

XI. — TALORCHESTIA BRITO STEBBING AND ORCHESTIA BOTTAE H. MILNE-EDWARDS, WITH A KEY TO THE DETERMINATION OF THE TALITRIDAE OBSERVED ON OUR COASTS.

BY Dr. J. J. TESCH. — (WITH PLATE III AND 3 TEXTFIGURES).

1. *Talorchestia brito* Stebbing.

In examining a lot of *Orchestia gammarellus* (Pallas) (= *O. littorea* (Montagu)) collected many years ago at Katwijk by Dr. J. A. Herklots, late conservator of Invertebrates at the Leiden Museum, I came across some fine specimens of *Talorchestia brito* Stebbing, which have evidently been picked up together with the common *Orchestia*.

The sample was undated, but as Dr. Herklots died in 1872, the specimens must have been caught on our sea-shore long before Stebbing described his new species, in October 1891 (Ann. Mag. Nat. Hist., ser. 6 v. VIII p. 324—328, pl. XV), obtained plentifully in the summer of this year „on Woolacombe and Saunton Sands, in North Devon”. Afterwards Chevreux found it, likewise in abundance, on the shore of Verdon (Gironde) in August 1893 (Rev. biol. d. Nord d. l. France, t. VII, 1894—95, p. 158), but no further record seems to have been given since that time.

Though Stebbing characterized his species with his usual accuracy and gave some figures of the gnathopods, the last joints of the pereopods and the telson, I have thought it not superfluous to give a full account of the characters of my specimens, which were all males (12 in all). I have not been able to recognize the females of this species, which in my opinion are scarcely, if at all, to be distinguished from *Talitrus saltator* (Montagu) (= *T. locusta* (Pallas)), as I shall explain further on.

With regard to the distinctive characters of *Talorchestia*, it has been rightly remarked by Stebbing, that this genus is composed of the genera *Orchestia* and *Talitrus*, indeed in such a manner, that the males of *Talorchestia* should be referred to *Orchestia*, while the females are *Talitri*.

From *Orchestia gammarellus*, with which my specimens of *Talorchestia brito* were found to be associated, the latter could be easily separated by their more compressed shape of the body, by thinner integuments, which exhibit a milk-white colour in alcohol-preservation, whereas *Orchestia* was lightly straw-coloured, by dark-brown eye-pigment (black in *Orchestia*)

and by the last joint of the peduncle of the inferior antennae being considerably larger than the preceding joint, at least in full-grown specimens of about 15 mm., whereas in *Orchestia* the difference in length between these two joints is much less pronounced. Besides, the middle joints of the last pereopods are not at all expanded, as in the males of our common littoral *Orchestia*-species.

The figure of *Talorchestia brito* here given (pl. III) may serve to elucidate many further points of differences. It is needless to describe the various parts at length, as this has been accomplished by Stebbing in a quite satisfactory way. In a few points however my specimens did not entirely answer to his description. Stebbing says, that the fourth joint of the peduncle of the lower antennae „is not very much shorter than the long fifth joint”, but I found the latter more than twice as long as the preceding joint, and not parallel-sided, but constricted at the base, widened in the middle-third of its length and again, but very slightly, diminishing in breadth towards the distal end. In the flagellum of these antennae I counted 27—28 joints (not 30 or more — Stebbing); the proximal five of these are slightly, if at all, separated one from another, the last joint is narrow, subcylindrical and provided at the top with a tuft of short hairs. In all the joints but the last one we find on either side a short hair, but when examined with strong magnification this hair, in the upper as well as in the lower antennae, proves to consist of a bunch of 2—4 stiff spinules, closely fitted together, curved towards the end of the joint and slightly crenulated at the fore margin near the tip; the tips of the spinules of the same bunch are always in close contact, but in the upper antennae they are somewhat twisted round each other.

