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**A REDESCRIPTION  
OF *PEREIONOTUS TESTUDO* (MONTAGU)  
(CRUSTACEA : AMPHIPODA)  
WITH OBSERVATIONS  
ON THE GENERA *PEREIONOTUS*  
BATE & WESTWOOD  
AND *PALINNOTUS* STEBBING**

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**ABSTRACT**

A male specimen of *Pereionotus testudo* (Montagu) is fully described and figured. Comparison between this specimen and the male of *Palinnotus thomsoni* (Stebbing) (the first description of a male under this genus, by J.L. BARNARD, in press) is also included. The study shows that the observations of STEBBING (1906) and CHEVREUX & FAGE (1925) on the monotypic genus *Pereionotus* Bate & Westwood contain many oversights and that the males of *Pereionotus* and *Palinnotus* Stebbing are identical in respect of the structure of the first maxilla, uropods 2 and 3 and the proportionate size of the maxilliped outer plate. Hence, it is pointed out that there is at present no valid criterion left to distinguish these genera from one another. It is also felt possible, therefore, that earlier authors described *Palinnotus* on the females of *Pereionotus*. A detailed discussion on these aspects is given.

The study further suggests that the presence of a small triangular inner plate for the first maxilla in *P. thomsoni*, described by J.L. BARNARD (in press), will have to be checked on materials from different localities before its validity in generic separation can be established. The same applies also to the presence of an inner plate on the lower lip in *Palinnotus alaniphlias* J.L. Barnard and *P. thomsoni*.

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## INTRODUCTION

During the course of my studies on the marine amphipoda of the south Indian waters, I obtained a single male specimen of the interesting phliantid amphipod, *Pereionotus testudo* (Montagu). A detailed study of this species has shown that some of the characters hitherto considered as valuable in distinguishing *Pereionotus* Bate & Westwood from *Palinnotus* Stebbing are really not so. Since the creation of the latter genus in 1900 with *P. thomsoni* (Stebbing) as its type from Australia, three more species have been added to the genus from widely distant regions of the Indo-Pacific namely, *P. natalensis* K.H. Barnard from south Africa and India; *P. holmesi* Gurjanova from the Japan sea and *P. alaniphlias* J.L. Barnard from Hawaii. But the genus *Pereionotus* is even now monotypic and the only dependable description of the type is by CHEVREUX & FAGE (1925). Although their study rectified a few of the doubts found in STEBBING'S (1906) description of this genus, it still contained omissions and oversights. The purpose of this paper is, therefore, to redescribe the species fully and make a reassessment of the two genera.

Gratitude is expressed to the following persons and agencies for helps rendered during the course of this investigation. To Dr. N. KRISHNA PILLAI, Reader in Marine Biology, University of Kerala, for his guidance and encouragement; the University of Kerala, for providing space for the study and the Government of India for the support.

I particularly thank Dr. J.L. BARNARD, Smithsonian Institution, Washington, for supplying me with details of a forthcoming paper by him on the male of *Palinnotus thomsoni*.

## SYSTEMATICS

Suborder : GAMMARIDEA

Family : PHLIANTIDAE

Genus : *Pereionotus* Bate & Westwood

*Pereionotus testudo* (Montagu)

*Phlias rissoanus* Spence Bate, 1862 : 88, pl. 14 (A), fig. 2.

*Pereionotus testudo* Stebbing, 1906 : 202; Chevreux & Fage, 1925 : 142-144, figs. 142 & 143.



Material : A single male, orange-red in life, obtained by washing algal and weed scrapings collected from a floating buoy off the Pamban bridge, Gulf of Mannar, India.

#### MALE.

Body depressed, prominently ridged; cephalon short, with a slight, median transverse depression; eyes large and placed almost in the centre of the cephalon; peraeon segments subequal in length, dorsally elevated into strong laterally compressed, blunt and posteriorly directed carinae, beset with fine setules, the carinae becoming larger towards the hind end. Pleon flexed underneath the peraeon, first two segments resembling the last segment of peraeon, with projecting dorsal carinae, that of 2nd pleon segment nearly triangular and pointing upwards, ventral margins of both segments slightly convex and with rounded posteroventral corners. Third pleon segment roughly oblong, with a straight ventral border and a slightly angular posteroventral corner. Fourth pleon segment smaller than third, but nearly of equal depth, fifth and sixth not clearly demarcated from one another. Telson a perfect triangle, reaching the distal border of 3rd uropod, ending in a blunt apex, lateral borders very slightly convex and each carrying a slender setule in the distal half. Coxae laterally projecting, first three as deep as corresponding segments, oblong, first slightly broadened below and with a concave anterior margin, 4th deeper than the segment, with posterodistal excavation, 5th to 7th small and faintly bilobed.

