

1912

ADDITIONAL NOTES ON  
**FRESH-WATER CALANOIDA**

FROM VICTORIA, SOUTHERN AUSTRALIA

BY

**G. O. SARS**

WITH 3 AUTOGRAPHIC PLATES



ALB. CAMMERMEYERS FORLAG



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**INTRODUCTION.**

In a previous paper<sup>1)</sup> inserted in this Journal, Vol. XXIX, I have described and figured several Australian fresh-water Calanoida chiefly belonging to the genus *Boeckella*, and found in a collection kindly sent to me from the late Mr. O. A. Sayce. I am now enabled to add 5 other species from the same tract of Australia, 2 belonging to the genus *Brunella*, 2 to the genus *Boeckella*, and one representing the type of a new genus, *Hemi-boeckella*. These forms were contained in a very interesting collection of fresh-water Entomostraca recently received from Mr. Searle, to whom I am much indebted for this valuable material, which will enable me, also as regards other groups of Crustacea, to extend very essentially my knowledge to the fresh-water fauna of that remote region of the world.

Of the species here recorded 2 have already been briefly described and figured by Mr. Searle in a paper inserted in the "Victorian Naturalists" Vol. XXVIII. I think however, that a redescription, accompanied by figures drawn to a larger scale, may be desirable. In the same paper Mr. Searle also describes a 3rd species, *Boeckella nyorensis* Searle; but of this form no specimens were contained in the collection received.

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<sup>1)</sup> G. O. Sars, Fresh-water Copepoda from Victoria, Southern Australia.

L2 1908

It has been of much interest to me to become acquainted with the genus *Brunella* of Smith and to state its true relations to other fresh-water Calanoida. For this purpose one of the 2 species here recorded has been subjected to a careful anatomical examination, and on Pl. VII, besides habitus-figures, also detail-figures of the several appendages are given. A similar full anatomical analysis has also been executed of the interesting form here described as *Hemiboeckella Searli* and figured on Pl. IX.

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Gen. **Brunella**, Smith 1909.

**Generic Characters.**—Body comparatively slender, with the head well defined from the 1st pedigerous segment, and the rostral projection very small and simple. Lateral parts of last pedigerous segment in some cases simple, rounded, in other cases produced to wing-like expansions similar to those in *Boeckella*. Urosome composed in female of 3, in male of 5 segments. Genital segment in female with a greatly prominent opercular protuberance below. Caudal rami narrowly produced, resembling somewhat those in the genus *Eurytemora*, apical setæ present in the usual number and subequal in length. Anterior antennæ slender, composed in female of 25 joints; right antenna in male hinged in the usual manner. Posterior antennæ with the inner ramus well defined from the basal part, outer ramus 6-articulate, only 3 short joints being present in front of the terminal one. Oral parts nearly as in *Boeckella*. 1st pair of legs with the inner ramus uniarticulate, outer one, as usual, 3-articulate, but wanting the spines outside the first 2 joints. The 3 succeeding pairs of legs with only a single spine outside the terminal joint of the outer ramus, inner ramus biarticulate. Last pair of legs in female with the middle joint of the outer ramus, as in *Boeckella*, produced inside to an unguiform process, inner ramus biarticulate; those in male very asymmetrical, left leg scarcely prehensile, the outer ramus terminating in a short and thick, club-shaped joint, outer ramus of right leg distinctly prehensile, with the proximal joint considerably produced, inner rami in the 2 legs subequal in length and setiferous at the end.

Remarks.—This genus was established in the year 1905 by Mr. G. W. Smith, to include a Tasmanian species, *B. tasmanica* Smith. Unfortunately in the description of this form some apparent errors have been introduced, which I find it necessary to note here. Thus the urosome of the female is represented as being composed of 4 segments, not including the caudal rami, whereas in reality only 3 segments are present, as in the females of all other fresh-water Calanoida. The number of joints counted in the anterior antennæ (27) is also unquestionably incorrect, the usual number (25) being found in both species here recorded. On the 1st pair of legs, moreover, the outer ramus is said to be composed of only 2 joints, whereas it is distinctly 3-articulate in both of the Australian species. Finally, in the description of the last pair of legs of the male the 2 legs have been confounded, the left being described as the right and vice versa.