The shape of the side-plates may be seen in the figure; I shall only remark here, that the hind margin of the second to fourth plate shows a prominent knob somewhat above the middle of the margin, which feature is also shown in Stebbing's figure of the side-plate of the second gnathopod, on his pl. XV. As such a structure is found likewise in *O. gammarellus* and *T. saltator* it cannot be used as a distinctive character.

The carpopodite of the first gnathopod has at its hind margin near the distal end a very remarkable pellucid bubble-like process, about which Stebbing rightly remarks: „as this projects among various spines, the impression produced at first sight was that of an actual bubble of water entangled among the spines.” The hand of this gnathopod is rendered subchelate by a similar but less sharply defined and broader process at the hind margin. The powerful and large, irregularly-oval-shaped hand of the second gnathopod has been fully described and figured by

Stebbing; it indeed furnishes, as in nearly all other Amphipods, the most characteristic feature of the species. The spines on the palm margin are mostly of one size, but on close examination there are scattered some smaller spinules among them, in such a way that smaller and larger spines alternate at regular intervals. There is no defining knob at the palm margin, to which the tip of the closed finger may fit, as in *Orchestia gammarellus*. According to Stebbing, there is a little gap left between the closed finger and the palm margin, and the tip of the finger overlaps this margin, but I have not been able to find these features pronounced in the way as figured by this author.

It is useless to give a fresh description of the pereopods, as this has been done by Stebbing. I only figured the two last joints of these pereopods, in order to corroborate my finds with those of Stebbing who likewise figured these parts in the case of the first to fourth pair. The propodite of the first two pairs is narrow at the base and strongly bulging at each group of spinules, according to Stebbing's figures; but I found these propodite parallel-sided nearly throughout and the bulging of the fore margin much less pronounced; the inner margin of the dactylus of the second pair is in Stebbing's figure strongly bulging at the base and this part is separated from the rest of the margin by a deep notch; but in my specimens this dactylus agrees better with Stebbing's description: „very short, abruptly narrowed on the inner margin halfway towards the nail”; indeed this finger does not differ from the corresponding one in *Talitrus saltator*. The finger of the third pair is much inflated, but narrowed towards the base and of course also towards the very short, acute nail; those of the fourth and fifth pair are long and slender, especially in the case of the last pair. Here there is no trace of the flat expansion of the mero- and carpopodite, so conspicuous in the male of *O. gammarellus*. All the legs are strongly spined, and the spines are mostly placed in groups, most regularly so in the last pairs of legs; these spines, and also those of the gnathopods are blunt, with a thick subterminal hair, projecting sometimes a little way beyond the tip of the spine. Even the larger conical hooks along the palm margin of the second gnathopod are always provided with a distinct subterminal hair.

About the pleopods, the uropods and the telson I have nothing to add to Stebbing's description.

The length of an adult male is four-fifths of an inch according to Stebbing; my largest specimen was about 17 mm long.

It is remarkable, as I previously said, that this species was caught on our shore, long before it was described by Stebbing in 1891. At Herklots's time it obviously occurred in quantities, as 12 specimens were

collected together, perhaps at one and the same occasion, with about as many specimens of *Orchestia gammarellus*. Other Dutch authors however never have made mention of it, and even Hoek in his „Crustacea Neerlandica” (Tijdschr. Ned. Dierk. Ver., ser. 2, v. 2, 1889) does not seem to have been aware of any *Orchestia* different from those he included in his list <sup>1)</sup>. Ritzema Bos, however, in his „Bijdrage tot de kennis der Crustacea Hedriophthalmata van Nederland en zijne kusten” (Groningen 1874) records one single specimen of „*Orchestia mediterranea* Costa” found by him on the shore of Rottum (p. 43) and he gives a description of his specimen (the sex of which is not stated) on p. 22. As both sexes are described I am unable to trace out whether this information is original or simply transcribed from some text-book (i. e. Bate & Westwood, British sessile-eyed Crustacea, which has been frequently used by the author). One is struck, however, by the author's assertion, that the palm margin of the second gnathopod of the male is destitute of any tooth or spine, but probably it is intended to say that there is no defining tooth at the proximal end of the palm margin, so that this margin is not sharply marked off, as is the case in *O. gammarellus*. So there is some probability that this „*O mediterranea*” of Ritzema Bos indeed may have been *Talorchestia brito* <sup>2)</sup>.

