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CONTRIBUTIONS TO A MONOGRAPH

OF THE

AMPHIPODA HYPERIIDÆ

BY

CARL BOVALLIUS.

PART I: 1.

THE FAMILIES TYRONIDÆ, LANCEOLIDÆ AND VIBILIDÆ.

WITH TEN PLATES.

COMMUNICATED TO THE ROYAL SWEDISH ACADEMY OF SCIENCES JANUARY 14, 1885.

INVERTEBRATE  
ZOOLOGY  
Crustacea

STOCKHOLM 1887.  
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The Amphipoda Hyperiidæ, the object of the present treatise, have been very much neglected by Zoologists, and, as a whole, they have not hitherto been treated monographically. The most important contributions to our knowledge of them have been afforded by H. MILNE EDWARDS, J. D. DANA, C. SPENCE BATE and C. CLAUS<sup>1)</sup>. Many new species have also been described by others, too often, however, without any attempt to identify them with the already known forms. The result has been an almost inextricable confusion of the synonymy, not redeemed by the peremptory manner in which names given by previous authors have been cleared away. I shall do my best to retain as much as possible of genera and species established by my predecessors.

Through the great benevolence of Professor SVEN LOVÉN<sup>2)</sup> and Professor JAPETUS STEENSTRUP<sup>3)</sup>, I have obtained very large materials for the elaboration of this monograph. These materials were afterwards increased by the kindness of Professor TYCHO TULLBERG<sup>4)</sup> of Upsala, Professor CHR. F. LÜTKEN<sup>5)</sup> of Copenhagen, Professor ALPHONSE MILNE EDWARDS<sup>6)</sup> of Paris, Professor WILHELM LECHE<sup>7)</sup> of Stockholm and Dr C. CRÜGER<sup>8)</sup> of Hamburg.

<sup>1)</sup> H. Milne Edwards. Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes. (Annales des Sciences naturelles. Tome 20<sup>me</sup>, p. 385—399). 1830. — H. Milne Edwards. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 70—102. Paris 1840. 8:o. — J. D. Dana. United States Exploring Expedition. Crustacea. Vol. 2, p. 833—836, 978—1018 and 1442—1443. Philadelphia 1852. Fol. — C. Spence Bate. Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 284—346. London 1862. 8:o. — C. Claus. Der Organismus der Phronimiden, and Die Gattungen und Arten der Platysceliden. (Arbeiten aus dem Zoologischen Institute der Universität Wien und der Zoologischen Station in Triest. Tom. 2, p. 59—146 and 147—198). 1879. — C. Claus. Die Platysceliden. Wien 1887. 4:to.

<sup>2)</sup> The Hyperiidæan collection of the Zoological State Museum at Stockholm consists principally of precious specimens captured by Professor H. Kinberg during the circumnavigation of the R. Swed. Frigate Eugenie 1851—53, and of northern and arctic species in hundreds of examples. Lately my own collection has been incorporated with the collections of the Museum.

<sup>3)</sup> The Hyperids of the University Museum at Copenhagen form certainly one of the largest Hyperiidæan collections in the world. The Atlantic regions and the seas off Greenland are well represented, from the Pacific and the Indian Ocean there are comparatively few species.

<sup>4)</sup> From the Zoological Museum of Upsala I got a very interesting collection made by the late Captain George von Schéele, one of the most zealous collectors I have met with. His death last year in a hurricane off the east coast of Africa, was a great loss to zoological science. The specimens are principally from the southern Atlantic, southwestern Pacific, and the seas around Australia.

<sup>5)</sup> An additional collection from the University Museum at Copenhagen.

<sup>6)</sup> Probably the most precious collection of all, as it contains some of the types of the new species described by H. Milne Edwards, Guérin-Méneville, and Spence Bate.

<sup>7)</sup> Some Mediterranean species, collected by Professor Leche himself at Messina.

<sup>8)</sup> Mostly Pacific specimens from the Museum Godeffroy.

During some years of voyages in the European seas, and in the tropical parts of the Atlantic and of the east Pacific, I had myself opportunities of studying and collecting many interesting forms. Thus the materials I have had at my disposal have been tolerably rich, and only five or six of the known generic forms have been unrepresented.

In the »Historical account» (part III of this treatise) I shall give a detailed exposition of the previous systemization of the group; here I intend to begin directly with the system such as, according to my opinion, it ought to be drawn up. In the »Morphological remarks» (part II) I shall deal with the most interesting morphological and anatomical features, and the transformation of some of the organs in the different families.

I have distributed the Hyperids into 16 families. The third family is synonymous to the »Hypérines gammaroïdes» of MILNE EDWARDS, the seven succeeding and the first two families nearly correspond with his »Hypérines normales», and the last six with his »Hypérines anormales», but as there are many transitions and gradual alterations between the different families I do not think it convenient to divide the tribe into so sharply distinguished sub-tribes as did MILNE EDWARDS<sup>1)</sup>. If the increasing number of species should make it desirable to establish any sub-tribes, they certainly ought to be three, distinguished however by the different form of the first pair of antennæ in the males; and corresponding with the divisions A, B, and C in the diagram of the next page.

As for the terminology, I follow that adopted in my previous carcinological papers, only remarking here that I interpret the fourth joint of the first pair of antennæ, commonly very largely developed, as the first joint of the flagellum. A sufficient corroboration of this view is afforded by a comparison with the same organ in the genus *Synopia*, DANA, where the appendicular flagellum originates from the anterior margin of the third joint of the antennæ<sup>2)</sup>.

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<sup>1)</sup> For further information about this matter see the »Historical account», part III.

<sup>2)</sup> See Amphipoda Synopidea by Carl Bovallius. (Acta Societatis Scientiarum Upsaliensis. Seriei III, Vol. XIII. 1886.

- A.** The first pair of antennæ straight, the first joint of the flagellum large, the following few in number, terminal:
- a 1.** The head small, not tumid.
- aa 1.** The first joint of the flagellum of the first pair of antennæ styli-  
form, not tumid..... **1. Tyronidæ.**
- aa 2.** The first joint of the flagellum of the first pair of antennæ high,  
tumid.
- aaa 1.** The seventh pair of pereopoda not transformed..... **2. Lanceolidæ.**
- aaa 2.** The seventh pair of pereopoda transformed..... **3. Vibilidæ.**
- a 2.** The head large, tumid.
- aa 3.** The first joint of the flagellum of the first pair of antennæ  
tumid.
- aaa 3.** The seventh pair of pereopoda transformed..... **4. Cyllopodidæ.**
- aaa 4.** The seventh pair of pereopoda not transformed..... **5. Paraphronimidæ.**
- aa 4.** The first joint of the flagellum of the first pair of antennæ  
styliform, not tumid..... **6. Thaumatosidæ.**
- a 3.** The head with the pereion transformed into a balloon-like bladder..... **7. Mimonectidæ.**
- B.** The first pair of antennæ straight, the first joint of the flagellum large, the following many in number, filiform ( $\sigma^7$ ), terminal.
- b 1.** The uropoda normal, with rami.
- bb 1.** The mandibles with palp..... **8. Hyperiidæ.**
- bb 2.** The mandibles without palp..... **9. Phronimidæ.**
- b 2.** The uropoda transformed, without rami. Last five pairs of pereopoda  
prehensile organs..... **10. Anchylomeridæ.**
- C.** The first pair of antennæ curved, the first joint of the flagellum large, the following few in number, subterminal. Second pair angularly folded ( $\sigma^2$ ).
- c 1.** The femur of the sixth pair of pereopoda not operculiform, the rest  
of the leg articulating terminally.
- cc 1.** The first pair of antennæ fixed at the anterior side of the head **11. Euphorcidæ.**
- cc 2.** The first pair of antennæ fixed at the inferior side of the head.
- ccc 1.** The anterior part of the head very shortly produced, or  
not produced..... **12. Tryphænidæ.**
- ccc 2.** The anterior part of the head produced into a rostrum,  
longer than half the rest of the head..... **13. Oxycephalidæ.**

- c 2. The femur of the sixth pair of pereopoda more or less opereuliform, the rest of the leg articulating subterminally.
- cc 3. The femur of the fifth pair of pereopoda normal, not opereuliform ..... 14. Pronoidæ.
- cc 4. The femur of the fifth pair of pereopoda opereuliform.
- ccc 3. The seventh pair of pereopoda complete, six-jointed ... 15. Parascelidæ.
- ccc 4. The seventh pair of pereopoda rudimentary, one- or few-jointed ..... 16. Eutyphidæ.

The first family, **TYRONIDÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* parvum, non tumidum. *Oculi* parvi vel obsoleti. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, flagello styliformi instructæ. *Antennæ* secundi paris angulatæ, parti inferiori capitis affixæ. *Instrumenta oris* masticatoria; mandibulæ palpo earentes. *Pedes pereii* ambulatorii, pedes septimi paris non transformati. *Pedes uri* ramis instructi.

The *head* is small, not tumid. The *eyes* are small or indistinct. The first pair of *antennæ* are straight, fixed at the anterior side of the head, the flagellum is styliform. The second pair are angulated, fixed at the inferior side of the head. The *mouth-organs* are adapted for mastication; the mandibles without palp. The *pereopoda* are walking legs; the seventh pair are not transformed. The *uropoda* are provided with rami.

- Syn.** 1852. *Corophidæ*, Subf. 1. *Clydoninæ*. DANA. United States Exploring Expedition. Crustacea. Vol. 2, p. 833.
1862. *Corophiidæ*, Subf. 2. *Corophiides* (e. p.). SPENCE BATE. Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 273.
1887. *Tyronidæ* C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Haudl. Bd. 11. N:o 16, p. 3.

The first species of this family which was described, was H. MILNE EDWARDS' *Hyperia cornigera* in the year 1830. In 1840 the name was changed by himself into *Tyro cornigera*. The next additions to the family were made by DANA in 1850, viz. *Clydonia gracilis* and *C. longipes*. But in 1852 DANA, not recognizing the identity of *Tyro* and *Clydonia*, placed his new species among the Amphipoda Gammaridea as the first sub-family, *Clydoninæ*, of the family *Corophidæ*. SPENCE BATE in 1862 followed DANA in placing *Clydonia* among the Corophids, but as he did not accept the sub-family *Clydoninæ*, he connected the genus more closely with the *Corophidæ* than DANA himself. At the same time (l. c. p. 308) he mentions the genus *Tyro*, ranging it with the family *Hyperidæ* between the genera *Cylopus* and *Dairinia*. TH. H. STREETS<sup>1)</sup> completed in 1877 the description of DANA'S *Clydonia longipes*, and described the form of the second pair of antennæ. In the year 1882 G. O. SARS described a new *Clydonia* from the North

<sup>1)</sup> »Contributions to the Natural History of the Hawaiian and Fauning Islands and lower California» Bulletin of the United States National Museum, N:o 7. Washington, 1877.

Sea, *C. borealis*; by examining the mouth-organs he recognized the relationship of *Clydonia* with the Hyperids and ranged it with this tribe. In 1885 the author of the present treatise tried to prove the identity of *Tyro* and *Clydonia*, and in 1887 he proposed the family-name *Tyronidæ* for these animals.

The family *Tyronidæ* is less closely allied with the other Hyperids than any of the other families, and in the general habitus of the animals shows a certain resemblance to some of the Gammarids; still they are true Hyperids. From this reason *Tyronidæ* are placed as the first family next to the Gammarids.

In the form of the head and the eyes the *Tyronidæ* show the closest relation to *Lanceolidæ* and *Vibilidæ*, the first pair of antennæ somewhat resemble those of *Mimonectidæ* and *Thaumatopsidæ*; the form of the second pair points towards *Tryphænidæ* and the following families. The mouth-organs through the form of the mandibles remind one of the families *Paraphronimidæ* and *Phronimidæ*.

The sexual dimorphism seems to be restricted to the presence (♂) or rudimentary state (♀) of the second pair of antennæ.

As to the anatomical peculiarities I refer to the second part of this treatise, only calling attention to the very imperfect development of the eyes, quite contrary to the state of these organs in most of the other families.

The biological notices concerning these animals are very scarce indeed. DANA mentions that his specimens were taken at the surface of the open sea. SARS has taken *Tyro borealis* from a depth of 200 to 300 fathoms; he supposes that it may be parasitical. I myself captured many specimens in the Caribbean Sea during the expedition of H. Swed. Majesty's Corvette *Balder* 1881—82, and later in the Pacific, all swimming free on the surface of the sea. I could never find any ease of parasitism.

Hitherto only one genus is known.

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### Genus 1. **TYRO**, H. MILNE EDWARDS, 1840.

**Diagn.** *Caput* brevius quam altius. *Antennæ* primi paris pedunculo crasso, articulis tribus in unum coalitis formato. *Pedes pereii* primi et secundi parium simplices, non chelati, pedes quinti paris saltatorii. Epimera distincta. *Pedes plei* robusti, pedunculis permagnis. *Pedes uri* elongati, ramis internis eum pedunculis coalitis.

The *head* is shorter than deep. The first pair of *antennæ* with thick peduncles, formed of the three coalesced joints. The first and second pairs of *peretopoda* are simple, not chelate. The fifth pair are transformed into jumping legs. The epimerals are distinct. The *pleopoda* are well developed, with very large peduncles. The *uropoda* are elongated, the inner rami coalesced with the peduncles.

**Syn. 1840.** *Tyro*, H. MILNE EDWARDS. — — Histoire Naturelle des Crustacés.  
Tom 3<sup>me</sup>, p. 80.  
» » DANA, 1852. United States Exploring Expedition.  
Crustacea. Vol. 2, p. 980.

1840.	<i>Tyro</i> ,	H. MILNE EDWARDS.	SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 308.
»	»	»	C. BOVALLIUS.	1885.	»On some forgotten genera among the Amphipodous Crustacea». Bih. t. Sv. Vet. Akad. Handl. Bd. 10. N:o 14, p. 12.
»	»	»	»	1887.	»Arctic and Antarctic Hyperids». Vega-Exp. Vet. Iakttag. Bd. 4, p. 551.
1850.	<i>Clydonia</i> ,	DANA.	DANA.		Proc. of the Amer. Acad. of Science and Arts. Vol. 2, p. 219.
»	»	»	»	1852.	United States Exploring Expedition. Crustacea. Vol. 2, p. 834.
»	»	»	SPENCE BATE.	1862.	L. c. p. 284.

Although the generic description given by H. MILNE EDWARDS was a very good one, *Tyro* has not been recognized until lately, remaining in the literature only as a name. This has probably been due to the circumstance of its general habitus being too different from that of most known Hyperids to allow of its being sought for within the Hyperiidæan tribe. It is however remarkable enough that SPENCE BATE could not identify it although he examined closely the typical specimens of Hyperids in the collection of the »Musée du Jardin des Plantes». To-day the typical specimen is lost, according to information kindly given me by Professor ALPHONSE MILNE EDWARDS. Nevertheless I am fully convinced that the new species described below as well as the *Clydonie* of DANA and G. O. SARS belong to the old genus of H. MILNE EDWARDS.

- A.** The first pair of antennæ about as long as the body.
- a 1. The third pair of uropoda without distinct outer rami ..... **1. *Tyro cornigera*.**
  - a 2. The third pair of uropoda with distinct outer rami.
    - aa 1. The outer rami shorter than half the inner.
      - aaa 1. The lateral parts of the pleonal segments excavated .... **2. *Tyro gracilis*.**
      - aaa 2. The lateral parts of the pleonal segments rounded ..... **3. *Tyro Sarsi*.**
    - aa 2. The outer rami as long as half the inner.
      - aaa 3. The head not rostrate ..... **4. *Tyro atlantica*.**
      - aaa 4. The head rostrate ..... **5. *Tyro longipes*.**
- B.** The first pair of antennæ shorter than half the body.
- b 1. The anterior margin of the femur of the fifth pair of pereopoda serrated.
    - bb 1. The metacarpi of the first two pairs of pereopoda not produced.
      - bbb 1. The fifth pair of pereopoda longer than the sixth ..... **6. *Tyro borealis*.**
      - bbb 2. The fifth pair of pereopoda shorter than the sixth ..... **7. *Tyro Clausi*.**
    - bb 2. The metacarpi of the first two pairs of pereopoda produced anteriorly ..... **8. *Tyro marginata*.**
  - b 2. The anterior margin of the femur of the fifth pair of pereopoda smooth.
    - bb 3. The spine-like process of the femur of the fifth pair simple .... **9. *Tyro Tullbergi*.**
    - bb 4. The spine-like process of the femur of the fifth pair bifid ..... **10. *Tyro pacifica*.**

1. **TYRO CORNIGERA**, H. MILNE EDWARDS, 1830.

**Diagn.** *Caput* superne carinatum. *Antennæ* primi paris corpore longiores. *Pedes pereii* primi paris validi, metacarpis filiformi. Dactyli pedum tertii et quarti parium validissimi. Rami externi pedum *uri* obsoleti.

The *head* is keeled on the upper side. The first pair of *antennæ* are longer than the body. The first pair of *pereiopoda* are strong, with filiform metacarpus. The third and fourth pairs with very strong dactyli. The exterior rami of the *uropoda* are obsolete.

**Hab.** »The Atlantic, captured by Mr Raynaud». (M. E.).

**Syn.** 1830. *Hyperia cornigera*, H. MILNE EDWARDS. — — — — — »Extrait de Recherches pour servir à l'histoire naturelle des Crustacés amphipodes». Ann. Sc. Nat. Tome 20<sup>me</sup>, p. 387.

*Tyro* » » » 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 80.

» » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 308.

» » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 3.

I have not been able to identify *Tyro cornigera* with any of the specimens I have examined, but I think that it is closely allied to *T. atlantica* or *T. gracilis*.

H. MILNE EDWARDS has already pointed out the sexual difference, mentioning the long slender four-jointed second pair of antennæ in the male, and the rudimentary ones in the female. The characteristic of divergent obtuse keels on the upper side of the head is common to all species I know, being only more or less distinct, and depends upon a median depression caused by the strong development of the basal joints of the first pair of antennæ.

Here follows an extract of the description of MILNE EDWARDS.

The upper side of the *head* is provided with two small, obtuse, divergent crests.

The *first pair of antennæ* are longer than the body; the inner margins feebly ciliated.

The *second pair of antennæ* are rudimentary in the female; in the male they consist of four joints, the last two the longest.

The *first pair of pereiopoda* are tolerably robust, the tibia and carpus are elongated, the metacarpus is almost filiform.

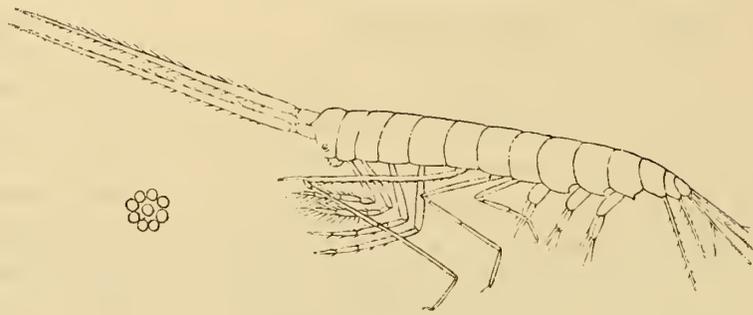
The dactyli of the *third and fourth pairs* are very strong.

The *fifth pair* are the longest; the femur is denticulated along the posterior margin, and armed with a strong, tooth-like spine at the lower anterior corner. The metacarpus and the dactylus are filiform.

The *seventh pair* are very small and slender, scarcely adapted for locomotion.

The *uropoda* are very slender, the exterior rami are obsolete.

## 2. TYRO GRACILIS, DANA, 1850.



*Tyro gracilis*, DANA.

Facsimile from DANA. U. S. Expl. Exp. Crust. II, pl. 55, fig. 6.

**Diagn.** *Oculi* parvi, lenticulis novem. *Antennae* primi paris corporis fere longitudine, subulatae. *Pedes pereii* quinti paris corpore non breviores, femore longissimo, post minute spinoso, apice spinose producto. *Pedes septimi* paris pedibus quinti paris plus dimidio breviores. *Segmenta plei* latere acuta, angulo postico subtruncato. *Segmenta uri* duo ultima libera, non coalita. *Pedes uri* tenes, *pedes primi et tertii* parium pedibus secundi paris longiores. *Pedes tertii* paris rannum externum brevem acutum ferunt.

The *eyes* are small, with nine ocelli. The first pair of *antennae* are about as long as the body. The fifth pair of *perceiopoda* are as long as the body; the femur is very long, minutely spinulous along the posterior margin, the apex produced into a spine-like process. The seventh pair are shorter than half the fifth. The lateral parts of the *pleonal* segments are sharp, the posterior corners subtruncate. The last two *ural* segments are free, not coalesced. The *uropoda* are slender, those of the first and third pairs are longer than those of the second pair. The third pair are provided with a short, sharp, exterior ramus.

**Colour.** Reddish in irregular spots, the antennae are in part reddish.

**Length.** 9 mm.

**Hab.** The Atlantic; Lat. 1° N. Long. 18° W. (DANA).

<b>Syn. 1850.</b>	<i>Clydonia gracilis</i> ,	DANA.	—	Proc. of the Amer. Acad. of Science and Arts. Vol. 2, p. 19.
»	»	»	1852.	United States Exploring Expedition. Crustacea. Vol. 2, p. 834; pl. 55, fig. 6 a—b.
»	»	SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 284; pl. 47, fig. 8.
	<i>Tyro gracilis</i> ,	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidea». Bih. t. K. Sv. Ak. Handl. Bd. 11. N:o 16, p. 4.

As I have never seen any specimen of this species the whole description is taken almost literally from DANA, with some few additions, derived from my examination of his drawing.

The *head* is short, about half as long as wide, not keeled on the upper side.

The *eyes* consist of eight lenses round a central one.

The *first pair of antennæ* are stout at the base and gradually taper to an acute apex; they have minute spines on the outer side and are short, pubescent on the inner.

Along the sides of the segments of the *pereion* the outline of the epimerals is barely distinguished. The last three pereional segments are as long as the first four.

The *first and second pairs of pereiopoda* are short, hirsute, with small dactyli. The second pair are a little longer than the first.

The *third and fourth pairs* are longer than the preceding, and very nearly naked.

The *fifth pair* are about twice as long as the fourth; the femur is about as long as the next three joints together; the metacarpus is a fourth of the length of the femur; the dactylus is very small.

The *sixth pair* are much shorter than the fifth.

The *seventh pair* are not half as long as the fifth.

The first *pleonal* segment is a little longer than the second.

The *ural* segments decrease rapidly in size.

The *uropoda* are slender, acute; the interior coalesced ramus of the third pair is almost as long as the peduncle.

### 3. TYRO SARSI, C. BOVALLIUS, 1885.

(Pl. I, fig. 1—17; Pl. II, fig. 1—10).

**Diagn.** *Corpus* carinatum. *Caput* tertia parte altius quam longius, superne carinatum, carinis divergentibus. *Antennæ* primi paris corpore paullo breviores. *Pedes pereii* primi paris carpis ac dactylis elongatis. *Pedes* quinti paris pedibus sexti paris multo longiores; femur ante leviter, post distincte serratum, articulis tribus sequentibus multo brevius, spinam rectam, genu duplo longiorem, gerens; tibia carpo multo brevior, carpus metacarpo ter fere longior.

Pedes septimi paris tertiam partem longitudinis pedum quinti paris superantes. Segmenta *uri* duo ultima coalita. *Pedes uri* lati, minute serrati; rami externi primi et secundi parium minutissimi, rami externi tertii paris distincti, tertiam partem longitudinis pedunculi fere superantes; rami interni trium parium pedunculis paullo breviores. *Telson* anguste lingulatum, ramo externo tertii paris paullo brevius.

The *body* is keeled dorsally. The *head* is a third deeper than long, provided on the upper side with two divergent keels. The first pair of *antennæ* are a little shorter than the body. The first pair of *pereiopoda* with elongated carpi and dactyli. The fifth pair are much longer than the sixth; the femur has the anterior margin feebly serrated, the posterior distinctly serrated; it is much shorter than the three following joints together; the apical spine-like process is twice longer than the genu, straight; the tibia is much shorter than the carpus; the carpus is almost three times longer than the metacarpus. The seventh pair are longer than a third of the fifth pair. The last two *ural* segments are coalesced. The *uropoda* are broad, minutely serrated; the exterior rami of the first and second pairs are very minute, those of the third pair are well developed, a little longer than a third of the peduncle; the interior rami of all the three pairs are almost as long as the peduncles. The *telson* is tongue-shaped, narrow, only a little shorter than the exterior ramus of the last pair of uropoda.

**Colour.** White to yellowish.

**Length.** 15—30 mm.

**Hab.** The north, tropical and south Atlantic. (D.M. S.M. U.M.)

**Syn. 1885.** *Tyro Sarsi*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea«. Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 15, fig. 3.

*Tyro Sarsi* is the largest of all known Tyronidæ and seems to be the most common species. It is closely allied to *Tyro atlantica* but distinguished from it by many characteristics, as will be seen below.

The *body* is somewhat depressed or rather meagre, the dorsal keel is broad and runs from the point where the divergent occipital crests meet to the urus. The integument is very hard, and rather rough. The line indicating the articulation of the epimerals continues along the lower parts of the sides of the pleonal segments, forming a low keel.

The *head* is concaved on the upper side between the two divergent crests, which run from the highest point of the head down to the bases of the first pair of antennæ. The head is a little shorter in the male than in the female; the anterior side is truncated and a little concavated.

The *eyes* (Pl. I, fig. 3) consist of 15 ocelli, a large one in the centre and seven close round it, the other seven being ranged in an outer circle, so that the whole forms a somewhat elevated bulb, without distinct facets.

The *first pair of antennæ* (Pl. I, fig. 4 and 5) are a little longer in the female than in the male. The peduncle is very thick, the three original joints are coalesced into one. In very young specimens the peduncle is three-jointed, the basal joint much the largest. The peduncles occupy nearly the whole surface of the anterior side of the head.

The first joint of the flagellum is very elongated, prismatic, tapering towards the end, and bordered by three denticulated keels, the teeth very long; the inner side is fringed with long olfactory hairs, more densely in the male than in the female. The olfactory hairs are placed in transversal rows along two thirds of the length of the joint, 12 to 6 in each row, the number decreasing from the base towards the end. The number of such transversal rows is 60—70. The rest of the flagellum consists of only one joint scarcely equalling a twelfth of the length of the first joint; it is conical, without hairs or serrations; the integument seems to be much thinner and softer than in the first joint. The flagellum is more than eight times longer than the peduncle. In the male the whole antenna reaches to the anterior margin of the second pleonal segment, in the female to the anterior margin of the urus; in young animals it is shorter.

The *second pair of antennæ* (Pl. II, fig. 2—5) in the male are, when stretched out, much longer than the first pair. The peduncle is three-jointed, the first joint short and stout, scarcely longer than broad, provided with some minute hairs at the lower anterior corner, the second is twice as long as the first, narrower; the third joint is more than twice as long as the second; both are fringed with minute hairs along the inferior margin. The third joint is broader at the outer end, where it articulates with the flagellum. The joints of the peduncle are capable of an almost rectangular articulation against one another; the first joint of the flagellum can be folded up along the third peduncular joint and the rest of the flagellum in the same manner against the first flagellar joint. The whole flagellum is filiform; the first joint, the longest, is a little shorter than the last peduncular joint, broader at both ends; the following joints, 8—10 in number, are elongated, the last one a little longer than the others, rounded at the tip and carrying along its whole length a row of long thick glandular hairs or slender saeks; the preceding joints are fringed with short hairs and some few short ovate sacks, filled with some glandular matter. In young males the flagellar joints are very short (Pl. II, fig. 4 and 5). In the female the peduncle consists of two short joints tipped with two or three minute articuli, totally smooth.

The *labrum* (Pl. I, fig. 6) is broad, the lower margin, being incised in the middle, forms two broadly rounded lobes.

The *mandibles* (Pl. I, fig. 7 and 8) are long, the free end very sharp, slightly crenulated, the inner corner projects into a sharp point.

The *first pair of maxillæ* (Pl. I, fig. 9) are well developed; they consist of a strong basal portion and two lobes; the inner lobe is strongly serrated at the apex, finely hirsute at the stem; the outer lobe is smooth with a small denticle at the lower inner corner; at the base of the inner lobe there is a short and thick, hirsute, appendicular lobe.

The *second pair of maxillæ* (Pl. I, fig. 10) consist of a rounded basal portion and two short, densely hirsute lobes, excavated at the ends, and pointed at the corners.

The *maxillipeds* (Pl. I, fig. 11) consist of a large basal portion and a median robust process, the homologon of the terminal joints of the lobes of the two maxillipeds in the Gammarids. At the anterior corners rise two double laminae, the homologa of the palps of the maxillipeds. The inner margins of the laminae carry some short hairs.

The *pereion* is a little longer and broader in the female than in the male. The first four segments are somewhat higher than the three following, and considerably

longer (3:2). The third and fourth segments are the longest, the first and seventh the shortest.

The *first pair of pereopoda* (Pl. I, fig. 12) are long and slender. The epimeral is longer than deep, almost quadrangular, the lower corners rounded; the epimerals of the following pairs have all the same form. The femur is four times longer than broad, linear, the margins smooth. The genu and tibia are short, the carpus elongated, almost linear, fringed with long slender hairs along the posterior margin and at the lower anterior corner. The metacarpus is elongate-ovate, considerably shorter than the carpus (4:3), beset with long slender hairs all around, the lower anterior corner feebly produced on both sides of the base of the dactylus; the posterior margin is sparingly serrated. The dactylus (Pl. I, fig. 13) is very long, longer than half the metacarpus (11:18), straight, with a deep circular notch at the base. At the bottom of this notch is a small hole, probably the opening for a metacarpal gland. The posterior margin of the dactylus is bordered with very short fine hairs. Long string-formed glands are to be seen in all the joints.

The *second pair* (Pl. I, fig. 14), are longer than the first. The femur, of the same form as in the first pair, carries a few long hairs at the lower posterior corner; the genu and tibia are short, provided with some hairs. The carpus is scarcely longer than the metacarpus, both less richly beset with hairs than in the first pair. The metacarpus without projections. The dactylus feebly curved, as long as half the metacarpus, provided with a small hole at the base. Glands as in the first pair.

The *third and fourth pairs* (Pl. I, fig. 5, and Pl. II, fig. 6 and 7) are equal in length and of the same form. The genu is uncommonly long, smooth; the three following joints are long, microscopically serrated along the posterior margins, and provided with equidistant, very minute spines. The dactylus is feebly curved, longer than half the metacarpus. Glands as in the first pair.

The *fifth pair* (Pl. II, fig. 8), as in all known species of the genus *Tyro*, are developed into a kind of jumping organ; at the same time they serve as a good weapon, the femur being produced into a very strong spine. The femur is long, linear, slightly serrated along the anterior margin and coarsely along the posterior; it is shorter than the three following joints together. The lower anterior corner projects into a very strong, straight, sharp process, twice longer than the genu. The tibia is much shorter than the carpus, both are smooth, almost linear. The metacarpus is very slender; it equals scarcely a third of the length of the carpus. The dactylus is small, feebly curved.

The *sixth pair* are considerably shorter than the fifth. The femur is a little more dilated, broader below. The tibia is longer than the carpus, the metacarpus as long as the carpus; these three joints are slightly serrated along the anterior margins. The dactylus is curved, with a hole for the metacarpal gland at the base, (Pl. I, fig. 15).

The *seventh pair* (Pl. I, fig. 16 and 17) are shorter than half the fifth pair, and about as long as the femur of the same pair. The tibia is longer than the carpus, the metacarpus is elongate-ovate, finely serrated along the anterior margin; it is longer than the carpus. The dactylus is long, feebly curved.

*Branchial sacks* are attached to the epimerals of the second to sixth pairs, those of the fifth pair are the largest.

*Ovitectrices* are present on the third to the sixth pairs; they are large, very thin laminae, fringed with some few distant thick hairs.

The *pleon* in the male equals the length of the last four pereionial segments, but in the female only the length of the last three and half the fourth. The segments are equal in length. The lateral parts are marked by a feeble keel, the continuation of the epimeral line on the pereion. The hinder corners are obtusely rounded.

The *pleopoda* (Pl. II, fig. 9) are well developed; the peduncles are robust and thick, longer than the rami. The outer ramus is 8—9-jointed, the inner 10—11-jointed. The ciliae are not longer than the rami, and not pedunculated.

The *urus* (Pl. II, fig. 10); the second and third segments are coalesced, and as long as the first, but narrower.

The *uropoda*; the inner rami of all the pairs are scarcely shorter than the corresponding peduncles; the exterior rami of the first and second pairs are very minute, those of the last pair are distinct, finely serrated along the inner margin, shorter than half the interior ramus. The first pair are minutely serrated along the outer margin and slightly but more coarsely along the upper two thirds of the inner margin; the second pair are smooth along the outer, and finely serrated along the inner margin. The third pair are smooth on the whole inner margin and on the outer margin of the peduncle, but finely serrated along the outer margin of the interior ramus. The last pair reach beyond the first pair. The uropoda contain distinct glands.

#### 4. TYRO ATLANTICA, C. BOVALLIUS, 1885.

Pl. II, fig. 11—18.

**Diagn.** *Corpus* leviter carinatum. *Caput* paullo altius quam longius, superne carinatum, carinis divergentibus. *Antennae* primi paris corpore paullo breviores. *Pedes pereii* primi paris carpi haud elongatis. *Pedes quinti* paris pedibus sexti multo longiores; femur ante non serratum, leve, post distincte serratum, articulis tribus sequentibus brevius, spinam rectam, genu paullo longiorem, gerens; tibia carpo multo brevior; carpus metacarpo duplo longior. *Pedes septimi* paris tertiam partem longitudinis pedum quinti paris superantes. *Segmenta uri* duo ultima coalita. *Pedes uri* lati, minute serrati; rami externi primi et secundi parium parvi, rami externi tertii paris magni, pedunculo paullo breviores. Rami interni trium parium pedunculis multo longiores. *Telson* anguste lingulatum, dimidium rami externi tertii paris haud æquans.

The *body* is feebly keeled. The *head* is a little deeper than long, provided on the upper side with two divergent keels. The first pair of *antennae* are a little shorter than the body. The first pair of *pereiopoda* with the carpi not elongated. The fifth pair are much longer than the sixth; the anterior margin of the femur smooth, not serrated, the posterior distinctly serrated; it is shorter than the three following joints together; the apical spine-like process is a little longer than the genu, straight; the tibia is much shorter than the carpus; the carpus is scarcely twice longer than the metacarpus. The seventh pair are longer than a

third of the fifth pair. The last two *ural* segments are coalesced. The *uropoda* are broad, minutely serrated; the exterior rami of the first and second pairs are small; those of the third pair are large, almost as long as the peduncle. The interior rami of all the three pairs are much longer than the peduncles. The *telson* is tongue-shaped, narrow, scarcely half as long as the exterior ramus of the third pair of *uropoda*.

**Colour.** Yellowish brown.

**Length.** 11—12 mm.; (without antennæ 7—8 mm.).

**Hab.** The south Atlantic, the Indian Ocean (S. M.)

**Syn. 1885.** *Tyro atlantica*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea«. Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 14.

The *body*, the *head*, and the *eyes* are very similar to those in *Tyro Sarsi*.

The *first pair of antennæ*, (Pl. II, fig. 12 and 13) have the peduncles longer than in the preceding species, almost equalling a sixth of the length of the flagellum. The elongated first joint has the same form and armature as in the preceding species, but the second joint is a little longer, equalling about a tenth of the first joint; it carries a straight bristle at the tip.

The *first pair of pereopoda* have the carpus only a little longer than the metacarpus (17:15) and the lower anterior corner of the metacarpus not produced. The dactylus is feebly curved, as long as half the metacarpus, wanting the characteristic notch at the base, mentioned in the preceding species.

The *fifth pair* (Pl. II, fig. 14 and 15) are of the same appearance as in *Tyro Sarsi*, but the anterior margin of the femur is smooth and the spine-like process is shorter and broader, and not much longer than the genu. The metacarpus is quite as long as half the carpus, very slender. The dactylus is short but stout, beset with fine hairs. (Pl. II, fig. 15).

The *sixth pair* (Pl. II, fig. 16) are much shorter than the fifth; the femur is narrow, linear; the anterior margin of the tibia and carpus smooth, that of the metacarpus slightly serrated.

The *seventh pair* (Pl. II, fig. 17) are shorter than the femur of the fifth pair; the dactylus is short and strong.

The *pleopoda*; the peduncles are as long as the rami; the outer ramus with 6 joints, the inner with 8 joints.

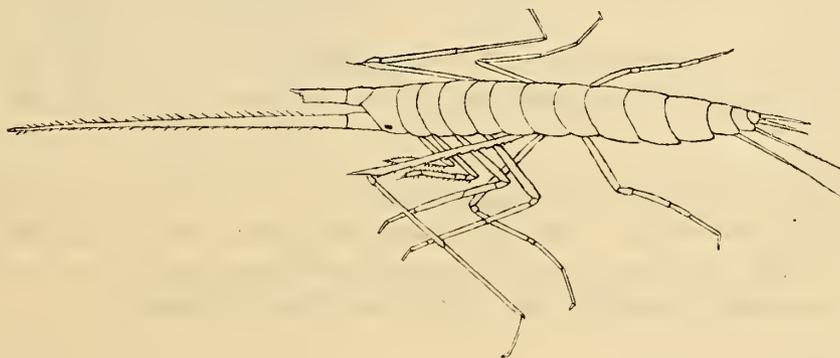
The *urus* (Pl. II, fig. 18); the coalesced second and third segment is shorter and narrower than the first segment.

The *uropoda*; the inner rami of all the pairs are much longer than the corresponding peduncles. The exterior rami of the first pair are small but distinct; those of the second pair are a little longer, almost equalling a sixth of the length of the peduncle (3:19). The exterior rami of the third pair are large, finely serrated along the inner margin, a little shorter than the peduncle (7:8). The serrations on the *uropoda* are the same as in the preceding species.

5. **TYRO LONGIPES**, DANA, 1850.

**Diagn.** *Caput* rostratum, superne depressum. *Antennae* primi paris corporis fere longitudine, subulatae. *Pedes pereii* quinti paris corpore non breviores, femore longissimo post minute spinoso, apice in spinam producto. *Pedes septimi* paris dimidio pedum quinti paris longiores. *Segmenta plei* duo antica angulis posticis acutis, non truncatis. *Segmenta uri* duo ultima libera non coalita. *Pedes uri* lati, *pedes primi* et *tertii* parium pedibus secundi longiores. *Pedes tertii* paris ramum externum longum, dimidium longitudinis rami interni æquantem, ferunt. (?)

The *head* is rostrate, depressed above. The first pair of *antennae* are about as long as the body. The fifth pair of *pereiopoda* are as long as the body; the femur is very long, minutely spinulose along the posterior margin, apically produced into a spine. The seventh pair are longer than half the fifth. The lateral parts of the *pleonal* segments with the posterior corners pointed, not truncated. The last two *ural* segments are free, not coalesced. The *uropoda* are broad, those of the first and third pairs reach longer than those of the second pair. The third pair are provided with a large exterior ramus, equalling half the length of the interior ramus. (?)



*Tyro longipes*, DANA.

Faësimile from DANA. U. S. Expl. Exp. Crust. II, pl. 55, fig. 7.

**Colour.** The pereion brownish, the rest of the body red.

**Length.** 12—16 mm.

**Hab.** »Pacific Ocean, Lat. 18° 10' S. Long. 126° W.» (DANA). North Pacific (STREETS).

<b>Syn.</b> 1850.	<i>Clydonia longipes</i> , DANA.	—	Proc. of the Amer. Acad. of Science and Arts. Ser. 2. Vol. 9, p. 19.
	»	»	— 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 835, pl. 55; fig. 7 a—b.
	»	»	SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 284; pl. 47, fig. 9.

1850. *Clydonia longipes*, DANA. TH. H. STREETS. 1877. »Contributions to the natural history of the Hawaiian and Fanning Islands and Lower California.» Bulletin of the United States National Museum. 1877. N:o 7, p. 124.
- Tyro* » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 5.

STREETS does not attempt to prove the identity of his species with DANA'S, but as it does not agree with any other of the known species I cite it here, using only the characteristic of the uropoda to complete DANA'S description.

DANA says:

There is a prominent angle on front of *head* and a low angle over each of the antennæ; but the front angle is not apparent in a vertical view, as the front margin, which is in advance of the angle, is depressed below the upper surface of the head.

The *eyes* are as in *Tyro gracilis*.

The *first pair of antennæ* are nearly as long as the body, a little stouter than in *Tyro gracilis*.

In the *second and third pairs of pereopoda* the carpus is longer than either the tibia or metacarpus.

The *seventh pair* are longer than half the fifth.

The posterior angles of the first two *pleonal* segments are acute, not truncated.

STREETS says:

The first pair of *uropoda* are longer than the second; both are lanceolate in shape, and serrated along their edges. The third pair are linear, and of the same length as the first pair. The third pair carry exterior rami, articulating just above the middle of the outer edge and reaching exactly to the half of the interior ramus.

## 6. TYRO BOREALIS, G. O. SARS, 1882.

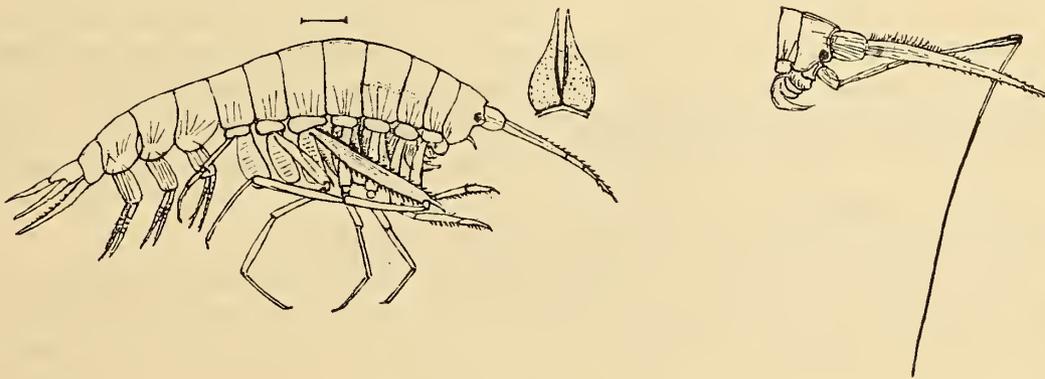
**Diagn.** *Corpus* depressum, non carinatum. *Caput* duplo altius quam longius, supine applanatum, lobis lateralibus minutis rotundatis. *Antennæ* primi paris dimidiam corporis longitudinem haud assequentes. *Pedes pereii* primi et secundi parium carpis elongatis. *Pedes quinti* paris pedibus sexti multo longiores; femur ante et post fortiter serratum, articulis tribus sequentibus multo brevius, spinam curvatam, genu longiorem, gerens; tibia carpo paullo brevior, carpus metacarpo paullo longior. *Pedes septimi* paris tertiam partem longitudinis pedum quinti paris haud assequentes. *Segmenta vri* duo ultima coalita. *Pedes vri* lati, minute serrati; margines interni pedum primi paris spiniferi. *Rami externi trium parium* minutissimi, *rami interni pedunculis* longiores. *Pedes primi* paris ceteris longiores. *Telson* minimum, triangulare, acuminatum.

The *body* is depressed not carinated. The *head* is twice as deep as long, flattened above, with a small rounded projection on each side. The first pair of *antennæ* are shorter than half the length of the body. The first two pairs of *pereiopoda* with elongated carpi. The fifth pair are much longer than the sixth; the femur is strongly serrated along the anterior and posterior margins, much shorter than the three following joints together; the spine-like apical process is curved, much longer than the genu; the tibia is a little shorter than the carpus; the carpus is only a little longer than the metacarpus. The seventh pair are shorter than a third of the fifth pair. The last two *ural* segments are coalesced. The *uropoda* are very broad, finely serrated; the interior margins of the first pair are spiniferous. The exterior rami of all the pairs are very minute, the interior rami are longer than the peduncles. The first pair of uropoda are longer than the following. The *telson* is very small, triangular, pointed.

**Colour.** Hyaline.

**Length.** 5,5 mm.

**Hab.** The Lofoten Islands, west coast of Norway.



*Tyro borealis*, G. O. SARS.

Facsimile from G. O. SARS. Overs. of Norges Crust., pl. 3, fig. 1.

- Syn. 1882.** *Clydonia borealis*, G. O. SARS. — »Oversigt af Norges Crustacéer», etc. Christiania Vidensk. Selsk. Forhandl. 1882. N:o 18, p. 77; pl. 3, fig. 1, 1 a and 1 b.
- Tyro* » » C. BOVALLIUS. 1887. »Arctic and Antaretic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 551.

This species seems to be intermediate between *Tyro Sarsi* and *Tyro Clausi* but is easily distinguished from the first by the short antennæ, by the strongly serrated anterior margin of the fifth pair of pereiopoda, and by the spiniferous interior margin of the first pair of uropoda. From *Tyro Clausi* it differs by the length of the fifth pair of pereiopoda and of the first pair of uropoda, and by the minute exterior ramus of the last pair of uropoda.

The *body* has a very thin tegument.

The lateral margins of the *head* project into a small rounded process on each side at the lower corners of the bases of the first pair of antennæ; on these lobes the eyes are situated.

The *eyes* are small, rounded, of a red colour.

The *first pair of antennæ* consist of a large, one-jointed peduncle, equalling a fifth of the length of the flagellum. The first joint of the flagellum is long, conical with serrated margins and some few long hairs, the rest of the flagellum consists of a few short joints.

The *second pair of antennæ* are rudimentary in the female; in the male they are similar to those of *Tyro Sarsi*.

The *mouth-organs*; the *mandibles* are laminar, the sharp incisive margo with 3—4 minute teeth. The second pair of *maxillæ* are not hirsute. The *maxillipeds* with simple laminae, without hairs, lanceolate.

The *pereiion* is a little tumid, more tumid in the female than in the male; the last three segments are shorter than the first four (16:19).

The first two pairs of *pereiopoda* are long with the carpi elongated and the dactyli straight. The third and fourth pairs with narrow metacarpi and very small dactyli. The fifth pair are provided with unusually long metacarpi and minute dactyli. The seventh pair are small without hairs, shorter than a fourth of the fifth pair.

