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XXX.—*Notes on Amphipoda, old and new.*

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[Plates VIII.–X.]

THE family Photidæ was divided in Boeck's system into three subfamilies—Photinæ, Leptocheirinæ, and Microdeutopinæ. Though the name *Microdeutopus* alludes to the peculiarity of the animal's second gnathopods being smaller than the first, the Microdeutopinæ included species in which the first gnathopods are smaller than the second. For this and other reasons explained in the 'Challenger' Amphipoda, p. 1062, and Sars's 'Crustacea of Norway,' p. 538, it has seemed desirable to relinquish Boeck's subdivision of the family. Della Valle, in his 'Gammarini,' p. 351, carries the process of amalgamation further, and unites the Photidæ and the Podoceridæ in one rather unwieldy family with the Corophiidæ. It is quite true that the three families are intimately related, but it is certainly a matter of convenience to keep them separate, and for this purpose the dorso-ventrally depressed body in the Corophiidæ and the hooked uropods in the Podoceridæ are useful characters, neither of them being present in the Photidæ. To borrow the words which Professor T. Thorell uses on a similar occasion—"The groups are *on the whole* and *in their typical forms* sufficiently different to deserve their separate denominations and the rank in the system which it has hitherto been customary to give them."

Our present concern is with that section of the Photidæ in which the first gnathopods are larger than the second, especially in the male sex.

In *Aora* the first gnathopod of the male has the fourth joint greatly produced, so as, in combination with the long finger, to make the limb complexly subchelate.

In *Microdeutopus* it is the fifth joint, instead of the fourth, which is produced to meet the finger.

In *Stimpsonella* (the name proposed by Della Valle for Spence Bate's preoccupied *Stimpsonia*) the first gnathopod agrees with that of *Microdeutopus*, but the second gnathopod has the prehensile angle of the sixth joint more or less produced. Bate and Westwood (vol. i. p. 284) say:—"This genus probably bears too close a resemblance to *Microdeutopus* to be retained as generically distinct." Sars also ('Crustacea of Norway,' p. 540) remarks that it is closely allied to *Microdeutopus*, "and should, perhaps, more properly be combined with it." An opinion to the same effect is rather more decidedly expressed in the 'Challenger' Amphipoda, p. 334. One is the more encouraged in regarding the character on which *Stimpsonella* is founded as of not more than specific value, because Della Valle distinguishes his own *Autonoë spiniventris* from two other species of the same genus by the mark that it has the prehensile angle of the first gnathopods in the male *not* prolonged, whereas in the other two species it *is* prolonged into a spiniform process. It may be noticed that on page 400 of Della Valle's work "gnatopodi posteriori" is merely a misprint for "gnatopodi anteriori." But in closely related forms a difference cannot consistently be given generic value in one gnathopod if it has only specific importance in the other.

In *Autonoë*, as it is commonly called, the first gnathopods of the male are simply instead of complexly subchelate, there being no process either of the fourth or the fifth joint to meet the finger. Here, too, the sixth joint is as broad and as large as the fifth, which is far from being the case in *Microdeutopus*. As regards the name of the genus, it seems clear that the discarded *Lembos* ought to be restored. Under this name, published without description in 1856, a genus was instituted by Spence Bate in 1857 with four species, of which some indeed belong to the earlier *Microdeutopus*, but one of them, *Lembos Websterii*, has been referred alike by Boeck, Sars, and Della Valle to *Autonoë*. Now *Autonoë* was not instituted by Bruzelius before 1859. To it he ascribed six species, two of which he wrongly supposed to be new, while the whole set belonged in fact to no less than five already established genera.

The definition which he gave of the genus was so comprehensive, therefore, as to be practically no definition at all. As five of his species could not fail to be distributed among the genera *Aora*, *Microdeutopus*, *Gammaropsis*, and *Protomedeia*, the only one left to be the type of the new genus was that which he calls *Autonoë longipes* (Lilljeborg). The minutely accurate observation of Sars distinguishes this by some rather small differences from the *Lembos Websterii* of Spence Bate, which Della Valle considers to be a synonym of it. The last-named author recognizes the inadequacy of the definitions given both by Bate and Bruzelius, but assigns the preference to the name *Autonoë*, because in 1870 it was redefined satisfactorily by Boeck. This is introducing into the rules of nomenclature a new principle which might lead to much confusion. *Autonoë* having become a synonym of the earlier *Lembos*, it was not open to Boeck to make a choice between the two. His reason for giving the preference to *Autonoë* may have rested on a misapprehension that *Lembos* had lapsed as a synonym of *Microdeutopus*, an error in which he has been followed by several writers. The genus *Lembos* will now contain the species *Websterii*, Bate, *longipes* (Lilljeborg), *megacheir* (Sars), *arcticus* (Hansen), *spiniventris* (Della Valle), *philacantha* and *kergueleni* from the 'Challenger' expedition, possibly, as Sars has suggested, *tenuis* (Dana), and, lastly, a new species to be presently described.