Among the known genera of fresh-water Calanoida the present genus comes unquestionably nearest to *Calamoecia* Brady, one species of which has been described in my previous paper. It differs however somewhat, as regards the general form of the body, as also in the shape of the caudal rami, and in the structure of the last pair of legs, especially those of the male.

### 1. *Brunella longicornis*, Searle.

(Pl. VII.)

*Brunella longicornis*, I. Searle, Some new Victorian Copepoda, "Victorian Naturalist", Vol. XXVIII, p. 196, Pl. III.

Specific Characters.—Female.—Body very slender, with the anterior division narrow oblong in form, lateral parts of last pedigerous segment simply rounded. Genital segment slightly asymmetrical with the greatest width in front of the middle, ventral face greatly protuberant anteriorly. Caudal rami about the length of the 2 preceding segments combined, and scarcely at all divergent. Anterior antennæ very slender, considerably exceeding the body in length. Posterior antennæ with the terminal joint of the outer ramus fully as long as the other 5 joints combined. Last pair of legs with both rami rather slender, the inner one extending nearly to the end of the middle joint of the outer, terminal joint of the latter oblong oval in form,

with the setæ of the inner edge well developed. Ovisac comparatively small, only containing a very limited number of ova.

Male much smaller than female, and having the right prehensile anterior antenna only very slightly dilated in the middle. Last pair of legs resembling in structure those in the type species, the outer ramus of left leg being club-shaped, with the distal joint globularly dilated and provided at the end outside with a short hooked spine, inner ramus of same leg bi-articulate and partly covered by 2 lappets issuing from the basal part inside; right leg with the inner ramus distinctly 3-articulate, distal joint of outer ramus oblong in form, scarcely dilated in the middle. Length of adult female about 1 mm.

#### Description of the Female.

The length of the largest specimens found, measured from the front to the end of the caudal rami, only slightly exceeds 1 mm., and this form is accordingly of rather small size, as compared with the other known Australian fresh-water Calanoida.

The general form of the body (see figs. 1 & 2) is very slender and graceful, with the anterior division narrow oblong or somewhat fusiform in shape. Seen from above (fig. 1), it has its greatest width about in the middle and tapers slightly both behind and in front. The head is defined from the 1st pedigerous segment by a well-marked suture, and equals in length the 4 succeeding segments combined. The frontal part is narrowly rounded and has below a very small and quite simple rostral prominence. The last pedigerous segment is not expanded, the lateral parts being simply rounded at the end.

The tail, or urosome, is scarcely half as long as the anterior division and, as in the females of other fresh-water Calanoida, is composed of only 3 segments, not including the caudal rami. The 1st, or genital segment is much the largest, and is slightly asymmetrical, with the greatest width in front of the middle. Its ventral face is greatly protuberant, with a peculiar opercular prominence in front, covering the genital orifice (see fig. 2). The last segment is twice as large as the very short middle segment, and has dorsally, in front of the middle, a well defined anal opercle. The caudal rami (see also fig. 12) are much produced, equalling in length the last 2 segments combined, and

are sublinear in form, being scarcely at all divergent. At the slightly dilated extremity each ramus carries 5 strong, densely ciliated setæ of equal length, the outermost one attached to a separate ledge. Moreover, as usual, a very delicate bristle arises dorsally near the inner distal corner of each ramus.

The anterior antennæ (see figs. 1 & 2) are very slender and elongated, extending, when reflexed, far beyond the end of the caudal setæ. They are composed of the usual number of joints, viz. 25, and have some of the setæ rather elongated.

The posterior antennæ (fig. 3) are quit normally developed, the inner ramus being well defined from the basal part and about of same length as the outer. The latter is narrow cylindrical in shape and composed of 6 joints, the last of which is fully as long as all the others combined.

The anterior lip (fig. 4) is slightly trilobate, the middle lobe being fringed with slender diverging spikes.

The mandibles (fig. 5) are moderately strong, and nearly agree in structure with those in *Boeckella*, the palp being rather slender and about of same length as the mandible itself.