Della Valle, whose large work on the Amphipoda in the series „Fauna und Flora des Golfes von Neapel” is unfortunately less useful to the systematist, notwithstanding the enormous amount of work embodied in it, by the author's throwing together, often without any comment whatever, various names which represent different species, ranges (p. 498) *Talorchestia brito*, *Orchestia mediterranea* and some other names along with *O. chiliensis* H. Milne-Edwards, a simplification of the matter which cannot be justified by any tenable ground, as Stebbing has shown in his treatment of the Amphipoda in the „Tierreich” (see p. 531 and 552).

Another species of *Talorchestia*, *T. deshayesi* Andouin, which seems to be rather common all along our shores, is distinguished at first sight from *T. brito* by its smaller size, longer inferior antennae, the flagellum of which is shorter than the last joint of the peduncle, with about 20

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1) On p. 16 (of the separate copy) the author remarks, that he saw specimens of *Orchestia gammarellus* (named by him *O. littorea* Montagu), which were collected many years ago by Herklots at Katwijk. These must have been the very specimens among which I found *Talorchestia brito* and it is difficult to understand how Hoek came to overlook them.

2) There remains however a serious doubt about this probability, as the author ascribes to *O. mediterranea* a flatly expanded mero- and carpopodite in the last pair of legs of the adult male, a character which precisely occurs in the real *O. mediterranea* as well as in *O. gammarellus*, but is entirely absent in *Talorchestia brito*.

joints, and especially by the conspicuous, curved projection at the base of the inferior margin of the hand of the second gnathopod in the adult male, whereas the palm margin itself is oblique, almost straight and spineless (see Della Valle l. c. pl. 15 f. 28).

Though I made a careful search among all our specimens of *Talitrus saltator* (Montagu) I have not succeeded in finding one single specimen, which answered to Stebbing's description of the female of *T. brito*. Neither in the shape of the joints of the antennular peduncle, nor in the number of joints in the flagellum of the upper antennae there is any marked difference between the female of *Talorchestia brito* and that of *Talitrus saltator*. Comparing Stebbing's figure of the first gnathopod of the female of his species and that of Sars (Crustacea of Norway, v. I, Amphipoda, 1895, pl. 9) of the same gnathopod of the female of *Talitrus saltator*, we may only find this difference, that the second joint in the first named species is very broad, twice as long as broad, whereas in the latter species it is three times as long as broad. Stebbing remarks, that the hind margin of this gnathopod is „fringed with stout, round-headed spines; the subterminal hair in these and many of the other spines is so thick, that it produces the appearance of a cleft head to the spine”, but this very feature is present in females of true *Talitrus saltator* in exactly the same way. In the carpopodite (wrist) of the second gnathopod there is a remarkable difference between the two species: in *Talorchestia brito* it is much inflated, broadest in the distal half, and the hind margin is regularly curved and strongly convex (as in *Orchestia gammarellus*); in *Talitrus saltator* it is much more slender, with the greatest width before the middle, the hind margin is feebly concave or straight in its distal half. Among about 40 specimens of the latter species, collected at Katwijk, I always found, without exception, this latter feature. Of course I do not deny the existence of true females of *Talorchestia brito*, but it will be extremely difficult to distinguish these from the same sex of *Talitrus saltator*. The hand of the second gnathopod of the females does not afford any particular feature which may be used in separating the two species.

