

New Species of *Astacilla* from Tasmanian Waters

By

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(Read 2nd November, 1948)

FIGS 1-8

The only reference to any members of this family Arcturidae being encountered in Tasmanian waters is contained in Haswell's work on the Australian Crustacea (Haswell, 1882, p. 303). This reference is of a doubtful nature, the specimen being found in the Australian Museum collection pinned on a sheet of cork with several specimens from Tasmania, and was deduced to have come from Tasmania.

This specimen was described as *Arcturus longicornis* (Haswell cit.). More recently Hale describes it as being a synonym of *Arcturus baffini*, Sabine, found in the Davis Straits (Hale, 1946, p. 171).

The specimens which I describe below were all taken in a very restricted area, the northern end of the D'Entrecasteaux Channel.

The genus *Astacilla* was established by Cordiner (1795). Tattersall raised the genus *Neastacilla* (Tattersall, 1921, p. 243), defining the genus as ' . . . agreeing with *Astacilla* Cordiner, except that (1) the 2nd thoracic segment is fused to the head and the lateral parts are not expanded downwards and forwards to partially cover the mouth organs; (2) the abdomen is unsegmented, all being fused into one piece '. As a type he designated *Neastacilla* (*Astacilla*) *falclandica*, Ohlin.

Nordenstam modified the genus *Neastacilla*, his diagnosis reading 'The first pereion segment coalesced with the head, but separated from the head by a groove which is absent dorsally. The lateral parts of the first pereion segment are not expanded downwards and forwards. Abdomen with three segments indicated by shallow grooves anterior from the pleotelson. Dactylus of first pereopod not expanded, tapering towards the end and claw missing. "Secondary" ramus of uropod furnished with a long apical seta.' (Nordenstam, 1933, p. 118).

Nordenstam points out doubts as to the validity of the genus *Neastacilla*. In particular, doubts are expressed as to whether the grooves separating the head from the first pereion segment and the abdominal grooves are sufficiently characteristic to be called generic characters.

Hale places in *Astacilla* two species previously described as *Neastacilla* (Hale, 1924, p. 209, and Hale, 1946, p. 171), the evidence for this being the presence of two setae on the secondary ramus of the uropod and the doubtful nature of the characters expressed by Nordenstam.

Stebbing noted that the secondary ramus of the uropod bears an additional minute seta on its upper margin (Stebbing, 1905), in the species *Astacilla amblyura*.

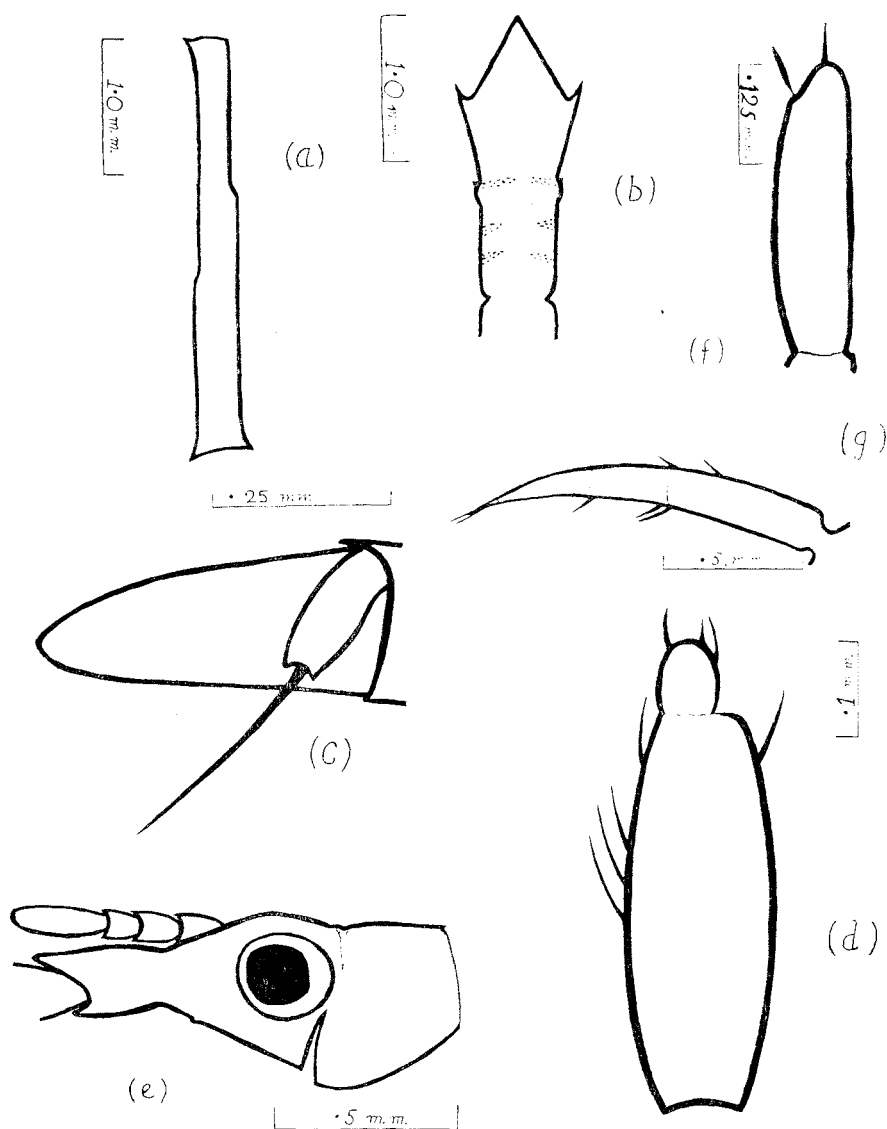


FIG. 1.--*Astacilla monoseta*, male. (a) Lateral view of IVth pereion segment. (b) Dorsal view of pleon. (c) Inner surface of right uropod. (d) Inner surface of dactylus of first pereopod. (e) Lateral view of cephalon and first pereion segment. (f) Lateral view of flagellum of first antenna. (g) 'Claw' of second antenna.

From the evidence of the above authorities and from the evidence of the condition to be seen in my own specimens described below, especially in *Astacilla monoseta*, I consider the genus *Neastacilla* to be superfluous.

Astacilla monoseta, sp. nov.

(Figs 1 and 2)

Male

Body smooth. Two pairs of lateral spines on the pleon. From above the anterior pair of these spines appear as round tubercles. The whole animal is covered with brown pigment. The body is slender and of total length, including second antennae, of 14.5 mms.

Cephalon fig. 1 (e) has a slight median dorsal process projecting between the basal segments of the first antennae. The cephalon is separated from the first pereion segment by a faint dorsal groove. The first pereion segment is produced downwards to cover the mouth parts. The second and third pereion segments are short, the sum of their lengths being less than that of the cephalon and the first pereion segment.

The fourth pereion segment is nearly three times as long as the cephalon and the first to third pereion segments combined. It is nearly one third of the total length of the animal. The segment is slightly broader posteriorly than anteriorly, fig. 1 (a).

The fifth pereion segment is longer than either the sixth or seventh.

In all of the pereion segments the coxal plates are not visible from above.

The pleon, fig. 1 (b), is slightly longer than pereion segments five to seven and terminates in a median apex. There are two pairs of lateral spines. Three faint dorsal grooves indicate the abdominal segments.