Lembos hirsutipes, sp. n. (Pls. VIII. & IX. B.)

The first side-plates in the male subacutely produced, subrhomboidal in the female. The third pleon-segment with the postero-lateral angles scarcely rounded.

The eyes are small. The first antennæ have a rather long and stout first joint, the remainder being broken off in all the specimens. In the second antennæ the third joint is less than once and a half as long as it is deep, much deeper than the fourth joint, which is as long as the first of the upper pair; the fifth joint is a little shorter than the fourth. The flagellum of four or five joints scarcely equals the length of the fifth joint of the peduncle. The mouth-organs do not appear to offer any distinctive features.

First Gnathopod.—In the male the second joint is broad, with a brush of very long setæ at the distal end of the hind margin, as in *Lembos longipes* (Lilljeborg); the small third joint has distally a transverse row of setæ, the fourth has two small groups on the hind margin, and the fifth has three. The fifth joint or wrist is considerably shorter than

the hand, but nearly as broad. The large and very broad hand has some small groups of setæ on its inner surface, on the hind margin, and near the palm, but none are very conspicuous. The palm has a deep narrow cleft between a broad inner and a long and narrow outer tooth. Beyond the latter, which is much longer than the corresponding tooth in *Lembos longipes*, the denticulate finger projects a little. The varying shape of this palm in different species of the genus will not easily be appreciated without comparison either of specimens or of figures. In the female the first joint is neither broad nor ornamented with setæ, and the palm has a comparatively small triangular indentation. The hand is much longer and slightly broader than the wrist, both being much broader than the second joint.

Second Gnathopod.—In the male the second joint is expanded, as in *Microdeutopus gryllotalpa*, Costa, oval, very nearly as broad as the side-plate, which is of about equal length and depth. The wrist is longer and broader than the hand, and has numerous groups of setæ adjoining each margin, those near the apices being the longest, the subapical of the hind margin curving towards and reaching beyond the hind margin of the hand. The hand has the front and hind margins nearly parallel, the setæ projecting from the former being very numerous and long, those of the latter forming six small groups of moderate length. The finger is small, curved, with its apex bending over beyond the palm. In the female none of the joints are broad; their relative lengths are about the same as in the male, but the hand is a little longer as compared with the wrist, neither of these joints having the front margin conspicuously setiferous except that the wrist has a bunch of long setæ at the apex; the hind margins are furnished as in the other sex; the finger does not reach beyond the palm.

First and Second Peræopods.—The two pairs are alike. In the male the large fourth joint in each is thickly clothed on both sides with long unfeathered setæ. The sixth joint has the front margin very convex. The finger is tolerably long, with the opening for the glandular secretion at a little distance from its apex. In the female the fourth joint has no conspicuous armature in either pair. All the marsupial plates are oval.

Third Peræopod.—The fourth joint has a spine at the apex of the hind margin; the fifth has two in this position and two on its inner surface; the sixth joint is twisted round, so that the short finger points backward instead of forward.

Fourth Peræopod.—The second joint carries several groups

of feathered setæ on its hind margin. The armature of the succeeding joints is nearly the same as in the third pair, but the sixth joint is straight instead of curved, and not twisted round.

Fifth Peræopods.—There is little doubt that these exceed in length the preceding pair, but none were found actually attached to the specimens.

Pleopods.—These carry two slender coupling spines on the peduncle and two cleft spines on the inner ramus. Each ramus has ten joints, but nevertheless the outer ramus is considerably shorter than the inner.

Uropods.—In the first two pairs the outer ramus is shorter than the inner; in the third pair there is no sensible difference in the length.