Antennae small; first larger, 1st segment of peduncle very stout, lower border distally somewhat projecting and shelf-like, carrying a short tooth, 2nd segment shorter and much narrower, almost squarish, lower border with a small distal projection (or tooth?), 3rd segment triangular, shorter than 2nd, flagellum composed of a very minute segment carrying an apical tuft of rather long setae. Antenna 2 inserted a little behind the first, only 3 free segments for the peduncle, 1st small, 2nd and 3rd subequal, flagellum 2-segmented and shorter than last peduncular segment, 2nd segment of flagellum minute and with an apical tuft of setae.

Upper lip lost in dissection. Incisor process of mandible tridentate, lacinia mobilis broad and strongly toothed, spine row consisting of 4 flat spines, molar obsolete and produced into a setiform process, palp absent. Maxilla 1 without inner lobe, outer lobe moderately large, distally carrying 5 spine-teeth, one of these small and pointed, the rest blunt and gently curved, palp 1-segmented, placed in a shallow declivity at the distal third of



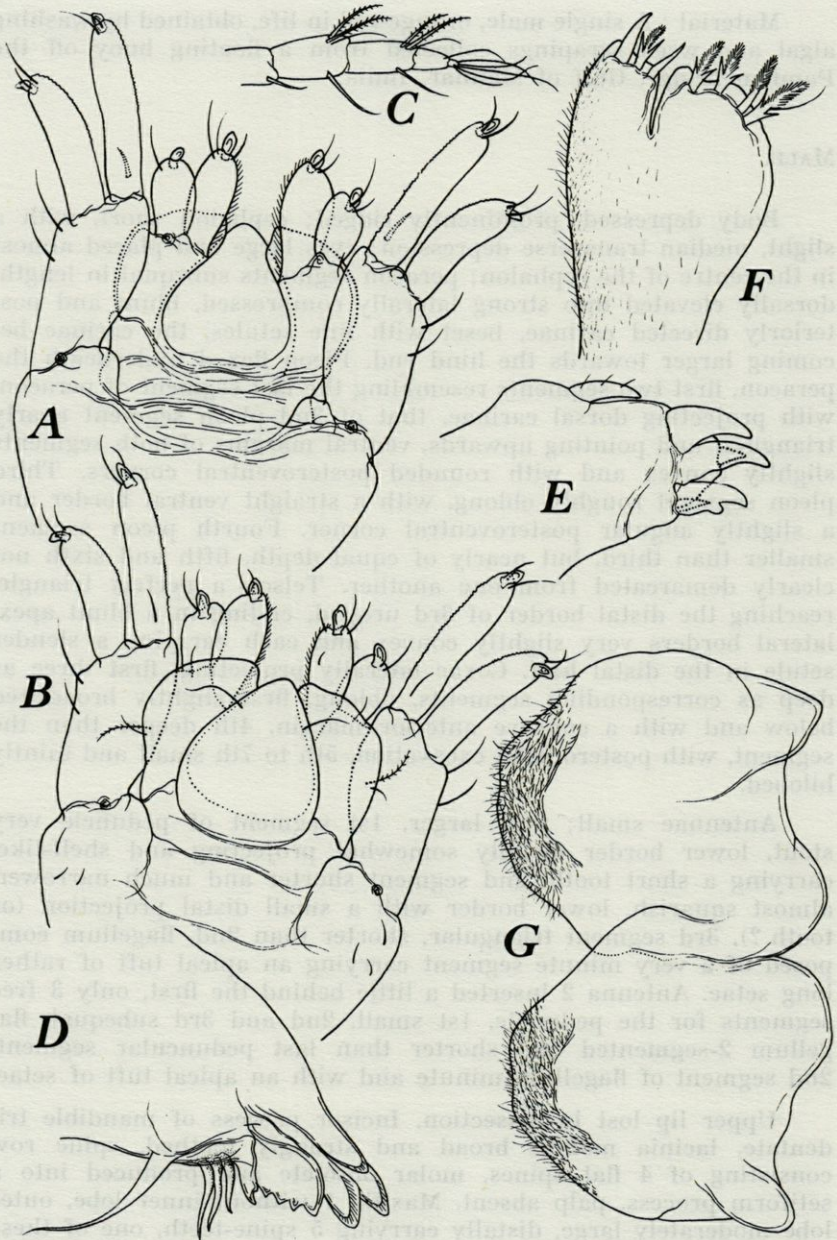


FIG. 1. — *Pereionotus testudo* (Montagu), male, 2.7 mm; A, urosome with uropods 1, 2 & 3 (ventral view); B, urosome with uropods 1, 2 & 3 (dorsal view); C, antenna 2; D, mandible; E, F, maxillae 1, 2; G, lower lip.



outer margin of the outer lobe and carrying 3 outer setules. Lobes of maxilla 2 coalesced except near apex and hairy, free portion of inner lobe broader than that of outer, both distally subtruncate and carrying characteristic feathery spine-teeth, 4 on the inner and 1 on the outer lobe, latter having in addition, 2 normal spines. Lower lip without inner lobes, outer lobes broad, distal part broadly rounded and hairy, mandibular processes very short. Inner lobe of maxilliped reaching beyond distal margin of 1st endopod segment, roughly rectangular, distal margin carrying 2 short spines, outer lobe broad and reaching the distal end of the endopod, inner and distal margins pectinate, former with setules, inner surface hairy, endopod 3-segmented, 1st segment longer than 2nd, unarmed, 2nd with a few setae near inner apex, 3rd segment about half length of 2nd, nearly conical and apically armed with 5 long, slender setae.