The *pleon* is a little longer than the last three pereional segments; the lateral parts are deep, evenly rounded.

The peduncles of the *pleopoda* are as long as the rami.

The first pair of *uropoda* reach beyond the last, the interior margins are very strongly serrated, the teeth long, spine-like. The second pair reach to the end of the last pair.

## 7. TYRO CLAUSI, C. BOVALLIUS, 1885.

Pl. II, fig. 19—28.

**Diagn.** *Corpus* non carinatum. *Caput* plus quam duplo altius quam longius, superne carinatum, carinis divergentibus. *Antennæ* primi paris dimidio corporis paullo breviores. *Pedes pereii* primi paris carpi elongatis. *Pedes quinti* paris pedibus sexti paris longitudine æquales vel paullo breviores; femur, ante et post spinulose serratum, articulis tribus sequentibus haud brevius, spinam gracilem fere rectam, genu longiorem, gerens; tibia carpo multo brevior, carpus metacarpo sexies fere longior. *Pedes septimi* paris dimidium longitudinis pedum quinti paris æquant. *Segmenta uri* duo ultima coalita. *Pedes uri* lati, minute serrati, margines interni pedum primi paris spinulose serrati. *Rami externi* primi et secundi parium minutissimi, tertii paris permagni, longitudinem pedunculi æquant, ramis internis paullo breviores. *Rami interni* duorum parium ultimorum pedunculis multo longiores. *Pedes primi* paris ceteris breviores. *Telson* triangulare, tertiam partem longitudinis rami externi ultimi paris superans.

The *body* is not keeled. The *head* is more than twice as deep as long, provided on the upper side with two divergent keels. The first pair of *antennæ* are a little shorter than half the body. The first pair of *pereiopoda* with elongated earpi. The fifth pair are as long as, or a little shorter than, the sixth; the femur is spinously serrated along the anterior and posterior margins, it is only a little shorter than the three following joints together; the apical spine-like process is slender, nearly straight, longer than the genu; the tibia is much shorter than the carpus, the earpus is almost six times longer than the metacarpus. The seventh pair are as long as half the fifth. The last two *ural* segments are coalesced. The *uropoda* are broad, minutely serrated; the inner margins of the first pair are spinously serrated. The exterior rami of the first and second pairs are very minute, those of the third pair are very large, as long as the peduncle, and only a little shorter than the inner rami. The inner rami of the last two pairs are much longer than the peduncles. The first pair do not reach beyond the others. The *telson* is triangular, a little longer than a third of the exterior rami of the last pair.

**Colour.** Yellowish.

**Length.** 8—10 mm., without rostrum 5—7,5 mm.

**Hab.** The North Atlantic. Lat. 62° N. Long. 15° W. (S. M.).

**Syn. 1885.** *Tyro Clausi*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 14.  
 »       »       »       1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 552; pl. 40, fig. 1—3.

Although *Tyro Clausi* is very similar to *Tyro borealis* in general habitus and in the armature of the fifth pair of *pereiopoda* and of the first pair of *uropoda*, it is easily distinguished from that species as well as from its other congeners by the short fifth pair of *pereiopoda*.

The *body* is more narrowed than in *Tyro Sarsi*, with a thinner and smoother integument.

The *head* (Pl. II, fig. 20) is very high with two divergent keels on the upper side. The lateral margins do not project into processes as in *Tyro borealis*.

The *eyes* are small, round, and consist of 15 ocelli each.

The *first pair of antennæ* (Pl. II, fig. 21) are feebly curved downwards. The peduncle is one-jointed, tolerably thick, and equals a tenth of the length of the flagellum. The first joint of the flagellum is conical with three feebly marked keels, beset with long, depressed, sharp-pointed, spine-like teeth. On the inner side of the joint there are transverse rows of long hairs. The rest of the flagellum consists of only one joint, which is unusually long and narrow, and equals about a sixth of the length of the first joint.

The *second pair of antennæ* consist in the female of a three-jointed, very short rudimentary piece; in the male they are similar to those of *Tyro Sarsi*.

The *pereiopodion* is evenly arched; the last three segments are as high as the preceding, not longer than the third and fourth together. The fourth segment is the longest, the seventh the shortest.

The *epimerals* are rounded below, those of the fifth pair are the largest.

The *first pair of pereopoda* (Pl. II, fig. 22); the femur is comparatively broad, the tibia very short, the carpus elongated, linear, fringed with slender hairs along the posterior margin; the metacarpus is shorter than the carpus, narrow, conical, sparingly beset with slender hairs; the dactylus is nearly straight, half as long as the metacarpus.

The *second pair* (Pl. II, fig. 23) are of the same form as the first, but the carpus is not elongated, almost shorter than the metacarpus; the dactylus feebly curved, as long as half the metacarpus.

The *third and fourth pairs* with elongated carpi, which are longer than the tibiae, and short dactyli.

The *fifth pair* (Pl. II, fig. 24) with the femur comparatively broad, linear, a little constricted at the upper end. The anterior margin is strongly serrated, the spine-like teeth, 9 in number, are directed downwards, pressed against the margin; the teeth forming the serration along the posterior margin are a little smaller, 10—12 in number; the apical spine-like process is very strong, feebly curved, a little longer than the genu. The tibia is shorter (17:19) and a little narrower than the carpus. The metacarpus is very slender, five times longer than the dactylus.

The *sixth pair* are as long as, or a little longer than, the fifth (20:19); the femur is pretty broad, very feebly serrated, the tibia is a little shorter than the carpus; the metacarpus as long as the carpus, curved; the dactylus is feebly curved.

The *seventh pair* (Pl. II, fig. 25) are half as long as the fifth or sixth pair; the femur is a little broader above, nearly as long as all the following joints together (6:7); the tibia is as long as the carpus, the metacarpus a little longer; the dactylus is slender.

The *pleon* equals the length of the last four pereionial segments. The lateral parts of the segments are broadly rounded below.

The *pleopoda* (Pl. II, fig. 26); the peduncles are elongate-ovate, as long as the rami. The inner ramus is 8-jointed, the outer 11-jointed. The ciliae are longer than the rami, and pedunculated (Pl. II, fig. 27).

The *urus* (Pl. II, fig. 28); the second and third segments are coalesced, longer than the first (4:5).

The *wropoda*; the interior rami of the first pair are as long as the peduncle, those of the last two pairs are much longer than the corresponding peduncles. The exterior rami of the first two pairs are minute but longer than those of *Tyro Sarsi*. The exterior rami of the last pair are very large, quite as long as the peduncles and only a fourth shorter than the interior rami, the inner margins are feebly serrated. The first pair are minutely serrated along the outer margin of the interior ramus, and strongly serrated along the inner margin, the teeth spine-like. The second pair are smooth along the whole outer margin and minutely serrated along the inner margin of the interior ramus. The third pair are minutely serrated along the outer margin of the interior ramus, the whole inner margin is smooth. The second pair reach beyond the first, and the third beyond the second. All the pairs contain glands.

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The *body* is more slender than in the other species, the lateral parts of the pereional segments are a little projecting just above the epimerals, forming a margo, which continues over the pleonal segments.

The *head* is robust, the divergent keels are more obtuse than in *Tyro Sarsi*.

The *eyes* are comparatively large, consisting of about twenty ocelli.

The *first pair of antennæ* (Pl. III, fig. 19 and 20) reach to the anterior margin of the fifth pereional segment; the peduncle is scarcely thicker than the base of the flagellum; it equals a seventh of the length of the flagellum. The first joint of the flagellum is long, rapidly tapering, provided with three longitudinal, strongly serrated keels, and richly beset with long clavate hairs on the inner side; the second and last joint of the flagellum is conical with one long hair at the tip; it is almost as long as a fifth of the first joint.

The *second pair of antennæ*; (Pl. III, fig. 21) the basal joint is almost globular, the two following increase in length. The flagellum is multi-articulate.

The *pereiopod* is long and comparatively narrow, the third segment is the longest, the first the shortest; the last three pereional segments are a little longer than the two preceding together. The lateral parts of the segments just above the articulation with the epimerals are bent outwards almost at a right angle so as to form a rounded prominent margo.

The *epimerals* are long and narrow, rounded below.

The *branchial sacks* are broader below, constricted above, attached to the epimerals of the second to seventh pairs of pereiopoda.

The *first pair of pereiopoda* (Pl. III, fig. 22); the femur is narrow, linear; the tibia is a little longer than the genu, the posterior margin fringed with some short unequal hairs. The carpus is about as long as the metacarpus, the hinder margin undulated and provided with a few short hairs. The carpus and metacarpus are much broader than in the other species. The lower anterior corner of the metacarpus is produced into a triangular process on the anterior side of the dactylus, longer than half the dactylus; it is provided with a stiff bristle at the tip; the hinder margin of the joint is undulated, finely serrated, and carries 4 to 5 short spines. This joint is more richly filled with glandular matter than the preceding. The dactylus is feebly curved, thick at the base, where it shows a large opening for the metacarpal glands; the hinder margin is provided with a small accessory spine a little below the middle. (Pl. III, fig. 23).

The *second pair* (Pl. III, fig. 24); the carpus is shorter than the metacarpus, the hinder margin straight, with two pairs of long hairs. The metacarpus has the triangular process shorter than half the dactylus; the anterior margin of the joint is sharply serrated, the posterior margin feebly undulated, beset with some few hairs; there are three sharp teeth at the lower corner. The dactylus is a little more slender than in the preceding pair.

The *third and fourth pairs* (Pl. III, fig. 25) are slender; the tibia and carpus are equal in length, a little broader below. The metacarpus is shorter than the carpus, the hinder margin beset with short, fine, hooked hairs. The dactylus is curved, slender, the hinder margin beset with short spines. At the base of the dactylus there is a wide opening for the metacarpal glands. (Pl. III, fig. 26).

The *fifth pair* (Pl. III, fig. 27) are considerably longer than the sixth pair; the femur is broader than in the other species, only five times longer than broad; the anterior margin shows 5—6 strong sharp teeth, the posterior is obtusely serrated; the apical process is very strong, quite straight, five times longer than the genu; the tibia is a little shorter than the carpus (21:22); the metacarpus is longer than half the carpus, tolerably stout. The daetylus is short, strongly curved, and robust, thicker at the base, with small opening, and a very short spine at the middle of the hinder margin. (Pl. III, fig. 28).

The *sixth pair* (Pl. III, fig. 29 and 30); the tibia, carpus and metacarpus are broad, almost tumid; the tibia a little shorter than the carpus, the carpus longer than the metacarpus. The daetylus as in the preceding pair.

The *seventh pair* (Pl. III, fig. 31 and 32) are exactly of the same form as the sixth but much smaller (5:8); they are shorter than half the fifth (5:11).

The *pleon* is a little longer than the last four pereional segments, the hinder corners of the lateral parts of the segments are deeper than the anterior, and broadly rounded.

The *pleopoda*; the peduncles are much longer than the rami; the exterior ramus is 7-jointed, the interior 9-jointed.

The *urus* (Pl. III, fig. 33) is almost shorter than the last pleonal segment; the last two coalesced segments are shorter than the first.

The *uropoda*; the inner rami of the first two pairs are longer than the peduncles, those of the second pair are excavated at the interior margin and finely serrated, as is also the inner margin of the peduncle. The outer margin of the interior ramus of the first pair is sharply serrated. The interior ramus of the third pair is as long as the peduncle, sharply serrated along the exterior margin. The exterior ramus of the first pair is short and narrow, equalling about an eighth of the length of the interior ramus, that of the second pair is long and narrow, almost as long as half the interior ramus. The exterior ramus of the third pair is pretty broad, finely serrated along the inner margin, equalling two thirds of the length of the interior one.

The *telson* is very minute, much shorter than a tenth of the length of the peduncles of the last pair of uropoda.

## 9. TYRO TULLBERGI, C. BOVALLIUS, 1885.

Pl. III, fig. 1—9.

**Diagn.** *Corpus* carinatum, lateribus pereii marginatis. *Caput* rostratum, duplo fere altius quam longius, superne carinatum, carinis divergentibus. *Antennae* primi paris quartam partem longitudinis corporis aequantes. *Femora pedum pereii* quattuor parium primorum lata, ovata. *Pedes* quinti paris pedibus sexti paris multo longiores; femur ante leve, post spinulose serratum, articulis tribus sequentibus multo brevius, spinam curvatam simplicem, genu paullo longiorem gerens; tibia carpo multo longior; carpus metacarpo tertia parte longior. *Pedes* septimi paris tertiam partem longitudinis pedum quinti paris aequantes,

dactylis ejusdem paris pedunculatis. Segmenta *uri* duo ultima coalita. *Pedes uri* angusti minute serrati; rami externi elongati, angusti, tertii paris dimidium pedunculi æquantes. Rami interni primi paris pedunculis longiores, secundi paris pedunculis multo breviores, illi tertii paris pedunculos longitudine æquantes. *Telson* elongatum, triangulare.

The *body* is keeled, the lateral parts of the pereion provided with a distinct margo. The *head* is rostrate, almost twice as deep as long, with two divergent keels on the upper side. The first pair of *antennæ* equal a fourth of the length of the body. The femora of the first four pairs of *pereiopoda* are dilated, ovate. The fifth pair are much longer than the sixth; the anterior margin of the femur is smooth, the posterior margin spinously serrated; the femur is much shorter than the three following joints together; the apical spine-like process is curved, simple, a little longer than the genu; the tibia is much longer than the carpus; the carpus is a third longer than the metacarpus. The seventh pair equal a third of the length of the fifth pair; the dactyli of the seventh pair are pedunculated. The last two *ural* segments are coalcesced. The *uropoda* are narrow, minutely serrated; the exterior rami are long and narrow; those of the third pair are as long as half the peduncles. The interior rami of the first pair are longer than the peduncles; those of the second pair much shorter than the peduncles; those of the third pair are as long as the peduncles. The *telson* is elongated, triangular.

**Colour.** Reddish white.

**Length.** 5 mm., without the antennæ 4 mm.

**Hab.** Off Cape Horn; taken by the late Captain GEORGE VON SCHÉELE. (U. M.).

**Syn.** 1885. *Tyro Tullbergi*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 15.  
 »       »       »       1887. »Arctic and Antaretic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 532, pl. 40, fig. 4—10.

It is a small delicate species with uncommonly well developed eyes and slender legs. Only the female is known.

The *body* is shorter and thicker than in the preceding species, with the dorsal side feebly keeled from the head to the first ural segment.

The anterior margin of the *head* projects into a very short, obtuse rostrum.

The *eyes* (Pl. III, fig. 2) are comparatively large, quite as large as in *Tyro marginata*, consisting of twelve hexagonal or pentagonal ocelli or rather groups of ocelli.

The *first pair of antennæ* (Pl. III, fig. 3) are short and stout; the peduncle is about a fourth of the length of the flagellum. The flagellum is three-jointed, the first joint is six times as long as the last two together; the second joint is almost three times as long as the third, both without hairs.

The *pereion* is very much arched, the fourth joint is the longest; the last three segments are scarcely longer than the two preceding together; the lateral parts of the segments form a margo, which is not, however, so prominent as in the preceding species.

The four anterior pairs of *epimerals* are a little deeper than in *Tyro marginata*.

The *first pair of pereopoda* (Pl. III, fig. 4); the femur is elongate-ovate, the tibia longer than the genu; the carpus is elongate-ovate, a little longer than the linear metacarpus, which is narrower; both joints are beset with long hairs. The dactylus is longer than half the metacarpus, feebly curved.

The *second pair* (Pl. III, fig. 5); the carpus is shorter than the metacarpus, narrow, linear; the dactylus is half as long as the metacarpus.

The *third and fourth* pairs are slender, with the femora a little dilated, the tibiæ shorter than the carpi, and the dactyli long, feebly curved.

The *fifth pair* (Pl. III, fig. 6); the femur is linear, seven times longer than broad, the anterior margin is quite smooth, the posterior spinously serrated; the apical process is curved, a little longer than the genu. The tibia is very elongated, nearly twice as long as the carpus (15:28), linear; the metacarpus equals two thirds of the length of the carpus, both are linear; the dactylus is long, slender, feebly curved, longer than a third of the metacarpus (2:5).

The *sixth pair* are slender, the joints linear, not tumid, the carpus much longer than the tibia. The dactylus as in the preceding pair.

The *seventh pair* (Pl. III, fig. 7) are short and slender, scarcely half as long as the sixth pair, and shorter than the femur of the fifth. The joints are linear, not tumid; the metacarpus is as long as the carpus; the dactylus is almost rectangularly bent, pedunculated; at the base of the peduncular part there is an opening for the metacarpal glands.

The *pleon* is a little shorter than the last four pereional segments (11:12). The lower margins of the lateral parts of the segments are straight, with rounded corners.

The *pleopoda* (Pl. III, fig. 8) with the peduncles longer than the rami, the exterior ramus with seven, the interior with nine joints.

The *urus* is only a little shorter than the last two pleonal segments together; the last two coalesced segments are as long as the first.

The *uropoda* (Pl. III, fig. 9); the first and third pairs are quite smooth, the second serrated along the inner margin of the peduncle. The exterior rami of the first pair are long, narrow, a third of the length of the interior ones; those of the second pair are shorter, scarcely a fourth of the length of the interior ones; those of the third pair are of the same form, equalling half the length of the corresponding interior rami.

The *telson* is elongate-triangular, longer than a third of the peduncle of the last pair of uropoda.

## 10. TYRO PACIFICA, C. BOVALLIUS, 1887.

Pl. III, fig. 10—17.

**Diagn.** *Corpus* non carinatum. *Caput* paullo altius quam longius, superne indistincte carinatum, carinis divergentibus. *Antennæ* primi paris dimidio corporis paullo breviores. *Femora pedum pereii* quattuor parium primorum angusta. *Pedes* quinti paris pedibus sexti paris

longiores; femur ante leve, post spinulose serratum, articulis tribus sequentibus multo brevius, spinam curvatam, bicuspidatam, genu haud longiorem gerens; tibia carpo multo longior; carpus metacarpo longior. Pedes septimi paris dimidio pedum quinti paris paullo breviores; dactyli ejusdem paris pedunculati. Segmenta *uri* duo ultima coalita. *Pedes uri* angusti parce serrati; rami externi elongati angusti, in tertio pari dimidium pedunculi paullo superantes. Rami interni primi paris pedunculis longiores, secundi et tertii parium pedunculis paullo breviores. *Telson* triangulare.

The *body* is not keeled. The *head* is a little deeper than long, with two indistinct divergent keels on the upper side. The first pair of *antennæ* are a little shorter than half the body. The femora of the first four pairs of *pereiopoda* are narrow. The fifth pair are longer than the sixth; the anterior margin of the femur is smooth, the posterior spinously serrated; it is much shorter than the three following joints together; the apical spine-like process is bifid, curved, not longer than the genu; the tibia is much longer than the carpus; the carpus is longer than the metacarpus. The seventh pair are a little shorter than half the length of the fifth pair; the dactyli of the seventh pair are pedunculated. The last two *ural* segments are coalesced. The *wropoda* are narrow, sparingly serrated, the exterior rami long, narrow; those of the third pair a little longer than half the peduncles. The interior rami of the first pair are longer than the peduncles; those of the second and third pairs are a little shorter than the peduncles. The *telson* is triangular.

**Colour.** White with red spots on the legs.

**Length.** 5,5 mm., without antennæ 4 mm.

**Hab.** The Pacific, at Corinto, Nicaragua. Captured by the author in 1882. (S. M.).

**Syn.** 1887. *Tyro pacifica*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 4.

This species is very closely allied to *Tyro Tullbergi*, and ought perhaps to be regarded only as a variety of it; however there being many, if not very important, differences, I give it preliminarily, though with some hesitation, as a species of its own. Only the female is known.

The *body* is smooth and even, not keeled or marginated.

The *head* is truncated anteriorly.

The flagellum of the first pair of *antennæ* is two-jointed, five times longer than the peduncle.

The *pereion* is not marginated; the second pereional segment is as long as the first. The last three segments are almost as long as the three preceding together.

The carpi of the *first two pairs of pereiopoda* (Pl. III, fig. 11) are longer than the carpi.

The *third and fourth pairs* (Pl. III, fig. 12) with the tibiæ as long as the carpi.

The femur of the *fifth pair* (Pl. III, fig. 13) has the apical process bifid, the anterior spine is much shorter and more slender than the posterior; the carpus is dilated and a little tumid; the dactylus scarcely a fourth of the metacarpus.

The *sixth pair* (Pl. III, fig. 14) with the carpus and the metacarpus a little tumid.

The *seventh pair* (Pl. III, fig. 15) are quite as long as the femur of the fifth pair; the tibia and the carpus are a little tumid; the metacarpus is shorter than the carpus. The dactylus as in the preceding species (Pl. III, fig. 16).

The *pleon* is scarcely longer than the three preceding pereional segments together. The *pleopoda* are similar to those of *Tyro Tullbergi*.

The *urus* is shorter than the two preceding pleonal segments together.

The *uropoda* (Pl. III, p. 17); the first pair is finely serrated along the outer margin of the interior ramus, the second along the inner, excavated margin of the interior ramus; the third pair are quite smooth. The exterior rami of the first and second pairs are very narrow, equalling a fourth of the length of the corresponding interior rami; those of the third pair are half as long as the interior rami.

The *telson* is triangular, equalling a fourth of the length of the peduncle of the last pair of uropoda.

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The second family, **LANCEOLIDÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* parvum, curtum, non tumidum. *Oculi* parvi vel obsoleti. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, flagello compresso instructæ, articulus primus flagelli permagnus, articuli sequentes parvi perpauci terminales. *Antennæ* secundi paris compressæ non angulatæ, parti anteriori capitis affixæ. *Instrumenta oris* masticatoria, mandibulæ palpo instructæ. *Pedes pereii* ambulatorii, pedes septimi paris non transformati. *Pedes uri* ramis instructi.

The *head* is small, short, not tumid. The *eyes* are small or indistinct. The first pair of *antennæ* are straight, fixed at the anterior side of the head, the flagellum is compressed, the first joint very large, the following small, terminal, few in number. The second pair are compressed, not angulated, fixed at the anterior side of the head. The *mouth-organs* are adapted for mastication, the mandibles are provided with palp. The *perciopoda* are walking legs, the seventh pair not transformed. The *uropoda* are provided with rami.

**Syn.** 1887. *Lanceolidæ*. C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Akad. Handl. B. 11. N:o 16, p. 5.

The animals of this family have shared with the *Tyronidæ* the fate of being neglected from the very first moment they made their entrance into the zoological system. None of the zoologists have recognized the genus *Lanceola* of SAY in its true form; it was pushed about as a literary curiosity from one place to another in the carcinological system. H. MILNE EDWARDS in 1830<sup>1)</sup> cites it as synonymous with *Hyperia*. JAMES E. DE KAY in 1844<sup>2)</sup> identified the species *Lanceola pelagica* described by Say with *Hyperia Latreilli* MILNE EDWARDS. C. SPENCE BATE in 1862<sup>3)</sup> interpreted it as a *Vibilia*, wherein he was followed by subsequent authors. In 1885<sup>4)</sup> I described some animals, which in my opinion were

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<sup>1)</sup> »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. Sc. Nat. Tome 20<sup>me</sup> p. 387.

<sup>2)</sup> Zoology of New-York, or the New-York Fauna. Part. 6. Crustacea p. 39.

<sup>3)</sup> Catal. Amph. Crust. Brit. Museum, p. 304.

<sup>4)</sup> See below.

closely allied to *Lanceola pelagica* SAY, and at the same time I claimed the generic name *Lanceola* for these animals as the true name due to them.

Only one genus is hitherto known.

Genus 1. **LANCEOLA**, TH. SAY, 1818.

**Diagn.** *Caput* ante excavatum multo brevius quam altius. *Pedes pereii* primi et secundi parium simplices non chelati. *Pedes* trium parium ultimorum metacarpi excavatis dactylisque retractilibus. *Epimera* distincta. *Pedes uri* curti lati robusti, ramis binis liberis, ut in *Hyperia*. *Telson* maximum lingulatum.

The *head* is excavated anteriorly, much deeper than long. The first and second pairs of *pereiopoda* simple, not cheliform. The last three pairs with the ends of the metacarpi hollowed and the dactyli retractile. The *epimerals* are distinct. The *uropoda* are short, broad, robust, each with two free rami, as in *Hyperia*. The *telson* is very large, tongue-shaped.

<b>Syn. 1818.</b>	<i>Lanceola</i> , TH. SAY.	—	»An account of the Crustacea of the United States». Journal of the Academy of Natural Sciences of Philadelphia. Vol. I, part. 2, p. 317.
	»	C. BOVALLIUS. 1885.	On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Akad. Handl. Bd. 10. N:o 94, p. 3.
	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 553.

- A.** The sixth pair of pereiopoda are longer than the pereion.
- a 1.** The seventh pair of pereiopoda are as long as the fourth pair ..... **1. L. pelagica.**
- a 2.** The seventh pair of pereiopoda are shorter than the fourth pair.
- aa 1.** The fifth pair of pereiopoda are much shorter than the sixth.
- aaa 1.** The telson is longer than the peduncles of the last pair of uropoda..... **2. L. Sayana.**
- aaa 2.** The telson is shorter than the peduncles of the last pair of uropoda..... **3. L. serrata.**
- aa 2.** The fifth pair of pereiopoda are almost as long as the sixth pair ..... **4. L. Lovéni.**
- B.** The sixth pair of pereiopoda are shorter than the pereion.
- b 1.** The fourth pair of pereiopoda are much shorter than the sixth ..... **5. L. felina.**
- b 2.** The fourth pair of pereiopoda are as long as, or longer than, the sixth pair ..... **6. L. Clausi.**

## 1. LANCEOLA PELAGICA, TH. SAY, 1818.

**Diagn.** *Caput* rostratum, ante excavatum. *Oculi* longitudinales. Segmentum primum *pereii* brevissimum, segmentum secundum ac tertium longissima æqualia. *Pedes pereii* sexti paris quam pereion longiores. *Pedes septimi* paris pedibus quarti paris longitudine æquales sed pedibus quinti paris multo breviores. *Pedes uri* primi et secundi parium longitudine æquales.

The *head* is rostrate, excavated anteriorly. The *eyes* are longitudinal. The first pereional segment is the shortest, the second and third the longest, equal in length. The sixth pair of *pereiopoda* are longer than the pereion. The seventh pair are as long as the fourth pair, but much shorter than the fifth pair. The first and second pairs of *wropoda* are equal in length.

**Colour.** ?

**Length.** 31 mm.

**Hab.** The Gulfstream; captured by Capt. Hamilton.

<b>Syn.</b> 1818.	<i>Lanceola pelagica</i> ,	TH. SAY.	—	»An account of the Crustacea of the United States». Journ. of the Acad. of Natural Sciences of Philadelphia. Vol. 1, part. 2, p. 318.
	<i>Hyperia pelagica</i> ,	»	H. MILNE EDWARDS. 1830.	»Extrait de Recherches pour servir à l'Hist. nat. des Crustacés amphipodes». Annal. Sc. Nat. Tome 20 <sup>me</sup> , p. 387.
	»	»	»	1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 77.
	<i>Vibilia pelagica</i> ,	»	SPENCE BATE. 1862.	Catal. Amph. Crust. British Museum, p. 304.

Although I have had several specimens of *Lanceola* for examination, I have not succeeded in identifying any of them with SAY's species; that which comes nearest it is *Lanceola Sayana*, but it differs by the long fourth pereional segment, the short seventh pair of *pereiopoda*, and the broad and long telson. I give below an extract of SAY's description (l. c.) containing the more specific characteristics.

The *body* is soft, the external covering membranaceous.

The *head* is very short, transverse, the clypeus projecting into an acute angle, the front concave.

The *eyes* are longitudinal, placed opposite the base of the first pair of antennæ.

The *first pair of antennæ* are short, compressed, the basal joints short, robust, concealed by the clypeus. The flagellum is linear, compressed, obtuse, attaining the middle of the third joint of the second pair.

The *second pair of antennæ* are longer than half the pereion, four-jointed, compressed; the basal joints are very short, the third and fourth longer, equal.

The *pereion*; the first segment is the shortest, the second and third the longest, equal. The *pereiopoda*; the first pair are the shortest, the third, fourth, and seventh pairs equal, the fifth longer, the sixth longer than the pereion.

The *urus* is depressed, three-jointed.

The first two pairs of *uropoda* are equal in length, the last pair rather shorter.

The *telson* is attenuated.

Only two specimens were captured, both females.

## 2. LANCEOLA SAYANA, C. BOVALLIUS, 1885.

The name in honour of THOMAS SAY.

Pl. IV, fig. 1—19; Pl. V, fig. 1.

**Diagn.** *Corpus* leviter carinatum, integumento laterum prominente. *Caput* rostrum acutum curvatum gerens. *Oculi* parvi elongati ovati. Segmentum primum et septimum *pereii* brevissima, segmentum quartum longissimum, segmenta tria ultima segmento quarto multo longiora. *Pedes pereii* primi paris metacarpus crasso conico, latitudine longitudinem æquante. *Pedes* quarti paris pedibus quinti paris multo breviores; pedes septimi paris pedibus quarti breviores. *Pedes* sexti paris quam pereion paullo longiores. Segmenta *plei* non serrata. *Pedes uri* breves, lati, robusti. *Telson* pedunculo ultimi paris pedum uri longius, latum, post serratum.

The *body* is feebly keeled dorsally, the integument of the sides prominent. The *head* is provided with a curved, sharp rostrum. The *eyes* are small, elongate-ovate. The first and seventh segments of the pereion are the shortest, the fourth is the longest; the last three segments together are much longer than the fourth. The metacarpus of the first pair of *pereiopoda* is thick, conical, as broad at the base as long. The fourth pair are much shorter than the fifth. The sixth pair are a little longer than the pereion. The seventh pair are shorter than the fourth. The *pleonal* segments are not serrated dorsally. The *uropoda* are short, broad, and stout. The *telson* is longer than the peduncle of the last pair of *uropoda*, serrated posteriorly, broad.

**Colour.** Red.

**Length.** 30—42 mm.

**Hab.** The North and South Atlantic. (D. M., S. M.).

**Syn. 1885.** *Lanceola Sayana*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Akad. Handl. Bd. 10. N:o 14, p.

*Lanceola Sayana* is one of the largest of all the amphipoda, easily distinguished from its allies by the regular prominences of the integument of the sides of the pereion and by the long broad telson. It seems to be the least rare of all the species. I have seen specimens from the North Atlantic, as well as from the South Atlantic.

The *body* is thick, swollen, a little more slender and elongate in the male than in the female. The integument is thick, calcareous. The dorsal line forms an obtuse keel, which is interrupted between the segments.

The *head* is more than twice deeper than long, the anterior side deeply excavated; the rostrum is broad, triangular, curved downwards, almost as long as the rest of the head. The head with the rostrum is a little shorter than the first pereionial segment.

The *eyes* (Pl. IV, fig. 3) are ovate, a little prominent, placed a little above the base of the first pair of antennæ. They consist of about 40 ocelli each. The ovate prominence formed by the eyes is vertical, almost twice as long as broad. Most of the ocelli consist of two elements each, some of them are composed of three, and a few ones of four crystalline elements. The ocelli are irregularly scattered over the whole surface of the ocular prominence but more decidedly crowded at both the ends.

The *first pair of antennæ* (Pl. IV, fig. 4 and 5) are a little thicker in the female than in the male, but of the same form. They are much shorter than the head and the first pereionial segment together. The peduncle consists of three joints; the first is much the largest, as thick as long, the second is longer than the third, all are provided on the upper side with a finely serrated crest. From the upper anterior corner of the third joint issues a peculiar bristle or spine provided with slender hairs at the tip. Possibly this appendix is an homologon of the accessory flagellum in the Gammarids and Synopids. The first joint of the flagellum is very large, somewhat compressed, fringed with long hairs along the inner side; it is about a third longer than the peduncle. The following joints are small, four in number in the male, two or three in the female. They are provided with slender hairs and olfactory glands. (Pl. IV, fig. 5.)

The *second pair of antennæ* (Pl. IV, fig. 6 and 7) are much longer than the first, narrow, compressed, four-jointed; the first three joints represent the peduncle, the fourth the flagellum; this in young males has two or three small terminal joints, evanescing with the growth of the animal. The first joint of the peduncle is short, the second longer, the third longer than the two preceding together. The upper margins of all the joints are fringed with minute hairs. The flagellar joint is a fourth longer than the last peduncular one, formed as the blade of a dagger. It is fringed with minute hairs along the upper margin, and tipped with the rudiment of a small terminal joint carrying two long hairs. In a young male two such terminal joints are distinctly visible, the last the longest. (Pl. IV, fig. 7).

The *mouth-organs* are well developed. The *labrum* is very broad, emarginate at the hinder margin, convex at the anterior (Pl. IV, fig. 8).

The *mandibles* (Pl. IV, fig. 9) are comparatively small, the masticatory process is short and broad, with the surface striated by fine lamellæ; on the inner side of this process the basal portion is densely covered with short curved strong spines pointing downwards. Between the process and the base of the palp there is a projecting crest fringed with long slender hairs. The palp is fixed a little above the middle of the basal portion; the first joint is the shortest, the second the longest, sparingly fringed with short hairs along the inferior margin, and provided with some bundles of long hairs at the upper outer corner. The third joint is a little shorter than the second, tapering towards the apex and feebly curved; it carries a row of very delicate hairs on the underside of the attenuated apex.

The *first pair of maxillæ* (Pl. IV, fig. 10) consist of a stout basal portion, almost cubical, and two narrow, linear, feebly curved laminae; the outer is the longest; both are

hirsute at long the lower third of their length; the lower margins are densely beset with long, straight, stout spines.

The *second pair of maxillæ* (Pl. IV, fig. 11) consist of a high rectangular basal portion and two laminae at the lower end; the outer is thin, broad, hollowed, and embraces the inner; it is undulated at the free margin, rounded, and nearly divided in two parts by a deep fissure. The inner lamina is thick, ovate, with four or five strong, tooth-like spines at the apex; the inner side is hirsute. On the inner side of the basal portion there is an accessory lamina, almost quadrate, densely hirsute on the inner side.

The *maxillipeds* (Pl. IV, fig. 12 and 13) show a short basal portion projecting inwards between the maxillæ, with a feebly hirsute, thick process. At the lower end the basal portion carries a small median lamina, fringed with long hairs, and two lateral lobes (homologa of the palps in the Gammarids and Synopids). The lateral lobes are broad, hollowed, rounded at the ends; the inner margins are densely fringed with very long hairs, the outer sparingly beset with short hairs.

The *pereiopod* is strongly arched above and below, more arched in the female than in the male, provided with a dorsal crest. The first segment is scarcely longer than the seventh, the fourth is the longest, the third only a little shorter (14:15). The sides of the segments are prominent so as to form a kind of elevated facets.

The *epimerals* of the first pair are very small and narrow, those of the fifth pair the largest, all rounded below.

The *branchial sacks* are very small on the second and third pairs, large on the fourth, fifth, and sixth pairs.

The *first pair of pereiopoda* (Pl. IV, fig. 14) are very robust; the femur is broadly ovate, twice as long as broad; the inner anterior side dilates into a thin lamina for the protection of the last joints when the leg is folded up; the high ridge on the femur behind this laminar part is fringed with long slender hairs, the posterior margin of the joint is beset with some few short hairs. The genu is small, the lower posterior part of the tibia is broadly produced to half the length of the carpus. The carpus is very large, almost triangular, as long as broad; the anterior margin curved, the posterior straight, the inferior feebly excavated and densely fringed with long hairs. The metacarpus is very thick, conical, not longer than the diameter of the base, beset with short hairs, and a little broader than two thirds of the length of the inferior margin of the carpus. The dactylus almost straight, shorter than half the metacarpus.

The *second pair* (Pl. IV, fig. 15) are a third longer than the first pair, and a little more slender. The femur is almost linear. The tibial process is longer than a third of the carpus. The carpus is much narrower than in the preceding pair, twice longer than broad; the inferior margin is excavated, fringed with hairs. The metacarpus is elongate, tapering towards the end, the posterior margin feebly excavated, with a few short equidistant hairs; the anterior margin is feebly curved; with four very short hairs; the metacarpus is shorter than the carpus (5:6). The dactylus is short and stout, scarcely equalling a fifth of the length of the metacarpus.

The *third and fourth pairs* (Pl. IV, fig. 16) are equal in length, and of the same form. The femur is short, laminar, the anterior margin straight; a little behind the very

thin margin the joint thickens abruptly and is fringed with long slender hairs. Against this wall the tibia impinges when the leg is folded up. The hinder margin is feebly curved, coarsely serrated, and fringed with hairs. The tibia is longer than the carpus (24:19); both carry a few short hairs along the hinder margins. The metacarpus is narrow, linear, as long as the carpus. The dactylus is small, feebly curved, fixed as usual terminally at the tip of the metacarpus.

The *fifth pair* are longer than the fourth (8:7), but much shorter than the sixth (2:3). The femur is long, linear; the tibia is longer than the carpus; the metacarpus is a little shorter than the carpus; the dactylus has the same articulation and form as that described below in the sixth pair.

The *sixth pair* (Pl. IV, fig. 17) are only a little longer than the pereion (36:35). The femur is tolerably broad, linear, the anterior and posterior margins are straight; the tibia and carpus are almost equal in length, the margins smooth. The metacarpus is elongated, slender; the lower end is rounded, deeply hollowed on the anterior side, forming a spacious pit for the reception of the dactylus when this joint is retracted. The dactylus is fixed subterminally, a little above the rounded lower end; it is strongly curved, of the same form as the claw of a cat, very sharp-pointed; the inner concave margin is beset with long spines.

The *seventh pair* (Pl. IV, fig. 18 and 19) are scarcely a sixth shorter than the fourth pair, and exactly half as long as the sixth pair. The tibia is longer than the carpus; the carpus equals two thirds of the length of the metacarpus. The lower end of the metacarpus is a little broader, hollowed as in the preceding pair. The dactylus is fixed as in the sixth pair, the concave margin indistinctly serrated.

The *pleon* is much shorter than the last three pereional segments (10:14), the dorsal line shows no serration; the lateral parts of the segments are evenly rounded below.

The *pleopoda* are provided with long, narrow peduncles, a little shorter than the rami; the outer ramus has 16—17, the inner 20—22 joints; the ciliæ are shorter than the rami, simple, shortly plumose.

The *urus*, without the telson, is shorter than the last two pleonal segments. The second and third ural segments are coalesced into one, scarcely longer than the first segment.

The *uropoda* (Pl. V, fig. 1) are short and broad, the peduncles are thick, almost prismatic; the peduncles of the first and second pairs are finely serrated along the outer margins and provided with a few hairs along the inner. The peduncle of the third pair, scarcely longer than the last ural segment, is smooth on the outer margin and sparingly beset with hairs along the inner. The rami of the first pair are equal in length, acute, serrated. The exterior rami of the last two pairs are a little shorter than the interior, serrated along the inner margins; the interior rami are acute, serrated along both margins.

The *telson* is long, broad, feebly serrated behind; it is longer than the peduncle of the last pair of uropoda.

3. **LANCEOLA SERRATA**, C. BOVALLIUS, 1885.

Pl. V, fig. 2—13.

**Diagn.** *Corpus* non carinatum, integumento reticulato. *Caput* rostrum minimum obtusum gerens. *Oculi* parvi, rotundati. Segmentum primum et septimum *perei* brevissima, segmentum quartum longissimum, segmenta tria ultima segmento quarto multo longiora. *Pedes perei* primi paris metacarpo gracili, elongato, longiore quam latiore. *Pedes* quarti paris pedibus quinti paris breviores. *Pedes* septimi paris pedibus quarti paris multo breviores. *Pedes* sexti paris quam *perei* longiores. Segmenta *plei* in dorso serrata. *Pedes uri* elongati. *Telson* pedunculo ultimi paris pedum *uri* brevius, acuminatum.

The *body* is not keeled, the integument is reticulated. The *head* is provided with a very small, obtuse rostrum. The eyes are small, rounded. The first and seventh segments of the *perei* are the shortest, the fourth the longest; the last three segments are much longer than the fourth. The first pair of *pereiopoda* have an elongated narrow metacarpus, much longer than broad. The fourth pair are shorter than the fifth. The sixth pair are longer than the *perei*. The seventh pair are much shorter than the fourth pair. The *pleonal* segments are dorsally serrated. The *uropoda* are elongated. The *telson* is pointed, shorter than the peduncle of the last pair of *uropoda*.

**Colour.** Hyaline.

**Length.** 38 mm.

**Hab.** The mouth of Davis strait. (D. M.).

**Syn. 1885.** *Lanceola serrata*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd 10. N:o 14, p. 7.  
 »           »           »           1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vctensk. Iakttagelser. Bd. 4, p. 554.

In general habitus this species comes near *Lanceola Sayana*, but it is easily distinguished by the serrated dorsal side of the pleon, the longer and more slender legs, and the shorter telson. Only the female is known.

The *head* is three times deeper than long; the obtuse rostrum is scarcely half as long as the rest of the head. The head with the rostrum is shorter than half the first pereional segment.

The *eyes* are placed just at the base of the first pair of antennæ; they are almost round and consist of about 20 ocelli each.

The *first pair of antennæ* (Pl. V, fig. 3) are more slender than in the preceding species, as long as the head and the first pereional segment together. The first joint of the peduncle is much longer than the two following together. The first joint of the flagellum is very elongated, more than three times longer than the peduncle; the following joints are three in number, the first is the longest, longer than the two preceding together (Pl. V, fig. 4).

The *second pair of antennæ* (Pl. V, fig. 5) reach beyond the posterior margin of the third pereional segment(?); the third peduncular joint is the longest, much longer than the flagellum (5:3).

The *pereion*; the first segment is longer than the seventh, the fourth is much the longest.

The *epimerals* and *branchial sacks* as in *Lanceola Sayana*.

The *ovitetrices* (Pl. V, fig. 11) are much longer than the branchial sacks, broadly dilated below, fringed with long equidistant hairs.

The *first pair of pereiopoda* (Pl. V, fig. 6); the carpus is triangular, as long as broad. The metacarpus is more slender than in the preceding species, almost twice as long as broad at the base, equalling in length the lower margin of the carpus; it is fringed with short hairs. The dactylus is slender, feebly curved, as long as half the metacarpus.

The *second pair* (Pl. V, fig. 7); the tibial process is shorter than a fourth of the carpus. The carpus and metacarpus are long with straight margins, the dactylus is feebly curved.

The *third and fourth pairs* are equal; the femur is long, linear; the tibia is longer than the carpus; the carpus shorter than the narrow, elongated metacarpus.

The *fifth pair* are longer than the fourth (7:6), and only a little shorter than the sixth (35:41). The metacarpus is longer than the carpus.

The *sixth pair* (Pl. V, fig. 8) are longer than the pereion (41:35); the femur is narrow, linear; the tibia longer than the carpus; these joints are coarsely but indistinctly serrated along both margins, each tooth carrying a very short bristle. The metacarpus is feebly curved, much longer than the carpus (5:3), and armed in the same way. The oblique anterior margins of the terminal excavation are totally straight. The dactylus is long, less curved than in the preceding species, armed along the concave anterior margin with three or four long spines, between which there are many short ones.

The *seventh pair* (Pl. V, fig. 9 and 10) are a third shorter than the fourth pair, and shorter than half the sixth; the anterior margins of all the joints are armed as in the preceding pair. The dactylus is serrated along the concave margin.

The *pleon* is a fourth shorter than the last three pereional segments. The dorsal line is prominent and the hinder median corner of the segment projects into a sharp-pointed tooth, the whole forming a serrated crest. The lateral parts of the segments are evenly rounded below.

The *pleopoda* (Pl. V, fig. 12) are like those of the preceding species.

The *urus* without the telson is as long as the last pleonal segment; the second and third ural segments are coalesced into one, shorter than the first segment. The first segment shows a pointed dorsal tooth as in the pleonal segments.

The *uropoda* (Pl. V, fig. 13) are more elongated and narrow than in *Lanceola Sayana*; the peduncles are smooth along the outer margins, and bordered with minute bristles along the inner, the interior rami are serrated along both margins.

The *telson* is elongate-lanceolate, pointed, shorter than the peduncle of the last pair of uropoda.

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4. **LANCEOLA LOVÉNI**, C. BOVALLIUS, 1885.

The name in honour of Professor SVEN LOVÉN.

Pl. V, fig. 24—26; Pl. VI, fig. 1—13.

**Diagn.** *Corpus* carinatum, integumento reticulato. *Caput* rostrum gerens. *Oculi* parvi obliqui ovati. Segmentum septimum *perei* brevissimum, segmentum secundum longissimum; segmenta tria ultima segmento quarto fere duplo longiora. *Pedes perei* primi paris metacarpo crasso fere sphaerico. *Pedes* quarti paris pedibus quinti paris multo breviores. *Pedes* quinti et sexti parium longitudine fere aequales, quam pereion multo longiores. *Pedes* septimi paris pedibus quarti paris multo breviores. Segmenta *plei* non serrata. *Pedes uri* elongati. *Telson* pedunculo ultimi paris pedum uri dimidio brevius, lingulatum.

The *body* is keeled, the integument reticulated. The *head* is provided with an obtuse rostrum. The *eyes* are small, placed obliquely, ovate. The seventh *perei* segment is the shortest, the second the longest; the last three segments are almost twice longer than the fourth. The first pair of *pereiopoda* have a thick almost globular metacarpus. The fourth pair are much shorter than the fifth. The fifth pair are almost as long as the sixth; both pairs much longer than the pereion. The seventh pair are much shorter than the fourth. The *pleonal* segments are not serrated. The *uropoda* are elongated. The *telson* is half as long as the peduncle of the last pair of uropoda.

**Colour.** Hyaline.

**Length.** 22 mm.

**Hab.** The mouth of Davis Strait. (D. M.).

**Syn.** 1885. *Lanceola Lovéni*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 6.  
 »       »       »       »       1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 554.

This species is at once distinguished from the others by the length of the fifth pair of *pereiopoda*. It is more slender and delicate than the above described species.

The *body* is less arched than in *Lanceola Sayana*, somewhat depressed; the integument is very thin, finely reticulated as in *Lanceola serrata*.

The *head* is more than three times deeper than long, the obtuse rostrum is almost as long as the rest of the head, the lateral anterior margins of the head are dilated on each side into a broad rounded lobe, on which the eyes are placed. The head with the rostrum is as long as half the first *perei* segment.