The maxillæ (fig. 6) and the anterior maxillipeds (fig. 7) are likewise built in much the same manner as in the said genus, and need not therefore to be described here in detail.

The posterior maxillipeds (fig. 8) also look rather similar, though having the inner distal corner of the 1st basal joint more prominent.

In the structure of the legs more conspicuous differences from that in *Boeckella* are found, these appendages being built in a very similar manner to that in the genus *Calamoecia* Brady.

The 1st pair of legs (fig. 9), as usual, are smaller than the succeeding ones and also of somewhat different structure. The outer ramus consists of 3 well-defined joints, the 1st of which is much the largest and, like the middle one, wants the usual spine outside. The terminal joint, on the other hand has 2 such spines and moreover 4 natatory setæ, 2 at the tip and 2 inside. The inner ramus is scarcely more than half as long as the outer and only consists of a single joint carrying 7 setæ, one outside, 2 at the tip and 4 inside.

The 3 succeeding pairs of legs (fig. 10) are essentially of same structure and have both rami rather slender, the outer

one being the longer. The last joint of this ramus is comparatively short and has outside only a single stout spine; the apical spine is very slender, exceeding in length the whole ramus. The inner ramus is only composed of 2 joints of nearly equal length, the proximal of which carries inside 3 setæ. The distal joint is provided with 8 setæ, 2 outside, 2 at the tip and 4 inside. On the 4th pair of legs one of the latter setæ is wanting.

The last pair of legs (fig. 11) are built on the same type as in *Boeckella*, the middle joint of the outer ramus being produced inside to a strong unguiform process. The spines outside this and the preceding joint are very small. The last joint is much shorter than the middle one and of oblong oval shape, carrying outside a small spine, inside 3 setæ and at the tip another seta and a slender spine. The inner ramus extends about to the end of the middle joint of the outer ramus and is biarticulate, the proximal joint being the longer and provided inside with 2 setæ. The distal joint carries 6 setæ, 2 outside, 2 at the tip and 2 inside.

The ovisac (see fig. 1) is comparatively small and only contains a very limited number of ova. In the specimen figured a very slender spermatophore was moreover attached to the genital segment below.

The adult male is considerably smaller than the female, and is easily recognised by the slender 5-articulate urosome and by the hinged right anterior antenna. The middle section of the latter is however only very slightly dilated.

The last pair of legs (fig. 12), as usual, greatly differ from those in the female, and on the whole are built in a very similar manner to that described by Mr. Smith in the type species, *B. tasmanica*. As in that species, the left leg is much shorter than the right and has the outer ramus club-shaped, with the distal joint almost globular in shape and armed at the end outside with a short claw-like spine. The inner ramus extends somewhat beyond the outer and is apparently biarticulate, being however partly obstructed by 2 unequal lappets issuing from the basal part inside. Its distal joint is of same appearance as in the female, carrying 6 well-developed setæ. The outer ramus of the right leg is rather slender, with the proximal joint much more produced than in *Boeckella*, being fully as long as the distal



joint. The latter is oblong in form and scarcely at all dilated in the middle, being, like the proximal joint, armed outside with a very small spine. The apical claw is of considerable length and gently curved having near the base inside a small secondary denticle. The inner ramus extends about to the middle of the distal joint of the outer, and is distinctly 3-articulate, with the 2 first joints quite smooth, the last of same structure as on the left leg.

The caudal rami are comparatively shorter than in the female, but otherwise of the very same structure.

According to the statement of Mr. Searle, the colour of the living animal is brown. In some of the specimens, preserved in formalin, the rami of the natatory legs, together with their spines and setæ, exhibited a very conspicuous dark bluish gray tint, whereas the remaining part of the body was nearly colourless and very pellucid.

Remarks.—The above described form is closely allied to the type species, *B. tasmanica* Smith, but is of smaller size and still more slender form of the body, differing moreover in the greater length of the anterior antennæ.

Occurrence.—Several specimens of this form were picked up from 3 of the samples received. 2 of these samples were taken at different dates near Caulfield, the 3rd at Nyora. It is from the very same localities that Mr. Searle records the species.