Gnathopods 1 and 2 simple, subequal in size, feeble and sparsely setose; basis of 1st about as long as next 3 segments combined, ischium more than half the length of basis, merus roughly triangular, carpus subrectangular, half as long as propodus, propodus equal to the combined length of merus and carpus, narrow oblong, with a medial inner row of pectinate spines, proximal part of inner surface pubescent, inner border with a few setules and a strong spine near finger hinge. Dactylus stout, ornamented, a little curved, pointed and about half as long as propodus. Basis of 2nd gnathopod slightly longer than ischium, merus and carpus as in the 1st gnathopod, propodus narrow, a little longer than merus and carpus combined, inner border with a distal spine and 2 setules at finger hinge, dactylus half as long as propodus and with a blunt tip. First pereopod shorter than 2nd, otherwise subsimilar and very much resembling the gnathopods, basis very short, subequal in length to propodus, distally widening, ischium one third shorter than basis, rectangular, merus and carpus small, together only as long as propodus, outer margin in both bulging, propodus similar to that of 2nd gnathopod and dactylus as in the 1st. Pereopods 3-5 robust, slightly increasing in length, basis of 3rd and 4th much expanded and nearly circular, ischium and merus subequal in length, latter trapezoidal, expanded on the outside and distally projecting over carpus, carpus small, subequal in length to ischium, propodus and dactylus subsimilar to those in 1st pereopod, former longer than any of the preceding segments. Basis of pereopod 5 very short, only one third longer than ischium, ischium subequal in length to merus, outer distal part of the latter considerably projecting and distally rounded, carpus subtriangular, with an inner distal spine, propodus and dactylus as in pereopod 3. All the pereopods poorly armed.



