Art. XVII.—*Niphargus pulchellus, a New Victorian Blind Amphipod.*

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(With Plates XV., XVI.)

[Read 16th November, 1899.]

In a previous paper published in this journal (present volume, p. 122), I described and figured a blind Isopod, *Phreatoicoides gracilis*, from a fresh-water runnel in Gippsland. In a small pool, within a few yards from this runnel, I collected three specimens of a blind Amphipod, which, upon examination I find to possess characters in common with the genus *Niphargus* of Schiödte. This genus is described by Bate and Westwood,[1] with which the present species agrees in all respects except in the terminal uropoda, which do not possess a rudimentary inner ramus. This slight modification of structure is, however, a minor feature, and I have, therefore, considered it a *Niphargus*.

The *Niphargi* are of particular interest, and live generally in closed pump-wells in England, and many parts of Europe, where some species inhabit lakes. Their nearest congener is said by Bate and Westwood to be *Eriopus*, from the deep sea off Bohusia.

In 1892 Mr. G. M. Thomson described two forms from Tasmania, which with some hesitation he placed in the genus *Niphargus*, viz., *N. mortoni* and *N. montanus*.[2] Of the two, the latter species, from the summit of Mount Wellington (4,000ft.), is the nearest to the normal type. The present species is well characterised, and differs from *N. montanus* by the more slender body, narrower side-plates, the want of eyes, the elongated last pereiopoda, and the greatly extended, unibranched, jointed, terminal uropoda; these are longer than in any figures of amphipods that I have seen, and bear, on microscopical evidence, numerous specialized sensory setæ.

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1 A History of British Sessile-eyed Crustacea, by C. Spence Bate, F.R.S., F.L.S., and J. O. Westwood, M.A., F.L.S., Vol. I., p. 311.

2 Notes on Tasmanian Crustacea, with Descriptions of New Species, by G. M. Thomson, F.L.S. Proc. Royal Soc. Tasmania, 1892, p. 68.

Niphargus pulchellus, n. sp.

Specific diagnosis.—Body long, slender. Eyes wanting. Coxæ of anterior four segments of pereion slightly less in depth than their respective segments, those of the three succeeding ones being short. Gnathopoda having the propoda small, subquadrate, narrowest proximally; second slightly the longer; palmæ transverse, margin straight, spinuous. Last pair of pereiopoda with propodos, and carpus much longer than those of the anterior ones. First three segments of pleon subequal, inferior margins rounded, posterior angles bearing two spinules. First and second uropoda short, first longer than second; similar in form, peduncle longer than rami. Terminal uropoda very long, jointed, inner ramus wanting. Telson cleft half way to the base.

Colour—Snow white.

Length—6 to 7 mm.

Habitat—Fresh-water pool, Thorpdale, Gippsland.

Detailed Description.

The following description is taken from a specimen of 6·5 mm. in length. The largest, amongst three collected, measured 7 mm. Each was similar in form, even in the proportional length of the terminal uropods, which in this genus are said by Schiödte to be variable in length according to sex, that of the male being the longer.

Body (Plate XV., Fig. 1).—The body is slender, with a few short setæ situated upon it. The coxæ of the first four segments of the pereion are almost as deep as their respective segments, those of the following three being narrow, and each is fringed by a few short setæ. The anterior segment of the pleon is produced downward to the level of the inferior margin of the coxa of the preceding segment, and the succeeding ones are subequal. The antero- and postero-inferior angles of the anterior three segments of the pleon are evenly rounded, and each have two spines pointing hindward on the posterior angle. There is no appearance of any eyes or pigment.

Upper Antennæ.—The upper antennæ are about two-thirds the length of the body. The first joint of the peduncle is long, with the upper margin convex, and lower straight, the second joint

narrower and subequal, the third half the length of the second, and each is sparsely setose. The flagellum is composed of about thirty joints, each with a series of radially arranged short setæ, and is nearly twice as long as the peduncle. The secondary appendage is short, and consists of four joints.