Telson.—The length and breadth are about equal. The apex is rounded, projecting a little beyond the usual pair of lateral processes, each of which is accompanied by a couple of setæ or slender spines.

The length of the animal, without the antennæ, is about three-twentieths of an inch, or 4 millim.

The specific name refers to the very distinctive feature that here the second peræopod of the male has the same hirsute adornment as the first peræopod. In this respect it differs from all species of the genus hitherto described.

For the locality see the remarks on the next species, the specimens of which were mixed up with those of *Lembos hirsutipes*.

Lemboides, gen. nov.

As in *Lembos*, the first gnathopod has neither the fourth nor the fifth joint produced to meet the finger, but the fifth joint is much broader and longer than the sixth, and the finger does not overlap the palm. The secondary appendage of the upper antennæ is shorter than the third joint of the peduncle.

The mouth-organs, peræopods, uropods, and telson are in general agreement with those of *Aora*, *Microdeutopus*, and *Lembos*, and, as in those genera, the gnathopods of the female differ much from those of the male. In the type species the third uropods, as well as the first and second, have the outer ramus shorter than the inner. It is at present doubtful whether this circumstance can usefully be included in the generic character.

Lemboides afer, sp. n. (Pls. IX. A. & X.)

The first side-plates in the male are longer than any of the

following pairs, but they are not acuminate. The large third segment of the pleon has its postero-lateral angles rounded; the sixth segment is scarcely visible dorsally.

The eyes are small and dark.

First Antennæ.—The first joint is rather longer and much stouter than the second; the third is rather more than a third of the first in length. The flagellum consists of about fifteen joints, of which the last is minute, the rest moderately long. The secondary flagellum is very narrow, two-jointed, not equal to the first of the primary, with the terminal joint minute. On one antenna of a female specimen this appendage consisted of three joints, of which the first was shorter than the second, the whole appendage equalling in length the first joint of the principal flagellum. The appendage of the companion antenna was normal.

Second Antennæ.—The third joint is equal in length and depth, having a winged appearance on the lower side. The fourth joint is much narrower, but more than two and a half times as long. The fifth joint is shorter and much narrower than the fourth, but longer than the three- to four-jointed flagellum. The lower antennæ, though with a much longer peduncle, are, on the whole, considerably shorter than the upper.

The mouth-organs offer no specially distinguishing features.

First Gnathopod.—In the male the second joint is moderately broad, carrying but few setæ; the fourth joint has a very acute apex; the fifth is of great length and breadth, much broader than the second, which it partially receives in a channelling of its front margin; its hind margin is serrulate and setiferous. On its straight distal border is seated the much narrower hand, which has several small groups of setæ on each margin and some on the inner surface. The palm is formed by a strong tooth near the hinge of the finger and a very small tooth at the other extremity, between them being a tooth of intermediate size, separated from the largest tooth by a broad denticulate cavity. The finger, with serrate inner margin, exactly reaches the small tooth of the palm, below which is inserted a stout spine. In the female the wrist is not much broader than the second joint or the hand. It is densely setose on the hind margin. The hand is abundantly setose on both margins; its palm is not dentate and is overlapped by the serrate finger. The second joint has several setæ projecting from the front border; there is a group on the apex of the third and several groups on the fourth joint.

Second Gnathopod.—In the male the second, third, and fourth joints are nearly as in the first pair, but on a smaller scale;

the wrist about equals the second joint in length and breadth, it is adorned with long feathered setæ on the front and shorter groups on the hind margin; the hand, which is considerably shorter than the wrist and narrower, though not extremely so, is similarly furnished; its palm has a single denticulate excavation between the point where the palmar spine is inserted and the tooth adjoining the hinge of the finger; the latter does not overlap the palm, and appears to have but one denticle on its inner margin. In the female the second joint carries some very long feathered setæ on the front, and this is the case also with the fourth joint. The wrist is not quite so long as the hand, proximally very narrow, but distally widest of all the joints, fringed with long feathered setæ on the front and shorter setæ on the back of the widened part. The long and rather narrow hand is similarly furnished, but with its width little varying throughout. The small finger just fits the convex palm.

First Peræopod.—The fourth joint is ornamented on the front margin with two slightly separated series of long plumose setæ. The marsupial plates are comparatively elongate.