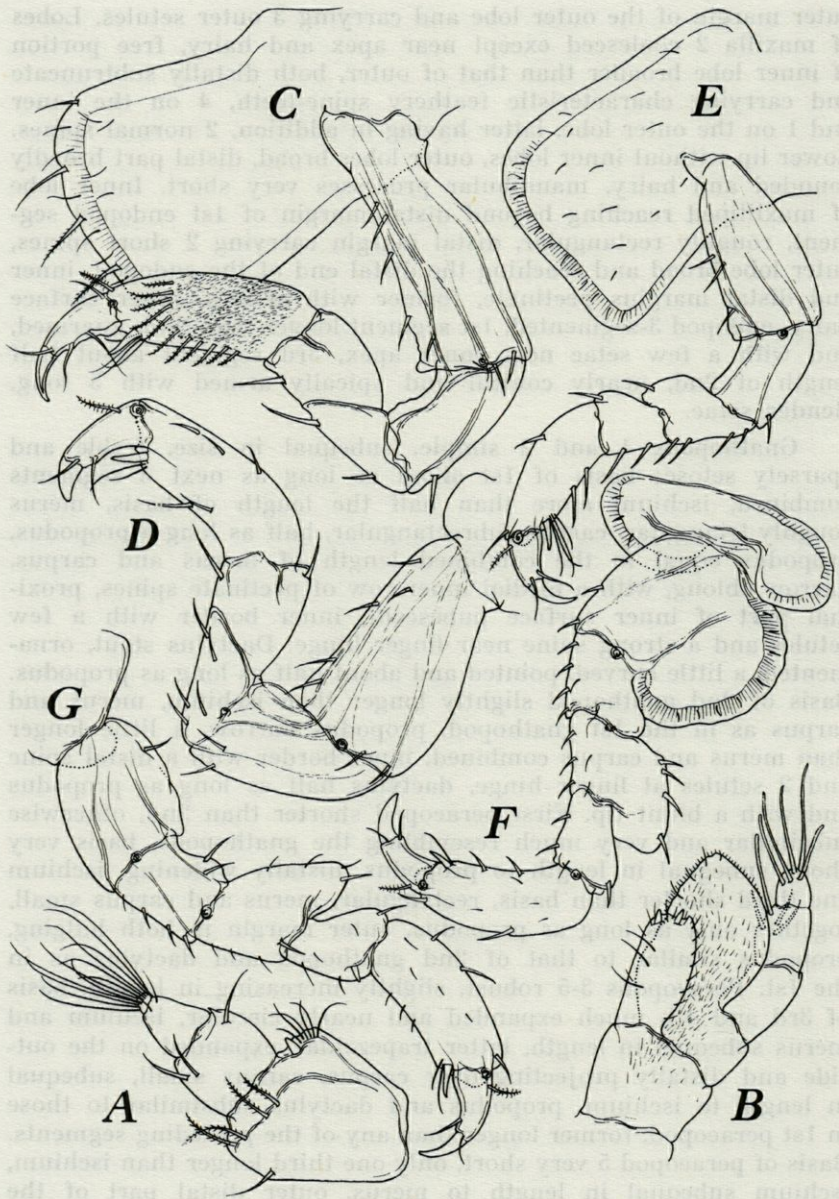


FIG. 2. — *Pereionotus testudo* (Montagu), male, 2.7 mm; A, antenna 1; B, maxilliped; C, D, gnathopods 1, 2; E, F, G, peraeopods 1, 3, 5.



Uropods 1 and 2 subsimilar in shape and biramous, 2nd only about as long as peduncle of the 1st; peduncle of 1st uropod distally broadening, as long as inner ramus, rami almost cylindrical, minutely crenate along margins, outer 1/5 shorter than inner, both armed at apex with a blunt spine and 2 setules. Peduncle of 2nd uropod nearly as long as the longer inner ramus, rami club-shaped, each distally armed with a blunt appendix and 1 or 2 setules, inner margin of inner ramus faintly hairy. Third uropod very much degenerated, its peduncle alone represented by a subtriangular stump, lying closely pressed against outer margin of telson, slightly overlapped by it and hidden by 2nd uropod in ventral view, so that in dorsal view the rami of uropod 2 appear to arise from this (which resulted in the view expressed by the earlier authors that one of these uropods is wanting). There is no setation on this vestigial appendage.

#### DISCUSSION

As indicated in the introduction, the only dependable estimation of *P. testudo* is that by CHEVREUX & FAGE (1925). But even their study contains a few oversights. In the first segment of the peduncle of antenna 1, CHEVREUX & FAGE have shown a simple notch which in my specimen lodges a fairly stout tooth. The figure of the mandible given by these authors is very small and indistinct. This appendage has a three or four-toothed incisor, a broad 4-dentate lacinia mobilis, a row of 4 spines and a very indistinct molar lobe, produced into a setiform process. CHEVREUX & FAGE have illustrated the first maxilla as a simple lobe carrying a cluster of 6 spines. In my specimen, the outer lobe (inner lobe is absent) carries 5 teeth, 3 of which are large and blunt and the remaining 2 rather sharp. The palp is small but distinct, with 3 small outer setae. CHEVREUX & FAGE did not observe the palp. They have illustrated the outer lobe of maxilla 2 as pointed, which in my material is truncate like the inner; both lobes carrying strong, pectinate spines and the surface armed with fine spinules. CHEVREUX & FAGE seem to have overlooked the characteristic inner medial spination and the pubescent nature of the proximal inner surface of the 6th article of the first gnathopod.

