and from comparison of the two I feel convinced that Bovallius is correct in uniting the species.

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