The first antenna is short. The peduncle of the first antenna not reaching beyond the middle of the first peduncular joint of the second antenna. The flagellum of the first antenna does not extend beyond one-quarter of the length of the second peduncular joint of the second antenna. The flagellum, fig. 1 (f), bears one terminal and one sub-terminal sensory appendage.

The second antenna is long and almost one-third of the total length of the animal. Reading inwards from and including the 'claw' the ratios of the principal segments are 1 : 4 : 4 : 2. The 'claw' of the second antenna is of three segments and bears two terminal sensory setae. There are two dorsal and three ventral spines also on the claw, fig. 1 (g).

The dactylus of the first periopod has few setae, fig. 1 (d). None of these setae are sufficiently enlarged to form a claw. The remaining limbs of the first four pereion segments are typical of those of the group as a whole, varying only in minor detail.

The limbs of the fifth to seventh pereion segments are clawed.

The secondary ramus of the uropod is approximately a quarter of the length of the other ramus and bears a long, slender spine which is over twice as long as the ramus, fig. 1 (c).

The specimen was dredged in ten fathoms in the northern end of D'Entrecasteaux Channel and was found among red algae, January 1948.

Female

Very different in outward appearance from the male. Body smooth with lateral ridges running down each side of the fourth pereion segment. The whole animal is covered with pigment, especially the lateral surfaces of the pleon. Two pairs of lateral spines are on the pleon. Pleon is sharply pointed posteriorly. The body is stout and of a total length of 31.75 mms.

The cephalon differs from the male in that the eye is sub-triangular, whereas in the male it is sub-circular. The lateral downgrowth of the first pereion segment is of different form than in the male, fig. 2 (a). The groove separating the cephalon and the first pereion segment is much better developed than in the male. The second and third pereion segments are short, the sum of their lengths being less than that of the cephalon and first pereion segment combined. Round the anterior and posterior edges of each pereion segment are a series of tubercles. These tubercles are arranged in a single row in each instance. There are tubercles scattered irregularly over the cephalon and also an anterior and a posterior row of them. The tubercles are very small and are difficult to see in the male, but quite prominent in the female.

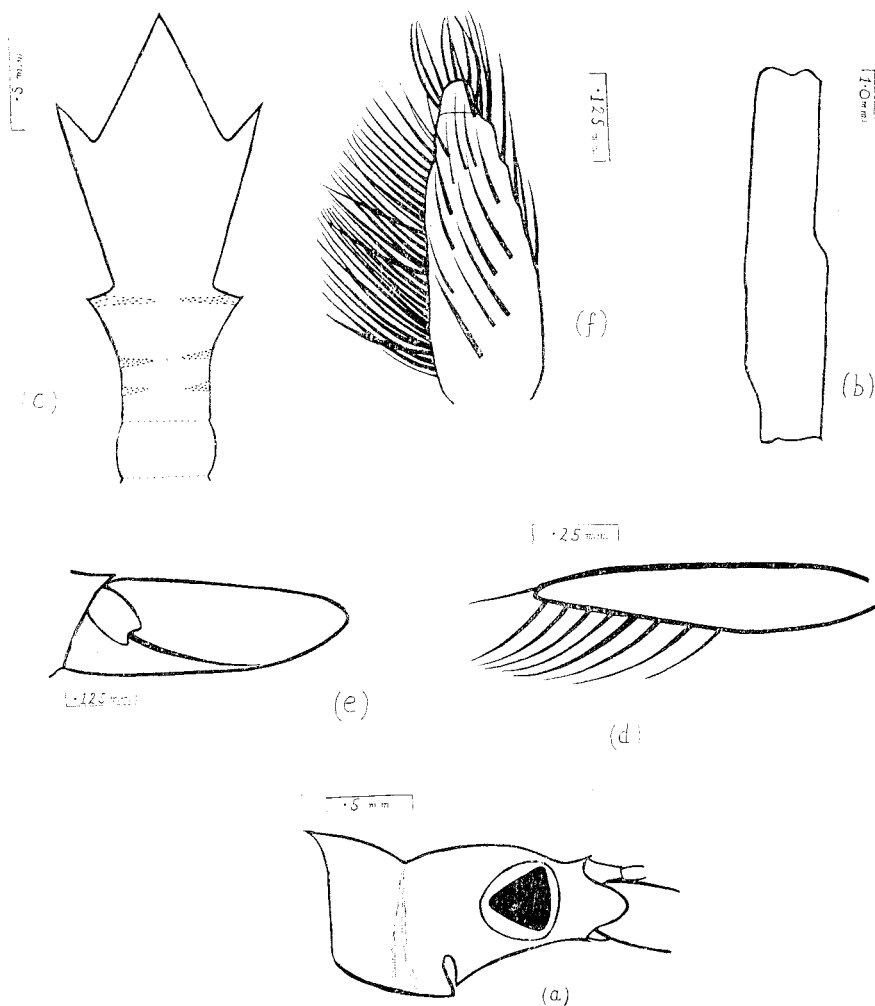


FIG. 2.—*Astacilla monoseta*, female. (a) Lateral view of cephalon and first pereion segment. (b) Lateral view of 14th pereion segment. (c) Pleon, dorsal view. (d) First antenna, lateral view. (e) Inner surface of the left uropod. (f) Dactylus of first pereopod.

The fourth pereion segment is over twice the length of the cephalon and pereion segments one to three inclusive. It is only one-quarter of the total length of the animal. It is much broader than in the male. It is broader posteriorly than anteriorly.

The fifth pereion segment bears on its dorsal surface a small sharp median spine. In the male this spine is represented by a small tubercle.

The abdominal segments are indicated by grooves on the dorsal surface of the pleon. The anterior pair of lateral spines does not appear rounded from above. The pleon is more sharply pointed than in the male. It is greater in length than pereion segments five to seven.

The relationship between the segments of the first antenna and those of the second antenna are the same in the female as in the male. The flagellum of the first antenna in the female bears one terminal and eight ventral and sub-terminal sensory appendages.

The ratios of the lengths of the segments of the second antenna are the same as in the male.

The dactylus of the first pereopod bears seven setae which are distributed evenly over the surface of the limb, fig. 2 (*f*). The propodite bears a great many setae on the exterior surface, while the lateral surface bears many strong, spine-like setae. The inner surface of the propodite only has six setae. None of the setae of the dactylus could be called a 'claw'.

The limbs of pereion segments two, three and four are all similar to those of the male. The fifth, sixth and seventh pereion segments are clawed.

The 'secondary' ramus of the uropod bears a single spine, fig. 2 (*e*). The form of the secondary ramus is different from that of the same structure in the male.

Dredged in ten fathoms in D'Entrecasteaux Channel, January, 1948. Among red algae.

This species possesses both Astacillid characters and also several characters of the genus Neastacilla. Comparing the features of the specimen with the diagnosis of the genus Neastacilli as modified by Nordenstam (1933), we find that the lateral part of the first thoracic segment is expanded down and forwards and that the groove separating the cephalon from the first pereion segment is not missing dorsally. These are not Neastacillid features as defined but are Astacillid. The dactylus of the first pereopod is not expanded and there is no claw is a Neastacillid feature, as is the single apical seta on the 'secondary' ramus of the uropod. The abdomen having three shallow grooves is a Neastacillid feature.

Astacilla inaequispinosa, sp. nov.

(Figs 3 and 4)

Male

Body smooth, stout. Total length 14.25 mms. One very large median conical projection on the cephalon between the eyes.