## 2. *Brunella expansa*, n. sp.

(Pl. VIII, figs. 1—5.)

Specific Characters.—Female. Body (see fig. 1) somewhat less slender than in the preceding species, with the anterior division scarcely narrowed behind; lateral parts of last pedigerous segment expanded to wing-like lamellæ of moderate size and acute at the tip, their inner edge slightly bulging. Urosome resembling in structure that of the preceding species, the genital segment having below a quite similar opercular prominence (see fig. 2). Caudal rami (fig. 4) considerably produced, though scarcely as long as the 2 preceding segments combined. Anterior antennæ (see fig. 1) much elongated, extending, when reflexed, to the end

of the caudal setæ. Posterior antennæ, oral parts, and natatory legs scarcely differing in structure from those parts in the preceding species; last pair of legs (fig. 3), however, less slender, with the terminal joint of outer ramus rounded oval in form and having the setæ of the inner edge very short.

Male, as usual, smaller than female, and having the lateral parts of last pedigerous segment scarcely expanded, though somewhat angular at the end. Right anterior antennæ more dilated in the middle than in *B. longicornis*. Last pair of legs (fig. 5) less unequal than in that species, left leg with the distal joint of the outer ramus much smaller, abruptly incurved and sub-reniform in shape, without any spine, but clothed at the rounded end with numerous curved rows of minute spikes; inner ramus scarcely extending beyond the proximal joint of the outer and uniaarticulate, not obstructed at the base by any lappets. Right leg with the distal joint of the outer ramus conspicuously dilated in the middle, subfusiform, and provided, in addition to the spine, with a small tubercle on the posterior face near the end, apical claw considerably curved and, as in the preceding species, armed near the base inside with a secondary denticle; inner ramus extending to the end of the proximal joint of the outer, and biarticulate.

Length of adult female 1.16 mm.

Remarks.—The female of this form is at once distinguished both from the preceding species and from *B. tasmanica* by the wing-like lateral expansions of the last pedigerous segment, and in the male, too, the last pair of legs exhibit very conspicuous differences in their structure from those in the two said species.

Occurrence.—Some few specimens of this form were picked up from a sample taken by Mr. Searle on the 7th November 1911 at Nyora.

### 3. *Boeckella tenera*, n. sp.

(Pl. VIII, figs. 6—9.)

Specific Characters.—Female. Body (see fig. 6) of rather slender form, with the anterior division narrow oblong in form, gradually tapered in front, somewhat less so behind, lateral expansions of last pedigerous segment compara-

tively small and conspicuously asymmetrical, that on the left side the larger, with the outer lobe narrowly produced and somewhat twisted, inner (or subdorsal) lobe, on both sides, very small, spiniform. Genital segment only slightly asymmetrical and rather broad, with a slight sinus on each side, ventral face not much protuberant, with a well-marked excavation in the middle (see fig. 7). Caudal rami lamelliform and about the length of the last segment, apical setæ of moderate length. Anterior antennæ rather slender, extending, when reflexed, to the end of the caudal rami. Posterior antennæ, oral parts, and natatory legs of the usual structure. Last pair of legs (fig. 8) moderately slender, with the unguiform process of the middle joint of the outer ramus rather strong, spine attached outside this and the preceding joint of moderate length, last joint about the length of the middle one and armed in the usual manner; inner ramus extending about to the end of the middle joint of the outer. Ovisac of moderate size, oval in form.

Male with the middle section of right anterior antenna only slightly dilated. Last pair of legs (fig. 9) of moderate size, left leg with a small, minutely denticulate lobe at the end of the basal part inside, outer ramus of normal structure, inner sub-cylindrical in form and extending almost as far as the proximal joint of the outer; right leg with the distal joint of the outer ramus rather large, though scarcely dilated in the middle, outer spine of this and the preceding joint long and slender, apical claw about the length of the ramus and quite smooth; inner ramus of this leg simple, lanceolate, extending about to the middle of the distal joint of the outer.

Length of adult female 1.80 mm.