Second Peræopod.—As in some other species within this group of genera, this pair of limbs is less setose than the preceding. The fourth joint has two series of setæ on the front margin, but the upper one is insignificant and the lower less developed than in the preceding pair.

The other peræopods are of the usual type.

Pleopods.—There are two coupling spines and three cleft spines to each pleopod. Each ramus has from fifteen to seventeen joints, but the outer is considerably shorter than the inner, its joints being smaller than those of its companion.

Uropods.—In all three pairs the outer ramus is decidedly shorter than the inner. The inner ramus of the second pair is stouter than any of the other rami.

Telson.—The length and breadth are equal, the apex shallowly rounded, the lateral processes accompanied by five spinules apiece.

Length, without the antennæ, about a quarter of an inch.

The specific name refers to the locality where the specimens were found, this being at or near the Cape of Good Hope. They were presented to the Copenhagen Museum by Professor Studer, and have been entrusted to me for examination by Dr. H. J. Hansen. The contents of two tubes had, Dr. Hansen informs me, for some reason been put together into a single tube. Upon inspection it proved that there were mixed up

males of two species and females of two species. As is well known, in this section of the Amphipoda the females differ rather strikingly from the adult males of their respective species. Nevertheless there can be little doubt that the sexes have been assorted rightly, as there are numerous points of resemblance between the specimens which have been classed as male and female of the same species, and between the two species there is a considerable difference of size to be taken into account with other important distinctions.

Helaidæ.

This family at present contains only the remarkable genus *Neohela*, S. I. Smith, which Sars refers provisionally to the Corophiidæ, and which Della Valle places in the Icilidæ. The latter author rightly remarks that the *Neohela serrata* of the 'Challenger' Amphipoda cannot properly stand in that genus, and suggests that it comes near to *Mœra rubromaculata* in the Gammaridæ. As soon, however, as the account of the species of *Melphidippa*, Boeck, appeared last year in the admirable and masterly work on the Crustacea of Norway by G. O. Sars, there could be no hesitation in assigning the 'Challenger' species to that genus; and, though the two fragmentary specimens of what now provisionally becomes *Melphidippa serrata* came from Kerguelen Island, far in the south, it is not altogether impossible that the new name may be a synonym of *Melphidippa borealis*, Boeck.

Dulichiidæ.

In this family Sars makes the *Cyrtophium Darwinii* of Spence Bate a synonym of *Lætmatophilus tuberculatus*, Bruzelius. This, however, is an oversight, since in *Lætmatophilus* there are only two pairs of uropods, whereas *Cyrtophium*, or *Platophium* as it is more properly called, has three pairs. *Platophium Darwinii* (Bate) is identified by Della Valle with *Platophium brasiliense*, Dana. In any case, the species named by Spence Bate is common on the south coast of England, and the character of its pleon agrees with the figures and description given of it by Bate and Westwood ('Sessile-eyed Crustacea,' vol. i. p. 481), although from the erratic lettering of their figures confusion may easily arise.

EXPLANATION OF THE PLATES.

Plate VIII.

Lembos hirsutipes, ♂.

Lateral view of the animal, with line above showing the actual length.

a.s., first joint of upper antenna; *a.i.*, lower antenna; *m*, mandible; *l.i.*, lower lip; *mx.* 1, first maxilla; *mxp.*, maxillipeds; *gn.* 1, *gn.* 2, first and second gnathopods; *prp.* 2, 3, 4, second, third, and fourth peræopods; *plp.*, a pleopod; *ur.* 1, 2, 3, first, second, and third uropods; T, telson.

Plate IX. A.

Lemboides afer, ♀.

a.i., lower antenna; *gn.* 1, *gn.* 2, first and second gnathopods; *prp.* 1, 2, first and second peræopods.

Plate IX. B.

Lembos hirsutipes, ♀.

a.i., lower antenna; *gn.* 1, *gn.* 2, first and second gnathopods; *prp.* 1, first peræopod.

Plate X.

Lemboides afer, ♂.

Lateral view of the animal, with line above showing the actual length.

a.s., upper antenna; *a.i.*, lower antenna; *l.s.*, upper lip; *m*, mandible; *l.i.*, lower lip; *mx.* 1, first maxilla; *mx.* 2, second maxilla; *mxp.*, maxillipeds; *gn.* 1, *gn.* 2, first and second gnathopods; *prp.* 2, 3, 5, second, third, and fifth peræopods; *ur.* 1, 3, first and third uropods; T, telson.