The cephalon is shorter than in any other species encountered, being only one-twelfth of the total length. The eye is sub-oval. The large projection on the dorsal cephalic surface between the eyes is slightly convex anteriorly and straight posteriorly. It is simple at the apex, not faintly bifid as in *Astacilla sheardi*, Hale. The only indication of the fusion of the cephalon and the first pereion segment is a slight dorsal depression visible in lateral view, fig. 3 (*i*). There is no anterior and downward projection of the first pereion segment. The second and third pereion segments are of moderate length, being about three-quarters of the length

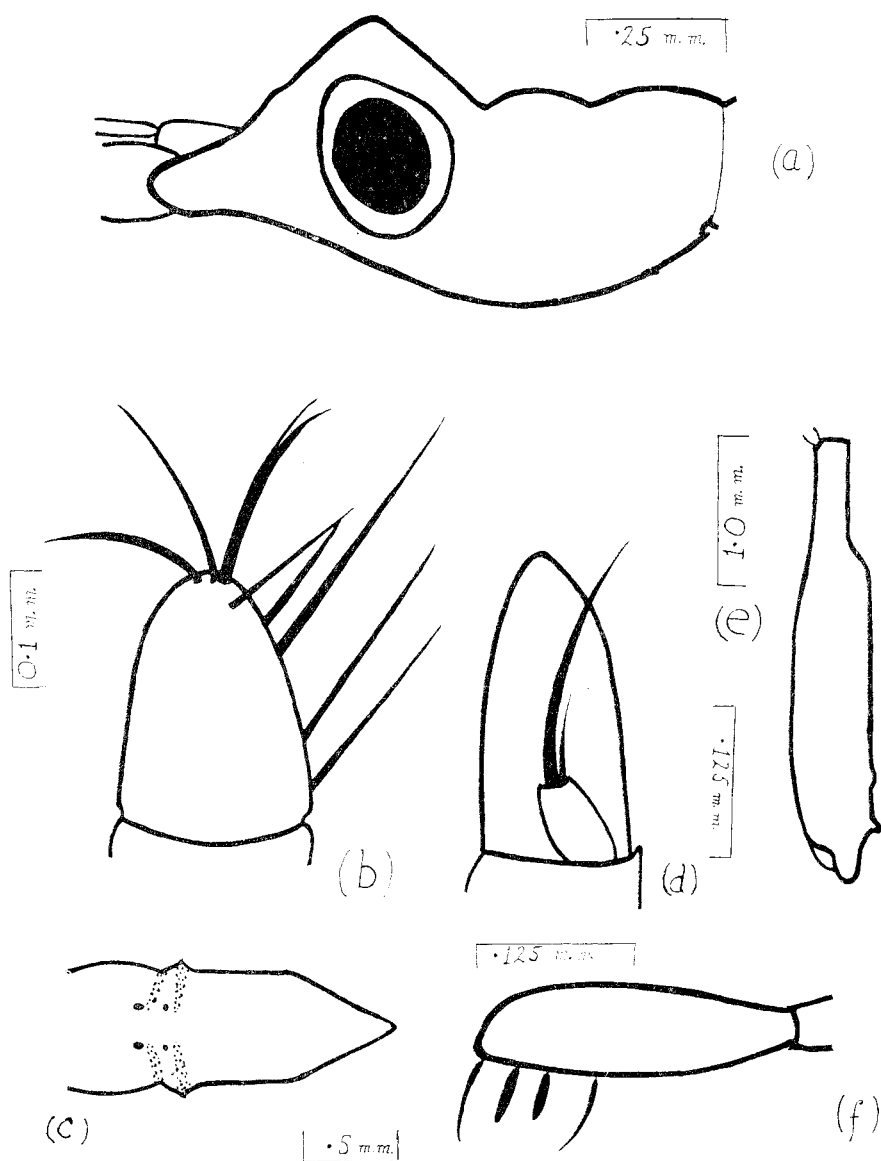


FIG. 3.—*Astacilla inaequispinosa*, male. (a) Cephalon and first pereion segment, lateral view. (b) Inner surface of dactylus of left first pereopod. (c) Dorsal surface of the pleon. (d) Inner surface of right uropod. (e) Lateral view of IVth pereion segment. (f) Lateral view of first antenna.

of the cephalon and first pereion segment. The fourth pereion segment is much deeper posteriorly than anteriorly. It is longer than the length of the cephalon and the first three pereion segments and is nearly one-fifth of the overall length of the animal, fig. 3 (e). Postero-dorsally this segment bears a large, median slightly hooked spine. Just anterior to this spine is a low median elevation, also on the dorsal surface. Laterally and posteriorly are a pair of lobes which serve as articulation with the fifth pereion segment, there being an equivalent 'socket' on the anterior surface of the latter segment.

The fifth to seventh pereion segments are of relatively long nature, being almost one-half of the length of the fourth pereion segment.

The pleon is a quarter as long again as the length of pereion segments five to seven. The first and second abdominal segments do not show any sutures or grooves, but form a slight dorsal elevation. On the posterior dorsal surface of this elevation there is a pair of small tubercles. The third abdominal segment shows grooves on the dorsal surface demarkating it anteriorly from the second abdominal segment and posteriorly from the pleo-telson. A pair of tubercles occur on the dorsal surface of the third abdominal segment. They are smaller than those on the preceding segments, fig. 3 (c). The pleon tapers to a slightly pointed end.

The first antenna is short, the flagellum not reaching beyond the distal end of the first peduncular segment of the second antenna. The flagellum bears one sub-terminal and three ventral sensory appendages, fig. 3 (f).

The second antenna is very long, being almost one-third of the total length of the animal. The ratios of the lengths of the segments of the second antenna, reading inwards from and including the 'claw', are 1 : 1.25 : 1.75 : 1.5. The 'claw' on its inner margin bears a single row of minute sharp teeth of a simple conical pattern. These teeth extend from the proximal end of the segment to a short distance from the distal end of the segment. This distance from the distal end is approximately one-twentieth of the length of the segment. These teeth number 110.

The dactylus of the first pereopod bears nine strong setae, all of which are concentrated on the outer surface, fig. 3 (b). Two of the setae are close together and might be regarded as a 'claw'. One seta is longer than the others and might likewise be regarded as a 'claw'. In my opinion none of the setae are sufficiently differentiated to be regarded as a 'claw'.

The fifth, sixth and seventh pereopods do not bear claws, and the coxal plates of these segments are visible from the dorsal surface.

The secondary ramus of the uropod bears two setae. One of these setae is very large and extends beyond the end of the other ramus while the second seta is less than one-half of the length of the former. In this feature the species resembles *Astacilla fusiformis*, Hale.

Dredged in ten fathoms. D'Entrecasteaux Channel, January, 1948. Among red weeds.

Female

Body broader than the male. Total length 27.5 mms.

The cephalon is similar to that of the male but the eyes are sub-triangular. The groove separating the first pereion segment from the cephalon is much more developed than in the male.

The second and third cephalon segments are only one-half of the length of the cephalon and the first pereion segment. The fourth pereion segment is broader than in the male but is long in proportion to the total length of the animal, being slightly greater than one-third of the total length of the animal. The slight ridge, which in the male is anterior to the dorsal hook-like spine, is absent in the female. The spine is present and of the same form.