Remarks. This form somewhat resembles in its general appearance *B. oblonga* G. O. Sars, but is of smaller size and moreover distinguished by the rather different shape of the lateral expansions of the last pedigerous segment in the female, and by the greater length of the anterior antennæ. The genital segment in the female is also rather unlike, and more agrees in shape with that in *B. symmetrica* G. O. Sars. The structure of the last pair of legs in the male likewise more resembles that in the last-named species.

Occurrence.—This form occurred rather abundantly in

2 of the samples received, the one taken on the 20th September 1910 at Alexandra, the other on the 23rd November 1910 at Kyneton.

#### 4. *Boeckella pseudocheles*, Searle.

(Pl. VIII, figs. 10—15.)

*Boeckella pseudocheleæ*, Searle, "Victorian Naturalist" Vol. XXVIII, p. 198, Pl. V.

**Specific Characters.**—Female. Body (see fig. 10) unusually robust with the anterior division broadly oval in form and scarcely narrowed behind. Lateral expansions of last pedigerous segment of moderate size and each, as usual, divided into 2 unequal triangular lappets separated by a narrow incision (see also fig. 11). Urosome comparatively short, with the genital segment only slightly asymmetrical and considerably dilated in the middle, ventral face not much protuberant. Caudal setæ unusually short and stout, spreading. Anterior antennæ scarcely longer than the anterior division of the body. Posterior antennæ, oral parts, and natatory legs of normal structure. Last pair of legs (fig. 12) with the unguiform process of the outer ramus comparatively short, spines attached outside the first two joints however very elongate, last joint slightly exceeding in length the middle one; inner ramus extending beyond the middle joint of the outer. Ovisac large, rounded.

Male with the right anterior antenna strongly hinged, penultimate joint produced at the end anteriorly to a conical projection (see fig. 13). Last pair of legs (fig. 14) differing in some particulars conspicuously from those in the other species, left leg with a small quite smooth lobe issuing from the 2nd basal joint inside, inner ramus lamelliform and generally reflexed upon the basal part (as shown in fig. 14), distal joint of outer ramus very slender and narrow, having, in addition to the usual spine, another very small one near the end; right leg with the distal joint oval in form, spine of outer edge attached close to the end and, like that of the proximal joint very slender, apical claw not much elongated and evenly curved, apparently biarticulate, and terminating in 2 unequal points, which, as it were, form together a minute chela (see fig. 15); inner ramus unusu-

ally long and slender, extending considerably beyond the distal joint of the outer, and exhibiting a somewhat irregular twisted form, with the base angularly dilated and with an abrupt bend in the middle.

Length of adult female 2.35 mm.

Remarks.—This is a very distinct species, being well distinguished by its unusually robust body and by the peculiar structure of the last pair of legs in the male.

Occurrence. Several specimens of this form were found in 2 of the samples received, the one taken on the 23rd September 1910 at Mansfield, the other on the 3rd November 1909 at Fairfield. Mr. Searle also records this form from 2 other localities.

#### Gen. *Hemiboeckella*, n.

Generic Characters.—Head well defined from the 1st pedigerous segment; rostral prominence cleft at the end into 2 delicate tentacular lappets. Lateral parts of last pedigerous segment not expanded. Urosome composed in female of 3, in male of 5 segments; genital segment in female perfectly symmetrical and greatly protuberant below. Caudal rami lamellar, with the setæ of very unequal length, one of them attached to the outer edge. Anterior antennæ in female 25-articulate, right antenna in male distinctly hinged and provided with unusually large and conspicuous sensory appendages (æsthetascs). Posterior antennæ with the inner ramus imperfectly defined from the basal part, outer ramus slender, 7-articulate. Mandibles strongly built, with the masticatory part much expanded and coarsely dentate, palp comparatively short. Maxillæ and anterior maxillipeds of normal structure. Posterior maxillipeds however unusually short and stout, with the 2nd basal joint considerably expanded, and with all the spines of the terminal part transformed to soft reflexed setæ. Natatory legs with both rami distinctly 3-articulate, terminal joint of outer ramus with 2 spines outside. Last pair of legs in female built on the same type as in *Boeckella*; those in male very unequal, the left leg being much shorter than the right, with the basal part considerably produced inside, outer ramus scarcely prehensile, its distal joint knife-shaped with a quite simple spine at

the tip, outer ramus of right leg with the proximal joint, as in *Brunella*, considerably produced, inner rami in both legs imperfectly developed, though distinctly jointed.