When alive, there seems to be a rather marked difference. According to G. O. Sars (l. c. p. 23) the colour of *Talitrus saltator* (called by him *T. locusta*) is „light greyish-white, with dark bluish markings on the back”, that of *Talorchestia brito* is „yellowish-white, here and there barred with deeper yellow, bordered along the side-plates and across the head with a beautiful purple, bands of which also sometimes extend across the back of the pleon” (Stebbing, p. 327). The habitat of these two species is also somewhat different, as the latter species „occupies a zone

of the shore immediately below that in which the *Talitri* are commonly found" (Stebbing, p. 328).

## 2. *Orchestia bottae* H. Milne-Edwards.

This species, insufficiently characterized by H. Milne-Edwards (Hist. nat. d. Crustacés, t. III, 1840, p. 17) has been made better known, under the same name, by Brandt (Bull. physico-mathém. de l'Acad. de St. Pétersbourg, t. IX, 1851, p. 142), by Czerniavsky (Mater. ad zoographiam ponticam comparatam, 1868, p. 117, pl. VIII f. 28—32) and above all by Chevreux (Rev. biol. d. nord d. l. France, t. VII, 1895, p. 156 f. 1—4). Heller described it as a new species under the name of *O. cavimana* (Verh. zool.-bot. Gesellsch. Wien, Bd. 15, 1865, p. 979, pl. 17) and this designation has been used by Hoek (Tijdsch. Ned. Dierk. Ver. ser. 1, D. IV, 1879, p. 131 pl. IX f. 8—10) and by Nebeski (Arb. zool. Inst. Wien, Bd. III, 1881, p. 142, pl. 2 f. 10). Neither of these authors seems to have been aware of the synonymy of *O. bottae* and *O. cavimana*; as far as I know it has been Stebbing for the first time („Tierreich", Amphipoda, Lief. 21, 1906, p. 534) who united the two names. Della Valle (Fauna u. Flora d. Golfes v. Neapel, Gammarini, 1893, p. 500) ranges both names under *O. gammarellus* (Pallas).

The figures that best characterize the species under discussion are those of Hoek and Chevreux; that of Nebeski, though reprinted in some text-books (R. Hertwig, Lehrbuch d. Zoologie, ed. 4, 1897, p. 386 f. 382 and Bronn's Klassen u. Ordn., Crustacea, Abt. II, pl. XXXIX) not being quite accurate in representing the gnathopods and the second joint of the three last pairs of pereopods.

*O. bottae* very much resembles the common *O. gammarellus*, but, except by the most remarkable difference in habits of these species, they are to be distinguished by the different shape and curve of the palm margin of the second gnathopod of the males and by the middle (4<sup>th</sup> and 5<sup>th</sup>) joints of the last pair of pereopods being expanded in the latter species. As these features have been amply discussed and figured, it is useless to enlarge upon these differences.

The first gnathopod (f. 1) of the males of the two species is very much alike; I have found no other difference than in the shape of the 4<sup>th</sup> joint (meropodite), the hind margin of which presents in its middle a marked protuberance in *O. bottae* (Chevreux, f. 3), followed by a straight or slightly concave part, which feature does not seem to have been detected by Hoek, though his f. 8, representing this gnathopod, does not show this joint in its full extent. The propodite of this gnathopod

in both species is remarkably expanded by a membranous, though tough, expansion of the hind margin, which is very well represented in the quoted figures of Hoek and Chevreux in the case of *O. bottae* and by Sars (Crustacea of Norway, v. I, Amphipoda, 1895, pl. 10) in the case of *O. gammarellus*; a similar expansion occurs at the hind margin of the preceding joint. At the outer side of the base of these rather pellucid