The *eyes* are small, placed a little below the base of the first pair of antennæ.

The *first pair of antennæ* (Pl. VI, fig. 3 and 4) are almost as long as the head and the first *perei* segment together. The first joint of the peduncle is three times longer than the two following together. The first joint of the flagellum is very high, compressed, nearly three times longer than the peduncle; the upper margin is strongly

curved, the inferior feebly concave, both serrated and beset with short spines; the two following joints are very minute, the last tipped with two minute hairs.

The *second pair of antennæ* (Pl. VI, fig. 5) were unfortunately broken in the only specimen I have seen, but even in their mutilated state they reached beyond the posterior margin of the second pereional segment. The second joint is about six times longer than the first, the third is more than twice as long as the second; of the first joint of the flabellum there is only a short piece left, but judging from the length of the third peduncular joint it seems very probable that the second pair of antennæ are very long, longer than in all the other species. All the joints are finely serrated on the upper margins and beset with short hairs, a little longer on the second peduncular joint.

The *pereion*; the first segment is nearly twice as long as the seventh; the second is much the longest, the following decreasing in length. The last three pereional segments are almost twice as long as the fourth (16:9).

The *epimerals* are smaller than in the preceding species, those of the fifth and sixth pairs are bent outwards rectangularly.

The *branchial sacks* of the second and third pairs are very small, those of the following three pairs much larger.

The *first pair of pereiopoda* (Pl. VI, fig. 6) are very robust. The carpus is longer than broad, the lower margin straight; the metacarpus is very thick, swollen, the anterior margin semicircular, the posterior a little less convex, finely serrated below and beset with hairs; it is shorter than the lower margin of the carpus. The dactylus is almost straight, finely serrated at the posterior margin, as long as half the metacarpus.

The *second pair* (Pl. VI, fig. 7); the tibial process is shorter than a fifth of the carpus. The carpus and metacarpus are equal in length, the margins feebly curved and beset with very short equidistant hairs. The dactylus is shorter than a third of the metacarpus, feebly curved.

The *third and fourth pairs* (Pl. VI, fig. 8) are equal; the femur is narrow, a little broader below; the tibia is about as long as the carpus, the metacarpus a little longer. The dactylus long, slender.

The *fifth and sixth pairs* (Pl. VI, fig. 9 and 10) are almost equal; they are much longer than the pereion (15:11); the femur is linear, elongated, narrow; the tibia is longer than the carpus, not equalling the metacarpus in length. The dactylus of the fifth pair is smooth, the margins of the metacarpal excavation straight; the dactylus of the sixth pair is provided with short spines on the concave margin; the margins of the metacarpal excavation are rounded.

The *seventh pair* (Pl. VI, fig. 11) are shorter than the fourth (11:13) but longer than half the sixth pair (11:19). The dactylus is finely serrated along the concave margin.

The *pleon* is as long as the last three pereional segments together; the dorsal line forms a keel but is not serrated; the lateral parts are not very deep, feebly rounded.

The *pleopoda* (Pl. VI, fig. 12); the peduncles are shorter than the rami; the rami are 15-jointed.

The *urus* without the telson is as long as the last two pleonal segments together; the second and third segments are coalesced into one, almost twice as long as the first.

The *uropoda* (Pl. VI, fig. 13) are elongated; the peduncles are smooth along the outer margins, and beset with longer or shorter hairs along the inner; those of the last pair are longer than the last ural segment. The rami are very narrow, acute, finely serrated along both margins.

The *telson* is triangular, shorter than half the length of the peduncle of the last pair of uropoda.

### 5. LANCEOLA FELINA, C. BOVALLIUS, 1885.

Pl. V, fig. 14—23.

**Diagn.** *Corpus* non carinatum, integumento levi. *Caput* rostrum acutum gerens. *Oculi* modici, ovati. Segmentum septimum *perei* brevissimum, segmentum secundum ac tertium longissima, segmenta tria ultima segmento quarto longiora. *Pedes perei* primi paris metacarpo crasso fere conico, longiore quam latiore. *Pedes quarti* paris pedibus quinti paris longitudine æquales. *Pedes sexti* paris quam *perei* breviores. *Pedes septimi* paris pedibus quarti paris breviores. Segmenta *plei* non serrata. *Pedes uri* breves. *Telson* pedunculo ultimi paris pedum uri brevius, lingulatum.

The *body* is not keeled, the integument smooth. The *eyes* are middle-sized, ovate. The seventh *perei* segment is the shortest, the second and third are the longest; the last three segments are longer than the fourth. The first pair of *pereiopoda* with a thick nearly conical metacarpus, which is longer than broad. The fourth pair are as long as the fifth pair. The sixth pair are shorter than the *perei*. The seventh pair are shorter than the fourth. The *pleonal* segments are not serrated. The *uropoda* are short. The *telson* is shorter than the peduncle of the last pair of uropoda, tongue-shaped.

**Colour.** Brownish.

**Length.** 10—13 mm.

**Hab.** The South Atlantic, the tropical parts of the Atlantic. (D. M.).

**Syn.** 1885. *Lanceola felina*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10, N:o 14, p. 7.  
 " " *curticeps*, " L. c., p. 8.

An examination of some fresher specimens of *Lanceola curticeps* has convinced me that I was wrong in making it a species of its own; it is not specifically different; the name *Lanceola curticeps* must therefore be rejected and the specimens considered as varieties only of *Lanceola felina*, characterized by a little longer pleon and a shorter telson.

The *body* is smooth, somewhat elongated and depressed, not so much arched as in the preceding species.

The *head* is only twice as deep as long, the acute rostrum is longer than the rest of the head. The head with the rostrum is half as long as the first *perei* segment.

The *eyes* are comparatively large, ovate, placed at the base of the first pair of antennæ. They consist of more than thirty ocelli each.

The *first pair of antennæ* (Pl. V, fig. 15 and 16) are long, longer than the head and the first pereional segment together. The first joint of the peduncle is almost as long as the two following joints together. The first joint of the flagellum is high and thick, not twice as long as the peduncle, the margins are smooth; the three following joints are comparatively large, the last one rounded, almost tumid, longer than the two preceding joints. The first three joints carry long hairs and olfactory sacks; the last joint carries only two simple hairs.

The *second pair of antennæ* (Pl. V, fig. 17) are comparatively short, reaching only beyond the posterior margin of the second pereional segment. The second joint of the peduncle is a little longer than the first, the third joint is more than twice longer than the two preceding together; the first joint of the flagellum is much longer than the last peduncular joint, tapering towards the end; it is fringed with very short hairs along the upper and inferior margins. After it follows only one minute joint, tipped with one very long and two shorter hairs.

The *pereion*; the first segment is longer than the seventh (5:7), the second and third are the longest. The last three pereional segments are much longer than the fourth (10:7). All the legs are more robust than in *Lanceola Lovéni*.

The *epimerals* are longer than in the next preceding species.

The *branchial* sacks as in *Lanceola Lovéni*.

The *first pair of pereiopoda* (Pl. V, fig. 18); the tibial process is long, tipped with long bristles; the carpus is much longer than broad (11:18), the lower margin feebly excavated. The metacarpus is longer than the lower margin of the carpus. The dactylus is feebly curved, half as long as the metacarpus.

The *second pair*; the carpus is ovate, longer and thicker than the metacarpus. The dactylus is feebly curved, longer than a third of the metacarpus.

The *third and fourth pairs*; the femur is elongate-ovate; the metacarpus is shorter than the carpus.

The *fifth pair* (Pl. V, fig. 19) are as long as the fourth; the femur narrow, linear; the tibia is long; the metacarpus is a little longer than the carpus. The dactylus is smooth.

The *sixth pair* (Pl. V, fig. 20) are shorter than the pereion (11:12); the metacarpus is a fifth longer than the carpus. The dactylus is serrated.

The *seventh pair* (Pl. V, fig. 21) are a fourth shorter than the fourth pair and longer than half the sixth. The dactylus is finely serrated along the concave margin.

The *pleon* is as long as the last three pereional segments or longer. The lateral parts of the segments are deep, evenly rounded below.

The *pleopoda* (Pl. V, fig. 22) with the rami 12 to 15-jointed.

The *urus* without the telson is longer than the last pleonal segment; the second and third segments are coalesced into one, much longer than the first.

The *uropoda* (Pl. V, fig. 23) are comparatively short; the peduncles of the first two pairs are finely serrated along the outer margin, fringed with equidistant hairs

along the inner; those of the last pair are longer than the last ural segment, smooth along the outer margin, provided with a few hairs at the lower inner corner. The rami are lanceolate-acute, the exterior ones shorter than the interior. The rami are finely serrated along both margins.

The *telson* is tongue-shaped, the margins smooth; it is a little longer than half the length of the peduncle of the last pair of uropoda.

## 6. LANCEOLA CLAUSI, C. BOVALLIUS, 1885.

The name in honour of Professor CARL CLAUS.

Pl. VI, fig. 14—23.

**Diagn.** *Corpus* latum, obtuse carinatum. *Caput* emutum, non rostratum. *Oculi* parvi, elongati. Segmentum primum *perei* brevissimum, segmentum tertium et quartum ante vallata, segmenta tria ultima segmento quarto paullo longiora. *Pedes perei* primi paris metacarpo crasso fere conico, paullo longiore quam latiore. *Pedes* quarti paris pedibus quinti paris longiores. *Pedes* sexti paris pedibus quarti paris breviores, quam *perei* dimidio breviores. *Pedes* septimi paris pedibus quinti paris longitudine fere aequales. Segmenta *plei* non serrata. *Pedes uri* lati, breves. *Telson* pedunculo ultimi paris pedum uri brevius, lingulatum.

The *body* is broad, obtusely keeled. The *head* is short, without rostrum. The *eyes* are small, elongate. The first *perei* segment is the shortest, the third the longest; the third and fourth segments are swollen so as to form a roll at the anterior margin; the last three segments together are longer than the fourth. The first pair of *pereiopoda* with a thick nearly conical metacarpus, a little longer than broad. The fourth pair are longer than the fifth. The sixth pair are a little shorter than the fourth pair, and not longer than half the *perei*. The seventh pair are almost as long as the fifth pair. The *pleonal* segments are not serrated. The *uropoda* are broad and short. The *telson* is shorter than the peduncle of the last pair of uropoda, tongue-shaped.

**Colour.** Light brown.

**Length.** 20 mm.

**Hab.** Baffins Bay, at L. 72° N. (S. M.).

**Syn. 1885.** *Lanceola Clausi*, C. BOVALLIUS.

»On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14. p. 8.

» " " " 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 552. Pl. 41, fig. 1—5.

*Lanceola Clausi*, in general habitus, is very unlike its congeners and is at once to be distinguished by the short robust legs and the long body with the very broad depressed *perei*, which is provided with rounded walls at the anterior margins of most of the segments. Probably the male is a little more slender; unfortunately I have seen only the female.

The *body* is depressed, marked with an obtuse keel dorsally; this keel is more distinct on the anterior *perei* segments and almost evanescent on the *pleonal* ones.

The *head* is very short, flattened anteriorly, five times deeper than long, and shorter than half the first pereional segment. Below the middle the anterior margin on each side projects into a broadly rounded lobe, at the upper corner of which the eye is situated. The upper anterior corner of the head is obtusely rounded without any trace of a rostrum.

The *eyes* are elongated vertically, very small, placed at the base of the first pair of antennæ; they consist each of about fifteen ocelli.

The *first pair of antennæ* (Pl. VI, fig. 15) are somewhat like those organs in the female of *Hyperia*; the first joint of the flagellum is thick, tapering towards the end, fringed with thick olfactory hairs or glands; it is twice as long as the peduncle; the following joints are three in number, the last is the longest and narrowest. The antennæ are twice as long as the head and the first pereional segment together.

The *second pair of antennæ* (Pl. VI, fig. 16) are short and robust; they reach to half the length of the second pereional segment. The second joint is longer than the third, and three times as long as the first; they are fringed with short hairs along the upper margins. The first joint of the flagellum is a little longer than the whole peduncle (9:8) and shaped as the blade of a dagger; it is fringed with short hairs along the upper margin and provided with comparatively large terminal joints, the last of which is the longest and tipped with two long hairs.

The *pereion*; the first segment is shorter than the seventh (3:5), and scarcely equals in length a fifth of the third segment, which is the longest. The anterior parts of the third and fourth segments are turgid or raised, forming a kind of round wall along the anterior margins. Such walls, though much smaller, are also to be seen at the anterior margins of the second, fifth, and sixth segments. The last three pereional segments are a little longer than the fourth (19:17). All the legs are thick and robust.

The *epimerals* are long but not very deep, irregularly rounded below.

The *branchial sacks* are comparatively small.

The *ovitetrices* were not much developed in the specimen examined, naked; they are fixed beneath the branchial sacks.

The *first pair of pereiopoda* (Pl. VI, fig. 17); the carpus is broad, triangular, a little longer than broad; the lower margin is straight. The metacarpus is much shorter than the lower margin of the carpus, a little longer than broad at the base (6:5), provided with some few long hairs along the margins. The dactylus is almost straight, longer than half the metacarpus.

The *second pair*; the carpus is very thick, longer and broader than the metacarpus; the metacarpus is of the same form as in the first pair, but longer; the dactylus is small, shorter than a third of the metacarpus.

The *third and fourth pairs* are equal, the longest of all; the femur is elongate-ovate; the tibia rather shorter than the carpus; the metacarpus a little longer than the carpus; all joints smooth without hairs or serrations.

The *fifth pair* (Pl. VI, fig. 18 and 19) are shorter than the fourth (7:8), the tibia is as long as the carpus, the metacarpus a little longer; the dactylus is quite smooth.

The *sixth pair* are very short, a little shorter than the fourth pair (15:16), and scarcely equalling in length half the pereion. The joints are smooth. The dactylus is provided with some very short spines at the concave margin.

The *seventh pair* (Pl. VI, fig. 20 and 21) are only a little shorter than the fifth (13:14); the tibia is shorter than the carpus, the metacarpus longer than the carpus; the dactylus is beset with a few very short spines at the concave margin.

The *pleon* is as long as the last three pereional segments. The lateral parts of the segments are deep, rounded below.

The *pleopoda* (Pl. VI, fig. 22) with the rami 13-jointed.

The *urus* without the telson is longer than the last pleonal segment. The second and third segments are coalesced into one, as long as the first.

The *uropoda* (Pl. VI, fig. 23) are broad and short; the peduncles of the first and third pairs are smooth along the outer margins, provided with some few long hairs along the inner; the peduncle of the second pair is finely serrated at the outer margin, beset with hairs along the inner; the peduncle of the third pair is longer than the last ural segment. The rami of the first two pairs are clongate-lanceolate, acute, finely serrated along both margins. The interior ramus of the third pair is much broader than the exterior, serrated along both margins; the exterior ramus is elongate-lanceolate, smooth on the outer margin and finely serrated along the inner.

The *telson* is tongue-shaped, the margins smooth; it is about as long as the last ural segment.

### The third family **VIBILIDÆ**, CLAUS, 1872.

**Diagn.** *Caput* parvum non tumidum. *Oculi* modici. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, flagello compresso instructæ; articulus primus flagelli permagnus, articuli sequentes minutissimi, perpauci, terminales. *Antennæ* secundi paris filiformes, parti anteriori capitis affixæ. *Instrumenta oris* masticatoria, mandibulæ palpo instructæ. *Pedes pereii* septimi paris transformati. *Pedes uri* ramis instructi.

The *head* is small, not tumid. The *eyes* are middle-sized. The first pair of *antennæ* are straight, fixed at the anterior side of the head, provided with a compressed flagellum; the first joint of the flagellum is very large, the following very minute, few in number, terminal. The second pair are filiform, fixed at the anterior side of the head. The *mouth-organs* are adapted for mastication; the mandibles are provided with a palp. The *pereiopoda* are walking legs, the seventh pair are transformed. The *uropoda* are provided with rami.

- Syn.** 1840. *Hypérines gammaroides*, H. MILNE EDWARDS. — Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 72.
1852. *Subfamily Vibilinæ*, DANA. United States Exploring Expedition. Crustacea. Vol. 2, p. 980.
1872. *Vibilidæ*, CLAUS. Grundzüge der Zoologie. 2te Aufl., p. 236.

Syn. 1872. <i>Vibilidæ</i> ,	CLAUS.	—	1879. »Organismus der Phronimiden». Arb. der Zool. Inst. der Universität Wien. Vol. 2, p. 59.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 6.

The *Vibilia*, like the *Hyperia*, the *Phronimæ*, and the *Oxycephali*, have always been recognized and maintained in their true characters, from the foundation of the genus in 1830 to these days. This probably depends only on the habitus of the animals being so striking that it could not be mistaken even by naturalists little experienced in carcinological matters. The *Vibilia* are the only Hyperids which have from the first been pointed out as an independent group in opposition to the other Hyperids. H. MILNE EDWARDS in 1840 (see above) ranged the genus *Vibilia* in the first tribe of the Hyperids, viz. »Tribu des Hyperines gammaroïdes». DANA, following MILNE EDWARDS, 1852 placed the genus in his family Hyperidæ, as the first subfamily *Vibilina*, but he added no new species to the genus. It contained then only two species, *Vibilia Peroni*, the typical one of MILNE EDWARDS, and *Vibilia Jeangerardi*, described in 1845 by LUCAS<sup>1)</sup> from the Mediterranean. C. SPENCE BATE in 1862<sup>2)</sup> increased the number of species to four — *Vibilia Edwardsi* and *V. affinis* being the new ones — but rejected the subfamily *Vibilina* of DANA and ranged the genus *Vibilia* among the other members of the family Hyperidæ between *Hyperia* and *Cylopus*. In the year 1872 Claus (see above) restituted the *Vibilia* as a division of its own, proposing the new family-name *Vibilidæ*, which has been since retained in the zoological hand-books.

The family contains many species, but according to my apprehension these may all be easily ranged within the old genus, so that there is no reason to establish any new genera in the family.

#### Genus 1. **VIBILIA**, H. MILNE EDWARDS, 1830.

**Diagn.** *Caput* parvum, fere quadratum. *Oculi* ovati vel subovati. *Pedes pereii* primi paris simplices non chelati, pedes secundi paris plus minusve subcheliformes. Femora pedum septimi paris articulis sequentibus conjunctis non longiora. *Telson* magnum, linguatum.

The *head* is small, almost quadrangular. The *eyes* are ovate or subovate. The first pair of *pereiopoda* are simple, not cheliform, the second pair are more or less subcheliform. The femora of the seventh pair are not longer than the following joints together. The *telson* is large, tongue-shaped.

Syn. 1830. <i>Vibilia</i> , H. MILNE EDWARDS.	—	»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences. Tome 20 <sup>me</sup> , p. 386.
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<sup>1)</sup> Exploration scientifique de l'Algérie. Crustacés, p. 56.

<sup>2)</sup> Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 300 and 302.

Syn. 1830.	<i>Vibilia</i> ,	H. MILNE EDWARDS.	—	1840.	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 72.
»	»	»	DANA.	1852.	United States Exploring Expedition. Crustacea. Vol. 2, p. 980.
»	»	»	SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 299.
»	»	»	CLAUS	1872.	Grundzüge der Zoologie. 2te Aufl. p. 236.
»	»	»	C. BOVALLIUS.	1887.	»Arctic and Antarctic Hyperids. Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 554.

**A.** The hinder corners of the last ural segment are not produced.

**a 1.** The head is rostrate.

**aa 1.** The eyes are middle-sized.

**aaa 1.** The femora of the fifth and sixth pairs of pereopoda are cylindrical ..... **1. V. Peroni.**

**aaa 2.** The femora of the fifth and sixth pairs of pereopoda are laminar.

**aaaa 1.** The flagellum of the first pair of antennæ is a little longer than the head ..... **2. V. Jeangerardi.**

**aaaa 2.** The flagellum of the first pair of antennæ is much longer than the head ..... **3. V. affinis.**

**aa 2.** The eyes are very large ..... **4. V. macropis.**

**a 2.** The head is not rostrate.

**aa 3.** The pereionial segments are dorsally humpy ..... **5. V. gibbosa.**

**aa 4.** The pereionial segments are dorsally smooth.

**aaa 3.** The fifth and sixth pairs of pereopoda are scarcely longer than the third and fourth pairs.

**aaaa 3.** The femora of the first and second pairs are very broad ..... **6. V. robusta.**

**aaaa 4.** The femora of the first and second pairs of pereopoda are narrow.

**aaaaa 3.** The peduncles of the uropoda are shorter than the rami ..... **7. V. borealis.**

**aaaaa 4.** The peduncles of the uropoda are longer than the rami ..... **8. V. Kroeyeri.**

**aaa 4.** The fifth and sixth pairs of pereopoda are more than a third longer than the third and fourth pairs.

**aaaa 5.** The dactyli of the third and fourth pairs are shorter than the metacarpi.

**aaaaa 5.** The metacarpi of the fifth and sixth pairs are shorter than the two preceding joints ..... **9. V. longipes.**

**aaaaa 6.** The metacarpi of the fifth and sixth pairs are as long as the two preceding joints ..... **10. V. Edwardsi.**

**aaaa 6.** The dactyli of the third and fourth pairs are as long as the metacarpi ..... **11. V. viatrix.**

**B.** The hinder corners of the last ural segments are produced backwards.

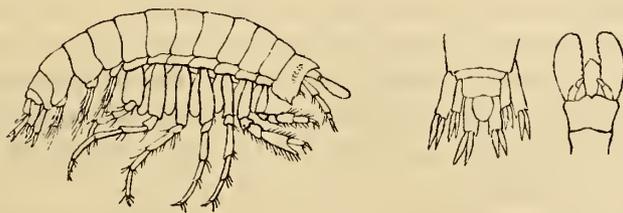
**b 1.** The peduncles of the last pair of uropoda are longer than the rami.

- bb 1. The metacarpus of the second pair of pereopoda is not produced.  
 bbb 1. The processes of the last ural segment are very short .... 12. *V. gracilis*.  
 bbb 2. The processes of the last ural segment are as long as the telson ..... 13. *V. gracilentia*.  
 bb 2. The metacarpus of the second pair of pereopoda is produced anteriorly ..... 14. *V. armata*.  
 b 2. The peduncles of the last pair of uropoda are shorter than the rami, pyriform ..... 15. *V. pyripes*.

The typical species *V. Peroni* was described in 1830 by H. MILNE EDWARDS (see below). However I was not able to find it in the collection of Hyperids from the »Musée du Jardin des Plantes», most liberally entrusted to me for examination by Professor ALPHONSE MILNE EDWARDS, nor have I succeeded to identify it among those many hundreds of *Vibiliae* that I have examined in other collections.

In the year 1836 TEMPLETON<sup>1)</sup> described under the name of *Thaumalia debilis* a crustacean which probably is a young *Vibilia*, but the description is too incomplete to allow of its identification. In 1845 LUCAS (see p. 48) gave a good figure and a short description of *Vibilia Jeangerardi* from the coast of Algeria. A. COSTA in 1883 proposed the name *Vibilia speciosa* for a *Vibilia* which according to the apprehension of MARION is the same animal as the last mentioned. The suggestion of this author seems to be well founded, judging from a comparison of the drawings and descriptions. The next increase in the number of species is due to SPENCE BATE, who described in 1862 (see below) two new species, viz. *Vibilia Edwardsi* and *Vibilia affinis*. The same author, in connection with WESTWOOD (see below), mentions shortly in 1868 a new species, *Vibilia borealis*, distinguished by the broad femora of the fifth to seventh pairs of pereopoda.

## 1. *VIBILIA PERONI*, H. MILNE EDWARDS, 1830.



*Vibilia Peroni*, H. MILNE EDWARDS.

Facsimile from MILNE EDWARDS Hist. nat. Crust. III, pl. 30, fig. 1.

**Diagn.** *Caput* rostratum segmentis duobus primis pereii brevius. Flagellum *antennarum* primi paris ante rotundatum, eapite paullo longius. Femora parium sex primorum *pedum pereii* cylin-

<sup>1)</sup> In the Transactions of the Entomological Society; vol. 1, p. 186. Pl. 20, fig. 2. 1836.

drica, carpi et metacarpi hirsuti. Tibiæ pedum tertii ac quarti parium non tumidæ. Pedes quinti ac sexti parium pedibus tertii ac quarti paullo solum longiores. Pedes sexti paris longissimi. Segmentum secundum et tertium *uri* libera, non coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* angusti, cylindrici, ramis multo longiores. *Telson* rotundatum dimidio pedunculi ultimi paris longius.

The *head* is rostrate, shorter than the first two pereionial segments. The flagellum of the first pair of *antennæ* is a little longer than the head, and rounded anteriorly. The femora of the first six pairs of *pereiopoda* are cylindrical; the carpi and metacarpi provided with long hairs. The tibiæ of the third and fourth pairs are not tumid. The fifth and sixth pairs are a little longer than the third and fourth pairs. The sixth pair are the longest of all. The second and third *ural* segments are free, not coalesced. The hinder corners of the last segments are not produced. The peduncles of the *uropoda* are narrow, cylindrical, much longer than the rami. The *telson* is rounded, longer than half the peduncle of the last pair of uropoda.

**Colour.** Greenish yellow (?).

**Length.** 12 mm.

**Hab.** The seas of Asia. (M. E.)

**Syn. 1830.** *Vibilia Peroni*, II. MILNE EDWARDS. — »Extrait de Recherches pour servir à l'Histoire nat. des Crustacés amphipodes». Ann. Sc. Nat. Tome 20<sup>me</sup>, p. 386.

»                   »                   »                   1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 73. Pl. 30, fig. 1.

»                   »                   »                   SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 303.

From the description of MILNE EDWARDS I add the following details.

The *head* carries a comparatively long rostrum, longer than half the head. The head is much deeper than long.

The *eyes* are elongate-ovate, large, placed vertically.

The *first pair of antennæ* are quite as long as the head and the first pereionial segment. The flagellum is thick, broadly rounded at the apex, as long as the head and half the first pereionial segment, provided with long hairs and some spines.

The *second pair of antennæ* are filiform, a little longer than the first pair, few-jointed, the last joints very short.

The *maxillipeds* are provided with a rounded median lamina and two large bean-shaped lateral lobes, (at the inner side are to be seen two rudimentary appendices corresponding with the palps in the Gammarids? see Hist. nat. des Crustacés p. 72 and pl. 30, fig. 2.)

The *pereion* is smooth, the segments almost equal in length, the seventh a little longer than the others. The epimerals are narrow, equal.

The first and second pairs of *pereiopoda* are subcheliform; the carpal process of the first is shorter, that of the second longer than half the metacarpus. The tibiæ, carpi, and

metacarpi are richly provided with long hairs. The third and fourth pairs are only a little shorter than the fifth; the sixth pair are longer than the fifth. All joints, with the exception of the narrow femora, are provided with long hairs. The seventh pair have laminar, broadly ovate femora; they are much shorter than the fourth pair but longer than half the sixth.

The *pleon* is scarcely longer than the last three pereional segments. The hinder corners of the lateral parts of the third segment are produced backwards, broadly rounded.

The peduncles of the *pleopoda* are very large, provided with a small tubercular appendix at the base of one of the rami (?) (l. c. p. 73, pl. 30, fig. 3 a).

The second and third *ural* segments are distinct, the third more than twice as long as the second; the first is longer than the two following together. The hinder corners of the last segment are feebly rounded, not produced.

The peduncles of the *uropoda* are long, narrow, linear, longer than the rami; the rami are indistinctly serrated.

The *telson* is large, rounded, longer than half the peduncle of the last pair of uropoda.

## 2. VIBILIA JEANGERARDI, LUCAS, 1845.

Pl. VII, fig. 1—11.

**Diagn.** *Caput* rostratum, segmentis duobus primis pereii brevius. Flagellum *antennarum* primi paris ante obtuse rotundatum, capite paullo longius. *Pedes pereii* curti, robusti, non hirsuti; pedes primi paris non subcheliformes, carpus metacarpo brevior. Carpus secundi paris metacarpi longitudinem æquans. Tibiæ pedum tertii ac quarti parium non tumidæ, carpis longitudine æquales; dactyli dimidio metacarporum breviores. *Pedes tertii ac quarti parium* pedibus quinti paris paullo breviores. Femora pedum quinti ac sexti parium laminata, ovata; dactyli brevissimi. *Pedes sexti paris* pedibus quinti longitudine æquales. Segmentum secundum et tertium *uri* libera non coalita. Anguli postici segmenti ultimi non producti. *Pedunculi* pedum uri lati, lineares, ramis longiores. *Telson* rotundatum, dimidio pedunculi ultimi paris pedum uri brevius.

The *head* is rostrate, shorter than the first two pereional segments. The flagellum of the first pair of *antennæ* is obtusely rounded anteriorly, a little longer than the head. The *pereiopoda* are short, robust, without hairs; the first pair are not subcheliform, the carpus is shorter than the metacarpus. The carpus of the second pair is as long as the metacarpus. The tibiæ of the third and fourth pairs are not tumid, as long as the carpi; the dactyli are shorter than half the metacarpi. The third and fourth pairs are a little shorter than the fifth. The femora of the fifth and sixth pairs are laminate, ovate; the dactyli are very short. The sixth pair are as long as the fifth. The second and third *ural* segments are free, not coalesced. The hinder corners of the last segment are not produced. The peduncles of the uropoda are broad, linear, longer than the rami. The *telson* is rounded, shorter than half the peduncle of the last pair of uropoda.

**Colour.** Yellowish.

**Length.** 9—14 mm.

**Hab.** The Atlantic, The Mediterranean. (D. M.; S. M.; U. M.)

<b>Syn. 1845.</b>	<i>Vibilia Jeangerardi</i> ,	LUCAS.	—	Exploration scientifique de l'Algérie, pendant les années 1840—42. Zoologie. Histoire naturelle des animaux articulés, p. 56. Pl. 5, fig. 4.
	»	»	»	SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 303. Pl. 49, fig. 9.
	»	»	»	MARION. 1874. »Recherches sur les animaux inférieurs du golfe de Marseille». Ann. Se. nat. 2 <sup>me</sup> Sér. Zoologie. Tome 1 <sup>er</sup> , p. 5. Pl. 1, fig. 1—1h, 1o and pl. 2, fig. 1k.
<b>?1853</b>	<i>Vibilia speciosa</i> ,	COSTA.	—	»Ricerche su' Crostacei Amphipodi del Regno di Napoli». Rendiconto della Società Reale Borbonica. 1853, p. 178.
<b>?1872</b>	<i>Vibilia mediterranea</i> ,	CLAUS.	—	Grundzüge der Zoologie, 2te Aufl. p.

The identity of *Vibilia Jeangerardi* and *V. mediterranea* seems to be a little doubtful, but as I do not find in the descriptions quoted above any differences worth speaking of, I have regarded the latter as synonymous to the former. *Vibilia speciosa*, COSTA, is too badly described and figured<sup>1)</sup> to allow of its identity being established with any degree of surety, but I am very much inclined to believe that MARION is quite right in supposing it to be synonymous to *V. Jeangerardi*. The original description of LUCAS is not satisfactory, but the later treatise published by MARION in 1874 is more exhaustive and makes it easy to recognize the species. However, *Vibilia Jeangerardi* is closely allied to *V. Peroni*, differing from it chiefly by the simple, not subcheliform first pair of pereopoda, by the want of hairs on the legs, and by the shorter telson.

The *body* is rather thick and broad.

The *head* is a little deeper than long, the rostrum very short, shorter than half the head.

The *eyes* are elongate, a little broader above; the peripheral row of ocelli contains larger ocelli than the central part. The pigment is very black.

The *first pair of antennæ* (Pl. VII, fig. 3) consist of a thick and broad three-jointed peduncle, the first or basal joint of which is more than twice as long as the two following together, and a few-jointed flagellum. The first joint of the flagellum is very large, tumid, ovate, slightly compressed, provided with long hairs at the inner sides; it is twice as long as the peduncle. On its apex it carries the following joints of the flagellum, two or three in number and very minute, the last one provided with some minute hairs. In the young animal these terminal joints are larger and well developed, in very old males they are almost obsolete.

<sup>1)</sup> In the drawing (l. c. pl. V, fig. 9) there are eight pairs of pereopoda instead of seven.

The *second pair of antennæ* (Pl. VII, fig. 3) are seven- to nine-jointed in the male, and five-jointed in the female; the third and fourth joints are the longest; the following, which constitute the flagellum, are short, equal in length, provided with minute hairs.

The *mouth-organs* will be described below at *Vibilia robusta*, p. 56.

The *pereiön*; the first segment is shorter than the second, the fifth is the longest.

The *first pair of pereiopoda* (Pl. VII, fig. 5) are a little shorter than the second. The tibia is feebly produced at the hinder lower margin, the projection is shorter than half the carpus. The carpus is shorter than the metacarpus, finely serrated along the lower margins, and provided with some few strong spines at the lower corners. The metacarpus is strongly serrated along the straight hinder margin and on the lower margins round the base of the dactylus. The dactylus is very stout, feebly bent, serrated along the posterior margin; it is half as long as the metacarpus.

The *second pair* (Pl. VII, fig. 6) with the tibial projection almost as long as the carpus, broad at the apex, fringed with long stout spines. The hinder lower corner of the carpus is produced into a stout, hollowed, spoon-shaped process, longer than half the metacarpus; the margins are sharply serrated. The metacarpus is broad, as long as the carpus, strongly serrated along the hinder margin and round the base of the dactylus. The dactylus is shorter than half the metacarpus, strongly serrated along the hinder margin.

The *third and fourth pairs* (Pl. VII, fig. 7) are equal in length; the tibia is a little longer than the carpus, but not tumid; the metacarpus is longer than the carpus, strongly serrated along the hinder margin. The dactylus is curved, scarcely as long as a third of the metacarpus, with a few serrations on the hinder concave margin.

The *fifth and sixth pairs* (Pl. VII, fig. 8) are almost equal in length. The femur is pretty broad, ovate. The tibia is a little longer than the carpus, smooth; the carpus is shorter than the metacarpus; both joints are finely serrated along the anterior margins. The metacarpus is much shorter than the two preceding joints together. The dactylus is very short, shorter than a fourth of the metacarpus.

The *seventh pair* (Pl. VII, fig. 9) are shorter than the fourth (7:9); the femur is broad, laminar; the transformed dactylus is much longer than the metacarpus.

The *pleön* is longer than the last four pereiönal segments; the hinder lateral corners of the third segment are not produced backwards as in the preceding species.

The peduncles of the *pleopoda* (Pl. VII, fig. 10) are shorter than the rami. The rami consist of 12—13 joints; the ciliæ are much shorter than the rami.

The second and third *ural* segments together are shorter than the first, the second is shorter than the third. The hinder corners of the last segment are rounded, not produced.

The *uropoda* (Pl. VII, fig. 11); the peduncles are much longer than the rami, pretty broad, linear, the peduncle of the first pair is finely serrated on the outer margin. The rami of each pair are equal in length, those of the first and second pairs are finely serrated along both margins; the exterior ramus of the third pair is smooth on the outer margin.

The *telson* is broad, semicircularly rounded, as long as the third ural segment, and half as long as the peduncle of the last pair of uropoda.

3. **VIBILIA AFFINIS**, SPENCE BATE, 1862.*Vibilia affinis*, SPENCE BATE.

Facsimile from SP. BATE. Catal. Amph. Crust. Brit. Museum, pl. 49, fig. 8.

**Diagn.** *Caput* leviter rostratum, segmentis duobus primis pereii multo longius. Flagellum *antennarum* primi paris elongatum, lanceolatum, capite cum segmentis duobus primis pereii multo longius. *Pedes pereii* curti, non hirsuti. Tibiæ pedum tertii ac quarti parium non tumidæ. *Pedes* quinti ac sexti parium pedibus tertii et quarti paullo longiores, femora lata, ovata. *Pedes* *uri* ultimi paris precedentes non superant. *Telson* parvum.

The *head* is feebly rostrate, much longer than the first two pereional segments. The flagellum of the first pair of *antennæ* is elongate-ovate, much longer than the head and the first two pereional segments together. The *pereiopoda* are short, not hirsute. The tibiæ of the third and fourth pairs are not tumid. The fifth and sixth pairs are only a little longer than the third and fourth; the femora are broad, ovate. The last pair of *uropoda* do not reach beyond the preceding pairs. The *telson* is small.

**Colour.** ?

**Length.** 7 mm.

**Hab.** »Java» (SPENCE BATE).

**Syn. 1862.** *Vibilia affinis*, SPENCE BATE. Catal. Amph. Crust. Brit. Museum, p. 302. Pl. 49, fig. 8.

I have not seen any specimen of this species, but it seems to be well characterised by its long superior antennæ, which are much longer than in any other known species.

The *head* is as long as deep.

The *eyes* are small.

The *first pair of antennæ* have the peduncle half as long as the head, three-jointed; the first joint is as long as the two following together, the flagellum is three times longer than the peduncle, with the apex acute.

The *second pair of antennæ* are slender, not longer than the first pair.

The first *pereional* segment is as long as the second, the fourth is the longest.

The first two pairs of *pereiopoda* are short, slender. The lower hinder corner of the carpus of the second pair is produced anteriorly.

The second and third *ural* segments are coalesced (?).

The *telson* is squamiform.

4. **VIBILIA MACROPIS**, C. BOVALLIUS, 1887.

Pl. VIII, fig. 1—8.

**Diagn.** *Caput* rostratum, segmentis duobus primis pereii longius. *Oculi* grandes, circulares. Flagellum *antennarum* primi paris lanceolatum, acutum, capite brevius. *Pedes pereii* curti, robusti, non hirsuti. Carpus pedum secundi paris leviter productus. Tibiæ pedum tertii ac quarti parium latæ, non tumidæ, dactyli longi. *Pedes* quinti et sexti parium pedibus tertii et quarti parium paullo longiores, femora lata, truncate ovata, dactyli modici. Segmentum secundum et tertium *uri* coalita. Anguli postici segmenti ultimi non producti. Pedunculi pedum *uri* primi et secundi parium ramis breviores, pedunculus pedum tertii paris ramis longior. *Telson* parvum semicirculare, dimidio pedunculi ultimi paris pedum *uri* multo brevius.

The *head* is rostrate, longer than the first two pereional segments. The *eyes* are large, circular. The flagellum of the first pair of *antennæ* is lanceolate, acute, shorter than the head. The *pereiopoda* are short, robust, not hirsute. The second pair with very short carpal process. The tibiæ of the third and fourth pairs are broad but not tumid, the dactyli are long. The fifth and sixth pairs are a little longer than the third and fourth; the femora are broad, truncate-ovate; the dactyli are middle-sized. The second and third *ural* segments are coalesced. The posterior corners of the last segment are not produced. The peduncles of the first and second pairs of *uropoda* are shorter than the rami, that of the third pair longer than the corresponding rami. The *telson* is small, semicircular, much shorter than half the peduncle of the last pair of *uropoda*.

**Colour.** White with small red spots.

**Length.** 6 mm.

**Hab.** The South Atlantic at Lat. 43° 30' S. and Long. 9° 50' V., taken by Captain GEORGE VON SCHÉELE. (S. M.; U. M.)

**Syn. 1887.** *Vibilia macropis*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 7.

This species is very interesting because through the high development of its eyes it connects the *Vibilidæ* with the *Cylopodidæ*; in all other respects it is a true *Vibilia*, though perhaps also the rami of the first two pairs of *uropoda* may bear some resemblance to those organs in the *Cylopodidæ*.

The *head* is almost as long as deep, the rostrum is very short, shorter than a fifth of the length of the head.

The *eyes* occupy almost the whole of the sides of the head; they consist each of a little more than 300 ocelli.

The *first pair of antennæ* (Pl. VIII, fig. 2) are provided with a very stout peduncle, the basal joint is longer than the two following together. The flagellum tapers evenly towards the apex, the first joint is not twice as long as the peduncle (10:7), with some few, very short spines along the upper margin. The terminal joints, two in number, are comparatively large, provided with a few minute hairs.

The *second pair of antennæ* are five-jointed in the female, the last joint is the shortest. The first *pereional* segment is only a little shorter than the second, the fourth segment is the longest.

The *second pair of pereiopoda* (Pl. VIII, fig. 3) have the femur narrow, linear, as long as all the following joints together. The hinder lower corner of the tibia is scarcely produced. The carpal process is scarcely as long as a third of the metacarpus, not serrated. The metacarpus is as long as the carpus, smooth; the dactylus is stout, longer than two thirds of the metacarpus.

The *third and fourth pairs* (Pl. VIII, fig. 4 and 5) are very robust; the tibia is very broad but not tumid, a little longer than the carpus; the metacarpus is very thick, not serrated, but provided with some few minute bristles; it is longer than the carpus. The dactylus is long and strong, longer than half the metacarpus. At its base there is a large hole, through which the secretion of the well-developed metacarpal glands passes out.

The *fifth and sixth pairs* (Pl. VIII, fig. 6). The metacarpus is a little longer than the carpus, provided with some short, equidistant, minute bristles along the anterior margin. The dactylus is smooth, as long as a third of the metacarpus.

The *seventh pair* are not fully developed, as the specimen examined is very young, the femur is broad, linear, with rounded corners.

The *pleon* is about as long as the last four pereional segments together.

The peduncles of the *pleopoda* are longer than the rami. The outer ramus is 8-jointed, the inner 9-jointed; at the base of the outer ramus there is to be seen a little appendicular tubercle or process without hairs, which may possibly be the same organ that is mentioned by MILNE EDWARDS in *Vibilia Peroni*<sup>1)</sup> (Pl. VIII, fig. 7).

The second and third *ural* segments are coalesced, about as long as the first.

The peduncle of the first pair of *uropoda* (Pl. VIII, fig. 8) is very broad, shorter than the rami (8:9), the rami are equal, coarsely serrated along both margins, with the serrations of the outer margin again finely serrated. The peduncle of the second pair is narrowed above, a fourth shorter than the rami; the exterior ramus is coarsely serrated along the outer margin and finely serrated along the inner; the interior ramus is finely serrated along the outer margin, the inner smooth. The peduncle of the third pair is a little longer than the rami (8:7), pretty broad, linear, exactly as long as the last ural segment; the exterior ramus is almost smooth on the outer margin, finely serrated along the inner. The interior ramus is a little shorter than the exterior, finely serrated at the apex.

The *telson* is short, almost semi-circular, scarcely longer than a third of the peduncle of the last pair of uropoda.

<sup>1)</sup> Histoire naturelle des Crustacés. Tome 3<sup>m</sup>e, p. 73. Pl. 30, fig. 3 a.

5. **VIBILIA GIBBOSA**, C. BOVALLIUS, 1887.

Pl. VIII, fig. 9—17.

**Diagn.** *Caput* non rostratum, segmenta dua priora pereii longitudine æquans. *Oculi* parvi. Flagellum *antennarum* primi paris ante obtusum, eapite brevius. *Pedes pereii* graciles, non hirsuti. Carpus pedum primi paris dilatatus, sed non productus; processus carpi pedum secundi paris dimidio metacarpi longior. Tibiæ pedum tertii ac quarti parium non tumida, dactyli modici. *Pedes* quinti et sexti parium pedibus tertii et quarti parium vix longiores, femora lata linearia, dactyli longi. Dactylus pedum septimi paris metacarpo paullo brevior. *Pereion* dorsaliter gibbosum. Segmentum secundum ac tertium *uri* coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* lineares, ramis paullo longiores. *Telson* mediocre, triangulare, dimidio pedunculi ultimi paris pedum uri longius.

The *head* is not rostrate, as long as the first two pereional segments together. The *eyes* are small. The flagellum of the first pair of *antennæ* is anteriorly obtuse, shorter than the head. The *pereiopoda* are slender, not hirsute. The carpus of the first pair is dilated but not produced; the carpal process of the second pair is longer than half the metacarpus. The tibiæ of the third and fourth pairs are not tumid, the dactyli middle-sized. The fifth and sixth pairs are scarcely longer than the third and fourth; the femora are broad, linear; the dactyli are long. The dactylus of the seventh pair is a little shorter than the metacarpus. The *pereion* is dorsally tuberculated. The second and third *ural* segments are coalesced. The hinder corners of the last segment are not produced. The peduncles of the *uropoda* are a little longer than the rami, linear. The *telson* is middle-sized, triangular a little longer than half the peduncle of the last pair of uropoda.

**Colour.** Yellowish white.

**Length.** 6—7 mm.

**Hab.** The tropical Atlantic at Lat. 17° 30' S. and Long. 2° 30' W. taken by Captain GEORGE VON SCHÉELE 1885. (S. M.; U. M.)

**Syn.** 1887. *Vibilia gibbosa*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 7.

By the tuberculous aspect of the pereion this species is easily to be distinguished from its allies.

The *head* is large, only a little deeper than long.

The *eyes* are comparatively small, elongated, a little broader above.

The *first pair of antennæ* (Pl. VIII, fig. 10) are almost as long as the head and the first pereional segment. The first joint of the peduncle is nearly twice as long as the two following joints together. The first joints of the flagellum is a third longer than the peduncle, the two terminal joints are very minute.

The *second pair of antennæ* (Pl. VIII, fig. 11) are shorter than the first pair, five-jointed, the basal joint is the shortest.

The *pereional* segments being separated from one another by deep impressions, the pereion appears humpy or tuberculous. Between the first and second segments

there is no such impression; the first segment is a little shorter than the second; the seventh segment is the longest.

The *first pair of pereopoda* (Pl. VIII, fig. 12) have the carpus dilated at the hinder lower corner, and rounded, but not produced into a process. The metacarpus is a little longer than the carpus, sharply serrated along the hinder margin. The dactylus is longer than half the metacarpus, serrated along the hinder, concave margin.

The *second pair* (Pl. VIII, fig. 13). The tibial process is longer than half the carpus, fringed with long bristles. The carpus equals the metacarpus in length, the process is straight, sharply serrated, a little longer than half the metacarpus. The metacarpus is sharply serrated along the hinder margin; the dactylus as in the preceding pair.

The *third and fourth pairs* (Pl. VIII, fig. 14) are only a little shorter than the fifth pair. The metacarpus is longer than the carpus, smooth; the dactylus is nearly half as long as the metacarpus.

The *sixth pair* (Pl. VIII, fig. 15) are somewhat longer than the fifth. The femur is laminar, linear, with three small teeth at the lower anterior corner. The metacarpus is finely serrated along the anterior margin. The dactylus is longer than a third of the metacarpus, smooth.