Remarks.—This new genus, as indicated by the name here proposed, is nearest allied to *Boeckella*, but differs essentially in several structural details, as shown in the above diagnosis. It contains as yet only a single species.

### 5. *Hemiboeckella* Searli, n. sp.

(Pl. IX.)

Specific Characters.—Female. Body comparatively short and stout, with the anterior division oval in form, narrowed both behind and in front, lateral parts of last pedigerous segment simply rounded at the end. Genital segment broadest in front, ventral protuberance obtuse and occurring behind the middle. Caudal rami somewhat exceeding in length the last segment and scarcely dilated distally, inner edge densely ciliated, seta of outer edge placed in the middle, outermost but one of the apical setæ much longer than the others, innermost but one the shortest. Anterior antennæ scarcely exceeding in length the anterior division of the body. Posterior antennæ with one of the 2 setæ attached to the end of the basal part in front remarkably strong and curved. Last pair of legs comparatively slender, with the unguiform process of the outer ramus well developed and scarcely denticulated, last joint about the length of the middle one and carrying at the tip 2 unequal coarsely denticulated spines; inner ramus extending slightly beyond the middle joint of the outer ramus.

Male much smaller than female, with about 14 very conspicuous lanceolate æsthetascs along the right anterior antennæ. Last pair of legs rather powerful, left leg with a strongly hooked lobe issuing from the basal part inside, inner ramus very delicate, biarticulate, with a single small seta inside the distal joint, outer ramus with the distal joint about the length of the proximal one and armed outside near the end with a small denticle, inside in front of the middle with a somewhat hooked spine, apical spine about the length of joint; right leg with the 2 joints

of the outer ramus subequal in length, each carrying outside a comparatively small spine, apical claw of moderate length and distinctly biarticulate, with a small secondary spine at the base inside, inner ramus 3-articulate, with the middle joint produced inside to a slender digitiform process.

Length of adult female 1.60 mm.

#### Description of the Female.

The largest specimens found measure in length about 1.60 mm., and this form is accordingly of medium size.

The general form of the body (see figs. 1 & 2) appears somewhat robust, with the 2 chief divisions sharply marked off from each other. The anterior division is, viewed dorsally (fig. 1) of oblong oval form, slightly tapering both behind and in front, with the greatest width about in the middle. The head is well defined from the 1st pedigerous segment and narrowly rounded in front, projecting below in a well-marked rostral prominence (fig. 3), which is not, as in *Brunella* and *Boeckella*, simple, but cleft at the end into 2 delicate tentacular lappets. The last pedigerous segment is rather short and has the lateral parts not expanded, but simply rounded at the end (see fig. 2). The urosome is not fully half as long as the anterior division and, as usual, composed of only 3 segments, not including the caudal rami. The 1st or genital segment is much the largest and is perfectly symmetrical, with the greatest width far in front, and gradually narrowed behind. The ventral face of the segment is greatly protuberant, forming behind the middle an obliquely rounded prominence containing the genital orifice (see fig. 2). The last segment is somewhat larger than the middle one, and exhibits dorsally a well-defined anal opercle.

The caudal rami (see also fig. 12) are lamellar in structure and exceed somewhat in length the anal segment. They are somewhat divergent, and have the inner straight edge densely ciliated. The outer edge exhibits in the middle a well-defined ledge, to which one of the caudal setæ is attached. The remaining 4 setæ issue close together from the obtusely truncated end of each ramus, and are of very unequal length, the outermost but one being much the longest and considerably exceeding the whole urosome in length. Of the other setæ, unlike what

is generally the case, the innermost but one is the shortest. As in other Calanoida, moreover a delicate bristle issues from the dorsal face of each ramus near the inner corner.

The anterior antennæ (see figs. 1 & 2) are not much elongated, scarcely exceeding in length the anterior division of the body. They are, as usual, composed of 25 joints, and are clothed with rather slender setæ; some of the proximal joints are very short.