Lower Antennæ.—The lower antennæ are about one-third less in length than the upper antennæ. The peduncle consists of only three free joints, and measures slightly longer than the peduncle of the upper antennæ; the first joint is very short, the second long and stout, and the third thin and of equal length to the second. Each possesses a few setæ, disposed in pairs. The flagellum is of about similar length to the distal joint of the peduncle and is composed of from seven to nine joints.

Upper Lip (Fig. 2).—The upper lip is subspherical in outline, margin entire, and densely clothed distally with short setæ.

Mandibles (Figs. 3 and 4).—The mandibles differ slightly from each other in the cutting edge and other minor details; that of the left side bears two rows of pointed teeth, while that of the right has a single row of pointed teeth.

The *right* is shown in Fig. 3 with the outer side uppermost, and consequently the molar tubercle is not seen. The cutting edge terminates in a single row of four pointed teeth, and between them and the molar tubercle is a bunch of broad, lanceolate spines, one edge being finely serrate, and the other, and also the broad side, fringed with fine filamentous setæ (Fig. 3*a*).

The *left mandible* is shown in Fig. 4, with the inner surface uppermost. It has the cutting edge bearing two rows of pointed teeth, widely separate distally, but united proximally; and between them and the base of the molar tubercle there is a bunch of stout plumose setæ (Fig. 4*a*). The molar tubercle presents no special features. The *palp*, which is similar in both mandibles, is long and composed of three joints. The first joint is the shortest, it widens slightly distally. The second is broader and twice the length of the first; it bears on its lower border, distally, three spines near together and pointing downwards, one of which is very long; also a long spine equi-distant between the proximal and distal ends, which point directly downwards. The terminal joint is not quite so long as

the second; the upper margin is concave, and the lower margin straight, with the end of the joint pointed, and bearing three long slightly curved spinules, pointing distally and downward; along the distal two-thirds of the lower margin there is a row of short setæ, and medianly on the outer side a few straight spinules.

Lower Lip (Fig. 5).—The principal lobes are bluntly rounded distally with long incurved setæ at the apices, the inner lobes narrow, and fringed with short setæ, and the mandibular lobes long and sharply truncate.

First Maxillæ (Fig. 6).—The first maxilla is very similar in form to that figured by Thomson for *N. montanus*. The end of the inner lobe is truncate, and bears about six plumose setæ (Fig. 6*a*). The middle lobe ends in about eight strong, more or less pectinated spines, curving inwards, those towards the inner margin being more toothed than those toward the outer margin (Fig. 6*b*); the inner margin of the lobe is finely setose. The first joint of the palp is short, and the second long, broad, and curving inwards; the extremity being rounded and bearing a number of short, stout, acute spines, which extend along the inner margin proximally, numbering six in all. Amongst them at the extremity there are also a few longer and finer spinules.

Second Maxillæ (Fig. 7).—The second maxillæ are of normal shape. The inner lobe of each is clothed with short setæ and an oblique row of long, stiff, simple setæ. The outer lobe has the extremity obliquely truncate, and bearing about six long curved setæ.

Maxillipedes.—In Fig. 8 the maxilliped of the left side is shown as viewed from above. The basos is short, the inner margin straight, and the inner distal angle produced into a lobe or plate, which extends nearly as far as the extremity of the ischios, and upon the summit of the outer half of which are five simple spinules, and on the inner half about four plumose spinules (Fig. 8*a*), and a single spine on the inner margin distally. The ischios is short, sub-rectangular, and the inner margin of the large ovoidal distally produced lobe which reaches to about one-third the length of the meros, and is fringed by short spinules along the inner margin, which gradually increase in length distally, and extend for a short distance over the distal extremity. The meros is twice the length of the ischios. The

carpus is sub-equal, and the outer margin convex with a few long setæ distally, the inner margin convex, and fringed by long, fine, curved setæ, and also a few spinules distally. The propodos is narrow, slightly shorter than the carpus, and curving inwards; the outer and inner margins bear a few long, stiff setæ, and on the upper surface, at two places equi-distant from the proximal and distal margins, there is a tuft of about three spinules. The dactylos is shorter than the propodos, it is somewhat curved, acute, and terminating in two long curved spinules, and a few shorter ones on the inner distal extremity.