The *seventh pair* (Pl. VIII, fig. 16) are short, scarcely more than half as long as the fourth pair; the femur is small, as long as the three following joints together.

The *pleon* is a little longer than the last three pereional segments together; the lateral parts of the segments are deep, evenly rounded.

The peduncles of the *pleopoda* are shorter than the rami; the rami are 9- to 10-jointed.

The second and third coalesced *ural* segments are longer than the first; the hinder corners are angular, not produced.

The peduncles of the *uropoda* (Pl. VIII, fig. 17) are longer than the rami, those of the first pair are serrated along the outer margin. The exterior rami are a little shorter than the interior, all finely serrated.

The *telson* is obtusely triangular, as long as half the last ural segment, and a little longer than half the peduncle of the last pair of uropoda.

## 6. VIBILIA ROBUSTA, C. BOVALLIUS, 1887.

Pl. VII, fig. 12—34.

**Diagn.** *Caput* non rostratum, segmenta dua priora pereii longitudine æquans. *Oculi* modici. Flagellum *antennarum* primi paris ante obtusum, caput longitudine æquans. *Pedes pereii* elongati non hirsuti. Femora pedum primi et secundi parium lata, ovata; carpi metacarpis longiores; processus carpi pedum secundi paris dimidium metacarpi æquans. Tibiæ pedum tertii ac quarti parium non tumidæ, dactyli breves. *Pedes quinti* paris pedibus tertii ac quarti parium multo longiores; pedes sexti paris pedibus quinti paris longiores; femora lata ovata, dactyli breves. Dactylus pedum septimi paris metacarpo multo brevior.

*Epimera magna*. Segmentum secundum ac tertium *uri libera*, non coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* primi et tertii parium ramis paullo longiores, pedunculus *pedum secundi* paris ramos longitudine æquans. *Telson* maximum triangulare, dimidio pedunculi ultimi paris *pedum uri* multo longius.

The *head* is not rostrate, as long as the first two pereional segments. The *eyes* are middle-sized. The flagellum of the first pair of *antennæ* is anteriorly obtuse, as long as the head. The *pereiopoda* are elongated, not hirsute. The femora of the first and second pairs are broad, ovate; the carpi are longer than the metacarpi; the carpal process of the second pair is as long as half the metacarpus. The tibiæ of the third and fourth pairs are not tumid; the dactyli are short. The fifth pair are a third longer than the third and fourth pairs. The sixth pair are longer than the fifth, the femora are broad, ovate; the dactyli are short. The dactylus of the seventh pair is much shorter than the metacarpus. The *epimerals* are very large. The second and third *ural* segments are free, not coalesced. The posterior corners of the last segment are not produced. The peduncles of the first and third pairs of *uropoda* are a little longer than the rami; that of the second pair is as long as the rami. The *telson* is very large, triangular, longer than half the peduncle of the last pair of *uropoda*.

**Colour.** Yellowish.

**Length.** 10—20 mm.

**Hab.** The North Atlantic, the tropical Atlantic. (D. M.; S. M.; U. M.)

**Syn. 1887.** *Vibilia robusta*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 7.

*Vibilia robusta* is one of the most common species and very difficult to distinguish from its next allies, *V. borealis* and *V. Kroeyeri*. However, it is characterized by the uncommonly large ovate femora of the two first pairs of *pereiopoda* and by the length of the sixth pair. From *Vibilia borealis* it differs especially by the length of the seventh pair of *pereiopoda*, and the shortness of the seventh pereional segment, from *Vibilia Kroeyeri* by the comparatively larger eyes, the long acute rami of the *uropoda*, and the long second *ural* segment.

The integument of the *body* is very calcareous, hard and smooth; the hinder margins of the segments are a little prominent.

The *head* is quite as long as deep, the anterior margin obtuse, not rostrate. The lower anterior corners project beneath the base of the second pair of *antennæ*.

The *eyes* are comparatively large, occupying more than two thirds of the height of the head; they are broader above, bean-shaped.

The *first pair of antennæ* (Pl. VII, fig. 13—15) are as long as the head and the first pereional segment. The first joint of the peduncle is twice as long as the two following joints. The flagellum is obtuse at the apex, the first joint is more than twice as long as the peduncle, the two terminal joints are very minute. In a younger animal, a male, (Pl. VII, fig. 15) the first joint of the flagellum is a little more rounded anteriorly, and the terminal joints are of a more considerable size.

The *second pair of antennæ* (Pl. VII, fig. 16 and 17) are seven-jointed in the male, and five-jointed in the female. In the male the third joint is the longest, in the female the third and fourth are equal.

The *labrum* (Pl. VII, fig. 18) is semicircular, incised at the middle of the hinder convex margin, and beset with very short hairs.

The *mandibles* (Pl. VII, fig. 19—22) are well developed; they consist of a thick stout basal portion and a strong molar tubercle with a striated and finely denticulated circular grinding surface (Pl. VII, fig. 20); at the tip there is, in the right mandible one sharp three-lobated incisive process, in the left there are two. Between these and the molar tubercle there is an accessory three-pointed smaller process, and some long strong simple spines. At the side of the incisive process there is a bundle of long slender hairs. At the outer side of the basal portion arises the three-jointed palp, fixed on a tubercular prominence; the first joint is short, the second is more than twice longer, curved; the third is the longest, beset with four rows of very short spines along the upper side, rounded at the apex (Pl. VII, fig. 22), and carrying short stiff hairs.

The *first pair of maxillæ* (Pl. VII, fig. 23) consist of a basal portion ending in a strong process, beset with curved spines and short hairs; on the outer side at the base of this process arises a long feebly bent lamina articulating with the basal portion, and bordered with short fine hairs. On the inner side there is to be seen a small accessory lamina, tipped with a few minute hairs.

The *second pair of maxillæ* (Pl. VII, fig. 24) are small, consisting of a short basal portion with two short rounded processes tipped with short stiff hairs.

The *maxillipeds* (Pl. VII, fig. 25—27) consist of a comparatively short basal portion, a broad median process, and two lateral lobes, bordered with a row of complicate teeth.

The *pereion*; the first segment is shorter than the second; the third, fourth, fifth, and sixth are equal in length, the seventh is considerably shorter.

The *epimerals* of the fourth, fifth, and sixth pairs are very large, those of the fifth pair the largest.

The *branchial sacks* of the fifth pair are the largest, those of the second the smallest.

The *first pair of pereiopoda* (Pl. VII, fig. 28) are a little shorter than the second; the broadly ovate femur is about as long as all the following joints together. The carpus is broader and longer than the metacarpus, the hinder margin fringed with long bristles. The metacarpus is stout, almost straight, the hinder margin bordered with a comb-like row and equal spines. The dactylus is somewhat longer than half the metacarpus, strong, the hinder concave margin strongly serrated.

The *second pair* (Pl. VII, fig. 29); the tibial process is almost as long as the carpus, fringed with stout bristles; the carpal process is quite as long as half the metacarpus, narrowly spoon-shaped, the margins serrated. The dactylus is shorter than the carpus, the hinder margin armed in the same way as the metacarpus in the first pair. The dactylus is longer than half the metacarpus, the hinder margin serrated.

The *third and fourth* pairs (Pl. VII, fig. 30) are equal in length, robust; the tibiæ and metacarpi are longer than the carpi; the metacarpi are finely serrated along the posterior margin, three times as long as the dactyli.

The *fifth pair* are a little shorter than the sixth; the femur is ovate, the metacarpus is much longer than the carpus, smooth.

The *sixth pair* (Pl. VII, fig. 31); the femur is broadly ovate. The anterior margin of the carpus is fringed with short, equidistant hairs. The metacarpus is sharply serrated. The dactylus is a fourth of the length of the metacarpus.

The *seventh pair* (Pl. VII, fig. 32 and 33) the femur is uncommonly large, almost as broad as long, longer than the three following joints together. The dactylus, shorter than the metacarpus, is thicker at the lower end, plated with small, ovate, spiniferous scales.

The *pleon* is very large, much longer than the last four pereional segments. The lateral parts of the segments are very deep, the hinder corner angulated.

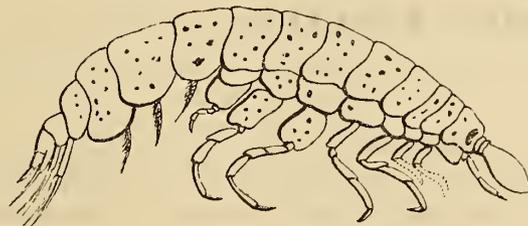
The peduncles of the *pleopoda* are shorter than the rami. The rami are 15- to 16-jointed.

The *urus* is shorter than the last pleonal segment. The first segment is almost as long as the two following together, the second segment is only a little shorter than the third. The hinder corners of the third segment are rectangular, not produced.

The *uropoda* (Pl. VII, fig. 34); the first pair reach nearly to the end of the last pair; the peduncle is broad, linear, only a little longer (21:19) than the rami; the rami are equal in length, narrow, acute, finely serrated along both margins. The second pair reach almost as far as the first pair; the peduncle is broad, linear, about as long as the interior ramus; the exterior ramus is shorter than the interior one, smooth on the outer margin, finely serrated on the inner. The third pair have the peduncle a little narrowed above, longer than the last two ural segments together, and longer than the rami; the rami are almost equal in length, elongate-lanceolate, acute. The exterior ramus is smooth on the outer margin and finely serrated along the inner; the interior ramus is serrated along both margins.

The *telson* is large, triangular, rounded behind, much longer than half the peduncle of the last pair of uropoda and nearly as long as the last two ural segments.

## 7. **VIBILIA BOREALIS**, SPENCE BATE AND WESTWOOD, 1868.



*Vibilia borealis*, SPENCE BATE and WESTWOOD.

Facsimile from SP. BATE and WESTWOOD. Brit. Sessile-eyed Crust. II, p. 524.

**Diagn.** *Caput* non rostratum, segmentis duobus primis pereii longius. *Oculi* modici. *Flagellum antennarum* primi paris ante rotundatum, caput cum segmentis duobus primis pereii longitudine æquans. *Pedes pereii* curti, non hirsuti. *Femora* pedum parium quatuor priorum angusta cylindrica, femora parium trium ultimorum dilatata. *Tibiæ* pedum tertii ac quarti parium non tumidæ, dactyli brevissimi. *Pedes* quinti et sexti parium pedibus tertii et

quarti parium paullo longiores; dactyli longi. Segmentum secundum et tertium *uri* libera, non coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* ramis longiores (?).

The *head* is not rostrate, longer than the first two pereionial segments. The *eyes* are middle-sized. The flagellum of the first pair of *antennæ* is anteriorly rounded, as long as the head and the first two pereionial segments. The *pereiopoda* are short not hirsute. The femora of the first four pairs are narrow, cylindrical, those of the last three pairs dilated. The tibiæ of the third and fourth pairs are not tumid; the dactyli are very short. The fifth and sixth pairs are somewhat shorter than the third and fourth pairs, the dactyli are long. The second and third *ural* segment are free, not coalesced; the hinder corners of the last segment are not produced. The peduncles of the *uropoda* are longer than the rami (?).

**Colour.** »Reddish orange, spotted with black».

**Length.** 9 mm.

**Hab.** Banff, the coast of Scotland. (SPENCE BATE and WESTWOOD)

**Syn. 1868.** *Vibilia borealis*, SPENCE BATE and WESTWOOD. »A History of the British Sessile-eyed Crustacea». Vol. 2, p. 524. Fig.

As the »specific character» given by SPENCE BATE and WESTWOOD (l. c. p. 524) is applicable to several of the known *Vibilia*æ, the diagnose here is taken from the »generic character» of the authors compared with the drawing. Only some few other characteristics have to be added.

The first two pairs of *pereiopoda* are subequal in length. The third and fourth pairs are a third longer, the metacarpi fringed with fine rows of short teeth. The seventh pair are scarcely as long as half the sixth.

The *uropoda* have the outer margins of the rami smooth, the inner margins fringed with short strong spines.

## 8. VIBILIA KROEYERI, C. BOVALLIUS, 1887.

The name in honour of the late Professor HENRIC KROEYER of Copenhagen.

Pl. VIII, fig. 18—25.

**Diagn.** *Caput* non rostratum, segmentis duobus primis pereii longius. *Oculi* parvi. Flagellum *antennarum* primi paris ante obtusum, capite longius. *Pedes pereii* elongati, non hirsuti. Femora *pedum* primi et secundi parium paullo dilatata. Processus carpi *pedum* secundi paris latus, dimidio metacarpi longior. Tibiæ *pedum* tertii ac quarti parium fere tumidæ, carpi multo longiores, dactyli longi. *Pedes* quinti ac sexti parium *pedibus* tertii ac quarti parium paullo longiores; femora lata, linearia, dactyli modici. Segmentum secundum ac tertium *uri* libera, non coalita. Anguli postici segmenti ultimi non producti, rotundati. Pedunculi *pedum uri* lineares, ramis longiores. *Telson* magnum, rotundatum, dimidio pedunculi ultimi paris *pedum uri* longius.

The *head* is not rostrate, longer than the first two pereionial segments. The *eyes* are small. The flagellum of the first pair of *antennæ* is anteriorly obtuse, longer than the head. The *pereiopoda* are elongated, not hirsute. The femora of the first and second pairs are a little

dilated. The carpal process of the second pair is broad, longer than half the metacarpus. The tibiae of the third and fourth pairs are almost tumid, much longer than the carpi; the dactyli are long. The fifth and sixth pairs are a little longer than the third and fourth; the femora are broad, linear; the dactyli are rather small. The second and third *ural* segments are free, not coalesce; the hinder corners of the last segment are not produced, rounded. The peduncles of the *uropoda* are linear, longer than the rami. The *telson* is large, rounded, longer than half the peduncle of the last pair of *uropoda*.

**Colour.** Brown.

**Length.** 13 mm.

**Hab.** Off the west coast of Greenland. (D. M.)

**Syn. 1887.** *Vibilia Kroeyeri*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideae». Bih. t. K. Vet. Ak. Handl. Bd. 11. N:o 16, p. 8.  
 »       »       »       »       1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 555.

The *body* is uncommonly broad.

The *head* is somewhat deeper than long.

The *eyes* are small, not elongate, scarcely occupying more than a third of the depth of the head.

The *first pair of antennae* (Pl. VIII, fig. 18) are longer than the head and the two first pereionial segments. The first joint of the peduncle is only a little longer than the two following joints together. The third joint is longer than the second. The first joint of the flagellum is high, broadly obtuse anteriorly, more than twice as long as the whole peduncle. The two terminal joints are minute.

The *first pair of pereiopoda* (Pl. VIII, fig. 20); the femur is comparatively narrow, irregular in shape. The carpus is shorter than the metacarpus. The metacarpus is finely serrated along the lower half of the hinder margin. The dactylus is half as long as the metacarpus, finely serrated.

The *second pair* (Pl. VIII, fig. 21) are scarcely longer than the first pair; the tibial process is shorter than the carpus. The carpal process is scarcely as long as half the metacarpus, narrowly spoon-shaped, the margins serrated. The hinder margin of the metacarpus is convex, serrated; the metacarpus is a little shorter than the carpus.

The *third and fourth pairs* (Pl. VIII, fig. 22); the tibiae are broad, almost tumid, longer than the carpi, and as long as the metacarpi. The metacarpi are provided with a few, 5 to 6, minute, equidistant spines along the hinder margin. The dactylus is shorter than half the metacarpus.

The *fifth and sixth pairs* (Pl. VIII, fig. 23) are equal in length. The femur is narrow, almost linear, with three minute spines at the lower anterior corner. The tibia is shorter than the carpus. The metacarpus is longer than the carpus, both joints finely serrated along the anterior margins. The dactylus equals a third of the length of the metacarpus.

The *seventh pair* are longer than half the sixth. The femur is much longer than broad, the dactylus is a little shorter than the metacarpus.

The *pleon* is as long as the last five pereional segments.

The rami of the *pleopoda* are 13-jointed.

The *urus* is a little longer than the last pleonal segment; the first segment is much longer than the two following together; the second is shorter than half the third. The hinder corners of the third segment are broadly rounded, not produced.

The *uropoda* (Pl. VIII, fig. 24 and 25) have the peduncles much longer than the rami. The first pair with the peduncle tolerably broad, linear, serrated along the outer margin; the rami are equal in length, lanceolate, more densely serrated along the outer margins than along the inner. The peduncle of the second pair is a little narrower, linear, smooth; the rami are lanceolate, the exterior is a little shorter than the interior, sparingly serrated; the interior ramus is strongly serrated along the outer margin and sparingly along the inner. The peduncle of the third pair is broad, as long as the last two ural segments together; the rami are equal in length, the exterior smooth on the outer margin, finely serrated along the inner, the interior ramus is smooth on the inner margin and finely serrated along the outer.

The *telson* is broad, rounded, a little shorter than the last ural segment, longer than half the peduncle of the last pair of uropoda.

## 9. VIBILIA LONGIPES, C. BOVALLIUS, 1887.

Pl. VIII, fig. 26—32.

**Diagn.** *Caput* non rostratum, segmentis duobus primi pereii brevius. *Oculi* modici. Flagellum *antennarum* primi paris ante rotundatum, caput longitudine æquans. *Pedes pereii* valde elongati, non hirsuti. Femora pedum primi et secundi parium lata, ovata, carpi metacarpis longiores. Processus carpi pedum secundi paris dimidio metacarpi longior. Tibiæ pedum tertii ac quarti parium non tumidæ; dactyli modici. *Pedes* quinti ac sexti parium pedibus tertii ac quarti parium duplo fere longiores, femora lata, ovata; dactyli modici. Segmentum secundum ac tertium *uri* libera, non coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* ramis longiores. *Telson* latum, triangulare, dimidio pedunculi ultimi paris pedum uri longior.

The *head* is not rostrate, shorter than the first two pereional segments. The *eyes* are middle-sized. The flagellum of the first pair of *antennæ* is anteriorly rounded, as long as the head. The *pereiopoda* are very elongated, not hirsute. The femora of the first two pairs are broad, ovate: the carpi are longer than the metacarpi. The carpal process of the second pair is longer than half the metacarpus. The tibiae of the third and fourth pairs are not tumid; the dactyli are rather small. The fifth and sixth pairs are almost twice as long as the third and fourth; the femora are broad, ovate; the dactyli are middle-sized. The second and third *ural* segments are free, not coalesced. The hinder corners of the last segment are not produced. The peduncles of the *uropoda* are longer than the rami. The *telson* is broad, triangular, longer than half the peduncle of the last pair of uropoda.

**Colour.** Whitish.

**Length.** 10 mm.

**Hab.** The South Atlantic; the Pacific. (M. Godeffroy.)

**Syn.** 1887. *Vibilia longipes*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bib. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 8.

In many of its characteristics *Vibilia longipes* resembles *V. robusta*, but it is easily distinguished by the long slender pereopoda of the fifth and sixth pairs. From *Vibilia Edwardsi*, probably its nearest relative, it is distinguished by the form of the flagellum of the first pair of antennæ, and by the short uropoda.

The *head* is deeper than long, rounded below.

The *eyes* are comparatively large; they occupy more than two thirds of the depth of the head.

The *first pair of antennæ* are nearly as long as the head and the first pereionial segment, the peduncle is shorter than half the first joint of the flagellum.

The *epimerals* are not very large, even.

The *ovitrices* are very large, ovate, those of the fourth pair the largest.

The *first pair of pereopoda* (Pl. VIII, fig. 27); the femur is considerably shorter than the following joints together. The hinder margin of the metacarpus is straight, strongly serrated. The dactylus is longer than half the metacarpus, serrated.

The *second pair* (Pl. VIII, fig. 28). The tibial process is about as long as half the carpus, fringed with bristles. The carpal process is almost as long as the hinder margin of the metacarpus. The dactylus is a little longer than half the metacarpus, serrated.

The *third and fourth pairs* (Pl. VIII, fig. 29) are equal, slender. The tibia is not longer than the carpus. The metacarpus is as long as the carpus. The dactylus is almost straight, shorter than half the metacarpus.

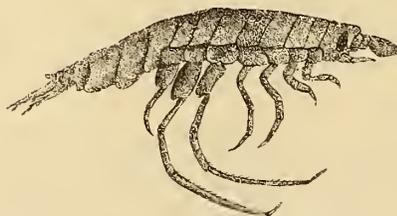
The *fifth and sixth pairs* (Pl. VIII, fig. 30) are very elongated. The femur is elongate-ovate. The tibia is much longer than the carpus. The metacarpus is much longer than the tibia, but shorter than the tibia and carpus together. The dactylus is shorter than a third of the metacarpus.

The *seventh pair* are scarcely shorter than the fourth (21:22). The dactylus is as long as half the metacarpus.

The *pleon* is as long as the last four pereionial segments.

The first segment of the *urus* is longer than the two following together, the second segment is half as long as the third. The hinder corners of the third segment are feebly rounded, not produced.

The *uropoda* (Pl. VIII, fig. 31); the peduncle of the first pair is very broad, serrated at the outer margin, the rami are lanceolate, acute, serrated. The peduncle of the second pair is narrower.

10. **VIBILIA EDWARDSI**, SPENCE BATE, 1862.*Vibilia Edwardsi*, SPENCE BATE.

Facsimile from SP. BATE. Catal. Amph. Crust. Brit. Museum, pl. 49 fig. 6.

**Diagn.** *Caput* non rostratum, segmentis duobus primis pereii paullo longius. *Oculi* modici. Flagellum *antennarum* primi paris ante truncatum, capite paullo longius. *Pedes pereii* quinti ac sexti parium valde elongati, pedibus tertii ac quarti parium plus quam duplo longiores. *Tibiæ* pedum tertii ac quarti parium non tumidæ. *Femora* pedum quinti ac sexti parium lata, ovata: *metacarpi* articulos duo præcedentes longitudine fere æquantes. *Dactylus* septimi paris *metacarpum* longitudine æquans. Segmentum secundum ac tertium *uri* libera, non coalita. *Anguli* postici segmenti ultimi non producti. *Pedunculi pedum uri* ramis longiores. *Telson* lanceolatum, dimidium *pedunculi* ultimi paris *pedum uri* longitudine æquans.

The *head* is not rostrate, a little longer than the first two pereional segments. The *eyes* are middle-sized. The flagellum of the first pair of *antennæ* is anteriorly truncated, a little longer than the head. The *perciopoda* of the fifth and sixth pairs are very elongated, more than twice longer than the third and fourth pairs. The *tibiæ* of the third and fourth pairs are not tumid. The *femora* of the fifth and sixth pairs are broad, ovate; the *metacarpi* are almost as long as the two preceding joints together. The *dactylus* of the seventh pair is as long as the *metacarpus*. The second and third *ural* segments are free, not coalesced. The hinder corners of the last *ural* segment are not produced. The *peduncles* of the *uropoda* are longer than the *rami*. The *telson* is lanceolate, as long as half the *peduncle* of the last pair of *uropoda*.

**Colour.** ?

**Length.** 19 mm.

**Hab.** »Near the Powel Islands». (SPENCE BATE.)

**Syn. 1862.** *Vibilia Edwardsi*, SPENCE BATE.

Catal. Amph. Crust. Brit. Museum, p. 300.

? » » » H. STREETS. 1877. »Contributions to the Natural history of the Hawaiian and Fanning Islands and lower California». Bull. U. S. National Museum. 1877. N:o 7, p. 128.

From the description of SPENCE BATE I give the following details:

The *eyes* are long-ovate.

The *first pair of antennæ* are stout, the second and third joints of the flagellum are smaller than the first. The flagellum is flattened, the upper margin thick, fringed with

a row of equidistant, short, fine hairs; the apex is obtusely pointed; the anterior margin is oblique, fringed with a thick row of short incipient (microscopic) spines.

The *second pair of antennæ* have a flagellum consisting of 7 articuli, one long, four short, one a little longer, and a minute terminal one.

The first pair of *uropoda* reach a little beyond the second; the rami have the margins serrated. The second pair reach not beyond the extremity of the peduncle of the last pair. The rami are coarsely serrated, the denticles upon the inner margins minutely serrated. The third pair have the peduncle twice as long as the rami; the rami minutely serrated.

The *telson* is lanceolate.

## 11. VIBILIA VIATRIX, C. BOVALLIUS, 1887.

Pl. IX, fig. 1—13.

**Diagn.** *Caput* non rostratum, segmenta dua priora pereii longitudine æquans. *Oculi* modici. Flagellum *antennarum* primi paris ante obtusum, capite longius. *Pedes pereii* quinti et sexti parium elongati, pedibus tertii ac quarti parium multo longiores. Femora pedum primi et secundi parium linearia, angusta. Tibiæ pedum tertii ac quarti parium tumidæ, dactyli longissimi. Femora pedum quinti ac sexti parium truncate ovata, metacarpi articulis duobus præcedentibus multo breviores. Dactylus septimi paris metacarpo multo brevior. Segmentum secundum ac tertium *uri* libera, non coalita. Anguli postici segmenti ultimi non producti. Pedunculi *pedum uri* ramis longiores. *Telson* magnum, obtuse triangulare, dimidio pedunculi ultimi paris pedum *uri* longius.

The *head* is not rostrate, as long as the first two pereional segments. The *eyes* are middle-sized. The flagellum of the first pair of *antennæ* are anteriorly obtuse, longer than the head. The fifth and sixth pairs of *pereiopoda* are elongate, much longer than the third and fourth pairs. The femora of the first and second pairs are narrow, linear. The tibiæ of the third and fourth pairs are large, tumid; the dactyli very long. The femora of the fifth and sixth pairs are truncate ovate; the metacarpi are much shorter than the two preceding joints together. The dactylus of the seventh pair is much shorter than the metacarpus. The second and third *ural* segments are free, not coalesced. The hinder corners of the last segment are not produced. The peduncles of the *uropoda* are longer than the rami. The *telson* is large, obtusely triangular, longer than half the peduncle of the last pair of *uropoda*.

**Colour.** Yellowish.

**Length.** 10—16 mm.

**Hab.** The North and South Atlantic, the Pacific, the Indian Ocean. (D. M.; S. M.; U. M.)

**Syn. 1887.** *Vibilia viatrix*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 8.

*Vibilia viatrix* seems to be the most cosmopolite species in the family. I know it from the North and South Atlantic, the tropical parts of the Pacific, and the Indian Ocean. It is easily to be distinguished from its congeners by the largely developed tibiæ of the third and fourth pairs of *pereiopoda*.

The *head* is deeper than long, the anterior margin is straight.

The *eyes* are ovate, occupying a little more than half the depth of the head.

The *first pair of antennæ* (Pl. IX, fig. 2) are quite as long as the head and the first two pereional segments together. The first joint of the peduncle is as long as the two following joints together. The first joint of the flagellum is more than twice as long as the peduncle.

The *second pair of antennæ* (Pl. IX, fig. 3) are ten-jointed in the male and five-jointed in the female; in the male the third joint of the peduncle is angularly bent against the preceding joint, a fact which points to the case of the *Tryphænidæ* and following families.

The *pereiön*; the first segment is shorter than the second, the fifth is the longest, the seventh scarcely shorter.

The *epimerals* are rather small, those of the sixth pair are the deepest.

The *first pair of pereiopoda* (Pl. IX, fig. 4) with the carpus broad, but not produced, shorter than the metacarpus. The metacarpus has the hinder margin feebly concave, finely serrated; the dactylus longer than half the metacarpus, serrated.

The *second pair* (Pl. IX, fig. 5); the tibial process is longer than half the carpus, tipped with long thick bristles. The carpal process is as long as two thirds of the metacarpus, narrowly spoon-shaped, the margins serrated. The hinder margin of the metacarpus is straight, strongly serrated. The dactylus as in the preceding pair.

The *third and fourth pairs* (Pl. IX, fig. 6) with the femur narrow, feebly bent. The tibia is very large and thick, tumid, much broader and longer than the following carpus. The metacarpus is very stout, finely serrated and spinous along the hinder margin. The dactylus is very long, almost as long as the metacarpus, smooth.

The *fifth and sixth pairs* (Pl. IX, fig. 7 and 8) with the femur irregularly ovate, provided with four to five short spines at the lower anterior corner. The tibia is a little longer than the carpus. The carpus of the sixth pair is provided with six long, equidistant bristles. The metacarpus is scarcely a third longer than the carpus, finely serrated along the anterior margin. The dactylus is somewhat shorter than the metacarpus.

The *seventh pair* (Pl. IX, fig. 9, 10 and 11); the femur is a fourth longer than broad, a little longer than the three following joints. The dactylus is as long as two thirds of the metacarpus.

The *pleon* is a little shorter than the last five pereional segments; the inferior margins of the segments are a little excavated.

The rami of the *pleopoda* (Pl. IX, fig. 12) are ten- to twelve-jointed.

The *urus* is as long as the last pleonal segment. The first segment is longer than the two following together, the third is more than twice longer than the second. The hinder corners of the last segment are feebly rounded.

The *uropoda* (Pl. IX, fig. 13). The exterior rami are a little shorter than the interior; those of the first two pairs are finely serrated along both margins. The exterior ramus of the last pair is smooth on the outer, and finely serrated on the inner margin; the interior ramus is smooth on the inner margin, and finely serrated on the outer; the peduncle is longer than the last two ural segments.

The *telson* is longer than the last ural segment.

12. **VIBILIA GRACILIS**, C. BOVALLIUS, 1887.

Pl. IX, fig. 14—28.

**Diagn.** *Caput* rostratum, segmentis duobus primis pereii longius. *Oculi* parvi. Flagellum *antennarum* primi paris acutum, caput longitudine æquans. *Pedes pereii* enrti. Femora pedum primi ac secundi parium linearia, angusta. Proecessus earpi pedum secundi paris metacarpum longitudine fere æquans. Tibiæ pedum tertii ac quarti parium non tumida; daetyli longissimi. *Pedes* quinti et sexti parium pedibus tertii ac quarti parium paullo solum longiores; femora lata, linearia; daetyli longi. Segmentum secundum et tertium *uri* coalita. Anguli postiei segmenti ultimi leviter producti. Peduneuli *pedum uri* lineares, ramis longiores. *Telson* rotundatum, dimidio peduneuli ultimi paris pedum *uri* longius.

The *head* is rostrate, longer than the first two pereional segments together. The *eyes* are small. The flagellum of the first pair of *antennæ* is acute, as long as the head. The *pereiopoda* are short. The femora of the first and second pairs of *pereiopoda* are narrow, linear. The carpal process of the second pair is almost as long as the metacarpus. The tibiæ of the third and fourth pairs are not tumid; the daetyli are very large. The fifth and sixth pairs are only a little longer than the third and fourth; the femora are broad, linear; the daetyli are long. The second and third *ural* segments are coalesced. The hinder corners of the last segment are feebly produced. The peduneles of the *uropoda* are linear, longer than the rami. The *telson* is rounded, longer than half the pedunele of the last pair of *uropoda*.

**Colour.** Hyaline, with deep red, starlike spots.

**Length.** 9 mm.

**Hab.** Tropical parts of the Pacific. (S. M.)

**Syn.** 1887. *Vibilia gracilis*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 9.

*Vibilia gracilis* and the three following species form a distinct group of *Vibiliae*, differing from all the preceding species by the comparatively long urus, with rounded sides and more or less produced hinder corners.

The *body* is slender, compressed. The integument is thin, hyaline, densely provided with starlike spots of a dark red colour. These spots consist of regular crystals of some calcareous matter (Pl. IX, fig. 16—18).

The *head* is a third deeper than long, as long as the first two pereional segments and half the third. The rostrum is as long as a fourth of the head, tolerably acute, feebly bent downwards. Just beyond the base of the first pair of *antennæ* the anterior sides project into a sharp toothlike process on each side of the head (Pl. IX, fig. 15).

The *eyes* are comparatively small; they consist each of scarcely more than twenty ocelli.

The *first pair of antennæ* (Pl. IX, fig. 15) have the basal joint of the peduncle more than twice longer than the two succeeding joints together, the third joint is twice as long

as the second. The flagellum is slender, evenly tapering towards the point, considerably longer than the peduncle (12:7); the two terminal joints are distinct. (Pl. IX, fig. 19).

The *second pair of antennæ* (Pl. IX, fig. 15) are five-jointed in the female, the basal joint is the shortest.

The first and second segments of the *pereion* are equal in length, shorter than the others; the fifth segment is the longest, the two succeeding ones scarcely shorter.

The carpus of the *first pair of pereopoda* (Pl. IX, fig. 20) is a little shorter than the metacarpus, the posterior margin straight, smooth; at the lower posterior corner there is a single bristle. The posterior margin of the metacarpus is straight, regularly serrated. The dactylus is shorter than half the metacarpus, serrated at the posterior margin.

The *second pair* (Pl. IX, fig. 21) have the carpus and metacarpus equal in length; the carpal process is almost as long as the posterior margin of the metacarpus, regularly serrated.

The *third and fourth pairs* (Pl. IX, fig. 22) have the tibia a little longer than the carpus, not tumid; the metacarpus is robust, minutely serrated along the posterior margin; the dactylus is only a fourth shorter than the metacarpus.

The *fifth and sixth pairs* (Pl. IX, fig. 23—25) are almost equal in length, a little longer than the fourth pair (16:13); the margins of the tibia and carpus are smooth, the anterior margin of the metacarpus is minutely serrated, or rather armed with a dense row of very short regular spines. The dactylus is about as long as half the metacarpus, provided with a short row of sharp spines at the anterior margin.

The *seventh pair* are shorter than the fourth; the femur is much longer than the three succeeding joints together. In a young specimen the dactylus carries a curved spine subapically and a row of short hairs. (Pl. IX, fig. 26.)

The *pleon* is as long as the last four pereionial segments; the lower margins are straight, smooth.

The peduncles of the *pleopoda* are longer than the rami. The outer ramus is 9-jointed, the inner 10-jointed. (Pl. IX, fig. 27.)

The second and third *ural* segments are coalesced, shorter than the first. The hinder corners are a little produced backwards, but not so far as half the length of the telson.

The peduncle of the first pair of *uropoda* (Pl. IX, fig. 28) is longer than the rami, linear, not broader than the peduncle of the second pair. The rami of the first two pairs are lanceolate, coarsely serrated along both margins; the exterior ones are a little shorter than the interior. The peduncle of the third pair is considerably longer than the rami, as broad the peduncle of the preceding pair, but shorter than the last coalesced ural segment. The rami are shortly lanceolate; the interior is the longest, minutely serrated along both margins; the exterior is smooth along the outer margin, minutely serrated along the inner.

The *telson* is almost circular, longer than half the peduncle of the last pair of uropoda.

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13. **VIBILIA GRACILENTA**, C. BOVALLIUS, 1887.

Pl. X, fig. 1—14.

**Diagn.** *Caput* non rostratum, segmenta duo priora pereii longitudine æquans. *Oculi* grandes. Flagellum *antennarum* primi paris acutum, capite longius. *Pedes pereii* curti. Femora pedum primi ac secundi parium angusta. Processus carpi pedum secundi paris latus, fortiter serratus, metacarpum longitudine fere æquans. Tibiæ pedum tertii ac quarti parium non tumidæ, dactyli modici. *Pedes* quinti ac sexti parium pedibus tertii ac quarti parium paullo longiores. Segmentum secundum ac tertium *uri* coalita. Anguli postici segmenti ultimi valde producti, processus telson longitudine æquantes formant. Pedunculi *pedum uri* primi ac tertii parium ramis paullo longiores, pedunculus pedum secundi paris ramum internum longitudine æquans. *Telson* modicum, rotundatum, dimidio pedunculi ultimi paris pedum uri brevius.

The *head* is not rostrate, as long as the first two pereional segments. The *eyes* are large. The flagellum of the first pair of *antennæ* is acute, longer than the head. The *pereiopoda* are short. The femora of the first and second pairs are narrow. The carpal process of the second pair is broad, strongly serrated, almost as long as the metacarpus. The tibiæ of the third and fourth pairs are not tumid; the dactyli are rather small. The fifth and sixth pairs are a little longer than the third and fourth pairs. The second and third *uræ* segments are coalesced. The hinder corners of the last segment are strongly produced, forming processes equalling the telson in length. The peduncles of the first and third pairs of *uropoda* are a little longer than the rami; that of the second pair is as long as the interior ramus. The *telson* is middle-sized, rounded shorter than half the peduncle of the last pair of *uropoda*.

**Colour.** Yellowish.

**Length.** 6—7 mm.

**Hab.** The Atlantic; captured by D:R HORNBEK. (D. M.)

**Syn.** 1887. *Vibilia gracilentæ*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 9.

This species is closely allied to the next preceding, differing only in some few characteristics, which are however of such a value that it must be ranged as a species of its own. Through the large eyes it approaches *Vibilia macropis*, through the *urus* and the telson it connects *Vibilia gracilis* with *Vibilia armata*.

The *body* is of the same form as in *Vibilia gracilis*, but the integument is harder and not hyaline, of a uniform yellowish-white colour without spots.

The *head* is not produced into a rostrum; it is as long as deep, equalling the first two pereional segments in length.

The *eyes* are very large, almost circular, consisting each of about 70 ocelli.

The *first pair of antennæ* (Pl. X, fig. 2 and 3) are of the same slender form as in *Vibilia gracilis*, but the first joint of the flagellum is more than twice as long as the peduncle. The two terminal joints are distinct, carrying some stout hairs.

The *second pair of antennæ* (Pl. X, fig. 4 and 5) are six-jointed, in the young male, the fifth joint is the shortest.

The first segment of the *pereiön* is shorter than the second, the fifth is the longest.

The *first pair of pereiopoda* (Pl. X, fig. 6 and 7) have the carpus considerably shorter than the metacarpus, the posterior margin rounded, armed with two strong bristles. The convex anterior margin of the metacarpus is armed with two bristles, the posterior margin is straight, serrated. The dactylus is longer than half the metacarpus, irregularly serrated along the posterior margin, provided with a distinct aperture at the base as an outlet for the metacarpal glands.

The *second pair* (Pl. X, fig. 8–10); the carpus is shorter than the metacarpus; the carpal process is very broad and stout, longer than the carpus itself and quite as long as the posterior margin of the metacarpus. The inner or anterior margins of the process are irregularly serrated (Pl. X, fig. 10). The metacarpus is thick, bulging, the anterior and posterior margins convex, the anterior smooth, the posterior regularly serrated. The dactylus is shorter than half the metacarpus, serrated along the posterior margin.

The *third and fourth pairs* (Pl. X, fig. 11) have the tibia and carpus equal in length; the tibia is tolerably broad but not tumid, the metacarpus is longer than the carpus, the posterior margin smooth. The dactylus is scarcely half as long as the metacarpus.

The *fifth and sixth pairs* (Pl. X, fig. 12 and 13) are subequal in length, a fourth longer than the fourth pair. The anterior margin of the carpus and metacarpus is armed with a row of very short, equidistant spines. The dactylus is shorter than half the metacarpus, armed with some few short spines as in *Vibilia gracilis* (Pl. X, fig. 13).

The *seventh pair* are considerably shorter than the fourth; the femur is longer than the three succeeding joints together.

The *pleon* is longer than the last four pereiönal segments.

The second and third *ural* segments are coalesced, shorter than the first, and distinctly broader than long. The hinder corners are produced into rounded processes reaching as far backwards as the tip of the telson.

The *uropoda* (Pl. X, fig. 14); the peduncle of the first pair is a little longer than the rami, broader below, distinctly serrated along the outer margin. The interior ramus is scarcely longer than the exterior, both are lanceolate, strongly serrated along the outer margins, and coarsely at the inner. The peduncle of the second pair is as long as the rami, linear, the margins smooth; the interior ramus is a little broader and longer than the exterior, broadly lanceolate, strongly serrated along both margins; the exterior is strongly serrated along the interior margin and has some few coarse serrations at the outer. The peduncle of the third pair is longer than the rami (7:5), as broad as the peduncle of the preceding pair, and only a little shorter than the last ural segment. The rami are equal in length, the interior minutely serrated along both margins, the exterior smooth along the outer margin and minutely serrated along the inner.

The *telson* is almost triangular, as long as broad, and half as long as the peduncle of the last pair of uropoda.

14. **VIBILIA ARMATA**, C. BOVALLIUS, 1887.

Pl. X, fig. 15—22.

**Diagn.** *Caput* obtuse rostratum, segmenta tria priora pereii longitudine æquans. *Oculi* modici. Flagellum *antennarum* primi paris angustum, acutum, caput longitudine æquans. *Pedes pereii* elongati. Femora pedum primi et secundi parium angusta, linearia. Processus carpi pedum secundi paris metacarpum longitudine æquans; metacarpus in apice productus duo processus acutos ad basin dactyli formans. Tibiæ pedum tertii ac quarti parium non tumidæ, dactyli longissimi. *Pedes* quinti ac sexti parium pedibus tertii ac quarti parium longiores; femora lata, linearia. *Pedes* sexti paris pedibus quinti paris longiores; metacarpus elongatus dactylusque longissimus. Femur pedum septimi paris parvum, dactylus metacarpo multo brevior. Segmentum *uri* secundum et tertium coalita. Anguli postici segmenti ultimi producti, processus quam telson breviores formantes. Pedunculi *pedum uri* lineares, ramos longitudine æquantēs. *Telson* elongatum, post rotundatum, dimidio pedunculi ultimi paris pedum uri longius.

The head is obtusely rostrate, as long as the first two pereional segments. The eyes are middle-sized. The flagellum of the first pair of *antennæ* is narrow, acute, as long as the head. The *pereiopoda* are elongated. The femora of the first and second pairs are narrow, linear. The carpal process of the second pair is as long as the metacarpus; the metacarpus is produced at the apex, forming two sharp processes at the base of the dactylus. The tibiæ of the third and fourth pairs are not tumid; the dactyli very long. The fifth and sixth pairs are longer than the third and fourth, the femora are broad, linear. The sixth pair are longer than the fifth; the metacarpus is elongated; the dactylus very long. The femur of the seventh pair is small; the dactylus is much shorter than the metacarpus. The second and third *ural* segments are coalesced. The hinder corners of the last segment are produced, forming processes shorter than the telson. The peduncles of the *uropoda* are linear, as long as the rami. The *telson* is elongate, rounded behind, longer than half the peduncle of the last pair of uropoda.

**Colour.** Yellowish white.

**Length.** 8—10 mm.

**Hab.** Tropical parts of the Atlantic, and the South Atlantic, taken by Captain G. VON SCHÉELE, and by the author. (S. M.; U. M.)

**Syn. 1887.** *Vibilia armata*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Akad. Handl. Bd. 11. N:o 16, p. 10.

*Vibilia armata* is easily distinguished from its allies by the produced anterior corner of the metacarpus of the second pair of *pereiopoda*, and by the small femur of the seventh pair.

The *body* is broad, robust; the integument is thick and hard.

The *head* is almost as long as deep, equalling the first three pereional segments in length, produced anteriorly into a very short obtuse rostrum.

The *eyes* are rather large, broadly ovate, consisting each of about 40 ocelli.

The *first pair of antennæ* (Pl. X, fig. 16) are of the same form as in the two preceding species; the first joint of the flagellum is more than twice as long as the peduncle. The two terminal joints are very minute, almost obsolete.

The *second pair of antennæ* are eight-jointed in the male, five-jointed in the female; the last joint is the shortest.

The first two *pereional* segments are equal in length, the fifth is the longest.

The *first pair of pereiopoda* (Pl. X, fig. 17) have the carpus as long as the metacarpus, the posterior margin armed with two bristles. The convex anterior margin of the metacarpus is armed with three bristles, the posterior margin is almost straight, regularly serrated. The dactylus is much longer than half the metacarpus, sparingly serrated at the posterior margin.

The *second pair* (Pl. X, fig. 18); the carpus is almost longer than the metacarpus; the carpal process is slender, sharp-pointed, shorter than the carpus itself, and scarcely as long as the posterior margin of the metacarpus. The metacarpus is stout, the lower anterior corner produced into a tolerably long serrated process, the lower posterior corner produced into a somewhat shorter process. The lower parts of the anterior and posterior margins are sharply serrated.

The *third and fourth pairs* (Pl. X, fig. 19) have the tibia considerably longer than the carpus (4:3); the tibia is narrow, not tumid; the posterior margins of the carpus and metacarpus are minutely serrated. The dactylus is almost straight, much longer than half the metacarpus (5:7).

The *fifth and sixth pairs* (Pl. X, fig. 20) are about a fourth longer than the fourth pair, the sixth pair are a little longer than the fifth; the femur is laminar, linear with rounded corners; the carpus and metacarpus are fringed along the anterior margins with very short equidistant spines. The dactylus of the fifth pair is shorter than a third of the metacarpus; the dactylus of the sixth pair is longer than half the metacarpus, irregularly serrated at the anterior margin.

The *seventh pair* (Pl. X, fig. 21) are equal in length to two thirds of the fourth. The femur has the anterior and posterior margins straight; it is scarcely as long as the three succeeding joints together.

The *pleon* is as long as the last six pereional segments; the lower margins of the first two segments are rounded, with an obtuse angle just behind the middle. The lower margins of the last segment are almost straight.

The *pleopoda* have the rami scarcely as long as the peduncles.

The second and third *ural* segments are coalesced, about a third shorter than the first segment. The hinder corners are produced backwards into processes extending a little farther than half the length of the telson.

The *uropoda* (Pl. X, fig. 22); the peduncles of the first and second pairs are linear, a little longer than the rami, serrated along the outer margins. The rami of the first pair are equal in length, lanceolate, strongly serrated along both margins. The interior ramus of the second pair is lanceolate, much longer than the exterior, strongly serrated at both margins. The peduncle of the third pair is only a little longer than the rami, and much shorter than the last ural segment. The interior ramus is a little longer than the exterior, minutely serrated.

The *telson* is elongate, triangular, with the margins feebly convex; it is only a fourth shorter than the peduncle of the last pair of uropoda.

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15. **VIBILIA PYRIPES**, C. BOVALLIUS, 1887.

Pl. X, fig. 23—30.