The posterior antennæ (fig. 4) have the proximal joint of the inner ramus quite confluent with the basal part, though a well-marked ledge of the anterior margin indicates the limit between them. To this ledge, as usual, 2 setæ are attached, but one of them is unusually strongly developed, almost spiniform and much curved. The distal joint of the inner ramus is well defined and of the usual structure. The outer ramus is very slender, considerably exceeding the inner in length, and is composed of 7 joints, the last of which about occupies  $\frac{1}{3}$  of the length of the ramus.

The mandibles (fig. 5) are very strongly built, with the masticatory part considerably expanded and coarsely dentate. Of the denticles as usual, the outermost one is much the largest and claw-shaped, being separated from the 6 or 7 others by a broad sinus. The palp is comparatively short and stout, scarcely exceeding half the length of the mandible itself, but is otherwise of quite normal structure.

This is also the case with the maxillæ (fig. 6) and the anterior maxillipeds (fig. 7).

The posterior maxillipeds (fig. 8), on the other hand, are highly distinguished by their short and stout form, being only slightly longer than the anterior ones. The 2nd basal joint is considerably expanded and scarcely narrower than the 1st, carrying inside 3 slender ciliated setæ. The terminal part is shorter than the 2nd basal joint and somewhat fusiform in shape. It is, as usual, composed of 5 joints, but the spines attached to these joints are all transformed to soft recurved setæ.

The natatory legs, as in *Boeckella*, have both rami distinctly 3-articulate and of rather coarse structure.

In the 1st pair (fig. 9) the rami are about of equal size, and the outer one is armed with the normal number of spines,



viz., 4, 2 of them occurring outside the terminal joint, which moreover has 5 natatory setæ. On the inner ramus each of the first 2 joints carries inside a seta, whereas the terminal joint is provided with 6 such setæ, one of them attached to a ledge of the outer edge.

The 3 succeeding pairs of legs (fig. 10) are larger and more powerfully built than the 1st, with the outer ramus a little longer than the inner and armed outside with strong denticulated spines. Two such spines occur on the terminal joint and moreover at the tip another much larger spine coarsely denticulate along the outer edge. The number of setæ on this joint is in all 3 pairs 5. The inner ramus has 2 setæ inside the middle joint, whereas the terminal joint carries in the 2nd and 3rd pairs 8, in the 4th pair (fig. 10) 7 setæ, 2 of them issuing from the outer edge.

The last pair of legs (fig. 11) are smaller and more slender than the preceding pairs, and want the ciliated seta attached in the other pairs inside the 1st basal joint. The outer ramus has no seta inside the 1st joint, and on the middle joint the seta is, as in *Brunella* and *Boeckella*, replaced by a strong unguiform process coarsely denticulated at the edge. The terminal joint is about the length of the middle joint, but narrower, and is armed at the tip with 2 strong denticulated spines of unequal length. Another shorter spine is attached to the outer edge, and inside the joint 3 small setæ occur, the outermost one quite rudimentary. The inner ramus extends slightly beyond the middle joint of the outer and agrees in structure with that in *Boeckella*.

The adult male, as usual, is much smaller than the female, scarcely exceeding a length of 1 mm., and is easily recognised by the slender 5-articulate urosome and by the distinctly hinged right anterior antenna.

The latter appendage (fig. 13) is found, on a closer examination, to be composed of only 22 joints, and exhibits the 3 sections very clearly defined and of about equal length; the proximal section being composed of 12, the middle of 6, and the terminal one of 4 joints. The spines generally found in some of the joints of the proximal section are wholly wanting. On the other hand, are the sensory appendages, the so-called «æsthetasks»,

quite extraordinarily developed and very conspicuous, of lanceolate form, and present on all 3 sections, their number being in all 14.