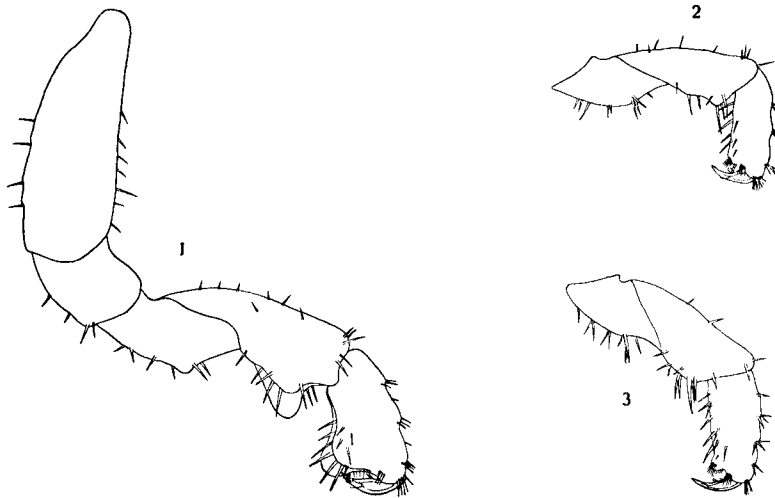


Fig. 1. First gnathopod of male of *Orchestia bottae* H. Milne-Edwards. Magn. 28.

Fig. 2. Part of first gnathopod of female of *Orchestia bottae*. Magn. 28.

Fig. 3. Part of first gnathopod of female of *Orchestia gammarellus* (Pallas). Magn. 28.

processes there is a row of large spines, projecting beyond the margin of the expansion; also at the inner side of the base there are some spinules. This disposition is shown by all my specimens of both species, but the only figures in which the spines inserted at the base of the expansions are depicted in the same way are that of Hoek (f. 8), of Chevreux (f. 3) and of Della Valle (pl. 15 f. 42) in the case of the carpopodite; neither of them corresponding as to the spines on the hind margin of the propodite with my finds, but representing these as rather irregularly placed.

In the females (f. 2 and f. 3) the expansions on carpo- and propodite of the first gnathopod are absent, but the hind margin of the carpopodite projects at a right angle, and the propodite is quadrangular, with a rounded projection at the distal angle of the hind margin; the distal margin of this joint has three bundles of tactile spines agreeing in shape with those on the joints of the antennae. All the spines of the gnathopods, as well as those of the other pereopods, have a thick subterminal hair, in the same way as in *Talorchestia brito*. The females of *O. bottae* and

*O. gammarellus* may be distinguished by the propodite of the first gnathopod being somewhat narrowed at the base and expanding towards the apex in *O. bottae*, nearly exactly quadrangular in *O. gammarellus* (compare f. 2 and f. 3). It is this feature that Chevreux (p. 159 f. 4) has pointed out in distinguishing the females of the first named species from those of other species of this genus.

*O. bottae* has been first recorded from our country by Hoek (Tijdschr. Ned. Dierk. Ver., ser. 1 Deel IV, 1879, p. 130—134), who examined specimens collected at Zalt-Bommel, afterwards it was found by Everts (Tijdschr. Ned. Dierk. Ver., ser. 2 Deel I, 1887, p. CXLVII) in a cellar at the Hague. In recent years the species has proved to be not uncommon in the neighbourhood of Leiden. Mr. van Heurn collected it in the Hortus Botanicus in 1911, and in the two or three last years it was observed repeatedly at different localities around Leiden by Mr. P. P. de Koning, one of the preparators of the Museum. It keeps to moist places, hiding under moss, dead leaves and stones, together with wood-lice and beetles, and occasionally jumping about with great agility. These habits have been mentioned by several writers (i. a. Nebeski, p. 32—33 and Hoek l. c.). My largest specimen measures 22 mm. The original dark colour very soon disappears in alcohol, but a faint reddish hue may remain some weeks after preservation at the antennae and the last joints of the pereopods.

Outside the mediterranean region and that of the Black Sea, the species seems to be very locally distributed. I do not know of any record from Great Britain, Danmark or Norway. From Alsace it has recently been recorded by Lienhart (C. R. Soc. Biol. Paris, t. 75, 1913, p. 603).