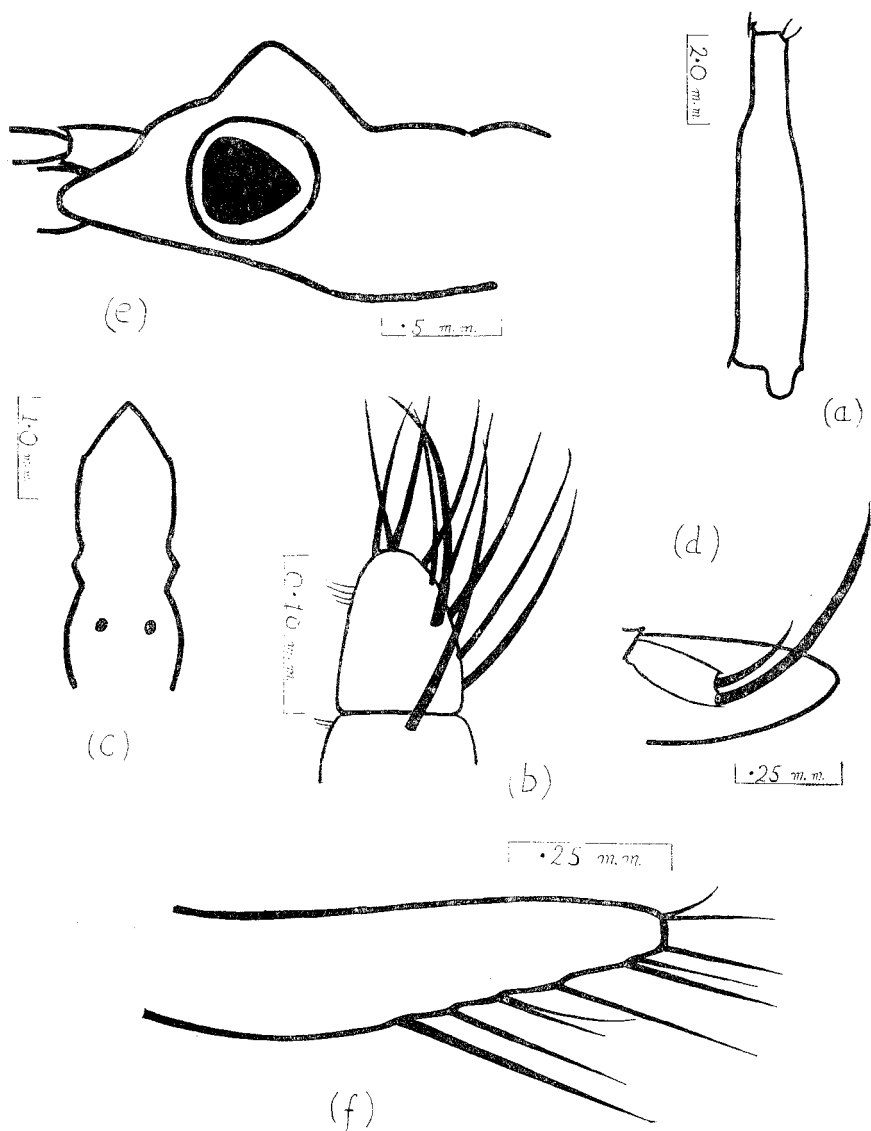


FIG. 4.—*Astacilla inaequispinosa*, female. (a) Lateral view of IVth pereion segment. (b) Inner surface of dactylus of left first pereopod. (c) Pleon, dorsal view. (d) Inner surface of left uropod. (e) Lateral view of cephalon and first pereion segment. (f) Lateral view of flagellum of first antenna.

The fifth pereion segment bears a single median dorsal spine of similar form to that borne on the posterior end of the fourth segment. The spine on the fifth pereion segment is smaller than that on the fourth.

The pleon is similar to that of the male but is not as long in relation to the total length of the animal. In the male the pleon is one seventh of the total length while in the female it is only one-eighth of the total length.

The first antenna is short and bears the same relationship to the segments of the second antenna as in the male. The flagellum bears two terminal sensory appendages and eight ventral and sub-terminal sensory appendages fig. 4 (*f*).

The second antenna is slightly more than one-third of the total length of the animal. The ratios of the segments are the same as in the male with the exception that the 'claw' is slightly longer. The 'claw' is composed of three segments as in the male. It also bears a single row of simple conical teeth, 110 in number. In the female some of the teeth had been broken and the number of teeth must only be considered as approximate.

The dactylus of the first pereopod bears ten setae on the outer side. None of these setae are smaller than the dactylus. On the inner side four small thin hair-like setae project vertically from the surface of the limb. There are three similar setae on the outer distal end of the propodite. None of the setae are sufficiently enlarged to be described as a claw. The distal end of the propodite bears a long seta which might be regarded as a claw. Fig. 4 (*b*).

The setae borne by the 'secondary' ramus of the uropod are much longer and stronger than in the male. They are so strong as to be described as spines. They are more curved than in the male, but the proportion of their lengths is the same as for the former sex.

The distribution of the pigment is the same in both sexes. In the cephalic region an area below the eye and on the lateral surfaces of the dorsal projection are pigmented. The anterior region of the fourth pereion segment and two spots in the mid-lateral region of the fourth pereion segment are also pigmented. The posterior end of the fourth pereion segment and the anterior of the fifth pereion segment are covered by a large area of pigment. The lower lateral surfaces of the sixth and seventh pereion segments are pigmented as in the lower lateral surface of the second abdominal segment and the lateral region of the posterior end of the animal.

This colour system is in no sense a characteristic of the species. *Astacilla derwenti*, described below, has the same system of pigmentation.

On comparison with the features of *Neastacilla*, *Astacilla inaequispinosa* furnishes several interesting observations. Firstly, the cephalic groove is not missing dorsally. In Nordenstam's diagnosis of the genus *Neastacilla* the groove is missing dorsally. The lack of an expanded part of the first pereion segment is a *Neastacillid* feature, as is the absence of a 'claw' on the dactylus of the first pereopod. The possession of two setae on the secondary ramus of the uropod is *Astacillid* in nature, while the abdomen only shows two external grooves.

Dredged in ten fathoms, D'Entrecasteaux Channel, January, 1948.

Astacilla unicornis, sp. nov.

(Fig. 5)

This species is described as a new species with some doubt as I have only the female on which to base a description. The specimen cannot be assigned to any described species, and in view of the great sexual dimorphism exhibited by other species of this genus it is only a tentative description here attempted.