According to STEBBING (1906) female of *Pereionotus* differs from that of *Palinnotus* in : (1) the structure of the upper lip. (2) the absence of a palp for the first maxilla, (3) the structure of the maxilliped and (4) the structure of the uropods. However,



subsequent studies on both the genera have necessitated substantial modifications in the definitions given by STEBBING. Hence, each of the above characters requires detailed examination.

(1) UPPER LIP : As the upper lip was lost during dissection, I am not in a position to comment on its structure in my material. At any rate, the condition of this appendage does not appear to provide any useful distinction between the two genera, as is indicated by J. L. BARNARD in a forthcoming paper by him on *Palinnotus thomsoni*, from western Australia.

(2) FIRST MAXILLA : In the genus *Pereionotus* the first maxilla is without a palp (STEBBING, 1906, p. 200), whereas the palp is represented by a small spinule in *Palinnotus* (p. 202). If this distinction has any significance, my specimen should be assigned to *Palinnotus* and not *Pereionotus*. However, in the definition of the genus *Pereionotus*, STEBBING observes "palp wanting, its place indicated by a bulge of the margin". CHEVREUX & FAGE also figured the first maxilla of *P. testudo* without the palp, but with "the bulge of the margin". Since the bulge alluded to is distinct in my specimen also, it is possible that earlier authors overlooked the small palp. Moreover, J.L. BARNARD (1970) in his revised diagnosis of the genus *Palinnotus* states, "maxilla 1 with variable palp, either represented by a spine, possibly absent or formed of a short flat plate"; which means the presence or absence of a palp for the first maxilla is not a crucial character in generic separation. If this is so, then couplet 3 of J.L. BARNARD's (1964) key becomes partially invalid.

(3) MAXILLIPED : According to STEBBING (1906), the outer plate of the maxilliped reaches the end of the second joint of the palp or further in *Pereionotus*, while in *Palinnotus* it reaches slightly beyond the 3-jointed palp. In all the species of *Palinnotus*, the outer plate of the maxilliped reaches or even slightly overreaches the tip of the palp. The same is true of *Pereionotus* also (see CHEVREUX & FAGE, fig. 143 and my illustration fig. 2 : B). In this connection it may be noted that DELLA VALLE's (1893) figure of this appendage is different from that given by CHEVREUX & FAGE. It would appear that DELLA VALLE went wrong in this respect or that his specimens are different from those of CHEVREUX & FAGE. At any rate, one may safely conclude that the maxilliped shows variations in its structure and, therefore, does not offer any valid distinction between the two genera.

(4) UROPODS : The only useful criterion now left to distinguish the two genera is the structure of the uropods. As stated already, my specimen possesses all the uropods — first well developed and biramous; second with a comparatively small peduncle and two distinct rami and the third in the form of a flattened,



distally broadening and projecting lamina, closely applied to the lateral sides of the telson. According to STEBBING (1906), female of *Pereionotus* has only two pairs of uropods (first and third), the second pair not developed. In the male he observed all the three pairs developed, though the third is described as being composed of a "single ramus not longer than broad, much shorter than peduncle". This description of the third uropod is confusing since this appendage is indeed a simple flattened plate in both the sexes, not differentiated into peduncle and ramus. I am inclined to suspect that both STEBBING and CHEVREUX & FAGE overlooked uropod 3 in the female and considered uropod 2 as uropod 3. Further, CHEVREUX & FAGE did not observe uropod 3 in the male.

In both *Palinnotus* and *Pereionotus* all the three pairs of uropods are present, in both sexes (see CHEVREUX & FAGE, fig. 143; J.L. BARNARD, 1970, fig. 148e and my figs. 1 A & B). In the female the second pair is uniramous and in the male biramous. This conclusion is fully in agreement with the forthcoming paper by J.L. BARNARD where he describes for the first time a male of *Palinnotus*.

The third uropod shows distinct sexual difference in its shape; in the female it is triangular, narrowing distalwards, but remotely oblong in the male. Table I gives a comparison of my specimen and the male *Palinnotus* described by J.L. BARNARD.