For the use of those who take interest in the discrimination of the Talitridae to be found on our shores or inland, I have tried to give a key, partly based on the diagnoses of Stebbing in his „Amphipoda” (Tierreich, Lief. 21, 1916).

- 1 Both sexes: first gnathopod simple; second gnathopod with broad, membranous carpo- and propodite and excessively small dactylus, as is usual in females of Talitridae. Inferior antennae sometimes half as long as body or still longer. Very common species on the sea-shore

*Talitrus saltator* <sup>1)</sup> (Montagu)  
(= *T. locusta* (Pallas)).

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1) The female of *Talorchestia brilo* Stebbing seems, according to Stebbing's description, only to be distinguished from *Talitrus* by a somewhat different shape of the propodite of the second gnathopod (see above p. 280).



Both sexes: first gnathopod subchelate <sup>1)</sup>, propodite quadrangular (in ♀) or with projecting hind margin (in ♂). In ♂ the hand of the second gnathopod is very large, massive, suboval, with a large claw. Inferior antennae mostly shorter than half the length of body. 2

- 2 Second gnathopod of male with „defining” tooth at proximal end of palm margin of hand, corresponding with tip of finger when closed. 3

Second gnathopod of male without such a „defining” tooth, but sometimes provided at hind margin of hand with a rather large falciform process at the base. 5

- 3 Both gnathopods in ♀ nearly equally built. Both pairs of antennae in ♂ as long as peduncle of inferior antennae. Small animals of about 7 mm. length hiding beneath rejectamenta on sea-shore and in shallow water.

*Hyale prevostii* (H. Milne-Edwards)  
(= *H. nilssoni* (Rathke)).

First gnathopod in ♀ subchelate, second gnathopod with membranous, broad carpo- and propodite, dactylus extremely small, placed at anterior margin of propodite, the distal margin of which latter projects in a rounded projection beyond this dactylus. Hand of second gnathopod in ♂ broadly suboval, with large, curved finger. Superior antennae very much shorter than inferior. 4

- 4 Carpo- and propodite of last pereopod in adult ♂ broadly expanded; palm margin of hand of second gnathopod regularly curved, semicircular, without excavation. On the sea-shore.

*Orchestia gammarellus* (Pallas)  
(= *O. littorea* (Montagu)).

Carpo- and propodite of last pereopods in adult ♂ not broadly expanded; palm margin of hand of second gnathopod with two excavations, the deeper of which occurs next finger-hinge, finger with a distinct bulging portion, corresponding to excavation in palm margin of hand. Living inland, under stones etc.

*Orchestia bottae* (H. Milne-Edwards)  
(= *O. cavimana* Heller)

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1) Except in the female of *Talorchestia brilo*.

5        Second gnathopod in ♂ provided at the base of hind margin of hand with a large, falciform process, hand rather slender, destitute of spines or hairs on palm margin.

*Talorchestia deshayesi* Audouin.

Second gnathopod in ♂ regularly curved at palm margin of hand, without falciform process, palm margin provided with alternating large and small spines.

*Talorchestia brito* Stebbing.