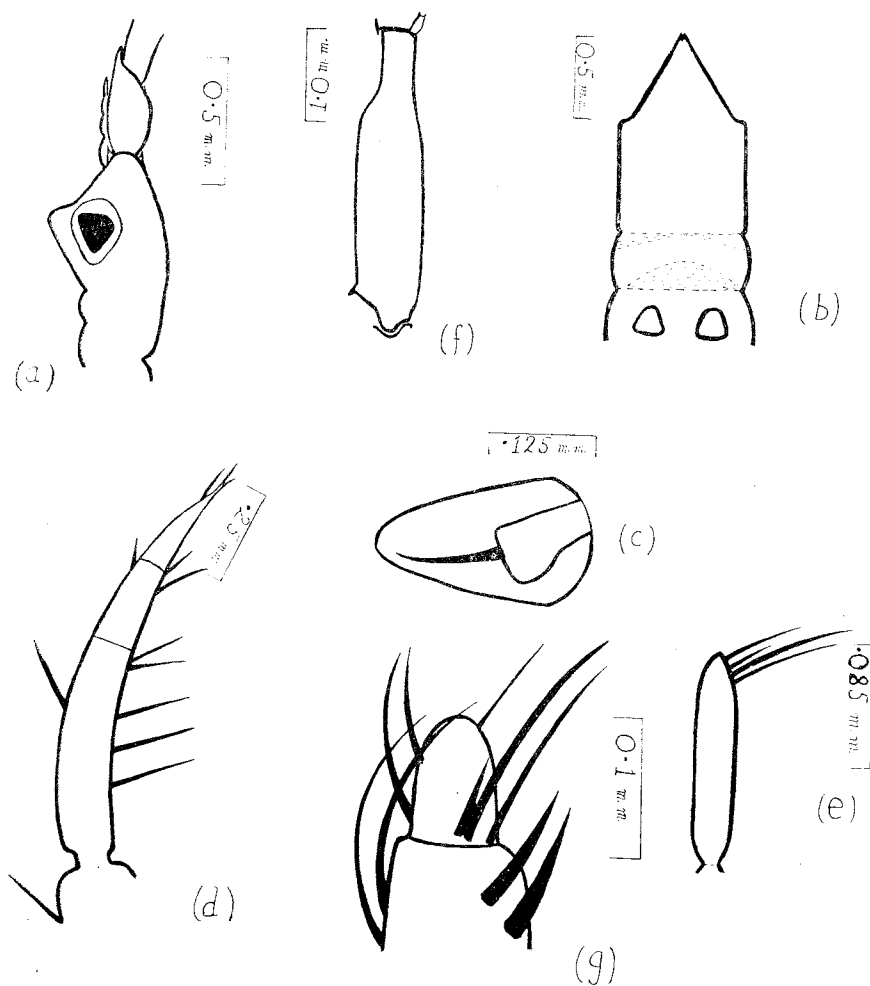


FIG. 5.—*Astacilla unicornis*, female. (a) Lateral view of cephalon and first pereion segment. (b) Pleon, dorsal view. (c) Inner surface of left uropod. (d) Lateral view of 'claw' of second antenna. (e) Dorsal view of first antenna. (f) Lateral view of IVth pereion segment. (g) Dactylus of left first pereciopod.

Female

Body broad, surface smooth. Total length 14.00 mms.

The dorsal cephalic surface bears a large median process similar to that of *A. inaequispinosa*. There is a very small median anterior projection of the cephalon. The eyes are smaller than in any preceding species and are sub-triangular in shape. The cephalon is separated from the first pereion segment by a fairly sharply defined dorsal groove. There is slight lateral expansion of the first pereion segment to cover the mouth parts.

The second and third pereion segments are short, being only one-half the length of the cephalon and the first pereion segment.

The fourth pereion segment is narrow anteriorly but becomes deeper about one-quarter of its length, fig. 5 (*f*). Postero-dorsally it has a hooked, median spine, as in *Astacilla inaequispinosa*. A median lobe of the fourth pereion segment articulates with a socket on the anterior surface of the fifth segment.

The fifth to seventh pereion segments are long in relation to the total length of the animal, being one-eighth of that length. This is different from most other species described in this paper in which the length of the segments is about one-ninth of the total length.

The first two abdominal segments are fused as in *A. inaequispinosa* but in this species the fused segments bear a pair of blunt tubercles. The third abdominal segment is indicated by grooves on the dorsal surface. The posterior extremity of the pleon is faintly incised.

The first antenna is short, the flagellum not reaching beyond the first peduncular joint of the second antenna. The flagellum bears four long sub-terminal sensory appendages.

The second antenna is long, being nearly one-third of the total length of the animal. The ratios of the segments reading inwards from and including the 'claw' are 1.5 : 1.75 : 1.25 : 1.00. The 'claw' on its inner surface bears a single series of minute teeth. The teeth are of a recurved conical pattern. The row of teeth commences at the distal end of the 'claw' and ends three-quarters of the length along the 'claw'. The 'claw' is composed of three segments, fig. 5 (*d*). There are 60 teeth.

The dactylus of the first pereopod has six setae. Two of these are on the outside of the limb and are the same size as the dactylus. The other four are of varying sizes and all on the inside of the dactylus, i.e., point towards the mouth. Of these four one is of sufficiently large size to be called a claw. The propodite bears on its inner surface many strong, spinous setae, fig. 5 (*g*).

The coxal plates of the pereopods are not visible from the dorsal surface. Pereopods five to seven are not clawed. The secondary ramus of the uropod bears one strong spine, which reaches almost to the end of the lateral ramus.

Dredge, D'Entrecasteaux Channel in ten fathoms, January, 1948.

This species, from the appearance of the female, again gives interesting results if compared with Nordenstam's diagnosis of the genus *Neastacilla*. The features of the latter genus to be seen are lack of expansion of the first pereion segment and the possession of the long apical seta on the secondary ramus of the uropod. Features of the genus which are absent or exist in modified form are . . . the groove separating the cephalon from the first pereion segment is present dorsally, the abdomen has only two shallow grooves and one of the setae on the dactylus of the first pereopod is enlarged and could be described as a 'claw'.

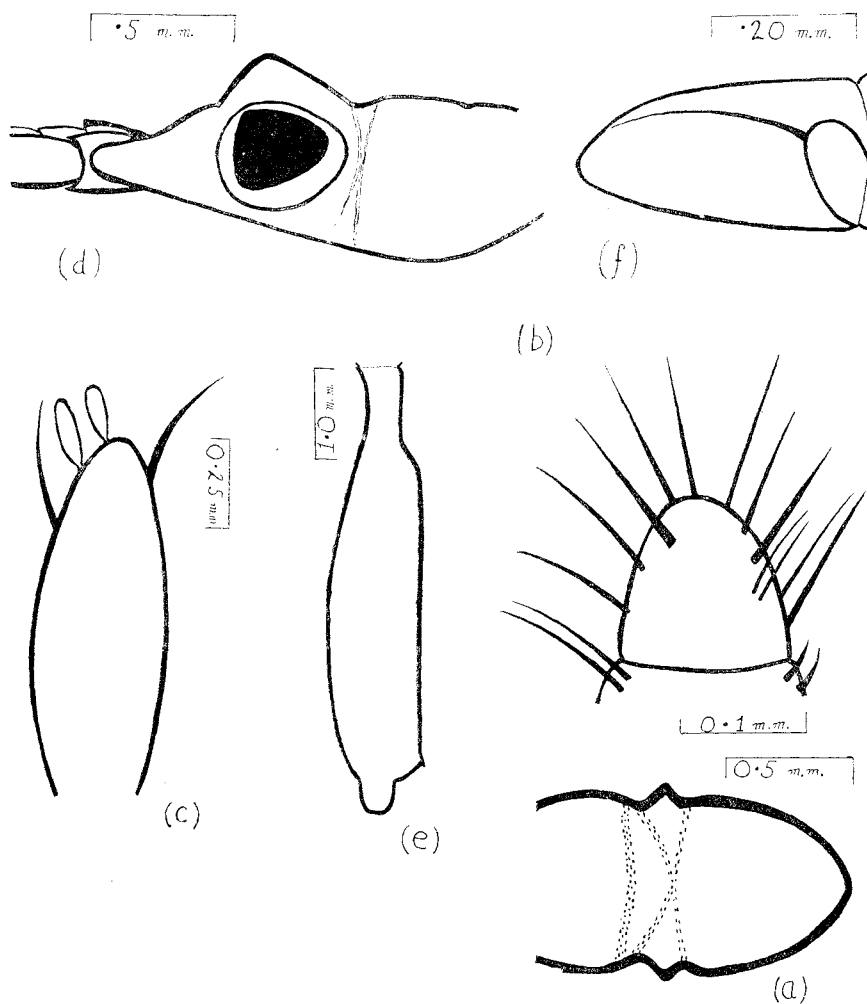


FIG. 6.—*Astacilla derwenti*, female. (a) Dorsal view of pleon. (b) Outer surface of dactylus of left first pereiopod. (c) Lateral view of first antenna. (d) Lateral view of cephalon and first pereion segment. (e) Lateral view of IVth pereion segment. (f) Inner surface of left uropod.