**Diagn.** *Caput* non rostratum, segmenta duo priora pereii longitudine haud æquans. *Oculi* parvi. Flagellum *antennarum* primi paris ante rotundatum, capite longius. *Pedes pereii* curti, non hirsuti. Femora pedum primi et secundi parium angusta. Processus carpi pedum secundi paris dimidio metacarpi brevior, non serratus. Tibiæ ac carpi pedum tertii et quarti parium lati, fere tumidi, metacarpi ac dactyli breves. *Pedes* quinti ac sexti parium pedibus tertii et quarti parium longiores; femora fere angusta, linearia; dactyli breves. Segmentum *uri* secundum et tertium coalita, sed linea divisionis in marginibus est indicata. Anguli postici segmenti ultimi producti, processus obtusos quam telson breviores formantes. Pedunculi *pedum uri* primi et secundi parium superne angustiores, ramis longiores, pedunculus pedum tertii paris pyriformis, ramis brevior. *Telson* magnum, rotundatum, pedunculo ultimi paris pedum uri paullo longius.

The *head* is not rostrate, shorter than the first two pereional segments. The *eyes* are small. The flagellum of the first pair of *antennæ* are anteriorly rounded, longer than the head. The *pereiopoda* are short, not hirsute; the femora of the first two pairs are narrow. The carpal process of the second pair is shorter than the metacarpus, not serrated. The tibiæ and carpi of the third and fourth pairs are broad, almost tumid; the metacarpi and dactyli are short. The fifth and sixth pairs are longer than the third and fourth: the femora are narrow, linear; the dactyli are short. The second and third *ural* segments are coalesced, but the line of division is marked by deep notches at the margins. The hinder corners of the last segment are produced, forming obtuse processes shorter than the telson. The peduncles of the *uropoda* of the first and second pairs are narrower above, longer than the rami; that of the third pair is pyriform, shorter than the rami. The *telson* is large, rounded, longer than the peduncle of the last pair of uropoda.

**Colour.** Yellowish brown.

**Length.** 8—9 mm.

**Hab.** Tropical parts of the Atlantic. (D. M.; S. M.)

**Syn. 1887.** *Vibilia pyripes*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 10.

This species is at once distinguished from its congeners by the short, pear-shaped peduncle of the last pair of uropoda.

The *body* is broad; the integument is rather thick.

The *head* is much deeper than long, a little shorter than the first two pereional segments, not produced into a rostrum.

The *eyes* are small, elongate, broader above; they consist each of about 30 ocelli.

The *first pair of antennæ* are thick, broadly rounded anteriorly. The basal joint of the peduncle is three times longer than the two succeeding joints together. The first joint of the flagellum is ovate, twice longer than the peduncle.

The *second pair of antennæ* are eight-jointed in the male, the last joint the shortest.

The first two *pereional* segments are almost equal in length, the fourth is the longest

The *first pair of pereopoda* have the carpus as long as the metacarpus; the posterior margin is straight without bristles. The anterior convex margin of the metacarpus is smooth, the posterior margin is straight, finely serrated. The dactylus is shorter than half the metacarpus, finely serrated at the posterior margin.

The *second pair* (Pl. X, fig. 24) have the carpus longer than the metacarpus; the carpal process short, indistinctly serrated, shorter than half the posterior margin of the metacarpus. The anterior and posterior margins of the metacarpus are convex, the posterior regularly serrated. The dactylus is shorter than a third of the metacarpus, not serrated.

The *third and fourth pairs* (Pl. X, fig. 25) are very robust, the tibia and carpus are very broad, almost tumid, the posterior margins straight, beset with very few minute spines. The metacarpus is shorter than the carpus, finely serrated along the posterior margin. The dactylus is shorter than half the metacarpus.

The *fifth and sixth pairs* (Pl. X, fig. 26) are a third longer than the fourth pair, robust. The carpus is longer than the tibia, minutely serrated along the anterior margin. The metacarpus is feebly bent, fringed along the anterior margins with minute spines. The dactylus is scarcely more than a fifth of the length of the metacarpus.

The *seventh pair* equal two thirds of the fourth pair in length; the femur is longer than the three succeeding joints together.

The *pleon* is as long as the last five pereionial segments; the lower margins of the segments are feebly rounded.

The *pleopoda* have the peduncles longer than the rami.

The second and third *ural* segments are only partly coalesced, the distinction between both the segments being marked at the sides by deep incisions or notches. The coalesced segment is as long as the preceding first ural segment. The hinder corners are produced backwards into obtuse processes, not reaching as far as the hinder margin of the telson.

The *uropoda* (Pl. X, fig. 27—30); the peduncle of the first pair is much longer than the rami, broader below, complicatedly serrated along the outer margin; the rami are lanceolate, equal in length, showing peculiar apertures at the under-side and well-developed glands in the interior<sup>1</sup>). The exterior ramus is strongly serrated along the outer margin, and coarsely along the inner. The interior ramus is sharply serrated along both margins with some few coarse teeth at the lower end. The peduncle of the second pair is much longer than the rami, a little broader below, indistinctly serrated along the outer margin. The rami are almost equal in length; the exterior sharply serrated along the inner margin and coarsely along the outer; the interior ramus is sharply serrated along both margins. The peduncle of the third pair is pear-shaped, very short, shorter than the rami and half as long as the last, coalesced ural segment. The rami are equal in length, tolerably broad. The exterior ramus is almost smooth along the outer margin and sharply serrated along the inner margin with a very large aperture at the lower end; the interior ramus is sharply serrated along both margins.

The *telson* is broadly rounded, almost broader than long and somewhat longer than the peduncle of the last pair of uropoda.

<sup>1</sup>) This peculiar organ will be spoken of in the anatomical part of the treatise.

I  
Tyro.

PLATE I.

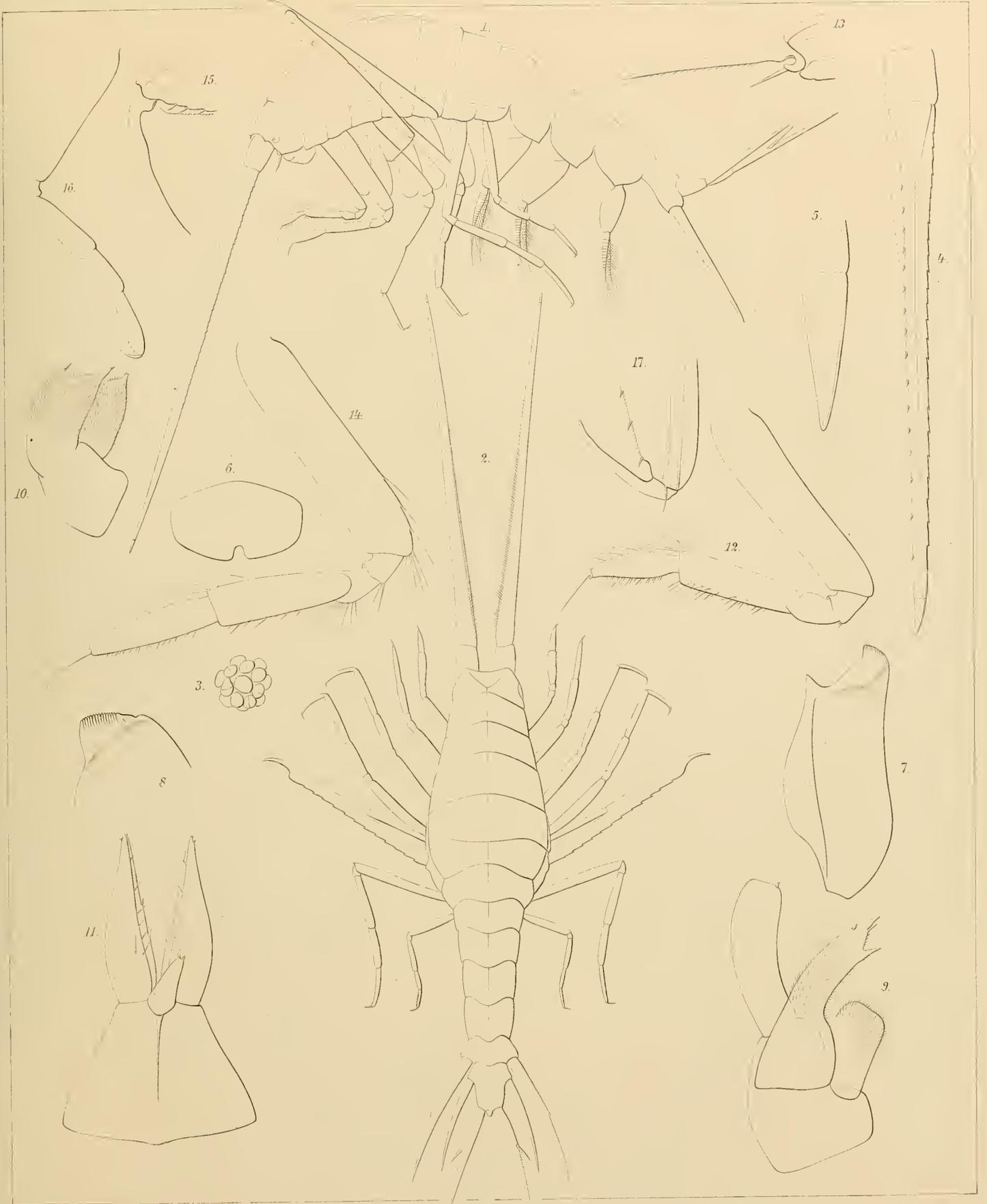
TYRO SARSI.

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PLATE I.

TYRO SARSI. ♀

- Fig. 1. The animal from the side ( $\frac{4}{1}$ ).  
» 2. » » » above ( $\frac{4}{1}$ ).  
» 3. The eye ( $\frac{30}{1}$ ).  
» 4. The first pair of antennæ ( $\frac{8}{1}$ ).  
» 5. The last joint of the same ( $\frac{40}{1}$ ).  
» 6. The labrum ( $\frac{70}{1}$ ).  
» 7. The left mandible ( $\frac{100}{1}$ ).  
» 8. The tip of the same ( $\frac{250}{1}$ ).  
» 9. The right maxilla of the first pair ( $\frac{100}{1}$ ).  
» 10. » » » » second » ( $\frac{100}{1}$ ).  
» 11. The maxillipeds, from the inside ( $\frac{70}{1}$ ).  
» 12. The first pair of pereopoda ( $\frac{12}{1}$ ).  
» 13. The dactylus of the same ( $\frac{42}{1}$ ).  
» 14. The second pair of pereopoda ( $\frac{12}{1}$ ).  
» 15. The dactylus of the third pair ( $\frac{60}{1}$ ).  
» 16. The seventh pair of pereopoda ( $\frac{8}{1}$ ).  
» 17. The dactylus of the same ( $\frac{17}{1}$ ).



A.L. Westergren del.

*Auctor direxit*.

Lith. W. Schläpfer Stockholm

Fig. 1-17 *Tyro Sarsi* +.



PLATE II.

TYRO SARSI, T. ATLANTICA AND T. CLAUSI.

PLATE II.

TYRO SARSI. ♂

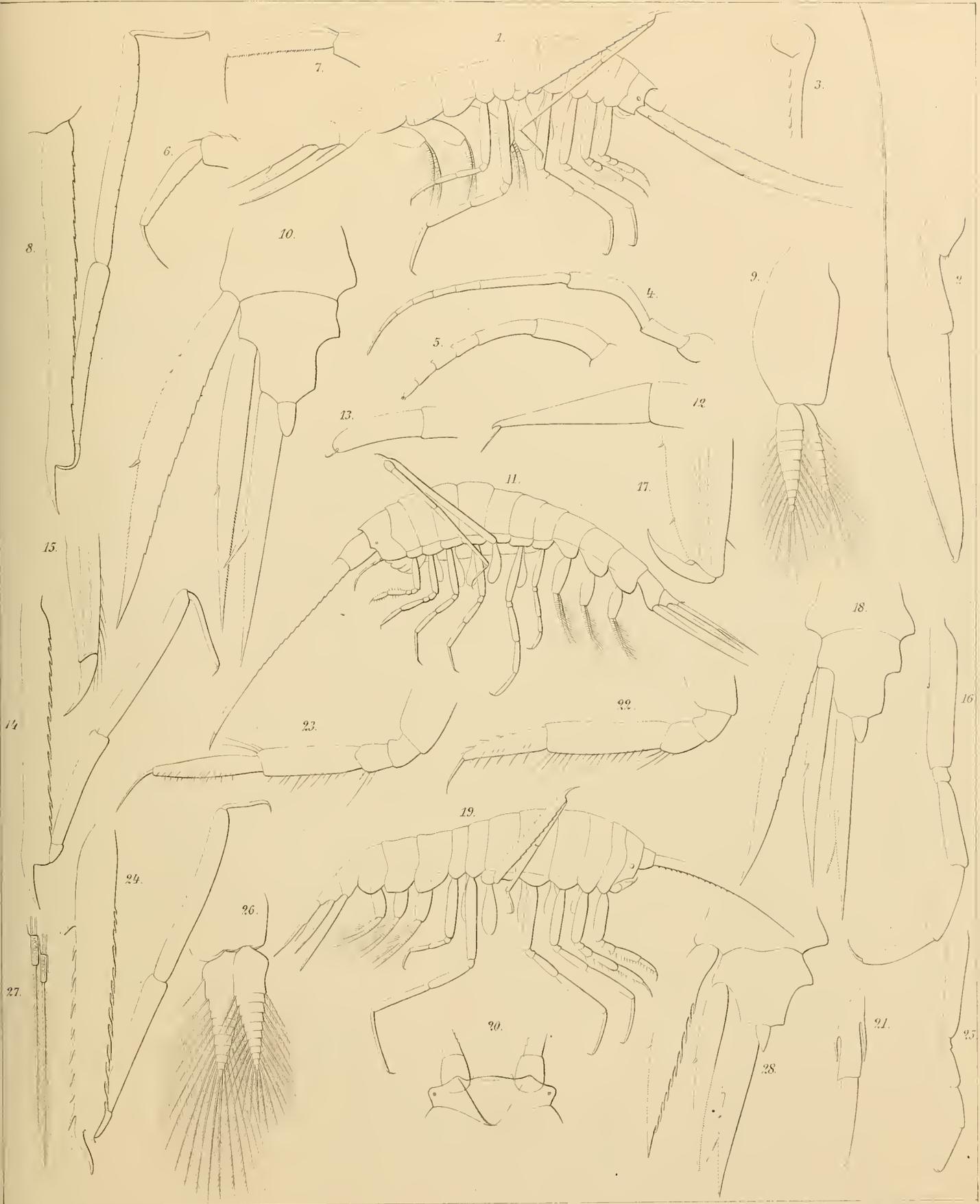
- Fig. 1. The animal from the side ( $\frac{6}{1}$ ).  
» 2. The second pair of antennæ ( $\frac{15}{1}$ ).  
» 3. The end of the fifth joint of the same ( $\frac{150}{1}$ ).  
» 4 and 5. The second pair of antennæ from younger animals ( $\frac{25}{1}$ ).  
» 6. The last joints of the third pair of pereopoda ( $\frac{18}{1}$ ).  
» 7. » » » » » fourth » » » ( $\frac{18}{1}$ ).  
» 8. The fifth pair of pereopoda ( $\frac{13}{1}$ ).  
» 9. The first pair of pleopoda ( $\frac{18}{1}$ ).  
» 10. The urus ( $\frac{18}{1}$ ).

TYRO ATLANTICA. ♂ (young).

- » 11. The animal from the side ( $\frac{10}{1}$ ).  
» 12. The last joint of the first pair of antennæ ( $\frac{100}{1}$ ).  
» 13. The same in a younger animal ( $\frac{150}{1}$ ).  
» 14. The fifth pair of pereopoda ( $\frac{20}{1}$ ).  
» 15. The dactylus of the same ( $\frac{120}{1}$ ).  
» 16. The sixth pair of pereopoda ( $\frac{25}{1}$ ).  
» 17. The dactylus of the seventh pair ( $\frac{150}{1}$ ).  
» 18. The urus ( $\frac{25}{1}$ ).

TYRO CLAUSI. ♀

- » 19. The animal from the side ( $\frac{10}{1}$ ).  
» 20. The head from above ( $\frac{20}{1}$ ).  
» 21. The last joint of the first pair of antennæ ( $\frac{100}{1}$ ).  
» 22. The first pair of pereopoda ( $\frac{42}{1}$ ).  
» 23. » second » » » ( $\frac{42}{1}$ ).  
» 24. » fifth » » » ( $\frac{28}{1}$ ).  
» 25. » seventh » » » ( $\frac{20}{1}$ ).  
» 26. » first » » pleopoda ( $\frac{20}{1}$ ).  
» 27. Ciliæ of the same ( $\frac{40}{1}$ ).  
» 28. The urus ( $\frac{25}{1}$ ).
-



A. M. Westergren del.

Auctor direxit.

Lith. W. Sandberg, Stockholm.

Fig 1-10 Tyro Sarsi ♂. 11-19 Tyro atlantica ♀. 20-28 Tyro clausi ♀.



PLATE III.

TYRO TULLBERGI, T. PACIFICA AND T. MARGINATA.

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### PLATE III.

#### TYRO TULLBERGI. ♀

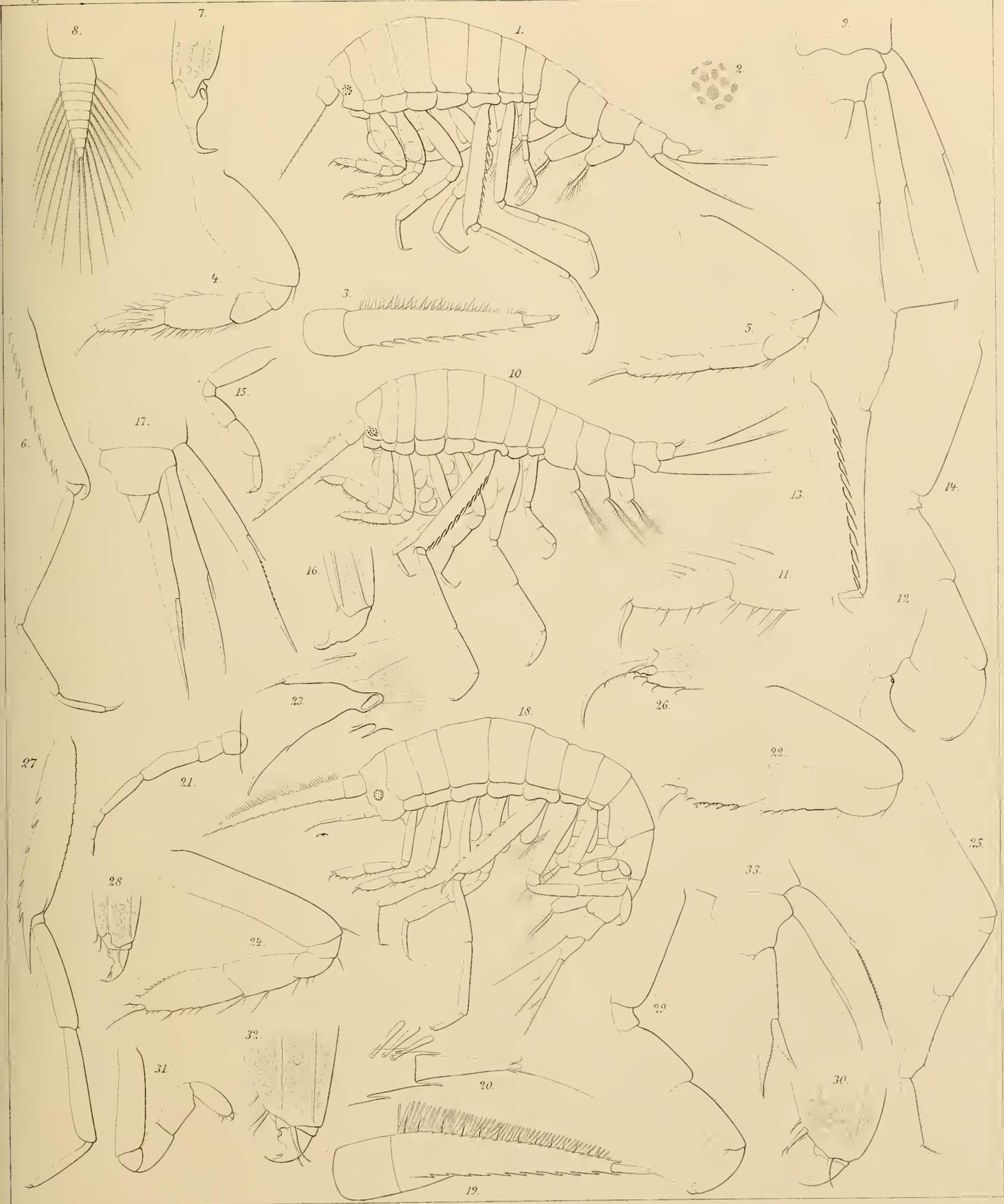
- Fig. 1. The animal from the side ( $\frac{22}{7}$ ).  
» 2. The eye ( $\frac{130}{1}$ ).  
» 3. The first pair of antennæ ( $\frac{50}{1}$ ).  
» 4. The first pair of pereopoda ( $\frac{50}{1}$ ).  
» 5. » second » » » ( $\frac{50}{1}$ ).  
» 6. » fifth » » » ( $\frac{35}{1}$ ).  
» 7. The dactylus of the seventh pair ( $\frac{220}{1}$ ).  
» 8. The first pair of pleopoda ( $\frac{70}{1}$ ).  
» 9. The urus ( $\frac{44}{1}$ ).

#### TYRO PACIFICA. ♀

- » 10. The animal from the side ( $\frac{20}{1}$ ).  
» 11. The last joints of the first pair of pereopoda ( $\frac{80}{1}$ ).  
» 12. » » » » » third » » » ( $\frac{120}{1}$ ).  
» 13. The fifth pair of pereopoda ( $\frac{40}{1}$ ).  
» 14. » sixth » » » ( $\frac{40}{1}$ ).  
» 15. » seventh » » » ( $\frac{30}{1}$ ).  
» 16. The dactylus of the same ( $\frac{180}{1}$ ).  
» 17. The urus ( $\frac{38}{1}$ ).

#### TYRO MARGINATA. ♂

- » 18. The animal from the side ( $\frac{23}{1}$ ).  
» 19. The first pair of antennæ ( $\frac{50}{1}$ ).  
» 20. The last joint of the same ( $\frac{100}{1}$ ).  
» 21. The second pair of antennæ ( $\frac{60}{1}$ ).  
» 22. The first pair of pereopoda ( $\frac{70}{1}$ ).  
» 23. The dactylus of the same ( $\frac{350}{1}$ ).  
» 24. The second pair of pereopoda ( $\frac{70}{1}$ ).  
» 25. » third » » » ( $\frac{50}{1}$ ).  
» 26. The dactylus of the same ( $\frac{200}{1}$ ).  
» 27. The fifth pair of pereopoda ( $\frac{40}{1}$ ).  
» 28. The dactylus of the same ( $\frac{130}{1}$ ).  
» 29. The sixth pair of pereopoda ( $\frac{50}{1}$ ).  
» 30. The dactylus of the same ( $\frac{225}{1}$ ).  
» 31. The seventh pair of pereopoda ( $\frac{50}{1}$ ).  
» 32. The dactylus of the same ( $\frac{200}{1}$ ).  
» 33. The urus ( $\frac{50}{1}$ ).



A.M. Westergren del.

Fractor direct.

Lith. W. Schlachter, Stockholm.

Fig 1-9 Tyro tullbergi ♀. 10-17 Tyro pacifica ♀. 18-33 Tyro marginata ♂.



PLATE IV.

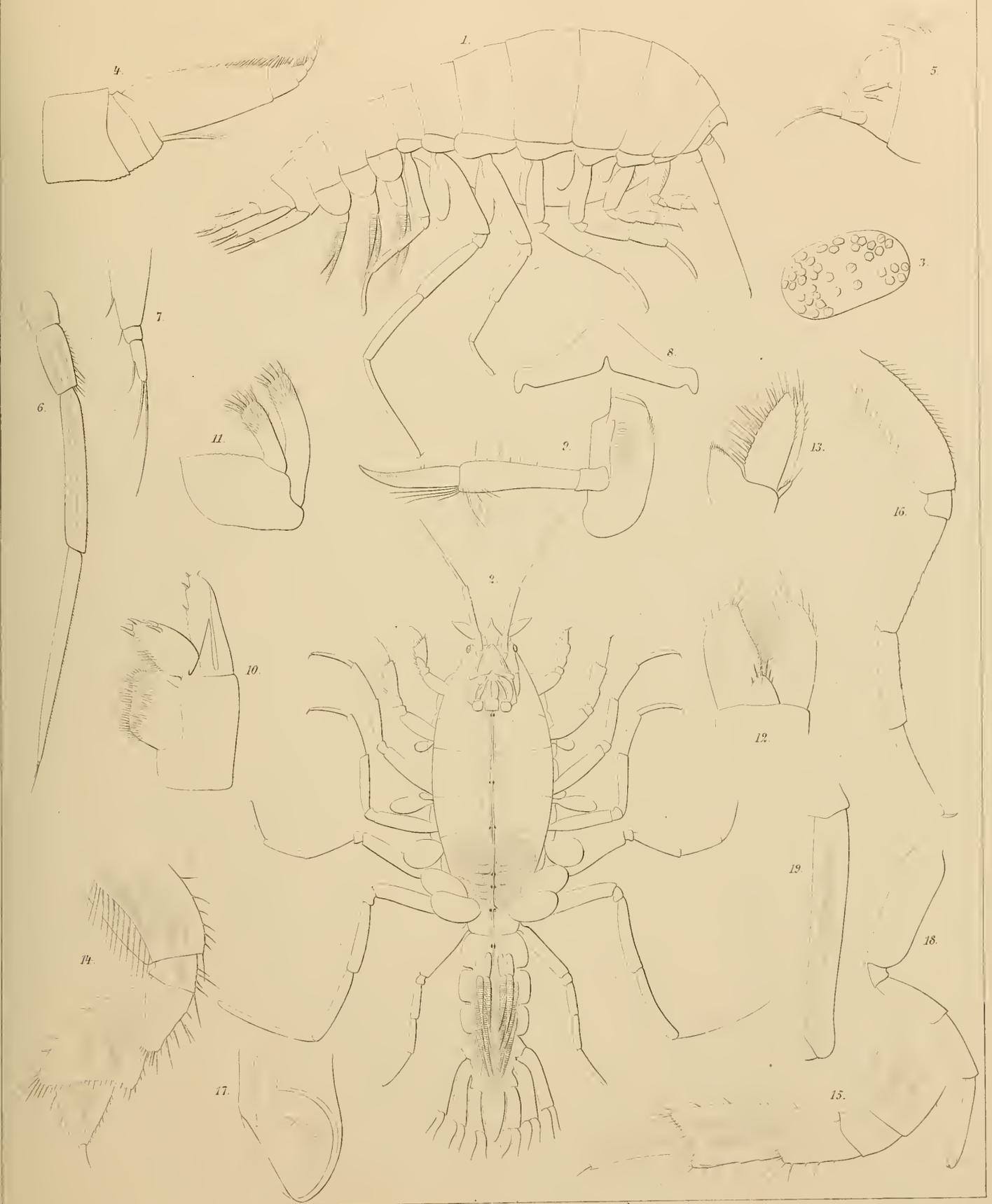
LANCEOLA SAYANA.

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PLATE IV.

LANCEOLA SAYANA. ♀

- Fig. 1. The animal from the side ( $\frac{3}{1}$ ).  
» 2. » » » below ( $\frac{3}{1}$ ).  
» 3. The eye ( $\frac{60}{1}$ ).  
» 4. The first pair of antennæ ( $\frac{25}{1}$ ).  
» 5. The last joints of the same ( $\frac{60}{1}$ ).  
» 6. The second pair of antennæ ( $\frac{10}{1}$ ).  
» 7. The last joints of the same ( $\frac{30}{1}$ ).  
» 8. The labrum ( $\frac{20}{1}$ ).  
» 9. The right mandible ( $\frac{20}{1}$ ).  
» 10. The left maxilla of the first pair ( $\frac{20}{1}$ ).  
» 11. » » » » second pair ( $\frac{20}{1}$ ).  
» 12. The maxillipeds from the inside ( $\frac{18}{1}$ ).  
» 13. » » » » side ( $\frac{15}{1}$ ).  
» 14. The first pair of pereopoda ( $\frac{15}{1}$ ).  
» 15. » second » » ( $\frac{15}{1}$ ).  
» 16. » third » » ( $\frac{8}{1}$ ).  
» 17. The dactylus of the sixth pair ( $\frac{50}{1}$ ).  
» 18. The seventh pair ( $\frac{8}{1}$ ).  
» 19. The last joints of the same ( $\frac{25}{1}$ ).



A. M. Westergren del.

Amphipoda

Lith. W. Schlichter, Stockholm.

Fig 1-19. *Amphipoda* Sayana ♀.



PLATE V.

LANCEOLA SAYANA, L. SERRATA, L. FELINA AND L. LOVÉNI.

PLATE V.

LANCEOLA SAYANA. ♀

Fig. 1. The urus ( $\frac{9}{1}$ ).

LANCEOLA SERRATA. ♀

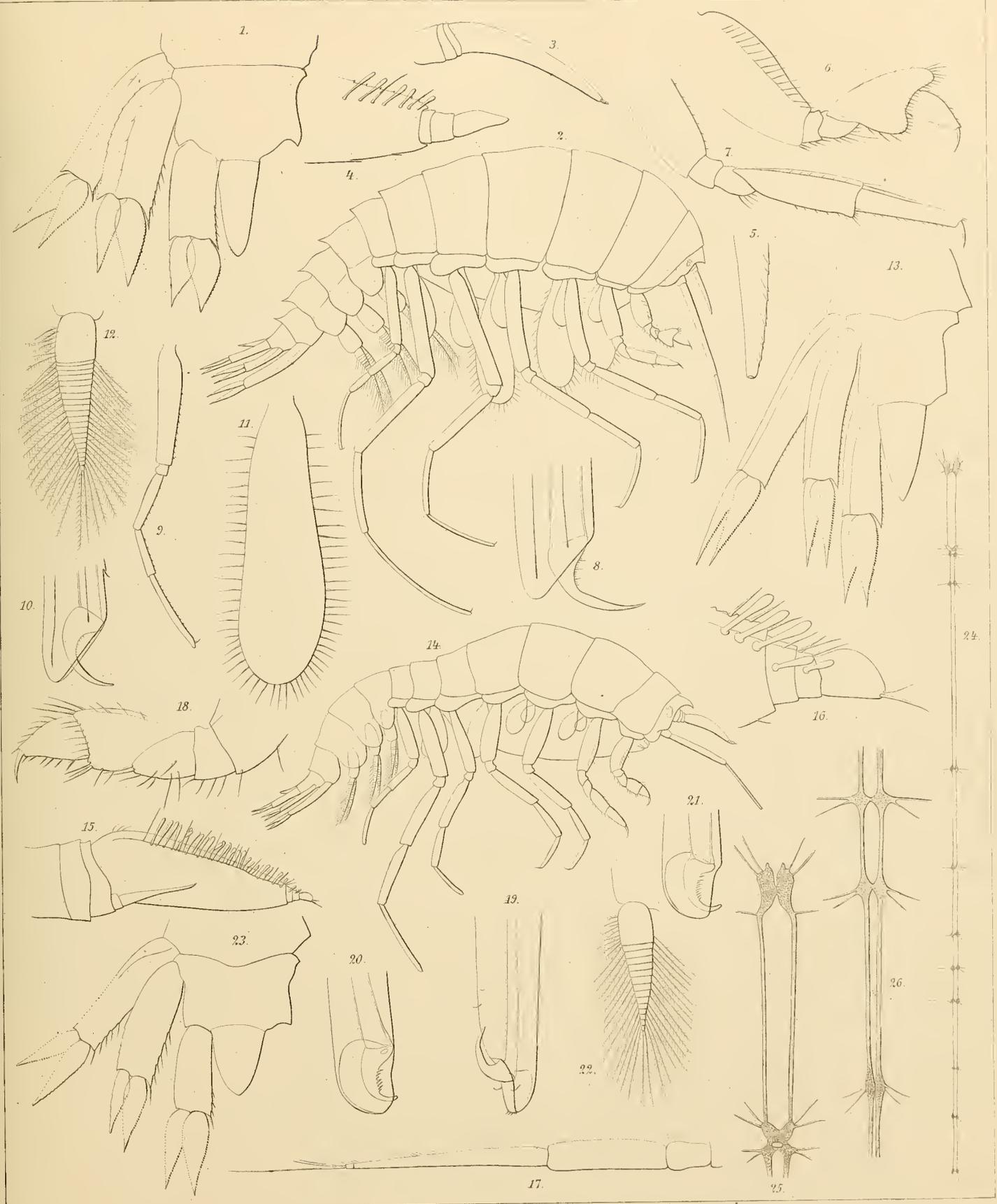
- » 2. The animal from the side ( $\frac{3}{1}$ ).
- » 3. The first pair of antennæ ( $\frac{12}{1}$ ).
- » 4. The last joints of the same ( $\frac{100}{1}$ ).
- » 5. The end of the second pair of antennæ ( $\frac{60}{1}$ ).
- » 6. The first pair of pereiopoda ( $\frac{14}{1}$ ).
- » 7. » second » » » ( $\frac{14}{1}$ ).
- » 8. The dactylus of the sixth pair ( $\frac{45}{1}$ ).
- » 9. The seventh pair of pereiopoda ( $\frac{5}{1}$ ).
- » 10. The dactylus of the same ( $\frac{45}{1}$ ).
- » 11. The ovitrix of the sixth pair of pereiopoda ( $\frac{6}{1}$ ).
- » 12. The first pair of pleopoda ( $\frac{14}{1}$ ).
- » 13. The urus ( $\frac{9}{1}$ ).

LANCEOLA FELINA. ♂

- » 14. The animal from the side ( $\frac{9}{1}$ ).
- » 15. The first pair of antennæ ( $\frac{36}{1}$ ).
- » 16. The last joints of the same ( $\frac{140}{1}$ ).
- » 17. The second pair of antennæ ( $\frac{24}{1}$ ).
- » 18. The first pair of pereiopoda ( $\frac{45}{1}$ ).
- » 19. The dactylus of the fifth pair ( $\frac{120}{1}$ ).
- » 20. » » » sixth » ( $\frac{120}{1}$ ).
- » 21. » » » seventh » ( $\frac{120}{1}$ ).
- » 22. The first pair of pleopoda ( $\frac{40}{1}$ ).
- » 23. The urus ( $\frac{30}{1}$ ).

LANCEOLA LOVÉNI. ♂

- » 24. The ganglionic chain ( $\frac{5}{1}$ ).
  - » 25. The cephalic ganglion ( $\frac{16}{1}$ ).
  - » 26. The ural ganglia ( $\frac{16}{1}$ ).
-



A. M. Westergren del.

Auctor direxit.

Lith. W. Schlachter. St. Koen.

Fig 1 *Lanceola Sayana* ♀. 2-13 *Lanceola serrata* ♀. 14-23 *Lanceola felina* ♀. 24-26 *Lanceola Loveni* ♂.



PLATE VI.

LANCEOLA LOVÉNI AND L. CLAUSI.

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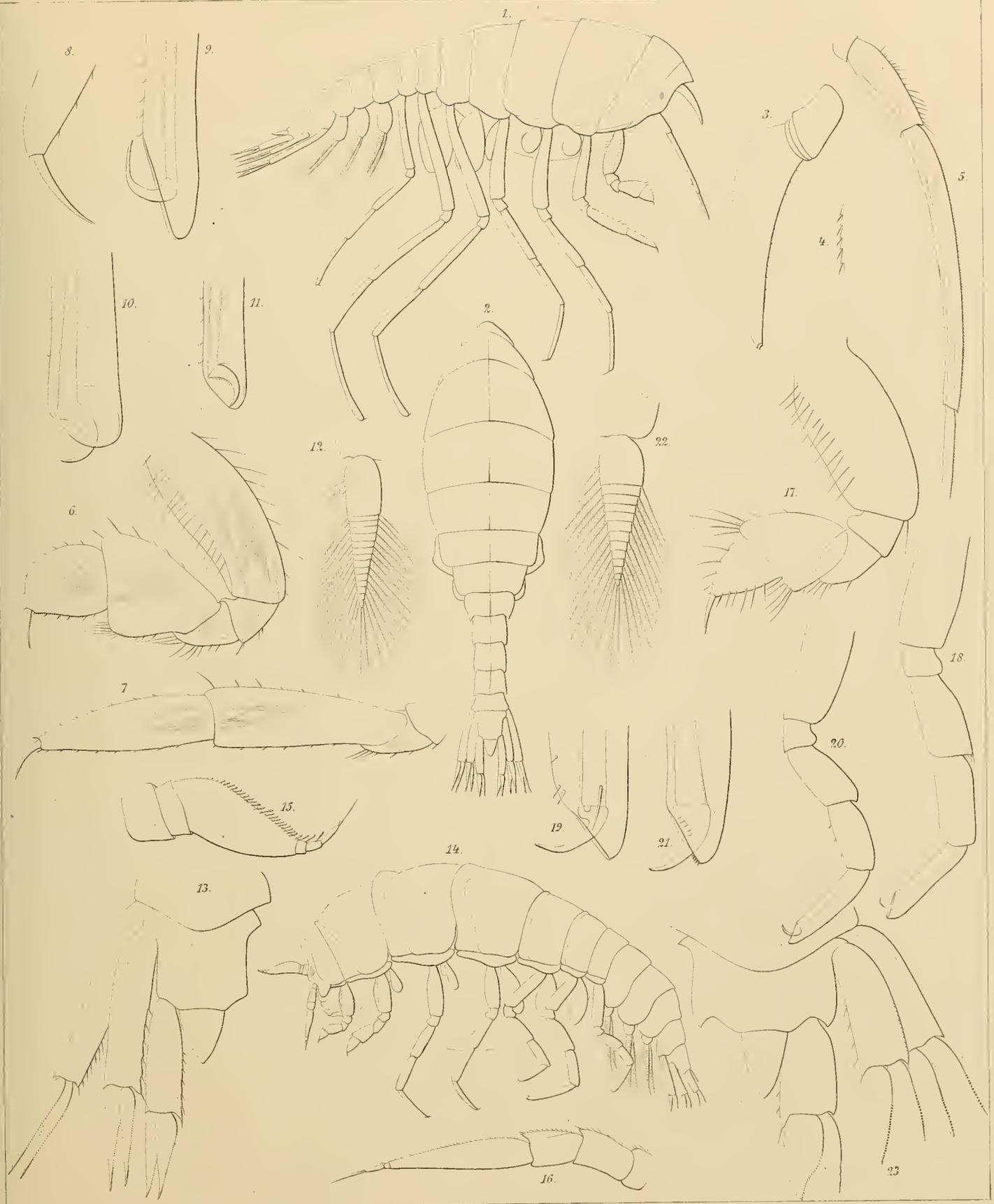
PLATE VI.

LANCEOLA LOVÉNI. ♂

- Fig. 1. The animal from the side ( $\frac{4}{1}$ ).  
» 2. » » » » above ( $\frac{4}{1}$ ).  
» 3. The first pair of antennæ ( $\frac{20}{1}$ ).  
» 4. A piece of the under margin of the same ( $\frac{80}{1}$ ).  
» 5. The second pair of antennæ ( $\frac{16}{1}$ ).  
» 6. The first pair of pereopoda ( $\frac{18}{1}$ ).  
» 7. » second » » » ( $\frac{18}{1}$ ).  
» 8. The dactylus of the third pair of pereopoda ( $\frac{45}{1}$ ).  
» 9. » » » » fifth » » » ( $\frac{45}{1}$ ).  
» 10. » » » » sixth » » » ( $\frac{45}{1}$ ).  
» 11. » » » » seventh » » » ( $\frac{45}{1}$ ).  
» 12. The first pair of pleopoda ( $\frac{16}{1}$ ).  
» 13. The urus ( $\frac{12}{1}$ ).

LANCEOLA CLAUSI. ♀

- » 14. The animal from the side ( $\frac{5}{1}$ ).  
» 15. The first pair of antennæ ( $\frac{20}{1}$ ).  
» 16. The second » » » ( $\frac{18}{1}$ ).  
» 17. The first pair of pereopoda ( $\frac{20}{1}$ ).  
» 18. » fifth » » » ( $\frac{15}{1}$ ).  
» 19. The dactylus of the same ( $\frac{45}{1}$ ).  
» 20. The seventh pair of pereopoda ( $\frac{15}{1}$ ).  
» 21. The dactylus of the same ( $\frac{45}{1}$ ).  
» 22. The first pair of pleopoda ( $\frac{20}{1}$ ).  
» 23. The urus ( $\frac{14}{1}$ ).



A. M. Westergrén del.

Auctor direct.

Imp. W. Schlachter, Stockholm

Fig 1-13 *Lanceola Lovéni* ♂. 14-23 *Lanceola Clausi* ♀



PLATE VII.

VIBILIA JEANGERARDI AND V. ROBUSTA.

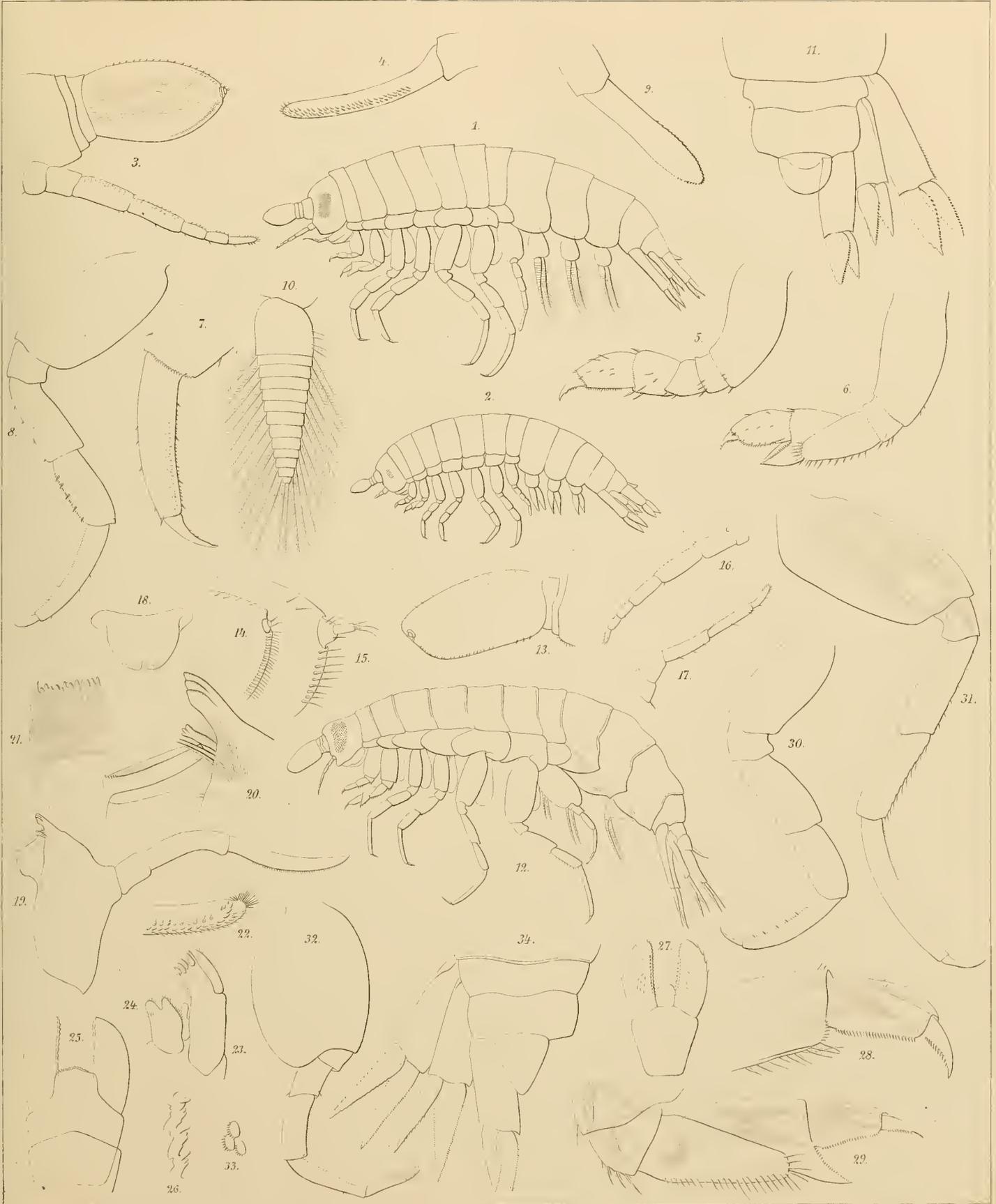
## PLATE VII.

### VIBILIA JEANGERARDI.

- Fig. 1. The adult animal (♀) from the side ( $\frac{8}{1}$ ).  
» 2. » young » » » ( $\frac{10}{1}$ ).  
» 3. The antennæ ( $\frac{32}{1}$ ).  
» 4. The last joints of the mandibular palp ( $\frac{180}{1}$ ).  
» 5. The first pair of pereopoda ( $\frac{24}{1}$ ).  
» 6. » second » » » ( $\frac{24}{1}$ ).  
» 7. The last joints of the third pair of pereopoda ( $\frac{40}{1}$ ).  
» 8. The fifth pair of pereopoda ( $\frac{24}{1}$ ).  
» 9. The dactylus of the seventh pair ( $\frac{50}{1}$ ).  
» 10. The first pair of pleopoda ( $\frac{40}{1}$ ).  
» 11. The urus ( $\frac{22}{1}$ ).

### VIBILIA ROBUSTA.

- » 12. The adult animal from the side ( $\frac{5}{1}$ ).  
» 13. The first pair of antennæ, ♂, ( $\frac{20}{1}$ ).  
» 14. » » » » » ♀ ( $\frac{40}{1}$ ).  
» 15. » » » » » young male ( $\frac{70}{1}$ ).  
» 16. » second » » » adult male ( $\frac{25}{1}$ ).  
» 17. » » » » » young male ( $\frac{35}{1}$ ).  
» 18. The labrum ( $\frac{60}{1}$ ).  
» 19. The left mandible ( $\frac{60}{1}$ ).  
» 20. The tip of the same ( $\frac{180}{1}$ ).  
» 21. A part of the grinding surface of the same ( $\frac{1500}{1}$ ).  
» 22. The end of the mandibular palp ( $\frac{150}{1}$ ).  
» 23. The first pair of maxillæ ( $\frac{60}{1}$ ).  
» 24. » second » » » ( $\frac{60}{1}$ ).  
» 25. The maxillipeds, adult male, ( $\frac{60}{1}$ ).  
» 26. A piece of the inner margin of the laminæ of the same ( $\frac{350}{1}$ ).  
» 27. The maxillipeds, young male ( $\frac{130}{1}$ ).  
» 28. The last joints of the first pair of pereopoda ( $\frac{50}{1}$ ).  
» 29. » » » » second » » » ( $\frac{28}{1}$ ).  
» 30. The third pair of pereopoda ( $\frac{15}{1}$ ).  
» 31. » sixth » » » ( $\frac{15}{1}$ ).  
» 32. » seventh » » » ( $\frac{15}{1}$ ).  
» 33. Spiniferous scales from the dactylus of the same ( $\frac{1000}{1}$ ).  
» 34. The urus ( $\frac{14}{1}$ ).