Gnathopoda (Fig. 9).—The gnathopoda are almost identical in form and in the arrangement of the setæ; the second is, however, somewhat the longest. I shall only describe the first, the figure will sufficiently delineate the slight difference of the second. The side plate (coxa) is not so deep as broad, the ventral margin is straight, with the angles rounded, and bearing a few scattered setæ. The basos is slightly more than twice as long as broad, with the anterior margin straight, and having a bunch of long stiff setæ proximally; the posterior margin is convex, and bears two or three very long scattered setæ, and from its postero-distal angle a tuft of long setæ; on the inner side, proximally, and toward the anterior margin there is a tuft of long setæ.

The ischios is short, sub-rectangular, and from its hinder distal angle there is a tuft of long setæ. The meros is of similar length to the ischios, triangular in outline, with a tuft of setæ on the hinder distal angle. The carpus is somewhat longer and wider than the meros, and articulates obliquely with it; it is ovoidal in outline, and the posterior margin is deeply grooved longitudinally, so that the propodos can, in part, be flexed within it. About midway along the anterior margin there is a tuft of two or three setæ, and a similar one close to the distal extremity; close to the hinder margin there is a single series of long pointed spinules, which is interrupted in two places by narrow spaces. The propodos is nearly square in outline, but narrowest proximally. At the antero-distal angle there is a tuft of stout setæ, and midway along the hinder margin there is a tuft of long fine setæ. The palm is transverse, and the posterior end slightly produced and rounded; the margins are fringed by short stout spines. On the outer surface of the joint, near the postero-distal

angle, there is a row of about three long setæ, and another row of about four similar setæ, near the front margin, about midway between the proximal and distal ends. The dactylos is long, slightly curved, margins entire, and the extremity acute.

Pereiopoda (Fig. 10).—The first pereipod is slender and about one-fourth longer than the second gnathopod. The basos is narrowly oblong, with two or these very long setæ on the hinder margin. The ischios is subrectangular, with a tuft of setæ at the postero-distal angle. The meros is oblong and slightly produced at the antero-distal angle, and possessing a few setæ on the anterior and posterior margins, and also tufts at the antero- and postero-distal angles. The carpus is somewhat shorter than the meros, with margins nearly straight, and having a tuft of setæ on the antero-distal angle, and a few scattered setæ on the hinder margin. The propodos is slightly longer than the carpus, but narrower, and the margins straight; on the antero-distal angle there is a tuft of long setæ, and the hinder margin is clothed with five short spinules. The dactylos is very slightly curved, acute, and with a fine tooth distally.

The second pereiopod is similar in all respects to the first.

The third pereiopod is subequal to the first and second, but it is reversed in its manner of articulation with the body, and is rather stouter.

The fourth pereiopod (Fig. 11, inside view), is longer and stouter than the third. The propodos has six short spines, arranged in transverse pairs, at equal distances along the anterior margin.

The fifth pereiopod is much longer than the fourth, due to the extra length of the carpus and propodos; the other joints are of similar length to the fourth pereiopod, and also of similar form except the dactylos, which is in the fifth almost straight, but, as in the other pereiopods, it has a fine lateral tooth distally.

Pleopoda (Fig. 12).—The pleopoda are of the usual shape, the anterior pair being somewhat the longer. Distally, on the inner surface of the peduncle, there are two "coupling spines" (12*a*), and on the first joint of the inner ramus there are four "cleft-spines" (12*b*), in two longitudinally disposed pairs.

First Uropoda (Fig. 1).—The first uropoda extend beyond the extremity of the second uropoda. The peduncle is twice the length of the rami, and bears three spines on the dorsal surface, two being situated on the outer margin, and one distally on the inner margin. The rami are similar to each other, each curving very slightly upwards, with bluntly rounded ends, bearing three short spinules and one long one, all of which point directly upwards; along the upper margin of each there are also two short spinules.

Second Uropoda.—The second uropoda are only half the length of the first uropoda, but are subequal in form.