The last pair of legs (fig. 15) are of rather peculiar structure, differing in some points very conspicuously both from those in *Brunella* and *Boeckella*. The left leg is much shorter than the right, and has the basal part produced at the end inside to a comparatively large triangular lobe terminating in a highly chitinised somewhat hook-like point. To the base of this lobe a very delicate biarticulate appendage is attached, evidently representing the inner ramus, and provided with only a single small seta inside the distal joint. The outer ramus of this leg is comparatively short and scarcely prehensile, with both joints of about equal length, but of different shape. The proximal joint is simple cylindric and armed at the end outside with a spine of moderate size. The distal joint is compressed, knife-shaped, and has outside, near the end, a small denticle, inside, in front of the middle, a somewhat hooked spine. At the tip a quite simple straight spine is attached about of same length as the joint. The right leg has the outer ramus rather slender, with its 2 joints of about equal size, the distal one being only slightly dilated in the middle. Each joint carries outside a comparatively small spines, that of the distal joint somewhat remote from the end. The apical claw is not much elongated and distinctly biarticulate, with a small secondary spine near the base inside. The inner ramus extends to the end of the proximal joint of the outer, and is composed of 3 well-defined joints, the middle of which is produced at the end inside to a slender digitiform process.

Remarks.—The above described form was already considered by Mr. Searle to be most probably the type of a particular genus, which he believed was intermediate between *Boeckella* and *Diaptomus*. As shown above, the generic distinctness of this form has indeed been fully confirmed, although its relation to *Diaptomus* is a much more remote one than to *Boeckella*. I have much pleasure in naming the species in honour of its detector.

Occurrence.—The specimens of this interesting form, contained in the collection, were taken by Mr. Searle on the 2nd December 1911 at Caulfield.

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**EXPLANATION OF THE PLATES.**

## Pl. VII.

**BRUNELLA LONGICORNIS**, Searle.

- Fig. 1. Adult female with ovisac and attached spermatophore, viewed from the dorsal face; magnified 105 diameters.
- » 2. Another female specimen, viewed from left side; same amplification.
  - » 3. Posterior antenna.
  - » 4. Anterior lip.
  - » 5. Mandible with palp.
  - » 6. Maxillæ.
  - » 7. Anterior maxilliped.
  - » 8. Posterior maxilliped.
  - » 9. Leg of 1st pair.
  - » 10. Leg of 2nd pair.
  - » 11. Leg of last pair.
  - » 12. Extremity of urosome with the caudal rami, dorsal view.
  - » 13. Last pair of legs of male.

## Pl. VIII.

**BRUNELLA EXPANSA**, G. O. Sars.

- Fig. 1. Adult female, dorsal view; magnified 95 diameters.
- » 2. Urosome with adjoining part of metasome, viewed from left side.
  - » 3. Leg of last pair.
  - » 4. Right caudal ramus with adjoining part of anal segment; dorsal view.
  - » 5. Last pair of legs of male.

**BOECKELLA TENERA**, G. O. Sars.

- Fig. 6. Adult ovigerous female viewed from the dorsal face (anterior antennæ reflexed), magnified 66 diameters.
- » 7. Urosome with adjoining part of metasome, viewed from left side.
  - » 8. Leg of last pair.
  - » 9. Last pair of legs of male.

**BOECKELLA PSEUDOCHELES**, Searle.

- Fig. 10. Adult ovigerous female, viewed from the dorsal face, magnified 50 diameters.
- › 11. Urosome with adjoining part of metasome, viewed from left side.
  - › 12. Leg of last pair.
  - › 13. Extremity of right anterior antenna of male.
  - › 14. Last pair of legs of male.
  - › 15. Extremity of apical claw of right leg, highly magnified.

## Pl. IX.

**HEMIBOECKELLA SEARLI**, G. O. Sars.

- Fig. 1. Adult female viewed from the dorsal face, magnified 66 diameters.
- › 2. Same viewed from left side.
  - › 3. Rostral prominence, highly magnified.
  - › 4. Posterior antenna.
  - › 5. Mandible with palp.
  - › 6. Maxilla.
  - › 7. Anterior maxilliped.
  - › 8. Posterior maxilliped.
  - › 9. Leg of 1st pair.
  - › 10. Leg of 4th pair.
  - › 11. Leg of last pair.
  - › 12. Right caudal ramus with adjoining part of urosome, dorsal view.
  - › 13. Right anterior antenna of male.
  - › 14. Last pair of legs of male.
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