XXXI.—*On Budding in* Perophora.

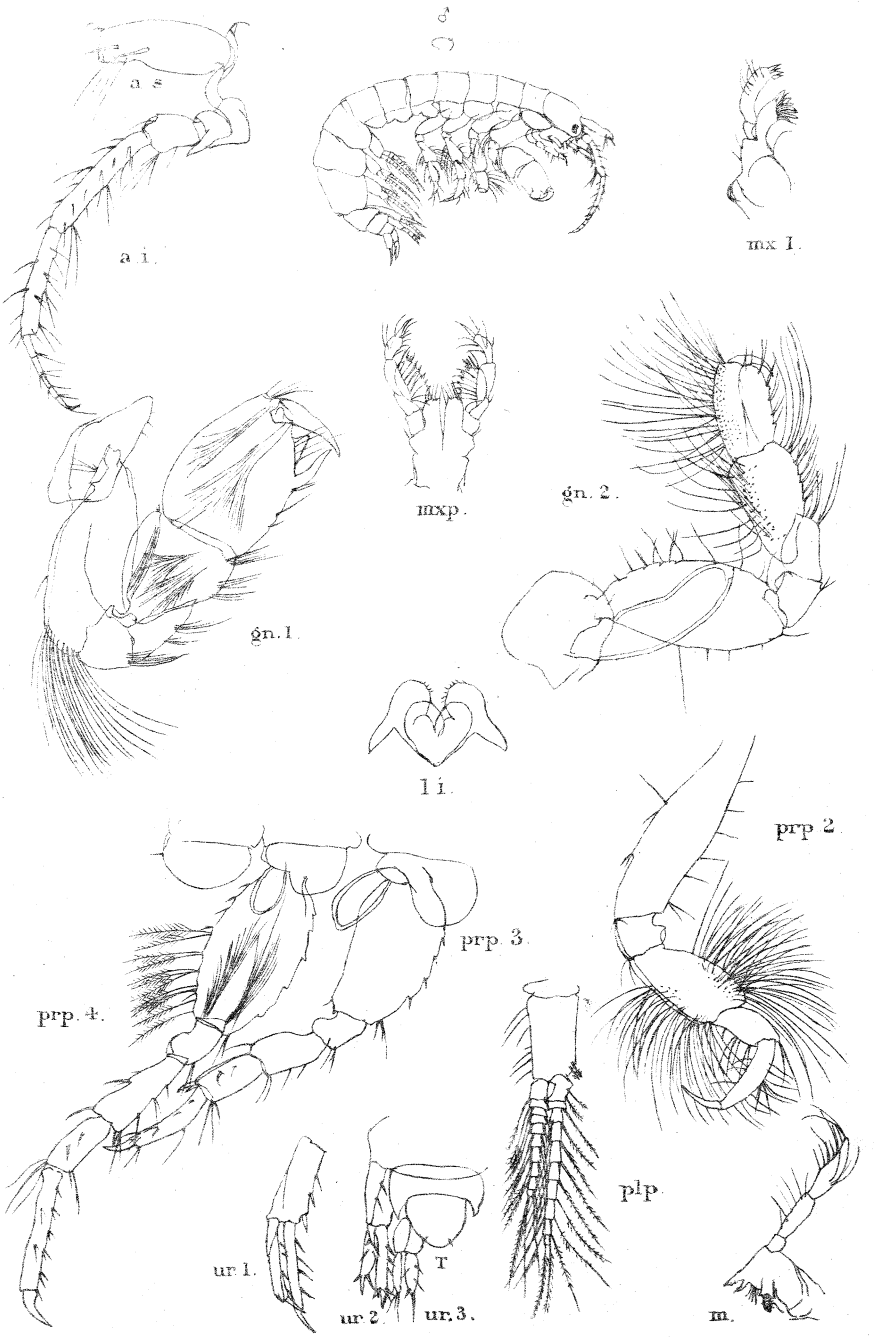
By George Lefevre*.

While the Johns Hopkins Marine Laboratory was stationed at Beaufort, N. C., during the summer of 1894, I collected material for the purpose of studying the development of the buds of this Ascidian. *Perophora viridis*, Verrill, was found growing luxuriantly on the wharf-piles, and ample material was easily obtained.