A. M. Westergaard del.

Auctor direxit.

Lith. W. Schlachter Stockholm.

Fig. 1-11 *Vibilia Jeangerardi*. 12-34 *Vibilia robusta*.



PLATE VIII.

VIBILIA MACROPIS, V. GIBBOSA, V. KROEYERI AND V. LONGIPES.

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PLATE VIII.

VIBILIA MACROPIS.

- Fig. 1. The head and the first segments of the animal ( $24/1$ ).  
» 2. The first pair of antennæ ( $72/1$ ).  
» 3. The second pair of pereopoda ( $60/1$ ).  
» 4. » fourth » » » ( $50/1$ ).  
» 5. The dactylus of the same ( $200/1$ ).  
» 6. The sixth pair of pereopoda ( $50/1$ ).  
» 7. The first pair of pleopoda ( $130/1$ ).  
» 8. The urus ( $50/1$ ).

VIBILIA GIBBOSA.

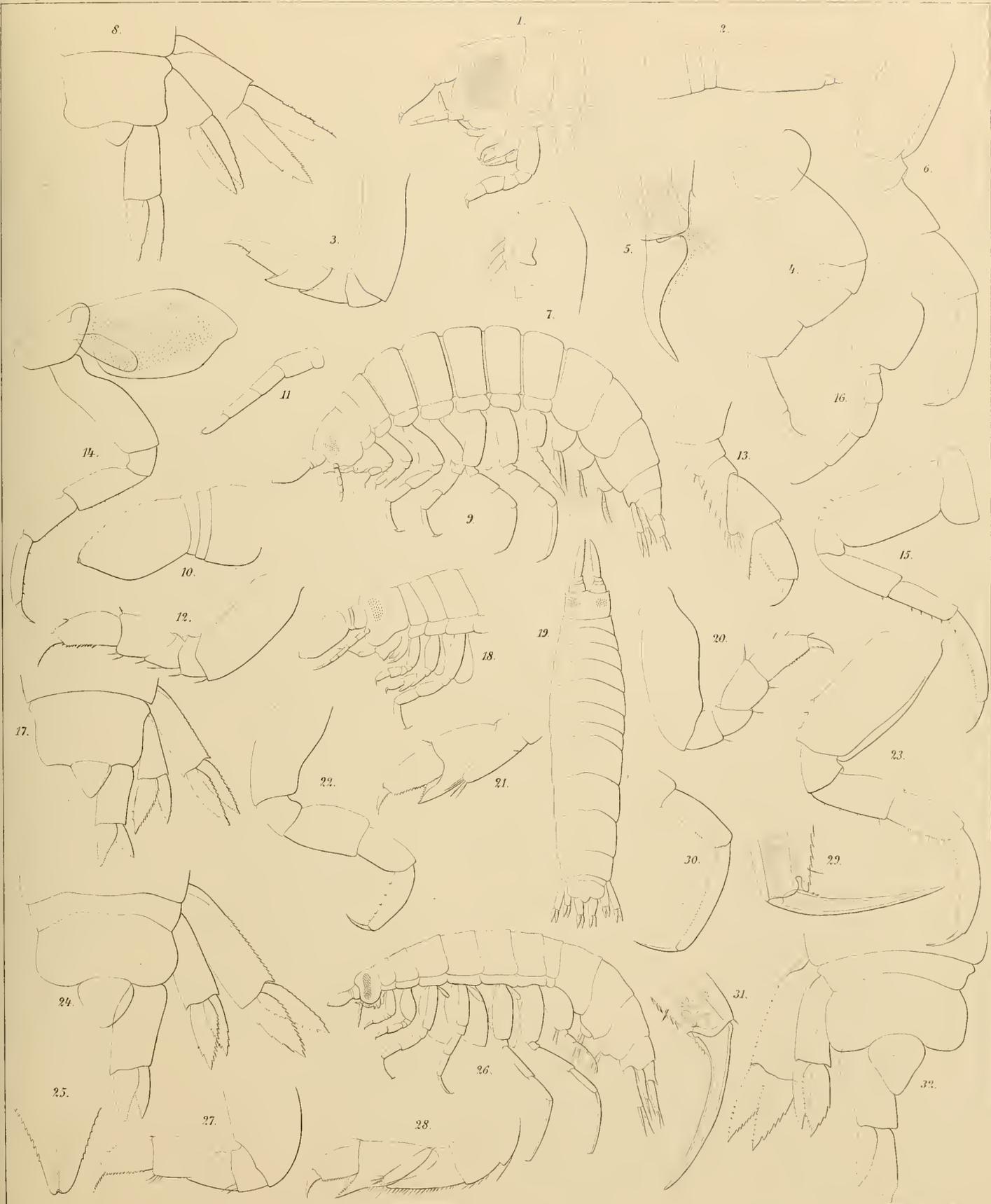
- » 9. The animal from the side ( $16/1$ ).  
» 10. The first pair of antennæ ( $50/1$ ).  
» 11. » second » » » ( $65/1$ ).  
» 12. The first pair of pereopoda ( $85/1$ ).  
» 13. » second » » » ( $80/1$ ).  
» 14. » fourth » » » ( $35/1$ ).  
» 15. » sixth » » » ( $35/1$ ).  
» 16. » seventh » » » ( $35/1$ ).  
» 17. The urus ( $50/1$ ).

VIBILIA KROEYERI.

- » 18. The head and the first segments of the animal ( $6/1$ ).  
» 19. The animal from above ( $6/1$ ).  
» 20. The first pair of pereopoda ( $28/1$ ).  
» 21. » second » » » ( $28/1$ ).  
» 22. » third » » » ( $16/1$ ).  
» 23. » sixth » » » ( $16/1$ ).  
» 24. The urus ( $25/1$ ).  
» 25. The end of the interior ramus of the third pair of uropoda ( $90/1$ ).

VIBILIA LONGIPES.

- » 26. The animal from the side ( $8/1$ ).  
» 27. The first pair of pereopoda ( $50/1$ ).  
» 28. » second » » » ( $50/1$ ).  
» 29. The dactylus of the third pair of pereopoda ( $120/1$ ).  
» 30. The last joints of the fourth » » » ( $35/1$ ).  
» 31. The dactylus of the sixth » » » ( $120/1$ ).  
» 32. The urus ( $30/1$ ).
-



A.M. Westergren del.

Auctor. Sibirici.

Lith. W. Jellacher, Stockholm.

Fig. 1-8 *Vibilia macropis*. 9-17 *Vibilia gibbosa*. 18-25 *Vibilia eroeyeri*. 26-32 *Vibilia lempes*.



PLATE IX.

VIBILIA VIATRIX AND V. GRACILIS.

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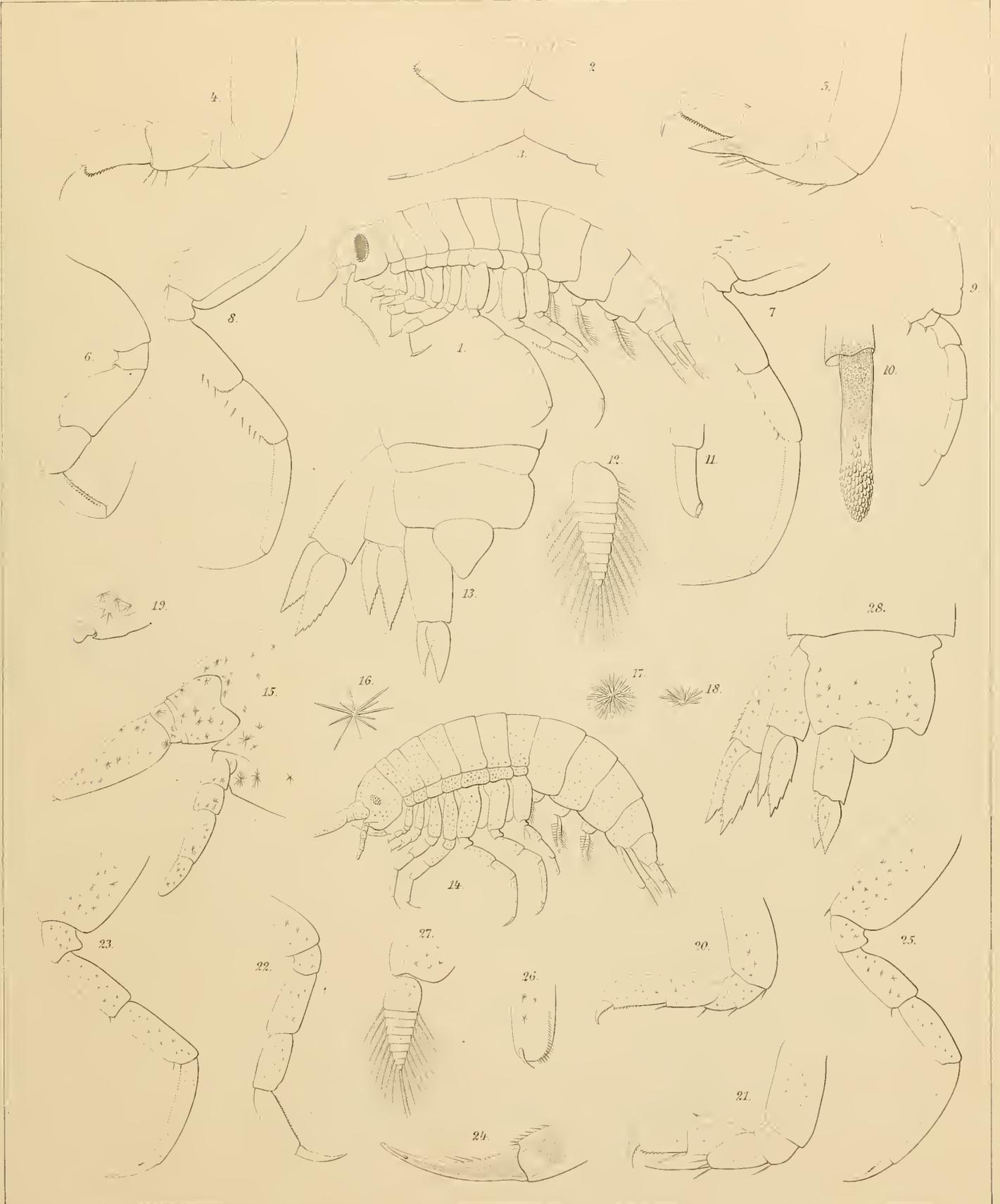
## PLATE IX.

### VIBILIA VIATRIX.

- Fig. 1. The animal from the side ( $6_1$ ).  
» 2. The first pair of antennæ ( $16_1$ ).  
» 3. » second » » ( $12_1$ ).  
» 4. The first pair of pereopoda ( $32_1$ ).  
» 5. » second » » ( $32_1$ ).  
» 6. » third » » ( $18_1$ ).  
» 7. » fifth » » ( $16_1$ ).  
» 8. » sixth » » ( $16_1$ ).  
» 9. » seventh » » ( $18_1$ ).  
» 10. The dactylus of the same, adult animal ( $80_1$ ).  
» 11. » » » » young » ( $120_1$ ).  
» 12. The first pair of pleopoda ( $25_1$ ).  
» 13. The urus ( $22_1$ ).

### VIBILIA GRACILIS.

- » 14. The animal from the side ( $10_1$ ).  
» 15. The antennæ ( $30_1$ ).  
» 16–18. Star-shaped concretions in the integument ( $220_1$ ).  
» 19. The end of the first pair of antennæ ( $100_1$ ).  
» 20. The first pair of pereopoda ( $50_1$ ).  
» 21. » second » » ( $50_1$ ).  
» 22. » third » » ( $30_1$ ).  
» 23. » fifth » » ( $30_1$ ).  
» 24. The dactylus of the same ( $15_1$ ).  
» 25. The sixth pair of pereopoda ( $30_1$ ).  
» 26. » seventh » » ( $150_1$ ).  
» 27. » first » » pleopoda ( $30_1$ ).  
» 28. The urus ( $35_1$ ).



A. M. Westergaard del.

Auctor auct.

Lith. W. Ståhlcker Stockholms.

Fig 1-13 *Vibilia viatrix*. 14-28 *Vibilia gracilis*.



PLATE X.

VIBILIA GRACILENTA, V. ARMATA AND V. PYRIPES.

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## PLATE X.

### VIBILIA GRACILENTA.

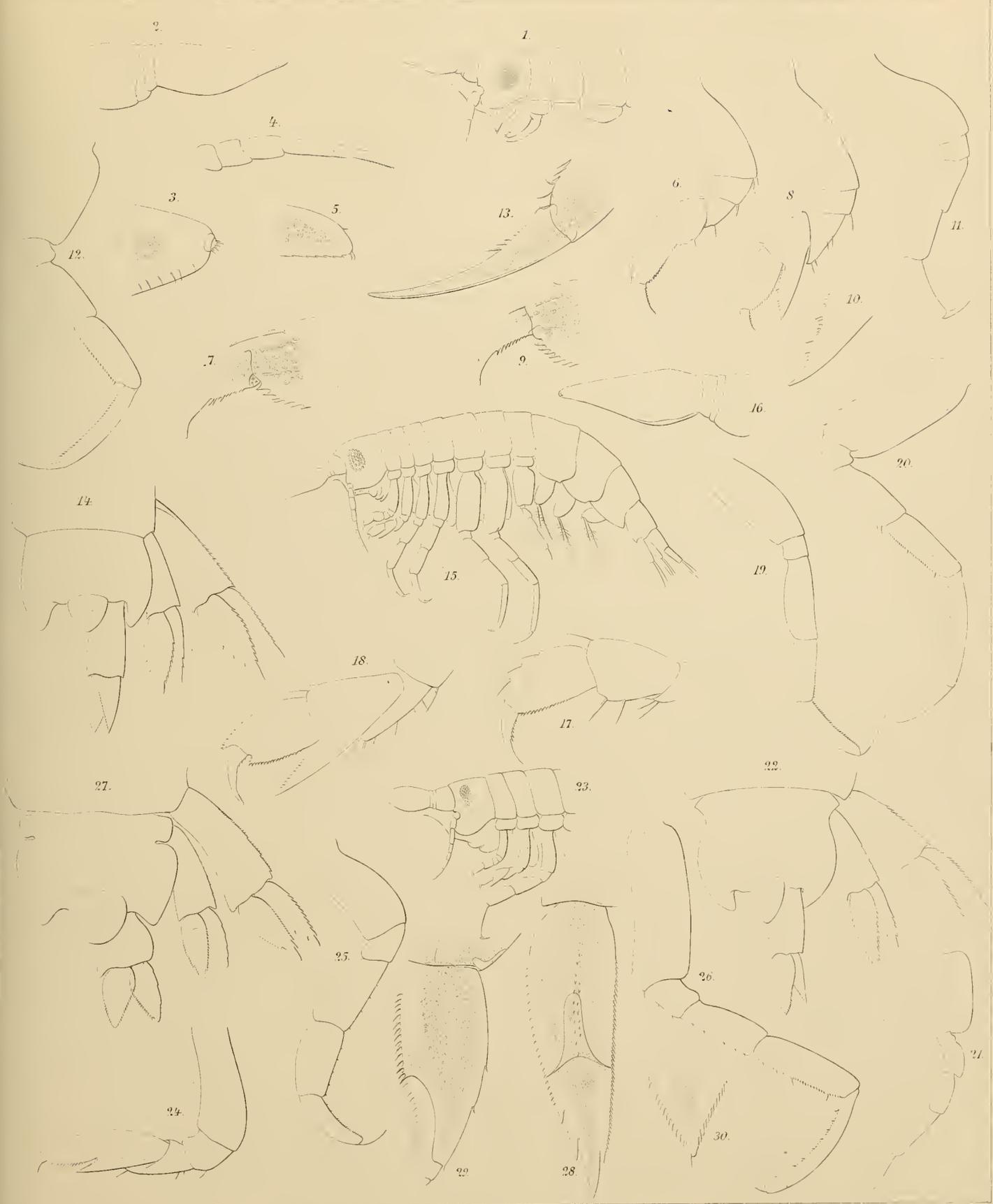
- Fig. 1. The head of the animal ( $\frac{20}{1}$ ).  
» 2. The first pair of antennæ ( $\frac{50}{1}$ ).  
» 3. The end of the same ( $\frac{150}{1}$ ).  
» 4. The second pair of antennæ ( $\frac{50}{1}$ ).  
» 5. The end of the same ( $\frac{250}{1}$ ).  
» 6. The first pair of pereopoda ( $\frac{50}{1}$ ).  
» 7. The dactylus of the same ( $\frac{125}{1}$ ).  
» 8. The second pair of pereopoda ( $\frac{50}{1}$ ).  
» 9. The dactylus of the same ( $\frac{125}{1}$ ).  
» 10. The carpal process of the same ( $\frac{125}{1}$ ).  
» 11. The fourth pair of pereopoda ( $\frac{40}{1}$ ).  
» 12. » fifth » » » ( $\frac{40}{1}$ ).  
» 13. The dactylus of the same ( $\frac{160}{1}$ ).  
» 14. The urus ( $\frac{45}{1}$ ).

### VIBILIA ARMATA.

- » 15. The animal from the side ( $\frac{12}{1}$ ).  
» 16. The first pair of antennæ ( $\frac{36}{1}$ ).  
» 17. The last joints of the first pair of pereopoda ( $\frac{75}{1}$ ).  
» 18. » » » » second » » » ( $\frac{75}{1}$ ).  
» 19. The third pair of pereopoda ( $\frac{32}{1}$ ).  
» 20. » sixth » » » ( $\frac{32}{1}$ ).  
» 21. » seventh » » » ( $\frac{36}{1}$ ).  
» 22. The urus ( $\frac{40}{1}$ ).

### VIBILIA PYRIPES.

- » 23. The head and the first pereionial segments ( $\frac{12}{1}$ ).  
» 24. The second pair of pereopoda ( $\frac{40}{1}$ ).  
» 25. » fourth » » » ( $\frac{36}{1}$ ).  
» 26. » sixth » » » ( $\frac{36}{1}$ ).  
» 27. The urus ( $\frac{50}{1}$ ).  
» 28. The interior ramus of the first pair of uropoda ( $\frac{180}{1}$ ).  
» 29. » exterior » » » third » » » ( $\frac{180}{1}$ ).  
» 30. » interior » » » » » » » ( $\frac{180}{1}$ ).



A. M. Westergren del.

Amph. direct

Lit. W. Nilsson

Fig. 1-14 *Vibilia gracilentata*. 15-22 *Vibilia armata*. 23-30 *Vibilia pygmaea*











CONTRIBUTIONS TO A MONOGRAPH  
OF THE  
**AMPHIPODA HYPERIIDEA**

BY

CARL BOVALLIUS.

**PART I: 2.**

THE FAMILIES CYLLOPODIDÆ, PARAPHRONIMIDÆ, THAUMATOPSIDÆ, MIMONECTIDÆ,  
HYPERIIDÆ, PHRONIMIDÆ AND ANCHYLOMERIDÆ.

WITH EIGHTEEN PLATES.

COMMUNICATED TO THE ROYAL SWEDISH ACADEMY OF SCIENCES JUNE 8. 1887.

---

STOCKHOLM, 1889.

KONGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER.

SMITHSONIAN INSTITUTION

1884



595.307  
B 737  
Mon 2.53

The fourth family **CYLOPODIDÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* magnum, fere sphæricum. *Oculi* magni, totum caput occupantes. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, flagello tumido instructæ; articulus primus flagelli permagnus, articuli sequentes minutissimi, perpauci, terminales. *Antennæ* secundi paris filiformes, angulatæ, parti inferiori capitis affixæ. *Instrumenta oris* masticatoria; mandibulæ palpo instructæ. *Pedes pereii* ambulatorii; pedes septimi paris transformati. *Pedes* uri ramis instructi.

The *head* is large, almost globular. The *eyes* are large, occupying the whole head. The first pair of *antennæ* are straight, fixed at the anterior side of the head, provided with a tumid flagellum; the first joint of the flagellum is very large, the following very minute and few in number, terminal. The second pair are filiform, angulated, fixed at the inferior side of the head. The *mouth-organs* are adapted for mastication; the mandibles are provided with a palp. The *pereiopoda* are walking legs; the seventh pair are transformed. The *uropoda* are provided with rami.

**Syn. 1887.** *Cylopodidæ*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 11.

Among all the Hyperidean families drawn up in this treatise the *Vibilidæ* and the *Cylopodidæ* are the closest related to one another, at least according to my apprehension. They show such a similarity in habitual character that I should not hesitate to unite them in the same family as two sub-families, if it was not for keeping up the congruity of the system. Their points of difference are namely the two essential characteristics: the form of the head with the development of the eyes, and the situation of the second pair of antennæ. In all other respects the likeness between them is very striking. At first view the first pair of antennæ seem to have a neatly characteristic form but a closer examination shows that in the young animals, especially in the young females, the resemblance is very great to those organs in the *Vibilidæ*. Also the form of the first two pairs of pereiopoda is almost identical, and even the other pairs of pereiopoda show a great correspondance. The dactylus of the seventh pair is transformed exactly in the same manner as in the *Vibilidæ*.

The animals belonging to this family seem to have a southern distribution and their principal centre, according to the material I have examined and to the notices picked up in the literature, is the southern coasts of the American continent.

The old genus constituting the family is *Cyllopus*, DANA; probably the animal described by STREETS (see below) under the name *Hyperia tricuspidata* belongs to this family; I have proposed for it the generic name *Cyllias*; but I am not fully sure that I am right in placing it here as I have not examined the animal myself.

- A. The carpus of the first pair of pereiopoda is not broader than that of the second pair, which is produced into a process..... 1. *Cyllopus*.  
 B. The carpus of the first pair of pereiopoda is much broader than that of the second pair, which is not produced into a process..... 2. *Cyllias*.

### Genus 1. **CYLLOPUS**, DANA, 1852.

**Diagn.** *Caput* globosum, tumidum. *Oculi* grandes, totum fere caput occupantes. *Pedes pereii* primi paris carpo non dilatato: pedes secundi paris subcheliformes, carpo plus minusve producto. Femur pedum septimi paris maximum, articulis sequentibus longius. *Telson* parvum, semicirculatum.

The *head* is globular, tumid. The *eyes* are large, occupying almost the whole head. The first pair of *pereiopoda* with the carpus not dilated; the second pair are subcheliform, with the carpus more or less produced. The femur of the seventh pair is very large, longer than the following joints together. The *telson* is small, semicircular.

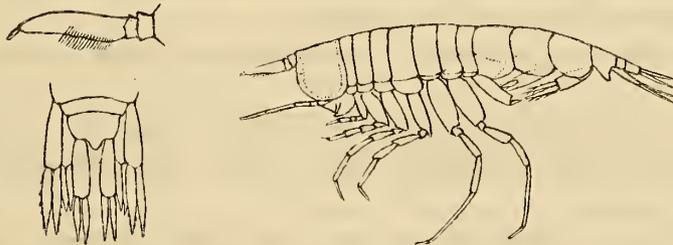
**Syn. 1852.** *Cyllopus*, DANA. — United States Exploring Expedition. Crustacea. Vol. 2, p. 989.  
 » » SPENCE BATE, 1862. Catal. Amph. Crust. Brit. Museum, p. 305.  
 » » C. BOVALLIUS, 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 555.

The genus *Cyllopus* was founded in 1852 by DANA for an antarctic Hyperid, taken during the United States' exploring expedition 1838—42, under the command of Captain WILKES. It was one of the many precious additions to the knowledge of the pelagic fauna given by this memorable expedition. The species *Cyllopus magellanicus* was not recognized by the next investigator on the same subject SPENCE BATE, who applied the name on a specifically different animal viz. *Cyllopus Batei* (see below); at the same time he proposed two new species viz. *Cyllopus Danae* and *Cyllopus Lucasii*, of which the first one possibly is only an elder form of *Cyllopus magellanicus*, DANA, but the second, *Cyllopus Lucasii* seems to be a well characterized species. The genus had got no more additions to the number of its species before I made my revision of the tribe. Presently the species are seven in number, the just published new species of STEBBING being added.

- A. The carpus of the first pair of pereiopoda is not produced.  
 a 1. The epimerals of the first four pereional segments are much deeper than the following..... 1. *C. magellanicus*.  
 a 2. The epimerals of the first four pereional segments are not deeper than the following.  
 aa 1. The metacarpi of the first and second pairs of pereiopoda are scarcely serrated.

- aaa 1. The metacarpus of the fifth and sixth pairs of pereopoda are more than twice longer than the carpi..... 2. *C. Danae*.
- aaa 2. The metacarpus of the fifth and sixth pairs of pereopoda are only a little longer than the carpi..... 3. *C. levis*.
- aa 2. The metacarpus of the first and second pairs of pereopoda are serrated.
- aaa 3. The peduncle of the last pair of uropoda is not twice as long as the rami ..... 7. *C. hookeri*.
- aaa 4. The peduncle of the last pair of uropoda is twice longer than the rami ..... 4. *C. armatus*.
- aaa 5. The peduncle of the last pair of uropoda is four times longer than the rami..... 5. *C. Batei*.
- B. The carpus of the first pair of pereopoda is produced into a process..... 6. *C. Lucasii*.

## 1. CYLLOPUS MAGELLANICUS, DANA, 1852.



*Cyllopus magellanicus*, DANA.

Facsimile from DANA, U. S. Expl. Exp. Crust. II, pl. 68, fig. 1.

**Diagn.** *Caput* subrotundatum, non productum, segmenta tria prima pereii longitudine æquans. *Antennæ* primi paris æquiter latitudine deerescentes, acuminatæ. Segmentum primum *pereii* brevissimum, segmentum quartum et quintum longissima. Epimera quattuor prima sequentibus multo altiora. Carpus primi paris *pedum pereii* non productus, longitudine metacarpum æquans. Carpus *pedum* secundi paris paullo productus, metacarpo multo brevoir. Metacarpus *pedum* quinti ac sexti paris carpi fere duplo longiores. *Pedes* septimi paris femore *pedum* sexti paris longiores; femur post non excavatum articulis sequentibus ter longius. *Latera* segmentorum *plei* rotundata, serrulata. Segmentum secundum ac tertium *uri* libera, non coalita. *Pedunculus pedum uri* primi paris ramis fere brevior, *pedunculus pedum* secundi paris ramos longitudine æquans, *pedunculus pedum* tertii paris ramis paullo longior. *Telson* quartam partem longitudinis *pedunculi pedum uri* ultimi paris æquans.

The head is nearly round, not produced, as long as the first three pereional segments. The first pair of antennæ are sharp-pointed, evenly tapering toward the end. The first pereional segment is the shortest, the fourth and fifth the longest. The first four pairs of epimerals are much deeper than the following. The carpus of the first pair of pereopoda is not produced, as long as the metacarpus; the carpus of the second pair is a little produced, much shorter than the metacarpus. The metacarpus of the fifth and sixth pairs are almost twice as long as the corresponding carpi. The seventh pair are longer than the femur of the sixth pair; the femur of the seventh pair is three times longer than the following joints

together; the hinder margin not excavated. The lateral parts of the *pleonal* segments are rounded, serrated. The second and third *ural* segments are free, not coalesced. The peduncle of the first pair of *uropoda* is rather shorter than the rami, the peduncle of second pair is as long as the rami; that of the third pair is a little longer than the rami. The *telson* is as long as a fourth of the length of the peduncle of the last pair of *uropoda*.

**Colour.** Nearly colourless, a little red in the posterior segments, and in the *uropoda*.

**Length.** 13 mm.

**Hab.** »Orange Bay, Tierra del Fuego, on the *Fucus*» (DANA.)

**Syn. 1852.** *Cylopus magellanicus*, DANA.

United States Exploring Expedition. Crustacea. Vol. 2, p. 990. Pl. 68, fig. 1.

» » » C. BOVALLIUS, 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 555.

The unequal size and depth of the epimerals is a good characteristic of this species; another characteristic is the great length of the rami of the last pair of *uropoda*.

From the description of DANA I transcribe further:

The *head* is almost filled with the pigment.

The pigment of the *eyes* is black in the mass, but when pressed out, a deep reddish purple.

The *first pair of antennæ* are a little shorter than the second pair; the first joint of the flagellum is long, acuminate, ciliate below, and following this there are two minute joints.

The *second pair* are seven-jointed, the articulation between the third and fourth joints is oblique; the fourth joint is longer than the third, the fifth is the longest, the sixth and seventh short and equal.

The *mandible* has a lateral process for manducation, which has a spinous surface; the palpus is slender three-jointed, the second joint the longest, the third a little shorter, the first quite short.

The *epimerals* of the fourth pair are the largest.

The *first two pairs of pereopoda* are terete (femur excepted), the carpus and metacarpus are subequal in the first pair, but in the second the metacarpus is much the longest. The dactylus is short, nearly straight.

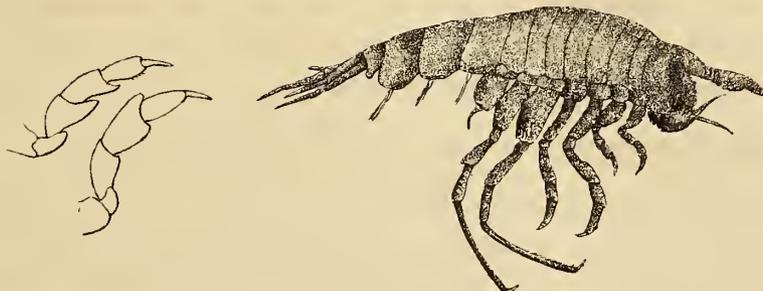
The *third and fourth pairs* are a little stouter than the following pairs, the femur broad laminar.

The *fifth and sixth pairs* are long and slender. Femur oblong, finely serrulate along the anterior margin, the metacarpus is delicately serrulate along the anterior margin. The dactylus equals a third of the length of the metacarpus.

The third *ural* segment is almost twice as long as the second.

The peduncle of the second pair of *uropoda* reaches almost as far as that of the first pair. The rami of all the three pairs are lanceolate, sharp-pointed, sparingly serrated. Those of the last pair are only a little shorter than the peduncle (6:7).

## 2. CYLLOPUS DANÆ, SPENCE BATE, 1862.

*Cyllopus Danæ*, SPENCE BATE.

Facsimile from SP. BATE, Catal. Amph. Crust. Brit. Museum, pl. 50, fig. 3.

**Diagn.** *Caput* paullo productum, segmentis tribus primis pereii paullo brevius. *Antennæ* primi paris crassæ, non acuminatæ. Segmentum primum *pereii* brevissimum, cetera subæqualia. Epimera quattuor prima sequentibus haud altiora. Carpus primi paris *pedum pereii* non productus, longitudine metacarpum æquans; metacarpus et dactylus non serrati. Carpus pedum secundi paris productus, minute serratus, metacarpum longitudine æquans. Metacarpi pedum quinti ac sexti parium carpi plus quam duplo longiores. Pedes septimi paris femore pedum sexti paris longiores; femur, post non excavatum, articulis sequentibus paullo longius. Latera segmentorum *plei* leviter rotundata. Segmentum secundum ac tertium *uri* coalita (?). *Pedes uri* imperfecte serrati, pedunculi ramis longiores. *Telson* dimidium pedunculi pedum uri ultimi paris æquans.

The *head* is a little produced anteriorly, somewhat shorter than the first three pereional segments. The first pair of *antennæ* are thick, obtuse. The first *pereional* segment is the shortest, the following subequal. The first four pairs of epimerals are scarcely deeper than the following. The carpus of the first pair of *pereiopoda* is not produced, as long as the metacarpus; the metacarpus and dactylus are smooth. The carpus of the second pair is produced, minutely serrated, as long as the metacarpus. The metacarpi of the fifth and sixth pairs are more than twice longer than the carpi. The seventh pair are longer than the femur of the sixth pair; the femur of the seventh pair is not excavate at the posterior margin, it is a little longer than all the following joints together. The lateral parts of the *pleonal* segments are feebly rounded below. The second and third *ural* segments are coalesced (?). The *uropoda* are imperfectly serrated; the peduncles are longer than the rami. The *telson* is half as long as the peduncle of the last pair of uropoda.

**Colour.** ?

**Length.** 14 mm.

**Hab.** »Near the Powel Islands» (SPENCE BATE).

**Syn.** 1862. *Cyllopus Danæ*, SPENCE BATE. —

Catal. Amph. Crust. Brit. Museum, p. 308,  
pl. 50, fig. 3.

»    »    »    »    C. BOVALLIUS, 1887. »Arctic and Antarctic Hyperids»- Vega-  
Exp. Vetensk. Iakttagelser. Bd. 4,  
p. 556.

The description and drawings given by SPENCE BATE (l. c.) are too imperfect to allow of a certain judgement about the identity of the species. Possibly it may prove to be an elder male form of the original *Cylopus magellanicus*, DANA, but as far as the characteristics hitherto are known (from the description of SPENCE BATE) it differs from that species by the obtuse first pair of antennæ, the very long metacarpi of the fifth and sixth pairs of pereopoda, the comparatively short femur of the seventh pair, the long peduncles of the uropoda and by the larger telson.

From the original description the following points may be added.

The flagellum of the *first pair of antennæ* terminates in a minute articulus.

The *second pair of antennæ* terminate with one long and two short articuli.

The metacarpus of the *second pair of pereopoda* is minutely serrated along the posterior margin; the dactylus is scarcely serrated.

The *third and fourth pairs* are uniform having the carpus unarmed; the metacarpus slightly serrated upon the posterior margin toward the distal extremity.

### 3. CYLLOPUS LEVIS, C. BOVALLIUS, 1887.

Pl. I, fig. 36—41.

**Diagn.** *Caput* non productum, segmentis tribus primis pereii brevius. *Antennæ* primi paris abrupte angustatae, apice cylindrato. Segmentum septimum *pereii* brevissimum, cetera subæqualia. *Epimera* quattuor prima sequentibus non altiora. Carpus primi paris *pedum pereii* non productus, longitudine metacarpi æquans. Carpus *pedum* secundi paris paullo productus, metacarpo brevior. Metacarpi *pedum* quinti ac sexti parium carpi paullo longiores. *Pedes* septimi paris femore *pedum* sexti paris longiores; femur, post rectum, articulis sequentibus ter fere longius. *Latera* segmentorum duorum priorum *plei* post angulata, latera segmenti ultimi rotundata. Segmentum secundum ac tertium *uri* libera non coalita. *Pedunculus pedum uri* primi paris ramis paullo brevior; pedunculus *pedum* secundi paris ramis plus quam dimidio brevior, ramus interior ovatus; pedunculus *pedum* ultimi paris ramis duplo longior. *Telson* semicirculatum, segmento ultimo *uri* brevius, quintam partem longitudinis pedunculi *pedum uri* ultimi paris hæud æquans.

The *head* is not produced, shorter than the first three pereional segments. The first pair of *antennæ* with the flagellum suddenly narrowed, the terminal part cylindrical. The seventh *pereional* segment is the shortest, the preceding are subequal. The first four pairs of *epimerals* are not deeper than the following. The carpus of the first pair of *pereopoda* is not produced, as long as the metacarpus. The carpus of the second pair is a little produced, shorter than the metacarpus. The metacarpi of the fifth and sixth pairs are a little longer than the carpi. The seventh pair are longer than the femur of the sixth pair; the femur of the seventh pair is almost three times longer than all the following joints together, the posterior margin is straight. The lateral parts of the first two *pleonal* segments with the posterior corners rectangular, that of the third segment rounded. The second and third *ural* segments are free, not coalesced. The peduncle of the first pair

of *uropoda* is a little shorter than the rami; the peduncle of the second pair is much shorter than half the rami, the interior ramus is ovate; the peduncle of the last pair is twice as long as the rami. The *telson* is semicircular, shorter than the last ural segment, scarcely as long as a fifth of the length of the peduncle of the last pair of *uropoda*.

**Colour.** Light green.

**Length.** 9 mm.

**Hab.** South Pacific. Only one specimen is known, captured during the circumnavigation of H. Swed. M:ty's Frigate *Eugenie* 1851—1853. (S. M.).

**Syn.** 1887. *Cylopus levis*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Akad. Handl. Bd. 11. N:o 16, p. 12.

*Cylopus levis* is to be distinguished from the other species by the large femur of the seventh pair of pereiopoda, the rectangular hinder corners of the first two pleonal segments, and by the ovate interior ramus of the second pair of *uropoda*. Only the male is known.

The *head* is almost globular, only a little longer than the first two pereional segments (8:7).

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* (Pl. I, fig. 37) are scarcely longer than the head and the first pereional segment together. The first joint of the peduncle is longer than the two following. The first joint of the flagellum is thick and tumid at the base, suddenly narrowed a little before the middle; the terminal part is almost cylindrical, about as long as the basal tumid part of the joint together with the whole peduncle. No minute articuli are to be seen at the apex of the flagellar joint.

The *second pair of antennæ* are six-jointed, the fourth joint is the longest, narrow, linear, longer than the three preceding together, and equalling the length of the two last ones. The joints are all fringed with minute, equidistant hairs along the upper and the inferior margins.

The *first pair of pereiopoda* (Pl. I, fig. 38) are as long as the second pair. The femur is tolerably broad, the anterior margin curved, the posterior straight. The tibia is a little produced at the lower, posterior corner. The carpus and metacarpus are equal in length, both smooth. The dactylus is feebly serrated along the posterior margin, half as long as the metacarpus.

The *second pair* (Pl. I, fig. 39) have the femur narrower, almost linear. The carpus is produced at the lower posterior corner forming a short spoonshaped process, not serrated but fringed with long stiff hairs, and reaching to a third of the length of the metacarpus. The carpus is considerably shorter than the metacarpus. The metacarpus is smooth. The dactylus is finely serrated along the posterior margin, shorter than a third of the metacarpus.

The *third and fourth pairs* are equal in length; the metacarpus is not serrated, as long as the carpus.

The *fifth and sixth pairs* are subequal, the femur of the sixth pair being a little longer and broader than that of the fifth. The femur is ovate, scarcely as long as the two following joints together. The carpus is smooth; the anterior margin of the metacarpus is fringed with very short bristles; the metacarpus is a third longer than the carpus. The dactylus is very short.

The *seventh pair* (Pl. I, fig. 40) have the femur as long and broad as the femur of the preceding pair, a little broader above; the anterior margin is fringed with some few minute hairs, the posterior is straight, totally smooth; the femur is three times longer than the following joints together. The carpus and metacarpus are equal in length. The dactylus is a third shorter than the metacarpus.

The *pleon* is as long as the whole pereion. The second segment is the shortest; the first and third are equal in length.

The peduncles of the *pleopoda* are longer than the rami.

The *urus* is considerably shorter than the last pleonal segment (7:10). The first segment is longer than the two following together, the second is almost as long as the third.

The peduncle of the first pair of *uropoda* is scarcely shorter than the exterior ramus (10:11), broader below; both rami are lanceolate, sharp-pointed, coarsely serrated along both margins, the exterior ramus is shorter than the interior. The peduncle of the second pair (Pl. I, fig. 41) is very short a little more than a third of the length of the rami (4:11); the rami are almost equal in length, the exterior is lanceolate, sharp-pointed, coarsely serrated, the interior elongate-ovate, the posterior end broadly rounded, finely serrated all around. The peduncle of the last pair is long, linear, about twice as long as the rami, which are equal in length, lanceolate, sharp-pointed, minutely serrated.

The *telson* is broadly rounded, almost semicircular, a little shorter than the last ural segment, scarcely as long as a fifth of the length of the last peduncle.

#### 4. CYLLOPUS ARMATUS, C. BOVALLIUS, 1887.

Pl. I, fig. 1—35.

**Diagn.** *Caput* non productum, segmentis tribus primis pereii brevius. *Antennæ* primi paris abrupte angustatae, apice cylindrato. Segmentum primum *pereii* brevissimum, segmentum quartum, quintum ac sextum longissima. Epimera quattuor prima sequentibus non altiora. Carpus primi paris *pedum pereii* latus, non productus, metacarpo longior; metacarpus composite serratus. Carpus *pedum secundi* paris productus, fortiter serratus, metacarpo longior. Metacarpi *pedum quinti* ac *sexti* parium carpis multo longiores. Pedes septimi paris femore *pedum sexti* paris longiores; femur post non excavatum, articulis sequentibus duplo longius. Latera segmentorum *plei* duorum priorum rotundata, post serrata, latera segmenti ultimi leviter rotundata, non serrata. Segmentum secundum ac tertium *uri* libera, non coalita. Pedunculi *pedum uri* primi et secundi parium ramis paullo breviores; pedunculus *pedum ultimi* paris ramis duplo longior. *Telson* semicirculare, segmento ultimi uri multo brevius, quartam partem longitudinis pedunculi *pedum uri ultimi* paris æquans.

The *head* is not produced, shorter than the first three pereionial segments. The first pair of *antennæ* with the flagellum suddenly narrowed, the terminal part cylindrical. The first *pereionial* segment is the shortest, the fourth, fifth and sixth the longest. The first four pairs of epimerals are not deeper than the following. The carpus of the first pair of *pereiopoda* is broad, not produced, longer than the metacarpus; the metacarpus is complexly serrated. The carpus of the second pair is produced, strongly serrated, longer than the metacarpus. The metacarpi of the fifth and sixth pairs are much longer than the carpi. The seventh pair are longer than the femur of the sixth pair; the femur of the seventh pair is twice longer than all the following joints together; the posterior margin is straight, not excavated. The lateral parts of the first two *pleonal* segments are rounded, posteriorly serrated, those of the last segment feebly rounded, not serrated. The second and third *ural* segments are free, not coalesced. The peduncles of the first and second pairs of *uropoda* are a little shorter than the rami; the peduncle of the last pair is twice as long as the rami. The *telson* is semicircular, much shorter than the last ural segment, equalling a fourth of the length of the peduncle of the last pair of uropoda.

**Colour.** Bluish green.

**Length.** 15—22 mm.

**Hab.** The South Atlantic, at various localities between Lat. 30°—60° S. Indian Ocean, the South Pacific.

**Syn. 1887.** *Cylopus armatus*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 11.  
 »           »           »           1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. II, p. 557. Pl. 41, fig. 15—25.

As I have not been able to identify this species, the most common of all, with any of the previously described ones, I have been compelled to propose for it a new specific name. It is not impossible, however, that a closer examination of the typical specimen of Spence Bate's *Cylopus magellanicus* (= *Cylopus Batei*, mihi,) will prove the both species to be identical. All the species of this genus seem to be closely connected with each other so that it is very difficult to point out good specific characteristics, but *Cylopus armatus* may be recognized easily enough by the complexly serrated metacarpus of the first pair of pereiopoda, the strong but irregular serration of the same joint of the second pair, the equal depth of all the epimerals and by the length of the last ural segment. The sexual difference is marked in the breadth of the pereion of the female, and in its length in comparison with the pleon, and also in the form of the first pair of antennæ. The form of the second pair of antennæ is, contrary to most of the other Hyperids, almost the same in both sexes.

The *body* of the female is higher and broader, in comparison with the legs, than the body of the male.

The *head* is almost globular, as long as the first two pereionial segments and half the third.

The *eyes* occupy the whole surface of the head except a narrow, longitudinal stripe on the summit of the head.

The *first pair of antennæ* (Pl. I, fig. 4, 4 a, and 5) in the male are of the same form as in *Cylopus levis*, but the basal joint of the peduncle is much stouter and larger, three times longer than the two following joints together, the narrow cylindrical part of the first flagellar joint is shorter than the tumid basal part together with the whole peduncle. The first joint of the flagellum is followed by two minute joints, the last half as long as the preceding, tipped with a bundle of hairs. The tumid, conical part of the first joint is provided with a mass of long, slender, cylindrical olfactory bristles, placed on depressed buttons or desks on the inner lower side of the joint. In the female (Pl. I, fig. 6) the first flagellar joint is much thicker, and the cylindrical portion much shorter. The whole length of the antennæ of the female is shorter, not equalling the length of the head; in the male longer than the head and the first two pereional segments together.

The *second pair of antennæ* (Pl. I, fig. 7 and 8) are six-jointed, the first joint is the shortest, but thick and stout; the second joint is a little longer; the third as long as the two preceding together; the fourth joint, twice as long as the third, is as long as all the three preceding together; the fifth is a little shorter than half the fourth; the sixth is as long as the fifth. The upper margin of all the joints is undulated, each undulation carrying a pair of short sharp-pointed bristles. The inferior margin is straight provided with single, equidistant short spines. The end of the sixth joint is tipped with a bundle of bristles. The last three joints are much narrower than the preceding, linear.

The *mouth-organs* are well developed.

The *labrum* (Pl. I, fig. 9) is almost as long as broad, rounded at the free hinder margin and deeply incised, the both lobes thus formed are densely hirsute.

The *mandibles* (Pl. XI, fig. 10—13) have a stout basal portion, the lower end forms a broad strong molar tubercle, the grinding surface is like that in the *Vibilia*, consisting of parallel, feebly curved, prominent rolls, the whole surface surrounded by long, strong, sharp spines (Pl. I, fig. 11). At the inner side of the molar tubercle in the left mandible project two broad cutting processes, bluntly serrated at the lower margins, in the right mandible there is only one. (Pl. I, fig. 12). At the base of this process is a mass of slender hairs. At the middle of the outer side of the mandible arises the mighty palp, the basal joint is the shortest, the second is the longest and stoutest, the last joint is evenly tapering, the end strongly curved, provided with slender hairs (Pl. I, fig. 13).

The *first pair of maxillæ* (Pl. I, fig. 14 and 15) have the basal portion stout, linear; the inner lamina is tipped with four or five strong, feebly curved spines; the outer lamina is curved, tapering toward the end, fringed with slender hairs.