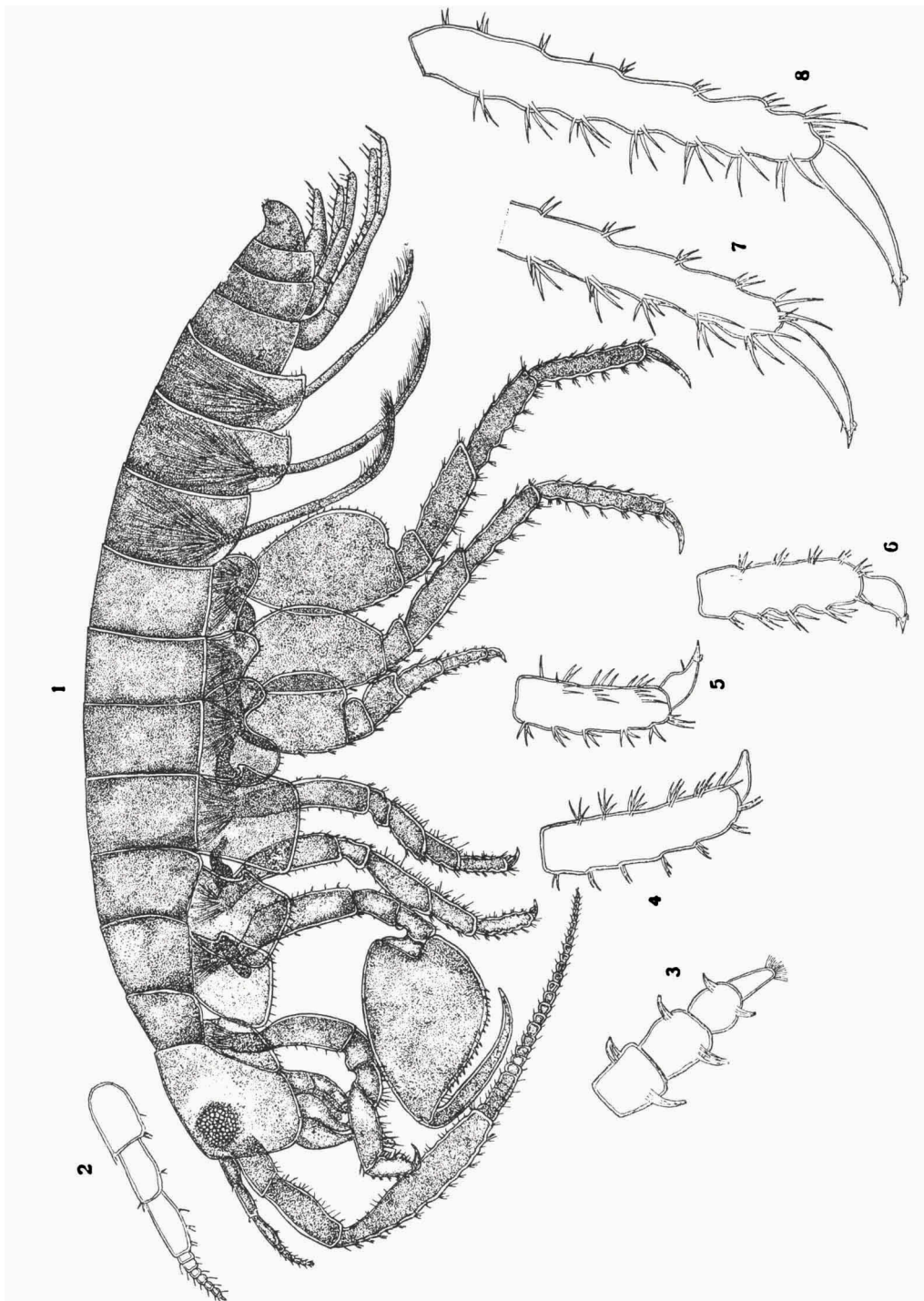
For the verification of some of the determinations made in using this key the reader is referred to G. O. Sars, Crustacea of Norway, v. I. Amphipoda, pl. 9—11.

Leiden Museum, April 1916.

EXPLANATION OF PLATE III.

*Talorchestia brito* Stebbing.

- Fig. 1. ♂. Magn. 65.  
 Fig. 2. Superior antenna. Magn. 18.  
 Fig. 3. Last joints of inferior antennae. Magn. 95.  
 Fig. 4. Last joints of pereopod 1  
 Fig. 5. » » » » 2  
 Fig. 6. » » » » 3  
 Fig. 7. » » » » 4  
 Fig. 8. » » » » 5
- } Magn. 30.



*Talorchestia brito* Stebbing.