In his key to the family Phliantidae, J.L. BARNARD (1964) observes (couplet 3) that in *Palinnotus* the lobes of the second maxilla are separate, but fused in *Pereionotus*. In his paper in press, he has again stated that the lobes of the second maxilla are separate in *Palinnotus thomsoni* also. However, while describing *Palinnotus alaniphlias* J.L. BARNARD (1970) himself stated that the lobes of the second maxilla are distinct from one another apically, but coalesced basally. According to STEBBING (1906), maxilla 2 of *Pereionotus* has the inner and outer plates fused except at the apex. It is therefore obvious that in both genera the second maxilla is identical; the lobes fused basally and distinct distally.

From the details discussed so far, it is clear that *Pereionotus* and *Palinnotus* are identical in every important character. However, in his paper on *P. thomsoni* (in press) J.L. BARNARD has described for the first maxilla a small triangular inner plate and for the lower lip, a fused inner lobe. In all the species of *Palinnotus* and *Pereionotus* so far described, the first maxilla has no inner plate. Similarly, in no species except *Palinnotus alaniphlias* and *P. thomsoni*, the lower lip has an inner plate. Therefore, these two characters will have to be checked on materials from different localities before their validity in generic separation could be



TABLE I

	<i>Percionotus testudo</i> (male)	<i>Pallinotus thomsoni</i> (male)	<i>Pallinotus alaniphlias</i> (female)
Cephalon	with median transverse depression	with median transverse depression	with median transverse depression
Rostrum	weak	weak	weak
Peraeonites	first with 1 and the rest with a pair of dorsal carinae; with lateral tubercles	first with 1 and the rest with a pair of dorsal carinae; with lateral tubercles	first with 1 and the rest with a pair of dorsal carinae; with lateral tubercles
Pleonites	1 and 2 with dorsal carinae	1 and 2 with dorsal carinae	1 and 2 with subdorsal bulge
Pleonal epimera 1-3	1 and 2 with rounded posteroventral corners, that of 3rd slightly angular	not known	1-3 with rounded-quadrate posteroventral corners
Telson	triangular, reaching distal border of uropod 3	triangular, reaching distal border of uropod 3	triangular, reaching beyond distal border of uropod 3
Coxa 4	with posterodistal excavation	with posterodistal excavation	with posterodistal excavation
Coxa 7	not fused with peraeonite 7	coalesced with peraeonite 7(?)	coalesced with peraeonite 7
Antenna 1	first article of peduncle with a tooth on upper distal end	first article of peduncle without tooth on upper distal end	first article of peduncle without tooth on upper distal end
Upper lip	not observed	with minor bilobation	not known
Maxilla 1	without inner lobe; with palp carrying 3 outer setules	with triangular inner lobe; with fleshy coniform palp carrying 2 outer setules	without inner lobe; with flat coniform palp carrying 1 outer setule
Maxilla 2	lobes coalesced except near apex	lobes coalesced except near apex (figure)	lobes coalesced except near apex
Lower lip	without inner lobe	with coalesced inner lobe	with separate (?) inner lobes
Maxilliped	outer plate reaching distal end of endopod, with hirsute inner surface	outer plate reaching distal end of endopod, with non-hirsute inner surface	outer plate reaching distal end of endopod, with non-hirsute inner surface
Gnathopod 1	article 5 without pectination of inner surface; article 6 with medial inner row pectinate spines and pubescent inner surface	article 5 with pectination of inner surface; article 6 with medial pectinate spination and pubescent inner surface	article 5 with pectination of inner surface; article 6 with inner series of «asparagoid spines and numerous short prickles».
Gnathopod 2	article 5 without pectination	article 5 with pectination of lower inner surface	article 5 without (?) pectination
Peraeopod 3	article 4 trapezoidal	article 4 trapezoidal	article 4 trapezoidal
Peraeopod 5	article 2 without distal constriction and posterior expansion; article 4 with outer expansion	article 2 distally constricted, but without posterior expansion; article 4 with outer expansion	article 2 without distal constriction and posterior expansion; article 4 with outer expansion
Uropod 1	rami with apical appendix	rami with apical appendix	rami without apical appendix
Uropod 2	articulation with pleonite 5 clear; biramous, inner ramus longer	articulation with pleonite 5 not clear; biramous, «inner offset from outer by extension of peduncle»	articulation with pleonite 5 clear; uniramous
Uropod 3	projecting slightly beyond telson, broadening distally	projecting slightly beyond telson, broadening distally	shorter than and concealed by telson, narrowing distally



established. Another criterion which requires confirmation is the structure of pleopod 2. According to STEBBING (1906), the peduncle of this appendage is internally produced in *Pereionotus* and not *Palinnotus*. Unfortunately, I lost the pleopods in my specimen, probably during collection or during the subsequent process of washing and hence, cannot comment on the possible generic importance of this character.