Third Uropoda.—The third uropoda are remarkably long, equalling in length that of the entire pleon. They are carried normally in a vertical position, and doubtless possess a special sensory function, for I have determined thereon, what are evidently from their structure, sensory hairs (Fig. 13). They are very similar in appearance under high magnification to those I noted on the first antennæ of *Phreatoicoides gracilis*, and described under "C" form.[1] The peduncle is very short and robust, the anterior margin concave, and the hinder margin evenly convex, with a tuft of six or more stiff setæ on its distal extremity which point upwards and hindwards. There is only one ramus, and no appearance of a second one remaining. This single ramus is two-jointed, the proximal one being slightly the longest as well as also being the stoutest; the hinder margin is straight; the posterior margin also is straight, but narrows both at its proximal and distal attachments. On the distal margin there is a circlet of sensory setæ similar in appearance to Fig. 13, and in two places equi-distant from the proximal and distal ends there are, on the hinder margin, two spinules pointing hindwards, and near to each of these, on the outer surface, there are two or three spinules pointing hindwards, and also in addition there are two or three fine setæ on the hinder margin near to the attachment with the peduncle. The second joint has the margins nearly straight, and extremity bluntly pointed, from which springs a circlet of long fine sensory setæ similar to Fig. 13. The hinder margin has two spinules disposed as in the first

[1] Antea, p. 128.

joint, also two spinules near these on the outer surface, which point hindward.

Telson (Fig. 14).—The telson is cleft half-way to the base, and is slightly shorter than the peduncles of the terminal uropoda. It has distally on the upper surface of each piece three long and one short stout and slightly curved spines, and also on the same surface, but proximally, there are two or three fine spinules near the outer margin.

DESCRIPTION OF PLATES.

PLATES XV. AND XVI.

Fig. 1. Side view of *Niphargus pulchellus* × 15.
„ 2. Upper Lip × 66.
„ 3. Right Mandible, outside view, × 66. (*a*) Spine from spine row × 190.
„ 4. Left Mandible, inside view, × 66. (*a*) Plumose Spine from corresponding position to 3*a* × 190.
„ 5. Lower Lip × 66.
„ 6. First Maxilla × 66. (*a*) Plumose spine from inner lobe × 190. (*b*) Pectinated spine from outer lobe × 190.
„ 7. Second Maxilla × 66.
„ 8. Maxilliped of left side, from above × 66. (*a*) Spines from summit of inner lobe × 190.
„ 9. First and Second Gnathopoda × 30.
„ 10. First Pereiopod × 35.
„ 11. Fourth Pereiopod, inside view, × 23.
„ 12. First Pleopod × 45. (*a*) Two "Coupling spines" × 300. (*b*) "Cleft spine" × 300.
„ 13. Extremity of a sensory seta from terminal Uropod, drawn under oil im. lens of N.A. 1.30. Abbé Condenser. $\frac{3}{4}$ Cone.
„ 14. Telson × 45.