My main object in undertaking this work was to compare the bud-development of this form with that of *Botryllus*, as described by Hjort †, and especially to determine, if possible, the origin of the nervous system.

* From the 'Johns Hopkins University Circulars,' vol. xiv. no. 119, pp. 75–77.

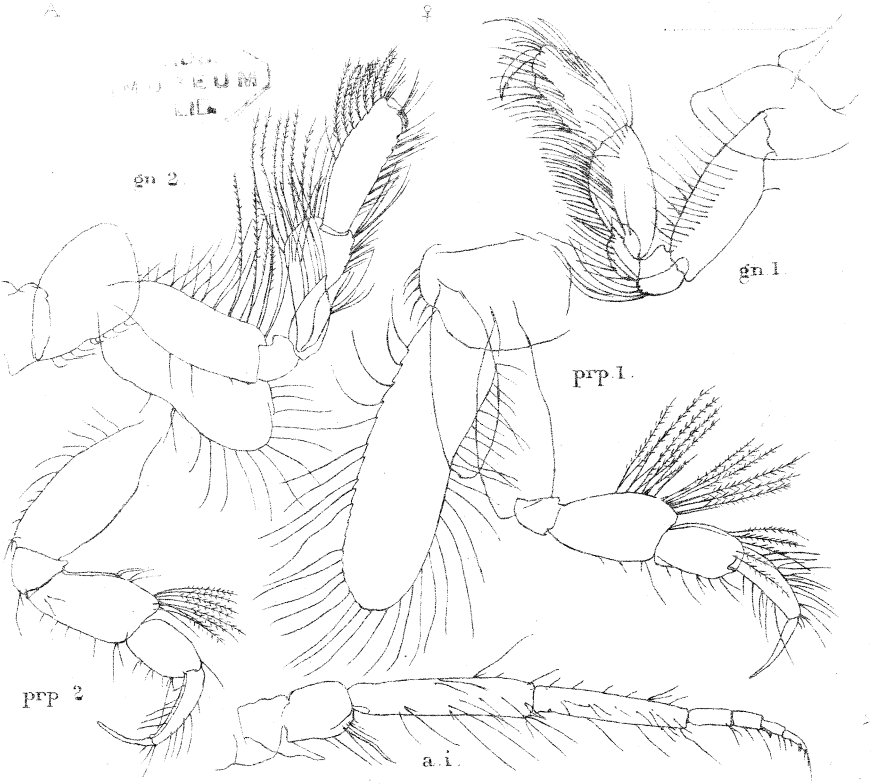
† Mitth. Zool. Stat. Neapel, x. Bd., 1891–1893.



T.R.R. Stebbing del.

LEMBOS HIRSUTIPES. n. sp.

Mintern Bros. lith.



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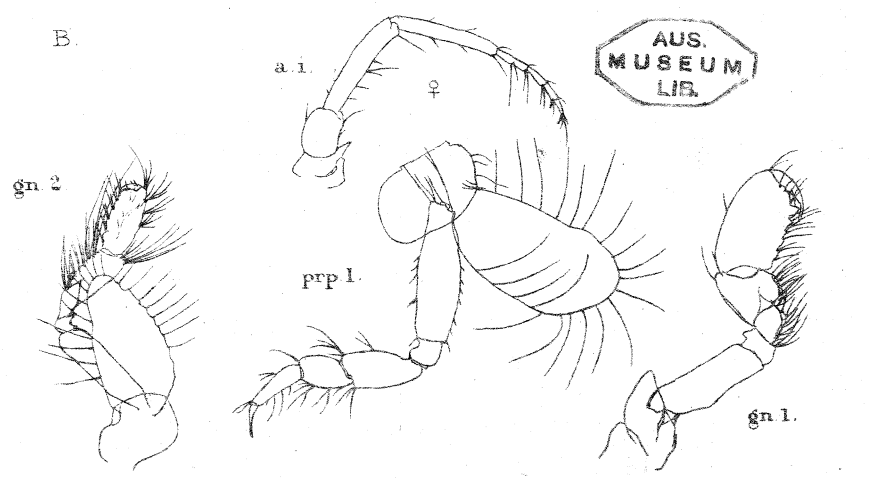

T. R. R. Stebbing del. Mintern Bros. lith.

LEMBOS HIRSUTIPES. n. sp.