Astacilla derventi, sp. nov.

(Fig. 6)

The same remarks as to the description of the species applies to this species as to *A. unicornis*. This species is known only from the female.

Female

Body smooth, form similar to *Astacilla inaequispinosa*. Total length 18.25 mms.

Large median projection on the dorsal cephalic surface between the eyes. Small antero-median projection of the cephalon. Eyes are large and sub-triangular.

The cephalon is separated from the first pereion segment by a groove which is present dorsally and absent laterally and ventrally. There are slight lateral extensions of the first pereion segment.

The second and third pereion segments are of moderate length being three-quarters of the length of the cephalon and the first pereion segment (as in *A. inaequispinosa*).

The fourth segment of the pereion is long and deep posteriorly and it is nearly one-third of the total length of the animal. Posteriorly and dorsally this segment has a short blunt spine. This spine is of a different form from that of the preceding species. A postero-lateral lobe of the segment articulates with a socket of the fifth pereion segment. The lobe resembles that of the male *Astacilla inaequispinosa*.

The fifth to seventh pereion segments are more than one eighth of the total length of the specimen. In none of these segments can the coxal plates be seen from a dorsal position.

The pleon is slightly longer than the fifth to seventh pereion segments. It has a pair of lateral processes. It is rounded posteriorly. The abdominal segments are distinguished by dorsal grooves. The first abdominal segment is larger than the second or third. There are no tubercles on the abdominal segments.

The first antenna is short, the flagellum just reaching to the end of the first peduncular segment of the second antenna. The flagellum bears one dorsal and one ventral process and two sub-terminal processes, fig. 6 (c).

The second antenna is long being over one-third of the total length of the animal. The ratios of the segments reading inwards from and including the 'claw' are 1 : 1.75 : 2.25 : 1.5. There are no teeth on the 'claw'.

The dactylus of the first pereopod, fig. 6 (b), bears five setae on the outer surface and seven setae on the inner or oral surface. The setae, with the exception of two, are all sub-equal. The two exceptions are smaller than the rest. The propodite bears on its inner surface a row of strong short spines similar to those on the same segment in *Astacilla unicornis*. The spines are shorter than in the latter species.

The fifth to seventh pereopods are not clawed.

The secondary ramus of the uropod is of oval form and bears one long slender apical seta.

Dredged in ten fathoms, D'Entrecasteaux Channel, January, 1948.

This specimen bears a number of resemblances to the female described above and tentatively assigned to *Astacilla unicornis*, but agrees more fully with the diagnosis of *Neastacilla*. The only feature of *Neastacilla* which the specimen does not possess is that the groove separating the cephalon from the first pereion segment is present dorsally. Were the genus *Neastacilla* valid this specimen would have been assigned to that genus.

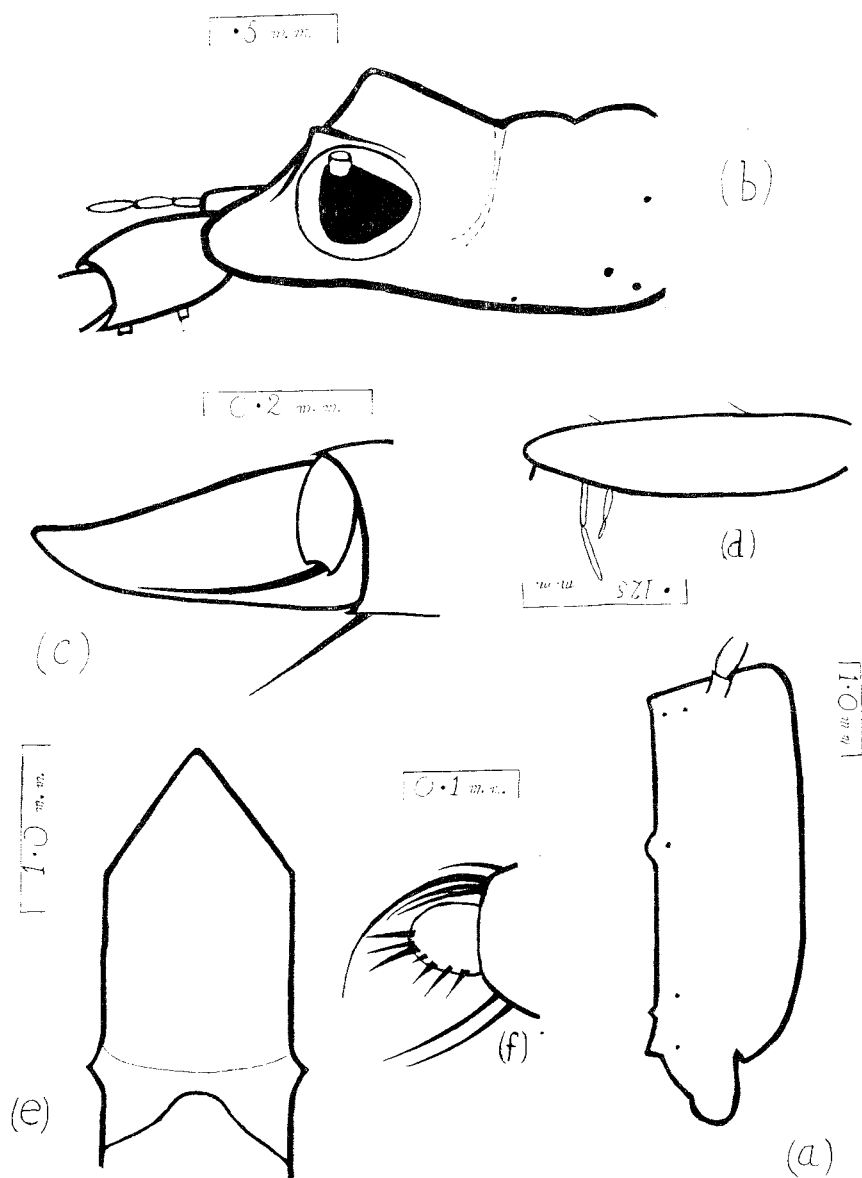


FIG. 7.—*Astacilla oculata*, female. (a) Lateral view of IVth pereion segment. (b) Lateral view of cephalon and first pereion segment. (c) Inner surface of right uropod. (d) Lateral view of flagellum of first antenna. (e) Pleon, dorsal view. (f) Dactylus of right first pereiopod.

Astacilla oculata, sp. nov.

(Fig. 7)

Known only from the female.