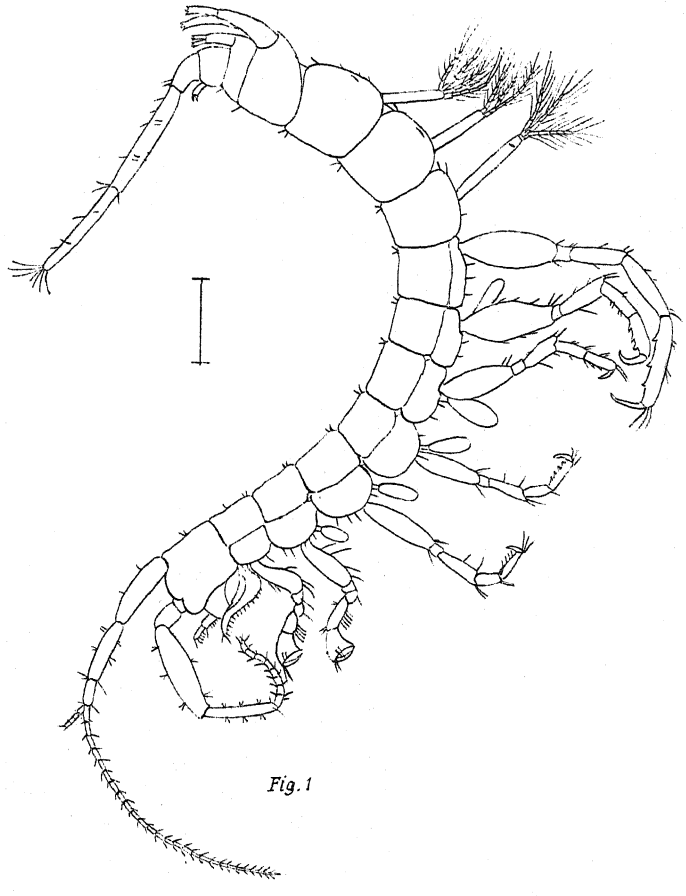
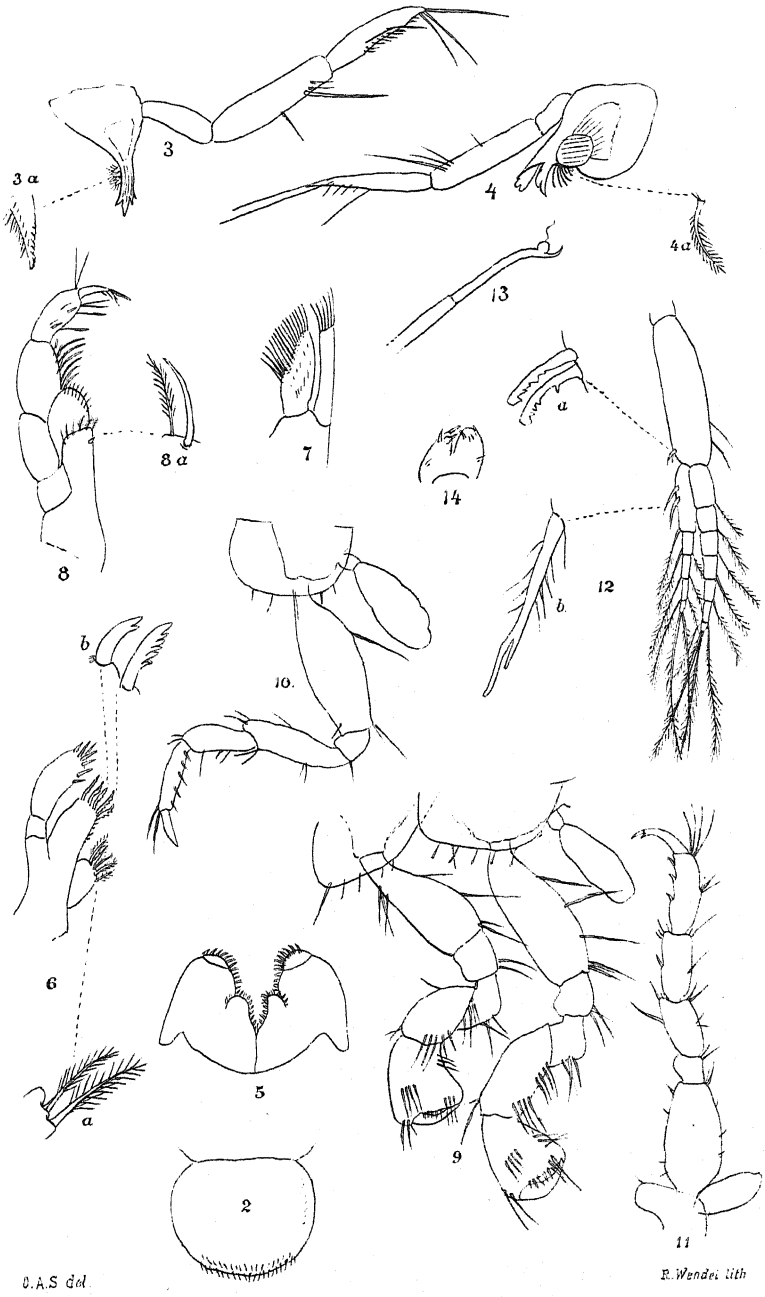


Fig. 1



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