The *second pair of maxillæ* (Pl. I, fig. 16 and 17) are small, curved, the lower end forming two rounded processes provided with short hairs.

The *maxillipeds* (Pl. I, fig. 18 and 19) consist of a broad basal portion, a broad thick median lobe, feebly rounded below and projecting inwards, and two stout lateral lobes; these are straight along the inner margin and complexly serrated. The serration consists namely of a row of broad, strong teeth; each tooth showing two to four sharp points. At the inner side of each lobe there is a row of short spines. The outer margins of the lateral lobes are strongly curved.

The *pereiopod* is considerably longer and broader in the female than in the male, the fifth segment being the broadest.

The *first pair of pereiopoda* (Pl. I, fig. 20—22) are a little shorter than the second; the femur is broad laminar, irregularly convex at the anterior margin and feebly curved at the posterior, it is shorter than the four following joints together. The carpus is broad but not at all produced at the hinder inferior corner. The metacarpus is much narrower and a little shorter than the carpus, complexly serrated along the posterior margin, each of the broad, strong teeth being three-pointed (Pl. I, fig. 22); the lower margin is provided with short sharp spines around the base of the dactylus. The dactylus is curved, longer than half the metacarpus, the posterior margin fringed with some few unequal sharp spines.

The *second pair* (Pl. I, fig. 23 and 24) have the femur long, narrow, almost linear, the hinder margin feebly convex; a little above the lower, hinder corner there is a strong bristle. The femur is longer than the four following joints together. The genu is short with two bristles at the lower hinder corner. The tibia is broadly produced at the lower hinder corner, carrying 5—6 long bristles. The carpus is very broad and stout, the spoonshaped carpal process is serrated along the lower margins, smooth at the hinder margin, reaching almost to the middle of the metacarpus. The metacarpus is a little shorter than the carpus, broader at the base, the anterior margin slightly convex; the hinder margin is provided with a irregularly serrated crest formed of long and short sharp teeth; the inferior margin is bordered with short sharp spines as in the first pair. The dactylus is curved, scarcely longer than half the metacarpus, strongly serrated along the posterior margin (Pl. I, fig. 24).

The *third and fourth pairs* (Pl. I, fig. 25 and 26) are a third longer than the second pair, stout; the femur is narrow, the tibia is longer than the carpus, both smooth. The metacarpus is longer than the carpus, provided with a row of short, equidistant spines along the posterior margin and some few bristles at the sides of the row of spines. The dactylus is longer than half the metacarpus, indistinctly pedunculated<sup>1</sup>), the peduncular part finely serrated along the posterior margin.

The *fifth and sixth pairs* (Pl. I, fig. 27 and 28) are nearly twice as long as the two preceding pairs (15:8). The femur is broad laminar, a little longer and broader in the sixth pair; the anterior margin is slightly convex provided with some few short bristles. The tibia is a little shorter than the carpus. The anterior margin of the carpus is armed with a row of short spines and some few bristles. The metacarpus is not twice as long as the carpus but almost as long as the both preceding joints together, evenly arched, and armed along the anterior margin with a comb-like row of fine slender bristles. The dactylus is slightly curved, distinctly pedunculated, without serration. It is shorter than a fourth of the length of the metacarpus.

The *seventh pair* (Pl. I, fig. 29 and 30) are longer than the femur of the sixth pair. The femur is shorter than the femur of the sixth pair (8:11), broader above, the anterior margin armed with some short bristles, the posterior almost straight. It is a little more

<sup>1</sup>) I call the dactylus pedunculated when it shows a basal part more or less distinctly marked from the terminal one. Sometimes this peduncular part grows very thick.

than twice as long as all the following joints together. The following joints are subequal in length, the dactylus a little the shortest, all richly provided with glands. The dactylus is linear, rounded below and covered with a mass of wartlike prominences, exactly as in *Vibilia robusta*.

The *epimerals* are equal in depth, those of the fifth pair are the largest, those of the seventh the smallest.

The *branchial sacks* are very large, as long as, or longer than the femora of the corresponding legs.

The *pleon* in the male is almost as long as the whole pereion, in the female much shorter. The segments are equal in length; the lower parts of the sides are evenly rounded, in the first two segments showing a small serrated projection posteriorly (Pl. XI, fig. 31), in the last segment entirely smooth.

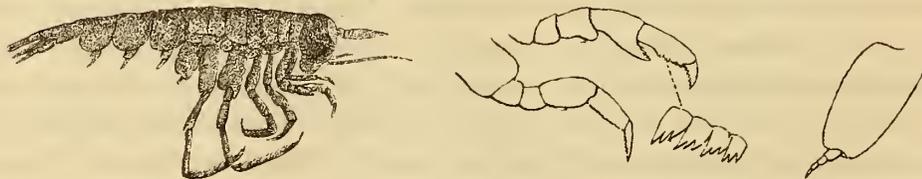
The *pleopoda* (Pl. I, fig. 32) have the peduncles shorter than the rami; the rami are 13—14-jointed.

The *urus* is as long as the last pleonal segment. The first segment is shorter than the two following together; the second segment is much shorter than the third; the hinder corners of the third segment are sharp-pointed.

The *uropoda* (Pl. I, fig. 33—35) have the peduncles broad, linear. That of the first pair is a little shorter than the exterior ramus (11:12); both rami are elongate lanceolate, coarsely and complexly serrated, the large teeth being finely serrated; the interior ramus is longer than the exterior (7:6). The peduncle of the second pair is a little longer than the exterior ramus, linear; the rami are nearly equal in length, serrated in the same manner as in the preceding pair. The peduncle of the last pair is a little narrower than those of the preceding pairs, linear, twice as long as the rami; the rami are equal in length, finely serrated.

The *telson* is broadly rounded, half as long as the last ural segment and equalling a fourth of the length of the peduncle of the last pair of uropoda.

## 5. CYLLOPUS BATEI, C. BOVALLIUS, 1887.



*Cyllopus Batei*, C. BOVALLIUS.

Facsimile from Sp. BATE, Catal. Amph. Crust. Brit. Museum, pl. 50, fig. 1.

**Diagn.** *Caput* fere rotundatum, non productum, segmentis tribus primis pereii brevius. *Antennæ* primi paris latitudine æquiter decrescentes, acuminatæ. Segmentum primum ac secundum pereii

brevissima, segmentum quintum longissimum. Epimera quattuor prima sequentibus non altiora. Carpus primi paris *pedum pereii* non productus, metacarpum longitudine æquans; metacarpus minute serratus. Carpus pedum secundi paris productus, minute serratus, metacarpo brevior. Metacarpi pedum quinti ac sexti parium carpi multo longiores. Pedes septimi paris femore pedum sexti paris breviores; femur post convexum, articulis sequentibus plus quam duplo longius. Latera segmentorum plei rotundata. Segmentum secundum ac tertium *uri* coalita (?). Pedunculus *pedum uri* primi paris ramos longitudine æquans, pedunculus pedum secundi paris ramis brevior; pedunculus pedum ultimi paris ramis quater longior, rami non serrati. *Telson* cylindratum, parvum.

The *head* is not produced, almost globular, shorter than the first three pereional segments. The first pair of *antennæ* evenly tapering toward the end, sharp-pointed. The first and second pereional segments are the shortest, the fifth the longest. The first four pairs of epimerals are not deeper than the following. The carpus of the first pair of *pereiopoda* is not produced, as long as the metacarpus; the metacarpus is minutely serrated. The carpus of the second pair is produced, minutely serrated, shorter than the metacarpus. The metacarpi of the fifth and sixth pairs are much longer than the carpi. The seventh pair are shorter than the femur of the sixth pair. The posterior margin of the femur of the seventh pair is convex; the femur is more than twice as long as all the following joints together. The lateral parts of the *pleonal* segments are rounded. The second and third *ural* segments are coalesced (?). The peduncle of the first pair of *uropoda* is as long as the rami; that of the second pair is shorter than the rami; that of the third pair is four times longer than the rami; the rami of the last pair are smooth. The *telson* is cylindrical, small.

**Colour.** Black, being thickly covered with coarse, stellate spots of black pigment.

**Length.** 8 mm.

**Hab.** The South Atlantic at Lat. 37° 26' S. and Long. 7° 44' W. (B. M. acc. to SPENCE BATE.)

**Syn.** 1862. *Cylopus Magellanicus*, SPENCE BATE. Catal. Amph. Crust. Brit. Museum. P. 305, pl. 50, fig. 1.  
1887. *Cylopus Batei*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 11.

From the description of SPENCE BATE the following details may be repeated:

The pigment of the *eyes* is black, almost filling the entire head.

The *first pair of antennæ* are longer than the head.

The *second pair of antennæ* are longer than the first pair, very slender.

The second joint of the *mandibular* palp is the longest.

The dactylus of the *first pair of pereiopoda* is straight, minutely serrated.

The metacarpus of the *second pair* is linear, the lower part of the posterior margin serrated with a row of triple-pointed teeth. The dactylus is short, thick, sharp, serrated upon the posterior margin.

The *third and fourth pairs* are longer than the two preceding pairs, subequal; the femur is not dilated; the metacarpus is longer than the carpus, armed with short stiff spines upon the posterior margin; the dactylus is short.

The *fifth and sixth pairs* are much longer than the two preceding pairs; the femur

posteriorly dilated; the tibia is about as long as the carpus; the metacarpus is longer than the carpus, armed with short, stiff spines along the anterior margin.

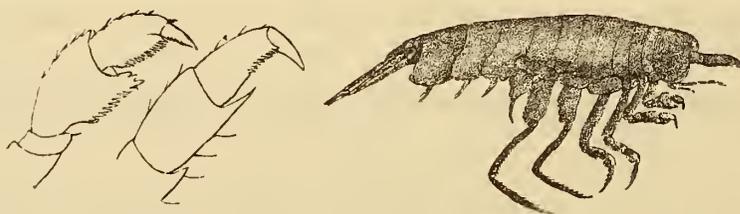
The *seventh pair* reach scarcely to the extremity of the femur of the preceding pair, having the femur posteriorly dilated and nearly as large as that of the preceding pair. The other joints are almost rudimentary.

The first pair of *uropoda* reach as far as the extremity of the ultimate pair. The rami are as long as the peduncle, minutely serrated on both sides. The second pair are shorter than the preceding, having the rami longer than the peduncle and serrated on both sides. The ultimate pair having the peduncle reaching to the extremity of the rami of the preceding pair, and having the rami scarcely one-fourth of the length of the peduncle, short, lanceolate, smooth.

The *telson* is small, cylindrical.

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## 6. CYLLOPUS LUCASI, SPENCE BATE, 1862.



*Cyllopus Lucasi*, SPENCE BATE.

Facsimile from SP. BATE, Catal. Amph. Crust. Brit. Museum, pl. 50, fig. 2.

**Diagn.** *Caput* leviter rostratum, segmentis tribus primis pereii longius. *Antenna* primi paris latitudine æquiter decrescentes, apice curvato. Segmentum primum ac secundum pereii brevissima, segmentum septimum longissimum. Epimera quattuor prima sequentibus paullo altiora. Carpus pedum pereii primi paris latus, serratus, productus, metacarpo longior; metacarpus fortiter serratus. Carpus pedum secundi paris productus, non serratus, metacarpo fere longior. Metacarpi pedum quinti ac sexti parium carpis duplo longiores. Pedes septimi paris femore pedum sexti paris breviores; femur post excavatum, articulos sequentes longitudine æquans. Latera segmentorum plei obtuse rotundata. Segmentum secundum ac tertium uri libera, non coalita. Pedunculus pedum uri primi paris ramis paullo brevior (?); pedunculus pedum secundi paris ramis multo brevior; pedunculus pedum ultimi paris ramis duplo longior, rami serrati. *Telson* parvum, lanceolatum, quintam partem longitudinis pedunculi pedum uri ultimi paris æquans.

The *head* is feebly rostrate, longer than the first three pereional segments. The first pair of antennæ are evenly tapering toward the end, curved at the apex. The first and second *pereional* segments are the shortest, the seventh is the longest. The first four pairs of epimerals are a little deeper than the following. The carpus of the first pair of *pereiopoda* is broad, serrated, produced, longer than the metacarpus; the metacarpus is strongly scr-

rated. The carpus of the second pair is slightly longer than the metacarpus, produced, not serrated. The metacarpi of the fifth and sixth pairs are twice longer than the carpi. The seventh pair are shorter than the femur of the sixth pair; the femur of the seventh pair is excavated at the posterior margin, almost as long as all the following joints together. The lateral parts of the *pleonal* segments are obtusely rounded. The second and third *ural* segments are free, not coalesced. The peduncle of the first pair of *uropoda* is a little shorter than the rami (?); that of the second pair is much shorter than the rami; that of the last pair is twice as long as the rami; the rami are serrated. The *telson* is small, lanceolate, as long as a fifth of the length of the peduncle of the last pair of uropoda.

**Colour.** ?.

**Length.** 18 mm.

**Hab.** »The Powel Islands» (SPENCE BATE).

**Syn.** 1862. *Cyrtopus Lucasii*, SPENCE BATE. — Catal. Amph. Crust. Brit. Museum, p. 306, pl. 50, fig. 2.  
 »       »       »       C. BOVALLIUS. 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 556.

Here follows the description of SPENCE BATE, completed with some characteristics derived from the examination of the drawing.

The *head* is slightly produced above and between the superior antennæ; it is longer than the three following peræonal<sup>1)</sup> segments.

The *first pair of antennæ* with downcurved point are as long as the head and the two first segments of the peræon.

The *second pair of antennæ* are three fourths of the length of the first pair; the flagellum is four-jointed, first joint long, second half as long, third longer than first, terminal short and pointed, furnished inferiorly with a few hairs.

The *peræon* is as long as pleon and the first segment of the urus.

The *first pair of peræopoda* are robust. The carpus is very broad *infero-anteriorly produced to one third the length* of the metacarpus, anterior and posterior margins deeply serrated. The metacarpus is long-ovate, posterior margin deeply serrated. The dactylus is pointed, slightly curved downward, the posterior margin serrated.

The *second pair of peræopoda* have the carpus inferiorly produced in a straight line to half the length of the metacarpus, posterior margin smooth, with two long hairs. The metacarpus straight, slightly narrowing distally, posterior margin serrated, the serratures increasing in depth anteriorly. The dactylus is stout, sharp.

The *third and fourth pairs* are twice the length of the preceding, having the carpus broad, with the infero-posterior margin oblique and serrated; the metacarpus is not longer than the carpus, with the posterior margin serrated, and capable of being inflected against the carpus. The dactylus is subulate, serrated toward the articular extremity.

<sup>1)</sup> TH. STEBBING justly remarks l. c. that the word must be written peræon, as it is derived von περιαιώω.

The *fifth pair* are considerably longer, having the femur dilated, the tibia and carpus subequal; the tibia has the anterior margin fringed with a few distant hairs; in the carpus the anterior margin is furnished with a row of close cilia of equal length, and a few distant hairs; infero-anterior margin oblique. The metacarpus is slightly areuate, the margins parallel, the anterior serrated and furnished with a few distant hairs. The dactylus is slender, smooth, sharp.

The *sixth pair* resemble the fifth except that they are slightly longer.

The *seventh pair* reach not beyond the distal extremity of the femur of the sixth pair. The femur is broadly dilated, posteriorly emarginate. The dactylus is as long as the metacarpus, terminating obtusely, being as broad at the end as at the base.

The *pleon* with the hinder corners of the segments rounded.

The *urus* is a little shorter than the two last segments of the pleon.

The *first pair of uropoda* have the peduncle reaching as far again as that of the next pair, the rami reaching beyond the extremity of the peduncle of the third pair and serrated like those of the next pair. The *second pair* have the peduncle not reaching beyond the last segment of the urus, whilst the rami reach to the extremity of the peduncle of the third pair, the inner branch being coarsely serrated upon the outer and on the distal extremity of the inner margin, and each denticle being minutely serrated along the outer line. The *third pair* have the peduncle nearly five times as long as the telson, the rami are about half as long as the peduncle, the interior one coarsely and the exterior minutely serrated upon the inner side, except toward the extremity where it is more coarsely serrated on each margin.

*Telson* small, lanceolate.

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From the just issued »Report on the Amphipoda collected by H. M. S. Challenger, during the years 1873—1876», by Rev. THOMAS R. R. STEBBING, I may introduce here a short description of a new species:

### 7. CYLLOPUS HOOKERI, TH. STEBBING, 1888.

**Diagn.** *Caput* leviter rostratum. *Antennæ* primi paris latitudine æquiter decrescentes, apice cylindrato. Carpus primi paris *pedum perævi* latus, non productus, metacarpo paullo longior; metacarpus serratus. Carpus pedum secundi paris productus, serratus, metacarpo longior. Metacarpi pedum quinti ac sexti parium carpis multo longiores. Pedes septimi paris femore pedum sexti paris paullo longiores; femur post non excavatum, articulis sequentibus duplo longius. Latera segmentorum *plei* rotundata, post serrata. Segmentum secundum ac tertium *uri* coalita. Pedunculus *pedum uri* primi paris ramos longitudine æquans; pedunculus secundi paris ramis brevior; pedunculus ultimi paris ramis multo, sed non duplo longior. *Telson* latius quam longius, triangulare-rotundatum, quartam partem longitudinis pedunculi pedum uri ultimi paris æquans.

The *head* with a small rostral angle. The first pair of *antennæ* gradually tapering, the terminal part cylindrical. The carpus of the first pair of *peræopoda* is broad, not produced,

a little longer than the metacarpus; the metacarpus is serrated. The carpus of the second pair is longer than the metacarpus, produced, serrated. The metacarpus of the fifth and sixth pairs are much longer than the carpi. The seventh pair are a little longer than the femur of the sixth pair; the femur of the seventh pair is twice longer than all the following joints together. The lateral parts of the *pleonal* segments are rounded, serrated. The second and third *ural* segments are coalesced. The peduncle of the first pair of *uropoda* is subequal in length to the rami; the peduncle of the second pair is shorter than the rami; the peduncle of the last pair is much, but not twice, longer than the rami. The *telson* is broader than long, triangularly rounded, equalling a fourth of the length of the peduncle of the last pair of *uropoda*.

**Colour.** »Colourless».

**Length.** About 6 mm.

**Hab.** The South Atlantic, surface; Lat. 37° 47' S., Long. 30° 20' W. March 9, 1876, the Challenger-Exp. One specimen.

**Syn. 1888.** *Cyllopus Hookeri*. TH. STEBBING. »Report on the Amphipoda collected by H. M. S. Challenger, during the years 1873—1876». The voyage of H. M. S. Challenger. Zoology Vol. 29, p. 1296, pl. 209.

For a fuller knowledge of the species I refer to the exhaustive description given by STEBBING l. c., here I mention only that *Cyllopus Hookeri* seems to be a well defined species distinguished from *Cyllopus magellanicus*, DANA, *C. armatus* and *C. levis* by having the second and third *ural* segments coalesced, from *Cyllopus Batei* by the comparatively short peduncle of the last pair of *uropoda* and by the serration of the metacarpus of the second pair of *peræopoda*. There are also many other special characteristics.

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## Genus 2. **CYLLIAS**, C. BOVALLIUS, 1887.

DERIVATIO: *Κυλλίας* a Greek name.

**Diagn.** *Caput* fere cubicum, tumidum. *Oculi* grandes, totum fere caput occupantes. *Pedes primi* paris carpo dilatato. *Pedes secundi* paris carpo cylindrato, non producto, metacarpo duo processus terminales præbente. *Femur pedum septimi* paris articulis sequentibus brevius (?). *Telson* lanceolatum.

The *head* is almost cubical, tumid. The *eyes* are large, occupying almost the whole head. The first pair of *peræopoda* with dilated carpus. The second pair with the carpus cylindrical, not produced, and the metacarpus provided with two apical processes. The femur of the seventh pair is shorter than the following joints together (?). The *telson* is lanceolate.

**Syn. 1887.** *Cyllias*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 12.

The ranging in of the type of the genus, *Hyperia tricuspidata*, STREETS, among the Hyperids is difficult, because the original description is very meagre. The reasons

why it is placed here in the family Cyllopodidæ are thus mostly negative. The characteristic of the straight first pair of antennæ does forbid its ranging in any of the last six families of the present system (see Part I. 1, p. 3). The great distance between the bases (the points of fixation) of both the pairs of antennæ does not allow of its introduction in any of the first ten families except in *Cyllopodidæ* or *Paraphronimidæ*. The form of the head and possibly also the shape of the second and seventh pairs of peræopoda hint to *Paraphronimidæ*, but the character of the second pair of antennæ and their presence in the female congrues best with Cyllopodidæ, and, as the characteristic of the second pair of antennæ is more important in systematical view than the form of the legs, I previously place it as the second genus of this family.

### 1. CYLLIAS TRICUSPIDATUS, H. STREETS, 1877.

**Diagn.** *Pedes peræi* primi paris robusti, pedibus secundi paris breviores, carpus metacarpo longior ac multo latior. *Pedes secundi* paris teretes, carpus metacarpo longior, processus terminales metacarpi longitudinem dactyli æquantés. *Pedes uri* primi et secundi parium subæquales, apicem pedum ultimi paris non attingentes. Rami pedum uri serrati. *Telson* curtum.

The first pair of *peræopoda* are robust, shorter than the second; the carpus is longer and much broader than the metacarpus. The second pair are slender, the carpus is longer than the metacarpus; the apical metacarpal processes equal the length of the dactylus. The first and second pairs of *uropoda* are subequal, not reaching to the end of the last pair. The rami of the *uropoda* are serrated. The *telson* is short.

**Colour.** ?

**Length.** 6—8 mm.

**Hab.** The North Pacific. (STREETS).

**Syn. 1877.** *Hyperia tricuspidata*, H. STREETS.

— »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the U. S. National museum. 1877. N:o 7, p. 125.

1887. *Cyllias tricuspidatus*,

»

C. BOVALLIUS.

»Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.

The description of STREETS follows here:

The *head* is large, deeper than broad, irregularly quadrangular from a lateral view, excavated in front. The head is larger in the female, but the general shape is the same.

The *eyes* are large, occupying most of the lateral portion of the head.

The *first pair of antennæ* are shorter than the head, stout; peduncle short, four-jointed; first joint longest, distal end enlarged; the second, third, and fourth short, together shorter than the first; flagellum broader than the peduncle, oval, acute at the apex, about

three times as long as the peduncle, uniarticulate; a few long auditory cilia at apex; a single row of short hairs on the inferior surface. In the female the first pair of antennæ are of the same shape but much smaller, and the joints are more plainly visible.

In the young animal the first pair of antennæ are short and stout, situated nearer the superior margin of the head than in the adult; the first peduncular joint as long as the three terminal ones; the second longer than the third, and their breadth less than that of the first; the fourth joint small, and either rounded or broadly triangular with rounded apex; flagellum minute, linear, uniarticulate, with one or two cilia crowning the apex, as long as or longer than the flagellum.

The *second pair of antennæ* rise from the inferior portion of the head, near the buccal region; more than twice as long as the first pair; peduncle four-jointed; first and second joints long; first about half the length of the second, extending to the anterior margin of the head, but not exposed beyond it; second joint slender, cylindrical, and the entire length of its upper border closely set with short equidistant hairs, curled at their tips; third and fourth joints short, subequal, about one quarter the length of the second, a few hairs on the upper surface; flagellum linear-lanceolate, in length almost equal to the second joint of the peduncle, uniarticulate, pointed, with seven or eight slight serrations along the superior edge, one or more hairs at each serration. The second joint is directed upward and outward, and the third, fourth, and flagellum are bent downward, nearly at a right angle with the second. When the animal is at rest the second pair of antennæ are evidently folded up in this manner in the concavity in the front of the head. In the female they are quite different, they do not extend at all, or very slightly, beyond the anterior margin of the head. The first peduncular joint is very short, and broader than the following; the second is long, and reaches nearly to the anterior margin of the head; the third joint is rudimentary; and the fourth is apparently obsolete. The flagellum is small, about one-third the length of the first joint, lanceolate in shape, and with two or three stout cilia at its apex. The shortening is chiefly due to the diminished length of the first joint of the peduncle.

In the young animal this pair are represented by a small rounded tubercle, tipped by a cilium; situated just beneath the first pair.

The depth of the *peræon* decreases slightly posteriorly. In the female the *peræon* is shorter and deeper, and the last segment is much narrower.

The *first pair of peræopoda* are shorter and more robust than the second; the tibia is produced postero-inferiorly<sup>1)</sup>, at its extremity a number of stiff hairs, slightly curled at their tips. The carpus is broad, dilated posteriorly, but not produced inferiorly, with its inferior edge straight, and armed at the posterior angle with two stout spines or bristles. The metacarpus is shorter than the carpus, and about one-half as broad. The dactylus is very minute.

The *second pair* have none of the joints dilated. The tibia is short, about one fourth the length of the carpus. The carpus is slender and cylindrical. The metacarpus

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<sup>1)</sup> The wording of his description is: »antero-inferiorly» but he evidently means that the lower hinder corner is produced.

is shorter than the carpus, and about the same breadth, with its distal extremity slightly produced on either side of the dactylus to an acute point, which is almost as long as the short dactylus. This arrangement probably compensates for the lack of the subchelate development of the carpus.

In the young animal the first two pairs are rudimentary, neither tibia nor carpus produced or dilated; they are readily distinguished from the following pereopoda by their more slender development.

The *five following pairs* are subequal, the third and fourth pairs directed forward, with the last two joints flexed backward; the last three pairs directed backward with the last two joints flexed forward, a few short hairs are set equidistant along the posterior margin of the third and fourth pairs, and on the anterior margin of the last three pairs. In the female the seventh pair are slenderer and shorter than the preceding pairs.

The *pleon* is narrower in the female than in the male.

The peduncles of the *pleopoda* are broadly elliptical in the male, decreasing in size posteriorly; in the female they are ovate.

The third pair of *uropoda* are the longest, the preceding pairs are nearly subequal. The rami of the first pair are the longest, those of the last pair the shortest. The rami are serrated.

The *telson* is short, lanceolate.

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The fifth family **PARAPHRONIMIDÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* permagnum, tumidum fere cubicum. *Oculi* magni, latera capitis occupantes. *Antennæ* primi paris rectæ, parte anteriori capitis affixæ, flagello tumido instructæ; articulus primus flagelli permagnus, articuli sequentes minuti, perpauci, terminales. *Antennæ* secundi paris compressæ, articulis paucis compositæ, parti inferiori capitis affixæ; in femina rudimentariæ. *Instrumenta oris* masticatoria, mandibulæ palpo carentes. *Pedes peræi* parium quinque ultimorum ambulatorii, pedes septimi paris non transformati. *Pedes uri* ramis instructi.

The *head* is very large, tumid, almost cubical. The *eyes* are large, occupying the sides of the head. The first pair of *antennæ* are straight, fixed at the anterior side of the head, provided with a tumid flagellum; the first joint of the flagellum is very large, the following are minute, very few in number, terminal. The second pair are compressed, few-jointed, fixed at the inferior side of the head, rudimentary in the female. The *mouth organs* are adapted for mastication, the mandibles without palp. The last five pairs of *peræopoda* are walking legs, the seventh pair are not transformed. The *uropoda* are provided with rami.

**Syn.** 1887. *Paraphronimida*, C. BOVALLIUS. —

»Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.

» TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1335.

The great discrepancies between the genus *Paraphronima* and the true *Phronimæ* made it indispensable to remove it from the family *Phronimida* and to establish for it a family of its own. CLAUS<sup>1)</sup>, the founder of the genus, says himself, that *Paraphronima* differs in important characteristics from the other members of the family *Phronimida*, and that it perhaps ought to be placed in the family *Hyperida*. It is however impossible to introduce it in this latter family, owing to the form of the antennæ and the want of a mandibular palp.

In an earlier paper I ventured the supposition that *Paraphronima* might prove to be identical with the genus *Daira* of H. MILNE EDWARDS and I hoped to obtain corroboration for this supposition lately when Professor ALPHONSE MILNE EDWARDS most generously transmitted to me the precious collection of Hyperids from the »Musée d'Histoire Naturelle». But unfortunately the type of the genus *Daira*, as well as the types of some other critical genera and species founded by his illustrious father, had been destroyed by accident. After further studies into the matter I fully admit that STEBBING l. c. is quite right in his criticism of my above named supposition, and that *Paraphronima* and *Daira* must be looked upon as two different genera. Nevertheless I think that the both genera are very closely related. Thus retaining *Daira* as a genus of its own, only correcting the name to *Eudaira* as *Daira* was preoccupied, I place it here in the family *Paraphronimida*. It is possible that also the genus *Cyllias* (see p. 20) ought to be placed in this family.

The family *Paraphronimida* has probably its centre of distribution in the tropical seas, some of its representants occur in the temperate regions, but none is hitherto recorded from the Arctic nor from the Antarctic regions.

The family thus contains two genera viz. *Paraphronima* and *Eudaira*.

- A. The carpus of the second pair of peræopoda is narrow, not produced into a process ..... 1. *Paraphronima*.
- B. The carpus of the second pair of peræopoda is broad, produced into a process, forming with the metacarpus a chela ..... 2. *Eudaira*.

### Genus 1. **PARAPHRONIMA**, CLAUS, 1879.

**Diagn.** *Corpus* gracile, leviter compressum, epimeris obsoletis. *Pedes peræi* primi paris carpum dilatatum sed non productum gerentes. *Pedes secundi* paris metacarpum angustum, in apice productum, gerentes.

The *body* is slender, a little compressed, the epimerals are obsolete. The first pair of *peræopoda* have a broad but not produced carpus. The second pair have a narrow carpus, and the metacarpus produced at the apex.

<sup>1)</sup> »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Vol. 2, p. 66 (8).

<b>Syn. 1879.</b>	<i>Paraphronima</i> ,	CLAUS. <sup>1)</sup>	—	»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Vol. 2, p. 64 (6).
»	»	C. BOVALLIUS.	1885.	»On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 19.
»	»	J. V. CARUS.	1885.	Prodromus Faunæ Mediterraneæ. Vol. I, p. 424.
»	»	A. GERSTÆCKER.	1886.	Der H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Bd. 5. Abth. 2, p. 489.
»	»	C. BOVALLIUS.	1887.	»Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.
»	»	TH. STEBBING.	1888.	»Report on the Amphipoda». Voy. H. M. S. Challenger. Zoology. Vol. 29, p. 1335.

The first representative of this genus is, as far as I know, *Hyperia pedestris*, described by GUÉRIN-MÉNEVILLE; he gave a very good drawing of it and a short description, probably in the year 1836 in the work »Iconographie du Règne Animal de G. Cuvier. Crustacés». Paris 1829—1843, p. 22, pl. 25, fig. 6. However, it was not mentioned by H. MILNE-EDWARDS in his classical work »Histoire des Crustacés» of 1840. SPENCE BATE did not quote it in his Catalogue of the Amphipoda of the British Museum. A. BOECK<sup>2)</sup> in 1875 overlooked it; TH. STEBBING<sup>3)</sup> in 1888 cite *Hyperia pedestris* in his excellent review of the literature concerning the Amphipoda, but without any remarks on its place in the system. I for my part am convinced that it is a true *Paraphronima*, and I think that only the examination of the drawing will be sufficient to prove its kindred.

CLAUS in 1878<sup>4)</sup> mentioned, and in 1879 gave the diagnose of the new genus *Paraphronima*, at the same time he mentioned, rather than described, two species: *Paraphronima gracilis* and *P. crassipes*. In 1885 (see above) the author of this treatise proposed three new specific names: *Paraphronima californica*, *P. Edwardsii* and *P. clypeata*. The first of them was later (1887), when I had the opportunity of examining a male specimen, made the type of a new genus *Dairella*. The second turned out to be only a more developed form of *Paraphronima gracilis*, CLAUS, the error owing to the very incomplete original description of the latter species. In 1887 (see above) I proposed the new specific name *Paraphronima pectinata* for a *Paraphronima* distinguished by the strongly pectinate armature of the inner ramus of the last pair of uropoda, but the subsequent examination of new and fresh material, kindly entrusted to me by Professor T. TULLBERG of Upsala, proved that this pectination is only a sexual characteristic, and that *Paraphronima pectinata* was the male of *P. clypeata*. At the same time I found the male of *P. gracilis*, which was not known by CLAUS. Just as this sheet was to be printed

<sup>1)</sup> Already in 1878 Claus mentions the new generic name *Paraphronima* in »Ueber Herz und Gefässsystem der Hyperiden»; Zoologischer Anzeiger, I, p. 270, but without the slightest diagnose, therefor I must cite »1879» as the right year for the date of the generic description.

<sup>2)</sup> De Skandinaviske og Arktiske Amphipoder.

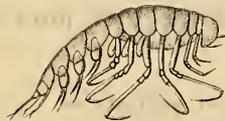
<sup>3)</sup> »Report on the Amphipoda collected by H. M. S. Challenger during the years 1873—1876.» Report on the scientific results of the Voyage of H. M. S. Challenger during the years 1873—1876. Zoology. Vol. 29, p. 163.

<sup>4)</sup> See footnote <sup>1)</sup>.

the Rev. Mr STEBBING most kindly sent me his magnificent work on the Challenger Amphipoda. Among the Hyperids quoted there he gives an elaborate description of *Paraphronima cuivis* n. sp. which, however, according to my opinion is a true *P. gracilis*. He himself mentions that the very short descriptions of the previously known species made it impossible to identify the Challenger specimens with any one of the old species. He suggests also »that a single name may suffice for them all». Really, I am very inclined to think that the species of *Paraphronima* could be just as well called varieties as species. But as I do not find it more convenient for the carcinological study to establish varieties without to know the connecting links, and as the four species *P. pedestris*, *P. gracilis*, *P. crassipes* and *P. clypeata* differ by constant, if truly small, characteristics I quote them here as species.

- A. The peduncles of the first two pairs of uropoda are more than twice as long as the inner rami ..... 1. *P. pedestris*.
- B. The peduncles of the first two pairs of uropoda are only a little longer than the inner rami.
- b 1. The seventh pair of peræopoda are not longer than the first four joints of the sixth pair ..... 2. *P. gracilis*.
- b 2. The seventh pair of peræopoda are nearly as long as the sixth pair.
- bb 1. The rami of the last pair of uropoda are much longer than the breadth of the peduncle ..... 3. *P. crassipes*.
- bb 2. The rami of the last pair of uropoda are not longer than the breadth of the peduncle ..... 4. *P. clypeata*.

## 1. PARAPHRONIMA PEDESTRIS, F. E. GUÉRIN-MÉNEVILLE, 1836.



*Paraphronima pedestris*, GUÉRIN-MÉNEVILLE.

Facsimile from GUÉRIN-MÉNEVILLE, *Iconographie du Règne Animal*, pl. 25, fig. 6.

**Diagn.** *Caput* multo altius quam longius, non duplo altius quam segmentum primum peræi, segmentis tribus primis peræi conjunctis brevius. *Pedes peræi* elongati, graciles, femoribus angustis, carpis valde elongatis. Femur pedum primi paris articulis sequentibus conjunctis longius. Metacarpus pedum tertii ac quarti parium metacarpo pedum quinti ac sexti parium longior. *Pedes* quinti paris quam peræon multo longiores. *Pedes* sexti paris pedibus quinti paris breviores. *Pedes* septimi paris pedibus sexti paris multo breviores. *Pedunculi pedum uræ* elongati, ramis multo longiores; rami acuti.

The *head* is much deeper than long, not twice as deep as the first peræonal segment, and shorter than the first three peræonal segments together. The *peræopoda* are elongate,



## 2. PARAPHRONIMA GRACILIS, CLAUS, 1879.

Pl. II, fig. 1—10.

**Diagn.** *Caput* altitudine longitudinem fere æquans, duplo altius quam segmentum primum peræi, segmenta quattuor prima peræi longitudine æquans vel superans. *Pedes peræi* elongati, graciles, femoribus angustissimis. Femur pedum primi paris articulis sequentibus conjunctis multo longius. Metacarpus pedum tertii ac quarti parium metacarpo pedum quinti ac sexti parium brevior. *Pedes* quinti paris quam peræon longiores. *Pedes* septimi paris pedibus sexti paris multo breviores. *Pedunculus pedum uri* ultimi paris longitudine ramorum multo angustior. *Telson* latum, post rotundatum.

The *head* is almost as deep as long, twice as deep as the first peræonal segment, and as long as, or longer than the first four peræonal segments together. The *peræopoda* are elongate, slender, with very narrow femora. The femur of the first pair is much longer than all the following joints together. The metacarpus of the third and fourth pairs is shorter than that of the fifth and sixth pairs. The fifth pair are longer than the peræon. The seventh pair are much shorter than the sixth. The peduncle of the last pair of *uropoda* is much narrower than the length of the rami. The *telson* is broad, rounded behind.

**Colour.** The body is whitish, almost hyaline, with a lustre of silver, the head is brown or deeply red, owing to the pigment of the eyes.

**Length.** ♂ 4—9, ♀ 5—11 mm.

**Hab.** The tropical and temperate regions of the Atlantic; [CH. E.; D. M.; F. M.; K. M.; P. M.; S. M.; U. M.] the northern temperate and the tropical regions of the Pacific. [CH. E.]

<b>Syn.</b> 1879.	<i>Paraphronima gracilis</i> , CLAUS.	—	»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Vol. 2, p. 65 (8), Pl. 1, fig. 4—5.
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1885.	» <i>Edwardsii</i> , C. BOVALLIUS.	—	»On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 10.
	»	»	»
1888.	» <i>cuvivis</i> , TH. STEBBING.	—	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1337. Pl. 157.

*Paraphronima gracilis* has the body more slender, and the legs comparatively longer and narrower than the two following species, the head is longer and deeper, the peduncles of the uropoda are also a little more elongated. From *P. pedestris* it differs chiefly by the large head and the comparatively short carpi of the last five pairs of pereopoda. The male is stouter than the female.

The integument of the *body* is very thin, hyaline, without ridges or impressions.

The *head* is almost cubical with rounded corners; at the anterior side there is a shallow groove where the first pair of antennæ are fixed. The under-side is evenly concavated. From a lateral view the under-margin is almost straight. The head is fully twice as deep as the first pereopodal segment and in the male as long as, in the female a little longer than the first four pereopodal segments.

The *eyes* consist of larger and more distant ocelli than in the preceding families. The ocelli are divided into two distinct agglomerations on each side of the head, one much larger in the middle, and one small near the under-side.

The *first pair of antennæ* (Pl. II, fig. 2) are straight, much longer and stouter in the male than in the female. In the male they are almost as long as the head, in the female they equal about a third of the length of the head. The first joint of the peduncle is longer than the two following together, the second is longer than the third. The first joint of the flagellum reminds in shape of that joint in the genus *Vibilia*, in the male it is elongate-lanceolate, about four times longer than the peduncle; in the female the first joint is scarcely twice as long as the peduncle. The inner-side of this joint is richly fringed with long hairs and stout olfactory bristles. The second and third joints of the flagellum are usually distinct, but very minute, the second longer than the third.

The *second pair of antennæ*, (Pl. II, fig. 3) are fixed closely in front of the mouth-organs at the hind corner of the under-side of the head. They consist in the male of five joints, the first joint is very short, coalesced with the head, and protuding as a round tubercle, at the side of it is a large, circular opening for the gland contained in this joint, the second joint is nearly as long as the head, fringed with short, club-like, glandular hairs; when at rest this joint is concealed in the above-mentioned groove at the under-side of the head. The third and fourth joints are short, equal in length, the fifth is about twice as long as the two preceding joints together, much narrower, linear, fringed with hairs. The articulation between the second and third joint permits the terminal part of the antennæ (the flagellum?) to be folded up along the under-side of the long second joint. In the female the second pair of antennæ consist of only two joints, the basal one short, the terminal five times longer, tapering, carrying a bristle at the apex.

The *mouth-organs* will be described below, under *Paraphronima clypeata*, they offer no differences in the three species.

The *pereopod* is more convex in the female than in the male. The first and second segments are the shortest, the seventh the longest.

The *epimerals* are not separated from the segments, but are represented by the abruptly narrowing lower end of each segment. At the inner side of this narrow projection articulates the femur of the corresponding leg.

The *branchial sacks* are attached to the third to sixth pairs of peraeopoda. They are smaller in the female than in the male. In the male those of the fifth and sixth pairs are the longest, but not half as long as the femur.

The *ovitriceræ* are large, smooth, attached to the second to fifth pairs of peraeopoda.

The *first pair of peraeopoda* (Pl. II, fig. 4) are the shortest of all. The femur is very long, narrow, linear, much longer than all the following joints together (5:3), the hind margin is straight. The genu is smooth, almost cubical. The tibia is scarcely longer than the genu, the lower hinder corner produced, carrying three or four short bristles. The carpus is as long as the two preceding joints together, considerably broader below; the lower hinder corner is not produced but armed with a strong spine; the under margin is perfectly straight, fringed with a row of short sharp bristles; the anterior and posterior margins are slightly convex. The metacarpus is almost as long as the carpus, feebly bent, tapering toward the apex, with a short bristle at the apex. The dactylus is pedunculated, with a short, sharp tooth at the hinder side, projecting from the peduncular part of the joint. All the joints are provided with glandular masses, but I have not been able to find any outlet for the glands.

The *second pair* (Pl. II, fig. 5 and 6) are longer than the first. The femur is a little longer and narrower than in the first pair, linear, in the male as long as, in the female longer than all the following joints together. The genu is a little longer than broad, longer than the tibia; both joints are totally smooth; the lower hinder corner of the tibia is not produced. The carpus is long, narrow, linear, longer than a third of the femur, smooth. The metacarpus is a little shorter than the carpus, and narrower, linear, the apex projects into two thin, hollowed processes, fringed with hairs; these processes reach a little farther than half the dactylus. The dactylus is robust, pedunculated, with an appendicular tooth at the hinder side. The dactylus equals about a fourth of the length of the metacarpus. In all the joints there are richly developed glandular masses.

The *third and fourth pairs* are equal in length and similar in shape. The femur is narrow, linear, in the female as long as the three following joints together, in the male a little shorter. The genu is scarcely longer than broad; the tibia is almost twice as long as the genu, both joints smooth. The carpus is almost twice as long as the two preceding joints together, linear, fringed with some short, equidistant bristles along the hinder margin. The metacarpus is shorter than the metacarpus of the fifth and sixth pairs and a little shorter than the next preceding joint, tapering, feebly curved, and totally smooth. The dactylus is scarcely as long as a fourth of the metacarpus, pedunculated, feebly curved, with a heel at the hinder corner of the base; in this heel is an oblong aperture for the outlet of the glands which fill all the joints.

The *fifth and sixth pairs* are equal in length as long as the two preceding pairs, and a little longer than the peræon. The joints are similar to those of the two preceding pairs, except that the metacarpus is a little longer; all joints filled with glands.

The *seventh pair* (Pl. II, fig. 7 and 8) are considerably shorter than the sixth pair, reaching scarcely farther than to the apex of the carpus of that pair. The femur is narrow, feebly curved, only a little shorter than all the following joints together, but

much shorter than the femur of the sixth pair. The genu is longer than broad, a little shorter than the tibia. The carpus is wider than the other joints, elongate-ovate, with some few, short, equidistant bristles along the anterior margin. The metacarpus is much shorter than the carpus, tapering, the hinder margin curved. The dactylus equals a third of the length of the metacarpus; it is feebly curved, acute, of the same shape as in the preceding four pairs. Glands as in the preceding pairs.

The *pleon* is a little longer in the male, and the lateral parts reach farther down than in the female; the lateral parts of the last two segments are deeper than those of the first, they are all evenly rounded but shorter than the corresponding segment itself, not occupying the foremost part of the segment.

The *pleopoda* (Pl. II, fig. 9) are larger and more developed in the male than in the female, the peduncles being globular, and the rami containing some more articuli; in the male the inner ramus has five, the outer seven articuli, in the female the inner shows usually not more than three, the outer five articuli.

The first segment of the *urus* is a little longer than the coalesced second and third, and considerably more than half as long as the last pleonal segment.

The *uropoda* (Pl. II, fig. 10). The peduncle of the *first pair* is longer, but not twice as long as the inner ramus, narrow, linear; the outer ramus is narrow, acute, more than half as long as the inner, both margins smooth; the inner ramus is three times longer than the breadth of the peduncle in the female, and about four times that in the male; it is smooth along the inner convex margin, and strongly pectinated along the outer in the male, but serrated on both margins in the female. The *second pair* have the peduncle broader in the male than in the female; the outer ramus is more than half as long as the inner, the outer margin smooth, the inner serrated; the inner ramus is much longer than half the peduncle, elongate lanceolate, serrated on both margins. The *third pair* have the peduncle as broad as that of the preceding pair, in the male; in the female it is a little broader than the peduncle of the second pair; the peduncle is almost linear, more than twice as long as the rami; the outer ramus, with the outer margin indistinctly serrated, the inner serrated, is as long as the inner ramus, which is serrated on both margins, more coarsely on the inner; the inner ramus is much longer than the breadth of the peduncle. The uropoda are filled with *glandular* matter, the outlets of the glands are situated at the bases of the rami just at their points of contact.

The *telson* is broad, rounded behind, almost as broad as the peduncle of the last pair of uropoda.

### 3. PARAPHRONIMA CRASSIPES, C. CLAUS, 1879.

Pl. II, fig. 1.

**Diagn.** *Caput* longius quam altius, non duplo altius segmento primo peræi, nec segmenta quattuor prima peræi longitudine æquans. *Pedes peræi* fere robusti, femoribus angustis. Femur pedum primi paris articulis sequentibus conjunctis haud longius. Metacarpus pedum tertii

ac quarti parium metacarpo pedum quinti ac sexti parium brevior. Pedes quinti paris quam peræon longiores. Pedes septimi paris pedes sexti paris longitudine fere æquantes. Pedunculus *pedum uri* ultimi paris longitudine ramorum multo angustior. *Telson* triangulare.

The *head* is longer than deep, not twice as deep as the first peræonal segment, nor as long as the first four peræonal segments together. The *peræopoda* are almost robust, with narrow femora. The femur of the first pair is scarcely longer than all the following joints together. The metacarpus of the third and fourth pairs is shorter than that of the fifth and sixth pairs. The fifth pair are longer than the peræon. The seventh pair are almost as long as the sixth. The peduncle of the last pair of *uropoda* is much narrower than the length of the rami. The *telson* is triangular.