It appears to me that *Palinnotus* has been described on females of *Pereionotus*. It is hoped that someone will discover *P. testudo* again from the Mediterranean and offer a satisfactory topotypic reidentification. A rich collection of this species from different localities should also be examined to clarify the question concerning the maxillipedal palp and see whether two or more species of this genus occur in the Mediterranean-Atlantic. Till then, I feel that one must accept CHEVREUX & FAGE's description and figures of *P. testudo* as a starting point for this species.

Table I also contains the salient characters of *P. alaniphlias*, which appears to have strong affinities with my specimen. Except for the structure of the lower lip (mentioned already) and a few minor points of questionable generic value, they are indeed very close.

#### SUMMARY

An illustrated description of *Pereionotus testudo* is given. This study has shown that the generic characters which were hitherto made use of to distinguish *Pereionotus* from *Palinnotus* were largely conjectures and it is felt that *Palinnotus* has so far been described on the females of *Pereionotus*. A comparison between the males of the two genera is also included.

#### RÉSUMÉ

L'auteur donne une description de *Pereionotus testudo* accompagnée d'illustrations. Son étude montre que les caractères génériques qui jusqu'ici permettaient de distinguer *Pereionotus* de *Palinnotus* étaient surtout des hypothèses, et il semble que *Palinnotus* n'ait été décrit que d'après des femelles de *Pereionotus*. Une comparaison entre les mâles des deux genres est aussi donnée.



## ZUSAMMENFASSUNG

Der Autor gibt eine illustrierte Beschreibung von *Pereionotus testudo*. Es zeigt sich, dass die generellen Merkmale, die bisher eine Trennung von *Pereionotus* und *Palinnotus* erlaubten, hypothetisch sind; *Palinnotus* scheint nur auf der Beschreibung von *Pereionotus*-Weibchen zu beruhen. Ein Vergleich zwischen den Männchen der beiden Gattungen wird ebenfalls gegeben.

## REFERENCES

- BARNARD, J.L., 1958. Index to the families, genera and species of the Gammaridean Amphipoda (Crustacea). *Occ. Pap. Allan Hancock Fdn.*, 19 : 1-145.
- BARNARD, J.L., 1964. Revision of some families, genera and species of Gammaridean Amphipoda. *Crustaceana*, 7 (1) : 49-74.
- BARNARD, J.L., 1970. Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. *Smithson. Contr. Zool.*, 34 : 1-286.
- BARNARD, K.H., 1940. Contribution to the crustacean fauna of south Africa. XII. Further additions to Tanaidacea, Isopoda and Amphipoda; together with keys for the identification of hitherto recorded marine and fresh water species. *Ann. S. Afr. Mus.*, 32 (5) : 381-543.
- BATE, C.S., 1862. Catalogue of the specimens of the amphipodous crustacea in the collection of the British Museum, London, i-iv + 1-399.
- CHEVREUX, E., L. FAGE, 1925. Amphipodes. *Faune Fr.*, 9 : 1-488.
- DELLA VALLE, A., 1893. Gammarini del Golfo di Napoli. *Fauna Flora Golf. Neapel. Monographie*, 20 : i-xi + 1-948.
- GURJANOVA, E., 1951. Bokoplavy Morei SSSR e Sopredelnyx Vod (Amphipoda-Gammaridae). *Opred. Faune SSSR*, 41 : 1-1031.
- PILLAI, N.K., 1954. On the occurrence of *Palinnotus natalensis* (Amphipoda) in Travancore. *Bull. Cent. Res. Inst. Univ. Travancore*, 3 (1) : 27-30.
- STEBBING, T.R.R., 1899. Amphipoda from the Copenhagen Museum and other sources. Part II. *Trans. Linn. Soc. Lond.*, 7, Zoology, 2 : 395-432.
- STEBBING, T.R.R., 1906. Amphipoda, 1. Gammaridae. *Tierreich*, 21 : 1-806.

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