Body sparsely tuberculated, stout. Total length 19.5 mms. Large median dorsal cephalic projection. On either side of this are two smaller projections situated above the eyes. Several small tubercles are scattered over the general surface. There is a very slight median anterior projection of the cephalon. The eyes are large. The pigmented area is sub-triangular while the non-pigmented area is sub-circular. The pigmented area bears on the dorsal side a large tubercle.

The cephalon is separated from the first pereion segment by a dorsal groove. The segment bears three lateral tubercles. There is slight lateral downgrowth of the segment.

The second and third pereion segments are short, being less than one-half of the length of the cephalon and first pereion segment.

The fourth pereion segment is broad, bearing several small tubercles on the dorsal surface. In general form it resembles that of *Astacilla sheardi*, Hale, but is much deeper. At an approximate mid-dorsal position there is a low ridge. There is a postero-dorsal process. This process is not sufficiently sharp to be described as a spine. Immediately anterior to this process is a low sharp spine. Paired lateral lobes of the fourth pereion segment articulate with sockets in the anterior face of the fifth pereion segment. The fourth pereion segment is nearly one-quarter of the total length of the animal, fig. 7 (a).

The fifth to seventh pereion segments are broad in appearance and measure four-fifths of the length of the pleon.

The first two abdominal segments do not show any external evidence of segmentation. The segmentation of the third segment is only faintly visible on the dorsal surface. The pleon tapers to a point, fig. 7 (e).

The first antenna is short the flagellum not reaching the end of the first peduncular segment of the second antenna. The flagellum bears two fine dorsal setae and one sub-terminal and two ventral sensory appendages, fig. 7 (d).

The second antenna is not quite one-third of the total length of the specimen. The ratios of the segments reading in from and including the 'claw' are 1.25 : 2.0 : 2.25 : 1.5. The 'claw' on its inner surface bears a single row of minute teeth. They are of a recurved conical nature. The teeth number 120. The first peduncular segment of the second antenna bears on its ventral surface two rectangular processes. One of these has two very fine sensory hairs protruding from it. The other lacks these hairs, but it is possible that they were damaged either in life or in preservation.

The dactylus of pereiopod of the first pereion segment bears on its outer surface seven short, strong spinous setae. The inner surface is devoid of setae. One of the setae on the propodite is very long and curves over the dactylus, fig. 7 (f).

Pereiopods five to seven are not clawed. The coxal plates of all the thoracic limbs are not visible dorsally.

The 'secondary' ramus of the uropod bears one curved spine which is three-quarters of the length of the lateral ramus.

Dredge, D'Entrecasteaux Channel, January, 1948. Ten fathoms on scallop grounds on shelly bottom.

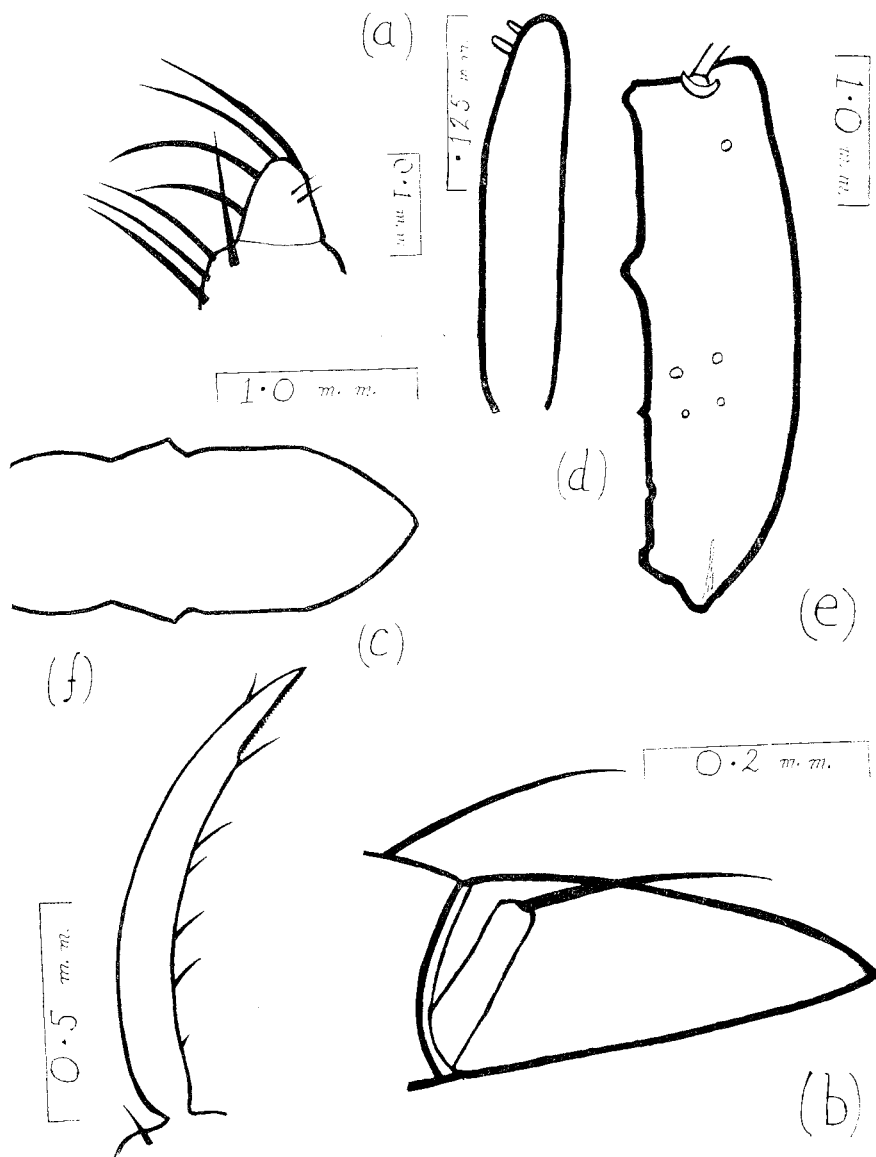


FIG. 8.—*Astacilla oculata*, young female. (a) Dactylus of the left first pereiopod. (b) Inner surface of right uropod. (c) Dorsal surface of pleon. (d) Lateral view of flagellum of first antenna. (e) Lateral view of IVth pereion segment. (f) Lateral view of 'claw' of second antenna.

On the condition of the dorsal groove separating the cephalon and the first pereion segment and the condition of the abdominal grooves this specimen differs from the diagnosis of *Neastacilla*. The dactylus of the first pereopod shows an interesting condition in which the setae are modified to form a number of spines. None of the setae are sufficiently modified to be regarded as a claw, unless the setae may be considered as claws.

Young female, fig. 8.

This specimen closely resembles the above that I believe it to be a young female of the species. If it is another species it must be very close to *Astacilla oculata*.

Total lengths of specimen 16.75 mms. General form very much as described above.

The tubercle on the dorsal surface of the eye is much smaller than in the female described above. There is a pair of small lateral tubercles on the second pereion segment. The relation of the length of the cephalon and first pereion segment to the length of the second and third segment are the same as above.

The fourth segment is of similar form but varies in the position of the tubercles, spines and ridges. The posterior process is blunt and flat on the dorsal surface. Anterior to the posterior process on the dorsal surface is a median groove, while approximately half-way along the dorsal surface of the segment is a sharp spine.

The sixth pereion segment has a pair of sharp dorsal spines.

The ratios of the segments of all the limbs are identical to those noted in the adult female. The first antenna has two sub-terminal sensory appendages, fig. 8 (*d*). The second antenna is of the same proportions as in the adult female and also bears teeth of the same form and number as the adult. In the diagram (fig. 8 (*f*)) only the teeth at the end of the 'claw' are shown.

The dactylus of the first pereopod has four long setae on the outer surface and on the inner surface two short spinous setae. The propodite bears a long spine.

The 'secondary' ramus of the uropod bears one long seta but the ramus is of different form than in the adult female.

The only difference in the measurements of the body is that the fourth pereion segment is one-fifth of the total length of the specimen.

Dredge in ten fathoms, D'Entrecasteaux Channel, January, 1948.

Discussion

A comparison of the known species of *Astacilla* and *Neastacilla* with the restricted diagnosis of the genus *Neastacilla* as given by Nordenstam yields many interesting points.

Doubts as to the validity of *Neastacilla* were cast by Nordenstam (1933) and later by Hale (1946) who remarked that he could see no valid reason for the genus, but as yet no critical work has appeared considering each point of the generic diagnosis in relation to present species. The lack of this criticism was probably due to the absence of intermediate species connecting the two genera, but the recent discovery last January of new species enable this work to be undertaken now with a greater degree of accuracy.

The genus *Neastacilla* was defined by Tattersall (1921) as follows: 'II Thoracic somite fused with the head and its lateral parts are not expanded downwards and forwards to cover partially the mouth organs. The abdomen is unsegmented, all the segments being fused into one piece'. Only two species were assigned to the genus, *falclandica* and *magellanica*, Ohlin, whose specific names give their localities.

This diagnosis was modified by Nordenstam 1833, to read 'first pereion segment coalesced with the head but separated from the head by a mere groove which is sometimes missing dorsally. Lateral parts of the 1st. pereion segment not expanded downwards and forwards. Abdomen with three segments indicated by shallow grooves, anteriorly from the pleotelson. Dactylus of first pereopod not expanded tapering towards end; "claw" missing. "Secondary" ramus of uropod furnished with a very long apical seta'. To this modified genus was added *amblyura* Stebbing (1905).

Astacilla was defined by Cordiner (1795) Singular Subjects of Natural History, and I shall point out salient features of this diagnosis later.

Nordenstam pointed out that, 'most species referred to *Astacilla* are imperfectly known as regards characteristics which are distinctive of *Neastacilla*'. It may therefore be asked whether there may not be some species intermediate between *Astacilla* and *Neastacilla*, thus perhaps rendering the genus *Neastacilla* superfluous.

Before proceeding to discuss the criticisms of recent workers levelled at the diagnosis of *Neastacilla*, it will be of assistance in clarifying the arguments if the salient features of each species be set out in tabular form.

	<i>Neastacilla</i> .	<i>Astacilla</i> .
a. Cephalic-thoracic Relationships.	Grooved.	f. Sutured.
b. First thoracic segment.	No lateral downward expansion.	g. Lateral & downward expansion.
c. Dactylus of first Thoracic Limb.	Tapering, clawless.	h. Blunt, clawed.
d. Three Anterior Abdominal segments.	Indicated by grooves.	i. Separate.
e. Secondary ramus of uropod.	1 long apical seta.	j. 2 seta.

The species mentioned previously as being recently discovered were dredged in eight fathoms in the D'Entrecasteaux Channel, living on red weeds. They were described under the names of *A. monoseta*, male and female; *inaequispinosa*, male and female; *unicornis*, female; *derwenti*, female; and *oculata*, female.

Considering the table point by point in light of previous criticisms based on the then known species and these described lately, we note the following—

a. Cephalic-thoracic Relationships

Nordenstam states that this is only minute difference and may vary in different species; and he considered it to be of little diagnostic importance. In *A. Monoseta*, the groove separating these parts of the body exhibits a certain sexual difference being more strongly developed in the female than in the male. As we shall see later, this species exhibits features a, g, c, i and e. This sexual dimorphism can be seen in *A. inaequispinosa*, which shows a, slightly, b; c or h; d;

j. a, slightly, in the latter species refers to fact that the groove is only very faintly present. In *A. algensis*, Hale, the groove appears to be absent dorsally yet this species shows j.

At the other extremes in *A. longicornis*, Sowerby, we see that the suture described in the diagnosis of the genus *Astacilla*.

This feature is very unstable as it can exist very well defined through stages to more or less absence at the same time the various species bearing mixed generic features.

b. First Thoracic Segment

Quoting Nordenstam 'in some species of *Astacilla* these expansions—judging by the literature on the subject—appear to be indistinct or quite absent'. This can be seen in such species as *A. mediterranea*, Kochler, and *A. deshaiesii*, Stephenson, which were nevertheless, assigned to the genus *Astacilla*.

This expansion can exist side-by-side with Neastacillid conditions, as is seen in *A. monoseta*, where we find a, g, c, d, and e.

From the above therefore, I conclude that this feature must only rank after specific and not generic diagnosis.

c. Dactylus of First Pereiopod

I cannot agree with Nordenstam on this feature being diagnostic. My principal reason for this is that the feature as defined after *Astacilla* exists beside Neastacillid features. *A. unicornis* possess features a; b; h; d; and e. One seta in this species is of sufficient size to be called a 'claw'.

Study of the illustrations of various authors shows that a certain amount of difference of opinion exists as to what may be called a 'claw'.

d. Condition of the Three Anterior Abdominal Segments

This feature was discarded by Nordenstam on the conflicting evidence shown by *A. longicornis*, Sowerby, and Tattersall's type figures for Neastacilla. In the specimens I examined there was a uniformity of this feature, that there is not sufficient data of the species to decide if a genus might be erected on this feature. I doubt if it might as, I believe it to be more in the nature of a feature common to the genus *Astacilla* but, similar to the sephatic thoracic relationships, in varying states of development.

e. Setae on Secondary Ramus of Uropod

The Astacillid feature of two setae in the secondary ramus of the uropod exists beside Neastacillid features in *A. inaequispinosa*, though the converse condition is not to be seen in any described species. This may be altered as the uropod has not been described in *A. marionensis*, Beddome and Kerguelensis, Vanhöffen. *A. monoseta* shows the single seta and other Neastacillid features and at the same time shows Astacillid feature in lateral and downward expansion of the first thoracic segment. It might seem that further Astacillid features may be found in some as yet undiscovered species.

There exists a series in the relative sizes of the setae on this ramus of the uropod. Starting with equal sized setae, as in *A. vicaria*, Hale, through the sub-equal condition seen in several species, to next stage where one seta is half of the length of the other as in *inaequispinosa* and *fusiformis*, Hale, followed by that seen in *amblyura*, Stebbing, where a rudimentary seta exists beside the large single seta to the end point of one single seta.

From the above comparisons it seems certain that Nordenstam's cautious remark that the genus *Neastacilla* might be rendered superfluous, has been verified not only by the recently discovered species from the channel but also by the longer known and described species from other localities.

Sexual dimorphism exists in other Isopods—notably—*Naesa bidentata* Bate and Westwood where the male and female were described as different species. In *A. monoseta* and *inaequispinosa* I have described what I consider to be the male and female of both species. In *monoseta*, I have used limb proportions as a guide as external appearances are very different. In *inaequispinosa* there is little dimorphism.

I must acknowledge the helpful advice and assistance of Professor V. V. Hickman during the preparation of this paper.

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