**Colour.** The body is yellowish, the head dark brown.

**Length.** ♂ 5—8 mm., ♀ 6—9 mm.

**Hab.** The tropical region of the Atlantic. (D. M.; F. M.; S. M.; U. M.). The Mediterranean (CLAUS).

**Syn. 1879.** *Paraphronima crassipes*, CLAUS.

»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Vol. 2, p. 65 and 66 (7 and 8), pl. 1, fig. 6—9; pl. 2, fig. 10.

» C. BOVALLIUS. 1885. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 11.

» J. V. CARUS. 1885. Prodrömus Faunæ Mediterraneæ. Vol. 1, p. 424.

» C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.

*Paraphronima crassipes*, has a comparatively smaller head, and more robust body and legs than the preceding species; by the shortness of the femora of the peræopoda and the length of the seventh pair it is to be distinguished from *P. gracilis*, by the narrower femora and by the length of the rami of the last pair of uropoda from *P. clypeata*.

The integument of the *body* is comparatively thick, of a yellow colour.

The *head* is almost globular, the under margin semi-circular; it is about a fourth deeper than the first peræonal segment, and distinctly longer than deep. It equals the length of the first three and half the fourth peræonal segments.

The *eyes* show not a distinct division of the ocelli into two aggregations on each side, the ocelli are placed closer to each others than in *Paraphronima gracilis*.

The *first pair of antennæ* (Pl. II, fig. 12) are robust and very long in the male, usually longer than the head; in the female they are longer than half the head, the first joint of the flagellum is lanceolate, the second is small tipped with two stout hairs.

The *second pair of antennæ*, (Pl. II, fig. 13) are similar to those of the preceding species.

The *peræon* is less convex than in *Paraphronima gracilis*, the segments slowly increasing in length from the first to the seventh.

The *branchial sacks* of the fifth and sixth pairs of peræopoda are longer or as long as half the corresponding femora.

The *first pair of peræopoda* (Pl. II, fig. 14) have the femur somewhat dilated, the hind margin convex; it is scarcely as long as the following joints together. The genu is smooth, shorter than long; the tibia longer, the lower hinder corner produced, armed as in the preceding species. The carpus is shorter than the two preceding joints together, narrower below than in *Paraphronima gracilis*. The metacarpus is considerably shorter than the carpus, robust, rapidly tapering. The dactylus is long, equalling a third of the length of the metacarpus.

The *second pair* have the femur considerably shorter than the following joints together. The carpus is half as long as the femur, and equals the length of the metacarpus, which has apical projections, similar to those of the preceding species.

The *third and fourth pairs*. The femur is much shorter than the three following joints together. The carpus is a little longer than the genu and tibia together. The metacarpus is shorter than the metacarpus of the fifth and sixth pairs, and a little shorter than the next preceding joint.

The *fifth and sixth pairs* are equal in length, a little longer than the peræon.

The *seventh pair* are only a little shorter than the sixth pair (7 : 8), reaching farther down than to the middle of the metacarpus. The femur is as long and as broad as the femur of the preceding pair, and is only a little shorter than the three following joints together.

All the joints of the peræopoda are provided with glandular cells as in the preceding species.

The *pleon*. The lateral parts of the segments are equal in depth, evenly rounded, as long as the corresponding segments.

The *pleopoda* (Pl. II, fig. 15) of the male are much smaller and more slender than in the preceding species, decreasing in size posteriorly. The number of articuli of the rami is the same in both sexes as in *Paraphronima gracilis*.

The first segment of the *urus* is twice as long as the coalesced second and third, and nearly as long as the last pleonal segment.

The *uropoda*. The peduncle of the *first pair* is broader than in the preceding species, a little longer than the inner ramus; the outer ramus is smooth, more than half the length of the inner; the inner ramus is more than three times as long as the breadth of the peduncle; it is serrated on both margins. The *second pair* have the peduncle much broader than the first pair, only a fifth longer than the inner ramus; the outer ramus is almost as long as the inner, smooth on the outer margin and serrated on the inner margin; the inner ramus is serrated on both margins; the second pair reach almost to the apex of the last pair. The *third pair* have the peduncle as broad as that of the second pair, not twice as long as the rami; the outer ramus with the outer margin smooth the inner serrated; the inner ramus with both margins serrated; the inner ramus much longer than the breadth of the peduncle.

The *telson* is triangular, narrower than the peduncle of the last pair of uropoda.

## 4. PARAPHRONIMA CLYPEATA, C. BOVALLIUS, 1885.

Pl. II, fig. 16—40.

**Diagn.** *Caput* altius quam longius, non duplo altius segmento primo peræi, nec segmenta quattuor prima peræi longitudine æquans. *Pedes peræi* curti, robusti, femoribus dilatatis. Femur pedum primi paris articulis sequentibus conjunctis haud longius. Metacarpus pedum tertii ac quarti parium metacarpo pedum quinti ac sexti parium longior. *Pedes* quinti paris, quam peræon breviores. *Pedes* septimi paris pedibus sexti paris paullo breviores. Latitudo pedunculi *pedum uri* ultimi paris longitudinem ramorum æquans vel superans. *Telson* parvum, obtuse triangulare.

The *head* is deeper than long, not twice as deep as the first peræonal segment, nor as long as the first four peræonal segments together. The *peræopoda* are short, robust, with dilated femora. The femur of the first pair is scarcely longer than all the following joints together. The metacarpus of the third and fourth pairs is longer than that of the fifth and sixth. The fifth pair are shorter, than the peræon. The seventh pair are a little shorter than the sixth. The breadth of the peduncle of the last pair of *uropoda* equals or is greater than the length of the rami. The *telson* is small, obtusely triangular.

**Colour.** Light yellow to brown.

**Length.** ♂ 6—14 mm., ♀ 6—15 mm.

**Hab.** The northern temperate region of the Atlantic (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.); the tropical region of the Pacific (S. M.).

**Syn. 1885.** *Paraphronima clypeata*, C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 11, fig. 3.  
 »           »           »           1887. »Systematical list of the Amphipoda Hyperideæ.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.  
 1887.       »           *pectinata*       »           l. c. p. 13.

*Paraphronima clypeata*, it may be considered a species or a variety, has some characteristics in common with *P. gracilis* and others with *P. crassipes*. The large head and the pectinate ramus of the first pair of uropoda in the male point to the former, the robust legs and the length of the seventh pair of peræopoda to the latter.

The integument of the *body* is thick and hard; the body is more compressed than in the other species.

The *head* is rounded as in *Paraphronima crassipes* but the under margin is nearly straight; it is about the half deeper than the first peræonal segment, and almost as long as deep. It is scarcely longer than the first three peræonal segments together.

The *eyes* are similar to those of *P. crassipes*, but there is some appearance of a division into a median and a lower portion.

The *first pair of antennæ* (Pl. II, fig. 23 and 24) of the male are shorter and more obtuse than in the other species; they are scarcely half as long as the head, in the male, and about a third of the length of head, in the female. The first joint of the peduncle is four times longer than the two following joints, in the male, in the female it is three times longer; the second joint is a little longer than the third. The first joint of the flagellum is scarcely twice as long as the whole peduncle. In the female the third and second flagellar joints are distinct; they are very minute, the last provided with three or four short hairs; in the male the terminal joints are obsolete. The olfactory bristles are stout, long, cylindrical, with a narrow neck, fixed at a small, round disk.

The *second pair of antennæ* (Pl. II, fig. 25, 26 and 27) are similar to those in *Paraphronima gracilis*.

The *mouth-organs* form an obtuse cone at the lower hinder corner of the head, just behind the bases of the second pair of antennæ.

The *labrum* (Pl. II, fig. 28) is very broad, emarginate at the lower hinder margin, and covered with minute hairs.

The *mandibles* (Pl. II, fig. 29 and 30) are large and strong, without palp and molar tubercle, terminating with an incisive process crenulated with seven rounded teeth; at the base of the process there are some short hairs. At the inside of the process is an outlet for a strongly developed gland, which occupies the interior of the stem of the mandible. The left mandible has an accessory process, thin, feebly hollowed, provided with a finely denticulated edge.

The *first pair of maxillæ* (Pl. II, fig. 31) consist of two laminae, the inner, or principal lamina, is broad at the base, terminating into a tongue-shaped process armed at apex with two very stout spines and about a dozen bristles; the outer, or secondary lamina, articulates with the outer side of the principal lamina, it is feebly curved, with a bristle at apex, and a minute one on the outer margin.

The *second pair of maxillæ* (Pl. II, fig. 32) consist of two laminae, both broadly rounded at apex, and fringed with short bristles, the secondary lamina is a little narrower than the principal one.

The *maxillipeds* (Pl. II, fig. 33 and 34). The basal portion is narrow, the usually free two lobes or palps are here coalesced into a broad, scoop-like covercle which conceals almost the whole of the mouth-organs.

The *peræon*. The first segment is a little longer than the second, the seventh the longest, but much shorter than the first pleonal segment.

The *first pair of peræopoda* (Pl. II, fig. 16 and 32) have a dilated, elongate-ovate femur only three times longer than broad, and scarcely longer than all the following joints together. The carpus is comparatively longer and narrower than in the two preceding species; the under margin is not straight, more or less convex; at the lower hinder corner it carries one or two stout, short spines; the posterior margin is almost straight. The metacarpus is considerably shorter than the carpus, with two short spines at the apex. The dactylus is pedunculated, robust, of the same shape as in *Paraphronima gracilis*, equalling a fourth of the length of the metacarpus.

The *second pair* (Pl. II, fig. 17, 18 and 36). The femur is a little longer but scarcely narrower than in the first pair; it is shorter than the following joints together. The carpus is half as long as the femur, much longer than the metacarpus, which has the apical projections larger, broader, and more gauge-shaped than in the preceding species. The dactylus has an appendicular tooth near to the apex.

The *third and fourth pairs*. The femur is dilated elongate-ovate, almost as long as the three following joints together. The tibia is a little longer than the genu. The carpus is a little longer than the two preceding joints together, somewhat dilated, the hind margin convex. The metacarpus is longer than the metacarpus of the fifth and sixth pairs, and fully as long as the next preceding joint. The dactylus is longer than a fourth of the metacarpus.

The *fifth and sixth pairs* (Pl. II, fig. 37) are as long as the two preceding pairs, and considerably shorter than the peræon. The femur is dilated, a little shorter than the three following joints together. The carpus is much longer than the metacarpus.

The *seventh pair* (Pl. II, fig. 19 and 38) are only a little shorter than the sixth pair, reaching farther down than to the middle of the metacarpus. The femur is more dilated than in the preceding pairs, fully as long as the femur of the sixth pair, and equalling the three following joints together in length. The carpus is usually very dilated, more or less ovate. The metacarpus is curved, somewhat more than half as long as the carpus.

All the joints of the peræopoda are provided with glands which will be spoken of more closely in the morphological part of this treatise.

The *pleon* is comparatively longer than in the three preceding species, and the lateral parts reach farther down, the first two being as long as the corresponding segments, evenly rounded below, those of the third segment are produced backwards longer than the segment, the lower hinder corner obtusely rounded.

The *pleopoda* (Pl. II, fig. 20 and 39) are much larger in the male than in the female, the peduncles being almost three times longer than the rami, swollen, globular; in the female they are not twice as long as the rami, more or less egg-shaped. The number of articuli of the rami is the same in male and female, six in the inner ramus and eight in the outer.

The *urus*. The first segment is about as long as the coalesced second and third, and half as long as the last pleonal segment.

The *uropoda* (Pl. II, fig. 21 and 40). The peduncle of the *first pair* is narrow, linear, almost twice as long as the inner ramus; the outer ramus is narrow, almost styliform, smooth, shorter and narrower in the female than in the male; the inner ramus is three times longer than the breadth of the peduncle in the male, somewhat shorter in the female; the outer margin is pectinated in the male and serrated in the female, in both sexes the inner margin is smooth on the upper half, and feebly serrated on the lower. The peduncle of the *second pair* is broad, a little longer than the inner ramus; the outer ramus is shorter than the inner, narrow, smooth on the outer margin, serrated along the inner; the inner ramus is almost twice as broad as the outer, serrated on both margins. The peduncle of the *third pair* is broader than that of the second pair, nearly three times

as long as the inner ramus, finely serrated on the lower part of the inner margin; the rami are equal in length; the outer ramus is smooth on the outer margin, serrated on the inner; the inner ramus is shorter than the breadth of the peduncle, serrated on both margins. Glands as in *Paraphronima gracilis*.

The *telson* is small, triangular, half as narrow as the peduncle of the last pair of uropoda.

Genus 2. **EUDAIRA**, H. MILNE EDWARDS,<sup>1)</sup> 1830.

**Diagn.** *Corpus* gracile, leviter compressum, retrorsum angustius. *Pedes perœvi* primi et secundi parium carpos dilatatos gerentes. Carpus pedum secundi paris valde productus, simul cum metacarpo chelam formans. Pedunculi *pedum uri*, elongati, lineares, ramis longis, acutis instructi.

The *body* is slender, somewhat compressed, narrowing backward. The carpi of the first and second pairs of *perœopoda* are dilated. The carpus of the second pair is very produced, together with the metacarpus forming a chela. The peduncles of the *uropoda* are elongate, linear, with long, sharp-pointed rami.

<b>Syn. 1830.</b>	<i>Daira</i> , H. MILNE EDWARDS.	—	»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. Sc. Nat. Tome 20:me, p. 392.
»	»	—	Histoire Naturelle des Animaux sans vertèbres par J. B. P. DE LAMARCK, 2:me Édition par G. P. DESHAYES et H. MILNE EDWARDS. Tome 5:me, p. 305.
»	»	H. LUCAS.	1840. <sup>2)</sup> Histoire Naturelle des Crustacés, des Arachnides et des Myriapodes, p. 235.
»	»	H. MILNE EDWARDS.	1840. Histoire Naturelle des Crustacés. Tome 3:me, p. 83.
»	»	H. LUCAS.	1849. »Daira», Dictionnaire universel d'Histoire Naturelle, dirigé par d'Orbigny. Tome 4:me, p. 592 bis.

<sup>1)</sup> I cite the name of the first founder of a genus after a corrected form of his original generic name, as here *Eudaira*, H. MILNE EDWARDS, because, I think that the definition of a generic division is of a greater importance to science than the more or less carefully elaborated form of the name, originally chosen by the founder for designating it. As such corrections I regard the rectification of wrong writing or spelling, or the applying of one of some few prefixes where the original name may be found preoccupied, as such prefixes I propose »eu» »para» and »pseudo»; but when the original preoccupied name is composed of more than four syllables, or already possesses one of these prefixes, I think it better from practical reasons to give a new name.

<sup>2)</sup> In 1851 appeared the same work only with a new title, the letterpress is the same (see the bibliography. Part. III).

	<i>Daira</i> , H. MILNE EDWARDS,	DANA.	1852.	United States Exploring Expedition. Crustacea. Vol. 2, p. 981.
1852.	<i>Dairinia</i> DANA	»	»	l. c. p. 1442. (P. 1519 <i>Dairilia</i> .)
	»	»		
		SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 309.
1885.	? <i>Paraphronima</i> , CLAUS.	C. BOVALLIUS.		»On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 8.

The original generic diagnose of H. MILNE EDWARDS runs as follows:

»Tête grosse et renflée; antennes styliformes et rudimentaires; thorax conique, très-étroit postérieurement et ayant le premier segment très-court; pattes des deux premières paires portant une main imparfaitement didactyle, dont le doigt mobile est formé par les deux derniers articles; abdomen comme dans le genre *Hypérie*.»

*Daira* was mentioned later by H. MILNE EDWARDS and H. LUCAS, as will be seen from the list of synonyms above, and some few characteristics were added, but unfortunately no drawing was given. In 1852 DANA quotes *Daira* and proposes for it the new name *Dairinia* or *Dairilia*, *Daira* being preoccupied by LEACH for a genus of crabs. But as he totally misunderstood the diagnosis of MILNE EDWARDS and applied the new name on animals belonging to a widely distant family of Hyperids, the *Lycæidæ*, the name *Dairinia* must be rejected, and the original one, with a slight correction, restituted.

From *Paraphronima* this genus is distinguished by the cheliform second pair of peræopoda. Most of the other characteristics quoted by MILNE EDWARDS as generic have probably only specific value, and are mentioned below in the description of the species.

## 1. EUDAIRA GABERTII, H. MILNE EDWARDS, 1830.

**Diagn.** *Caput* magnum, tumidum. Antennæ primi paris feminæ, curtæ subulatæ. Segmentum primum *peræi* brevissimum. Processus carpi *pedum peræi* secundi paris metacarpo paullo brevior. Pedes tertii ac quarti parium pedibus quinti ac sexti parium multo longiores.

The *head* is large, tumid. The first pair of antennæ in the female are short, subulate. The first *peræonal* segment is very short. The carpal process of the second pair of *peræopoda* is a little shorter than the metacarpus. The third and fourth pairs are much longer than the fifth and sixth.

**Colour.** ?

**Length.** 9—10 mm.

**Hab.** »The Indian Ocean, captured by the officers of »La Chevrette» (H. MILNE EDWARDS).

<b>Syn. 1830.</b>	<i>Daira Gabertii</i> ,	H. MILNE EDWARDS.	—	»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes.» Ann. Sc. Nat. Tome 20:me, p. 393.
	»	»	—	1840. Histoire Naturelle des Crustacés. Tome 3:me, p. 83.
	»	»	H. LUCAS.	1849. »Daira.» Dictionnaire universel d'Histoire Naturelle. Dirigé par d'Orbigny. Tome 4:me, p. 592 bis.
	<i>Dairinia Gabertii</i> ,	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 309.
	? <i>Paraphronima Gabertii</i> ,	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 14.

Here follow the characteristics which are to be found in the generic and specific descriptions given by H. MILNE EDWARDS.

The *head* is very large, less elevated than the *peræon*, and almost entirely occupied by the eyes.

The (*first pair of*) *antennæ* are very short, subulate, much resembling the second pair of *antennæ* in the female of *Hyperia*.

The *peræon* is not inflated in the middle as in *Hyperia Latreillei*, but gradually diminishing in size backward. The first segment is very narrow, and almost entirely concealed by the second.

The *first two pairs of peræopoda* are very small, compressed, similar in shape. The carpal process of the first pair is very small, that of the second pair is long, almost as long as the metacarpus. The *dactylus* is curved.

The *third and fourth pairs* are longer than the fifth and sixth.

The peduncles of the *pleopoda* are longer and more slender than in *Hyperia*; the rami are almost linear.

The *urus* resembles that in *Hyperia*, but the rami of the *uropoda* are elongate-lanceolate, acute.

The sixth family **THAUMATOPSIDÆ**, C. BOVALLIUS, 1886.

**Diagn.** *Caput* maximum, tumidum. *Corpus* magnum, tumidum. *Oculi* grandes, partem superiorem capitis occupantes. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, articulis paucis compositæ. *Antennæ* secundi paris obsoletæ. *Instrumenta oris* masticatoria, mandibulæ palpo carentes. *Pedes peræi* septimi paris non transformati.

The *head* is very large, tumid. The *body* is large, tumid. The *eyes* are large, occupying the upper part of the head. The first pair of *antennæ* are straight, fixed at the anterior side of the head, few-jointed. The second pair are obsolete. The *mouth-organs* are adapted for mastication; the mandibles without palp. The seventh pair of *peræopoda* are not transformed.

- Syn. 1885.** *Cystisomida*, R. VON WILLEMOËS-SUHM<sup>1</sup> — »On some Atlantic Crustacea from the Challenger Expedition». Trans. of the Linnean Society. Ser. II, Zoology, vol. 1, part 1, p. 2.
- » » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1317.
- 1886.** *Thaumatopsida*, C. BOVALLIUS. — »Remarks on the genus Cysteosoma or Thaumatops». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 4.

The strange-looking, colossal Hyperids, belonging to the genus *Thaumatops*, were called »the giants among the Hyperids» by the first describer of the genus, F. E. GUÉRIN-MÉNEVILLE. They differ in so very important points from the other known genera, that they must form a family of their own, as already v. WILLEMOËS-SUHM observed in his above cited paper on Challenger-crustacea. The first pair of antennæ show by their form, that the family must be placed close to the *Tyronidæ*, *Lanceolidæ* and *Mimonectidæ*. The general habitus of *Thaumatops* comes perhaps nearest to *Phrosina* and *Euprimno*, but systematically it is widely distant from them. The mouth-organs resemble most those in *Paraphronimidæ*, and by this reason *Thaumatopsidæ* have been placed here as the sixth family, next to *Paraphronidæ*.

The author of the first description of the genus, F. GUÉRIN-MÉNEVILLE, in 1842<sup>1)</sup> presumed that it ought to be ranged in the family »Hypérines normales» H. MILNE-EDWARDS, between the genera *Themisto* and *Daira*. J. J. DANA in 1852<sup>2)</sup> mentions it in the second subfamily: *Hyperinæ* of the family *Hyperidæ* next to *Dairinia*. C. SPENCE-BATE<sup>3)</sup> (1862) places it in the family *Hyperidæ*, between *Dairinia* and *Themisto*. R. WILLEMOËS-SUHM thought, as mentioned above, that it ought to be established as a new family,

<sup>1)</sup> Revue zoologique. Année 1842, p. 215.

<sup>2)</sup> U. S. Expl. Exp. Crustacea, vol. 2, p. 1442.

<sup>3)</sup> Catal. Amph. Crust. Brit. Museum, p. 311.

which he would call *Cystosomidæ*. In the above cited paper I proposed the name Thaummatopsidæ for the family, it being unfit to employ a family name which is not derived from a generic name in use within the family, and when *Cysteosoma*, *Cystisoma* or *Cystosoma* was justly rejected as being preoccupied, I could not maintain the proposed name *Cystisomidæ* or rather *Cystisomatidæ*, as it ought to have been written. TH. STEBBING, however, regarded my reasons for rejecting the old name as not valid, and restored both the names viz; *Cystisoma* and *Cystisomidæ*, presuming that ethymological correctness is not needed in writing zoological names, and that the difference between *Cystisoma* and *Cystosoma* is sufficient to allow the keeping of both alive, although both really are the same name. I cannot but oppose this opinion and still believe that each genus must have a name by itself, orthographically written. Therefore I still retain the names Thaumtops and Thaummatopsidæ.

The biological notices about the members of the family are very meagre. We only know that the most of the very few hitherto recorded specimens, the seven captured during the Challenger Expedition, have been dredged from a depth varying from 500 to 2500 fathoms; the previously known specimens were taken floating on the surface of the sea, as far as I could ascertain.

The enormous size of the body seems to be in some way connected with the animal's power of floating and diving, as the most of the interior of the body is occupied by a kind of vesicle filled with some fluid. It is very probable that the animal possesses means to change its specific gravity by compressing or dilating the vesicular room thus increasing or diminishing the amount of fluid in it, but I have not been able to detect neither muscles on the walls of the vesicle, nor any outlet from it.

As to their geographical distribution, they must be considered as chiefly tropical or subtropical animals, they are, however, widely spread out over the surface of the seas and probably more widely than most of the other Hyperids owing to their strongly developed floating powers.

Hitherto the family contains only one genus.

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Genus 1. **THAUMATOPS**, R. VON WILLEMOËS-SUHM, 1873.

**Diagn.** *Caput* plus minusve sphericum. *Antennæ* secundi paris tubercula minima formant. *Pedes peræi* primi et secundi parium cheliformes. *Epimera* indistincta. *Pedes vri* crassi, ramis internis cum pedunculis coalitis; pedes secundi paris desunt.

The *head* is more or less spherical. The second pair of *antennæ* form very small tubercles. The first and second pairs of *peræopoda* are cheliform. The epimirals are indistinct. The *uropoda* are thick, prismatic; the inner rami are coalesced with the corresponding peduncles; the second pair are wanting.

- Syn. 1842.** *Cystisoma*, F. E. GUÉRIN-MÉNEVILLE. »Description d'un Crustacé amphipode, formant un genre nouveau dans la famille des Hypérines». Revue Zoologique. Année 1842, p. 215.
- » » J. D. DANA. 1852. »On the classification of the Crustacea Choristopoda or Tetradecapoda». Amer. Journ. of Science and Arts. Ser. 2. Vol. 14.
- » » » 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 971 and 1442.
- » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 311.
- » » R. VON WILLEMOËS-SUHM. 1874. »The largest Amphipod». Nature. Vol. 9, p. 182.
- » » » 1875. »Briefe von R. von Willemoës-Suhn an C. Th. E. von Siebold», III. Zeitschr. f. wiss. Zool. Bd. 25, p. 37.
- Cystisoma* » » 1875. »On some Atlantic Crustacea from the Challenger Expedition». Trans. Linn. Soc. Lond. Ser. 2. Zoology. Vol. 1, part 1, p. 25.
- » » » 1876. »Report to Professor Wywille Thomson F. R. S.» Proc. Roy. Soc. Lond. Vol. 24, p. 570.
- Cystosoma*, » WYWILLE THOMSON. 1877. The voyage of the »Challenger». The Atlantic. Vol. 1, p. 129.
- » » H. A. PAGENSTECHER. 1879. Ueber die Thiere der Tiefsee, p. 39.
- » » (TH. STEBBING.) 1885. Narrative of the cruise of H. M. S. Challenger. Vol. 1, p. 129.
- » » A. GERSTAECKER. 1886. Bronn's Klassen und Ordnungen des Thierreichs. Bd. 5. Arthropoda. Abth. 2, 490.
- » » TH. STEBBING. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1318.

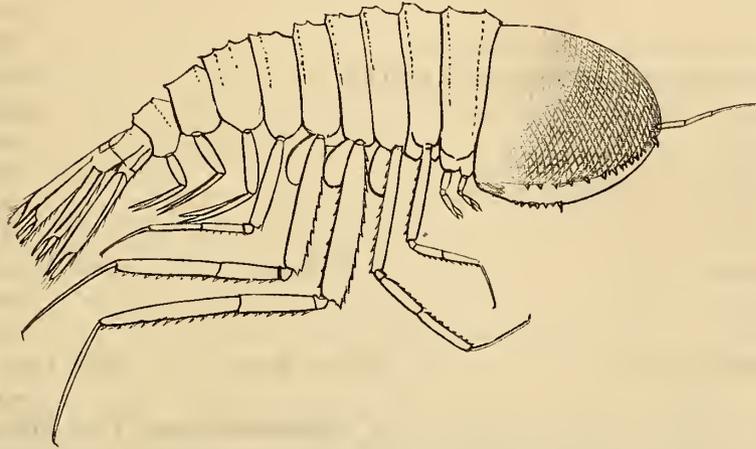
1873.	<i>Thaumops</i> ,	R. VON WILLEMOËS-SUHM.	»On a new genus of Amphipod Crustaceans». Proc. Roy. Soc. Lond. Vol. 21, p. 206.
»	»	»	1874. »On a new genus of Amphipod Crustaceans». Phil. Trans. Roy. Soc. Lond. Vol. 163, part. 2, p. 629.
	<i>Thaumatops</i> ,	E. v. MARTENS.	1875. The Zoological Record for 1873. Crustacea, p. 189.
»	»	C. BOVALLIUS.	1886. »Remarks on the genus <i>Cysteosoma</i> or <i>Thaumatops</i> ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 5.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 14.
»	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 5.

In my previous papers on Amphipoda Hyperiiidea I have overlooked the early description of *Oniscus spinosus* made in 1775<sup>1)</sup> by J. C. FABRICIUS. Already from the description itself it seems clear that the animal in question is a *Thaumatops*, this is proved beyond doubt lately by the Rev. TH. STEBBING in his Report on Challenger-Amphipoda. He has had access to the drawings of the original specimen, belonging to the Museum Banksianum, now preserved in the British Museum, and has compared the drawings with the description of FABRICIUS and with the Challenger-specimens. To him we thus owe the restoration of the old specific name and its identification with the later names of GUÉRIN-MÉNEVILLE and v. WILLEMOËS-SUHM. After the thorough examination and comparison made by STEBBING, I think it quite right to follow him in uniting under the old specific name, given by FABRICIUS, *Cystissoma Neptunus*, GUÉRIN-MÉNEVILLE and *Thaumops pellucida*, v. WILLEMOËS-SUHM. The species *Thaumatops Loveni* and *Th. longipes* in the contrary seem to be pretty well distinguished from *Thaumatops spinosa*, J. C. FABRICIUS, at least until a more rich material will provide us with specimens intermediate in characteristics.

Thus the genus contains three species.

- A. The first two peræonal segments are coalesced. The head is longer than the first four peræonal segments ..... 1. *Th. spinosa*.
- B. The first two peræonal segments are free, not coalesced.
- b 1. The head is longer than the first four peræonal segments ..... 2. *Th. longipes*.
- b 2. The head is shorter than the first three peræonal segments ..... 3. *Th. Loveni*.

<sup>1)</sup> Systema Entomologiæ, p. 298.

1. **THAUMATOPS SPINOSA**, J. C. FABRICIUS, 1775.*Thaumatops spinosa*, J. C. FABRICIUS.Facsimile from GUÉRIN-MÉNEVILLE, *Revue Zoologique*, 1842, pl. 1, fig. 1.

**Diagn.** *Caput* segmentis quattuor primis peræi conjunctis longius, altius quam longius. Segmentum primum et secundum *peræi* coalita. Femur *pedum peræi* primi paris articulos quattuor sequentes conjunctos longitudine æquans. Pedes quinti paris quam *peræon* et *pleon* conjuncta longiores, pedibus septimi paris plus quam duplo longiores; femur metacarpo haud longius. Ramus externus *pedum uri* ultimi paris latitudine peduneuli plus quam duplo longior.

The *head* is longer than the first four *peræonal* segments together, deeper than long. The first and second *peræonal* segments are coalesced. The femur of the first pair of *peræopoda* is as long as the four following segments together. The fifth pair are longer than the *peræon* and *pleon* together, more than twice as long as the seventh pair; the femur is scarcely longer than the metacarpus. The outer ramus of the last pair of *uropoda* is more than twice as long as the breadth of the peduncle.

**Colour.** Yellowish, pellucid.

**Length.** 90 mm. (GUÉRIN's specim.) to e:a 110 mm. (Spec. typ. Banksianum) 45—104 mm. (Challenger spec.).

**Hab.** The temperate and tropical regions of the Atlantic (J. C. FABRICIUS; Chall. Ex.), the (African) Arctarctic region (J. D. HOOKER, teste STEBBING), the Indian Ocean (GUÉRIN-MÉNEVILLE; Chall. Ex.), the tropical region of the Pacific (Chall. Ex.).

**Syn. 1775.** *Oniscus spinosus*, J. C. FABRICIUS. — Systema Entomologiæ, p. 298.  
 " " " — 1781. Species Insectorum. Tom. 1, p. 377.  
 " " " — 1787. Mantissa Insectorum. Tom. 1, p. 241.  
 " " " J. F. GMELIN. 1788. Caroli Linnæi Systema Naturæ, editio decima tertia. Tom. 1, pars 5, p. 3010.

- Cymothoa spinosa*, J. C. FABRICIUS. J. C. FABRICIUS. 1793. Entomologia systematica. Tom. 2, p. 508.
- Cystisoma spinosum*, " TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1319, pl. 154, 156.
1842. *Cystisoma Neptunus*, GUÉRIN-MÉNEVILLE. — »Description d'un Crustacé amphipode formant un genre nouveau dans la famille des Hypérines». Revue Zoologique. Année 1842, p. 215.
- " " " J. D. DANA. 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 981.
- Cystosoma Neptuni*, " SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 311, pl. 50, fig. 7.
- " " " R. V. WILLEMOES-SUHM. 1874. »The largest Amphipod». Nature, vol. 9, p. 182.
- Cystisoma Neptunus*, " " 1875. »On some Atlantic Crustacea from the Challenger Expedition». Trans. Linn. Soc. Lond. Ser. 2. Zoology, vol. 1, part 1, p. 24, 25, pl. 11, fig. 4--8.
- " " " " 1876. »Report to Professor Wywille Thomson. F. R. S.» Proc. Roy. Soc. Lond. Vol. 24, p. 570.
- Cystosoma Neptuni*, " WYWILLE THOMSON. 1877. The voyage of the »Challenger». The Atlantic. Vol. 1, p. 129.
- " " " H. A. PAGENSTECHER. 1879. Ueber die Thiere der Tiefsee, p. 39.
- " " " J. S. KINGSLEY. 1884. The Standard Natural History. Vol. 2, p. 74, fig. 101.
- Thaumtops Neptunus*, " C. BOVALLIUS. 1886. »Remarks on the genus Cystosoma or Thaumtops». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 6.
- " " " " 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 14.
1873. *Thaumops pellucida*, R. V. WILLEMOES-SUHM. »On a new genus of Amphipod Crustaceans». Proc. Roy. Soc. Lond. Vol. 21, p. 206.

<i>Thaumops pellucida</i> , R. v. WILLEMOËS-SUHM.	1874.	»On a new genus of Amphipod Crustaceans». Phil. Trans. Roy. Soc. Lond. Vol. 163, p. 629 and 637, pl. 49 and 50.
»           »           »	J. S. KINGSLEY. 1884.	The Standard Natural History. Vol. 2, p. 74, fig. 99.
<i>Thaumatops</i> »           »	C. BOVALLIUS. 1886.	»Remarks on the genus <i>Cysteosoma</i> or <i>Thaumatops</i> ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 8.
»           »           »           »	»           »           »           »	1887. »Systematical list of the Amphipoda Hyperideae». Bib. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 14.

STEBBING describes in an exhaustive manner two of the eight specimens collected during the Challenger-Expedition, a male and a female; of the remaining six he points out two as possibly distinct species viz: »*Cystisoma*, specimen *B*», which, if established as a species by itself, he would call *C. Parkinsoni*, and »specimen *C*», which eventually ought to be named *C. Fabricii*. The former comes very near to *Thaumatops longipes*, the latter resembles *Thaumatops Lovéni* in the shape of the metacarpus of the last pair of pereopoda, in other respects it seems to be closer connected with *Thaumatops spinosa*. The tabular view below (p. 58) will show the measurements of the hitherto known specimens, as far as I have been able to pick them up from descriptions and drawings. These measurements will prove, I suppose, that there is closer relationship between *Thaumatops spinosa* and *Th. longipes* than between *Thaumatops Lovéni* and the two mentioned species.

Here follows description only of GUÉRIN-MÉNEVILLE's specimen extracted from his diagnosis and drawing.

For a full account of the species I refer to the above quoted work of STEBBING.

The *head* is broader and deeper than the *peræon*, obtusely egg-shaped, almost as long, the first five *peræonal* segments together, measuring 25 mm. in length. From the bases of the antennæ runs on each side a row of 13 small teeth or spines; on the under side of the head there is another row of small spines on each side.

The *first pair of antennæ* are three-jointed, the last joint the longest; they are shorter than the head, 15 mm. long.

The segments of the *peræon* are high, inflated, the first and second are coalesced, longer than the third segment. The fourth, fifth and sixth segments are equal in length, the seventh longer, but shorter than the coalesced first and second, and shorter than the first pleonal segment. They show all a sharp median keel along the dorsal side, with two spine-like prominences on each segment, except the seventh which has three.

The *epimerals* are coalesced with the lateral parts of the corresponding segments.

Stout *branchial sacks* are attached to the fourth to sixth pairs of pereopoda.

The *first pair of peræopoda* are small, equalling a fifth of the length of the third pair. The femur is almost as long as the four following joints together. The metacarpus is a little longer than the carpal process.

The *second pair* are a little longer than the first, and a little longer than a fourth of the third pair. The femur is fully as long as the four following joints together. The metacarpus is a little longer than the carpal process.

The *third pair* are a third shorter than the fourth. The femur is about as long as the three following joints together; the tibia is a little shorter than the carpus; the metacarpus is longer than the carpus.

The *fourth pair* are similar to the third in shape, and in the relative length of the joints.

The *fifth pair* are longer than the peræon and the pleon together (14: 11), and more than twice as long as the seventh pair. The femur is a little longer than the carpus or the metacarpus, which are subequal. The carpus is much longer than the tibia.

The *sixth pair* are much longer than the seventh. The femur is a third longer than the femur of the seventh pair; the carpus is longer than the tibia, the metacarpus longer than the carpus.

The *seventh pair*. The femur is almost as long as the tibia and carpus together; the metacarpus is as long as the carpus.

The *pleonal* segments are carinated as the peræonal ones; the first segment with three spine-like prominences, the second and third with two each. The first segment is the longest, the following are equal.

The segments of the *urus* are carinated; the second and third are coalesced, shorter than the first.

The *first pair of uropoda* reach almost to the apex of the last pair. The outer ramus of the last pair is as long as the coalesced inner one, and much longer than the breadth of the peduncle.

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The original diagnosis of J. C. FABRICIUS in 1775 runs:

(Oniscus.) »Spinus 13. O. oblongus, corpore spinoso, pellucido.

»Habitat in Oceano Atlantico. Mus. Dom. Banks.

»Corpus medium, gelatinoso-membranaceum, pellucidum. Caput magnum rotundatum, obtusum, marginibus spinulosis. Oculi maximi, contigui. Antennæ duæ simplices, setaceæ. Segmenta corporis undecim sensim angustiora, carinata, carina spinulosa. Abdomen subtus foliolis sex ovatis obtegentibus. Cauda brevis, foliolis quatuor bifidis. Pedum septem paria, 1, 2, brevia, chelata approximata, 3, 4, 5, 6, longiora, angulata, angulis spinulosis, articulo ultimo subulato, simplici, 7, breve, articulo ultimo clavato, unguiculato.

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2. **THAUMATOPS LONGIPES**, C. BOVALLIUS, 1886.

Pl. III, fig. 1—16.

**Diagn.** *Caput* segmentis quattuor primis peræi conjunctis longius. Segmenta duo priora *peræi* libera, non coalita. Femur *pedum peræi* primi paris articulis quattuor sequentibus conjunctis longius. Pedes quinti paris quam peræon et pleon conjuncta multo longiores, pedibus septimi paris ter fere longiores; femur pedum quinti paris metacarpo multo longius. Femur sexti paris femore septimi paris duplo longius. Ramus externus *pedum vri* ultimi paris latitudine pedunculi duplo fere longior.

The *head* is longer than the first four peræonal segments together. The first two *peræonal* segments are free, not coalesced. The femur of the first pair of *peræopoda* is longer than the four following joints together. The fifth pair are much longer than the peræon and pleon together, and almost three times as long as the seventh pair; the femur of the fifth pair is much longer than the metacarpus. The femur of the sixth pair is twice as long as the femur of the seventh pair. The outer ramus of the last pair of *wropoda* is almost twice as long as the breadth of the peduncle.

**Colour.** Whitish, pellucid.

**Length.** 52—55 mm.

**Hab.** Off the West coast of Australia. (D. M.) Northern temperate region of the Atlantic, at Lat. 59° 38' N., Long. 5° 24' W. (D. M.).

**Syn.** 1886. *Thaumatops longipes*, C. BOVALLIUS. »Remarks on the genus Cysteosoma or Thaummatops». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 13, fig. 15—23.  
 »       »       »       1887. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 13.  
 »       »       »       1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 558.

The *head* is broader than the peræon, and much deeper, it is fully as long as the first four peræonal segments together, in specimen *A.* 13 mm., in specimen *B.*<sup>1)</sup> 12 mm. long. The foremost part of the head is almost truncated, showing on either side of the base of the antennæ a broad, flattened, prominent tooth. From this tooth runs on each side along the lower part of the head a row of 14—18 small, sharp-pointed, equidistant teeth to the hinder margin of the head, just above the mouth-organs. On the under-side of the head there are two short rows of smaller, similar spine-like teeth running from the conical tubercles which represent the second pair of antennæ.

The *eyes* occupy the upper surface of the head, they are contiguous only on the anterior half of their length, widely separated at the posterior ends. The ocelli are placed

<sup>1)</sup> Specimen *A.* from the Indian Ocean, off the West coast of Australia; Specimen *B.* from the Northern Atlantic.

close together in regular rows, ending in hexagonal facets in the surface. Each eye occupies a perfect ovate area of the surface of the head.

The *first pair of antennæ* (Pl. III, fig. 3 and 4) are long, narrow, straight, almost twice as long as the head (in specimen *A.* they were broken), measuring 25 mm. in length. The peduncle consists of two joints, the first egg-shaped, three times longer than the second. The first joint of the flagellum is very long and narrow, the dorsal line forming a keel which is finely serrated on the first fourth of the length of the joint. The under-side is widening, somewhat hollowed, fringed with fine, short hairs, which are longer along the first fourth of the length of the joint. The distal end is produced into two triangular teeth. Between these teeth extends the minute, narrow, cylindrical second joint of the flagellum.

The *second pair of antennæ* are represented by two conical tubercles on the under-side of the head, in front of the mouth-organs.

The *mouth-organs* are similar to those in *Thaumatops Lovéni*, and will be described below.

The *peræon* has the segments less high and inflated than in the other species, and also the dorsal keel less distinct. The first two segments reach much deeper down than the following, the first deeper than the second. The first segment is fully as long as half the second, with one spine-like prominence at the hinder corner of the keel, the hinder margins of the segment are smooth without tubercles or denticles. The second segment is the longest of all, armed with two spine-like prominences on the dorsal keel, and a row of small tubercles along the hinder margins. The third to sixth segments are equal in length, armed as the second segment. The seventh is longer than the sixth, but still considerably shorter than the second, armed as the next preceding segments. Along the lower side of the last five segments runs an elevated ridge or keel, which continues along the pleonal, and the first ural segments. This lateral ridge is perfectly smooth on the peræon, but feebly spinulous on the pleon. The peræon is about 22 mm. in length.

The *epimerals* are coalesced with the lateral parts of the corresponding segments.

The *branchial sacks* (Pl. III, fig. 15) exist only on the fourth to sixth pairs of peræopoda, they are shorter than a third of the length of the corresponding femora.

The *first pair of peræopoda* (Pl. III, fig. 5—7) equal about a third of the length of the third pair. The femur is longer than the four following joints together, prismatic as all the joints of the peræopoda; along the anterior, outer margin it is provided with fine, straight, or somewhat curved, long teeth; on the lower part of the hind margin it carries two broad but low teeth; the hinder, lower corner of the joint is produced into a strong, curved tooth. The genu is twice as broad as long, smooth, the hinder lower corner produced into a long, curved tooth, longer than in the preceding joint. The anterior margin of the tibia is very short, the hind margin four times longer, feebly curved, and provided with some few hairs at the apex and a little above. The anterior margin of the carpus is strongly curved, shorter than the anterior margin of the metacarpus, smooth, with a single spine at the lower corner; the carpal process is broad, stout, as long as the rest of the carpus, ending in a strong, sharp tooth, the hind margin has four sharp-pointed teeth, finely serrated at their bases (Pl. III, fig. 6); the front margin is longer than the hind margin of the metacarpus, armed with five strong teeth, finely serrated at their bases as

those of the hind margin; on the sides of the carpal process there are some short hairs. The metacarpus is broader than the carpal process, broadest at the middle, scarcely twice as long as broad; the hind margin is almost straight, armed with two smaller and three larger teeth, serrated at their bases, the denticles in the serration are very unequal in size; at the under margin there are one large, serrated tooth, and three minute denticles behind the dactylus; in front of the dactylus the anterior corner of the metacarpus is produced into two strong, spine-like processes; above these processes there are three teeth on the lower half of the front margin of the metacarpus. The dactylus is stout, curved, very broad at the base, much longer than half the length, and longer than the breadth of the metacarpus. Just at the base of the dactylus on the hind side there is a small, oblong aperture for the outlet of the secretion of the glands, which are to be seen within the carpus and metacarpus. A little below this aperture the hind margin of the dactylus is armed with four to five minute denticles. The length of the whole leg is 6,5 mm. (spec. *B.*), or 7 mm. (spec. *A.*).

The *second pair* (Pl. III, fig. 8 and 9) are about a third longer than the first pair, and nearly half as long as the third pair. The femur is nearly twice as long as the femur of the first pair, and much longer than the four following joints together; along the front margin there are six alternating short and long teeth, on the hind margin there are eight to nine broad teeth, unequal in size; the lower hinder corner of the joint is produced into a sharp tooth. The genu is much broader than long, the hinder lower corner produced into a long, spine-like tooth, above this there is a smaller tooth on the hind margin. The tibia is similar to that joint in the first pair. The front margin of the carpus is feebly curved, totally smooth, much shorter than the front margin of the metacarpus; on the outer side of the joint runs a low ridge, armed with three broad teeth, the inner margin is smooth. The carpal process is much longer than the rest of the joint, the apex forming a long, sharp tooth; the hind margin is armed with five broad teeth, finely serrulate at their bases as in the first pair; the front margin has seven to eight unequal teeth, serrulate; the front margin is somewhat longer than the hind margin of the metacarpus; on the sides of the carpal process there are some few scattered hairs. The metacarpus is more than three times as long as broad; the front margin is straight above and smooth, the lower part is curved, armed with two very small teeth, the lower corner is produced into two strong, spine-like teeth; the hind margin is provided with nine broad, unequal, serrulate teeth; the under margin is armed with one strong, narrow tooth, and one or two smaller ones. The dactylus is broad at the base, feebly curved, a little longer than in the first pair, but shorter than half the metacarpus; as in the first pair it exists an aperture at the base of the dactylus for the outlet from the glands, which occupy the interior of all the joints. The length of the leg is 10 mm. (spec. *B.*), or 11 mm. (spec. *A.*).

The *third pair* are more than a third shorter than the fourth pair. The femur is as long as the three following joints together, linear, narrow, not broader than the following joints, except metacarpus; the front margin is smooth; on the hind margin there are eleven or twelve sharp teeth. The genu is very short, with two teeth on the hind margin,

the front margin is smooth. The tibia is shorter than half the femur, the front margin smooth, the hinder margin armed with eight teeth. The carpus is longer than the tibia, fully half as long as the femur, the front margin and the sides provided with some long hairs, especially at the lower apex, the hind margin armed with nine larger and some few smaller teeth. The metacarpus is somewhat shorter and considerably narrower than the carpus, feebly bent, the front margin is smooth, the hind margin armed with about twenty-four smaller teeth. The dactylus is long, slender, almost straight, equalling more than a fifth of the length of the metacarpus. The length of the leg is 21 mm. (spec. *B.*), or 22 mm. (spec. *A.*).

The *fourth pair* (Pl. III, fig. 10) equal about two thirds of the length of the fifth pair, and are similar in shape to the third pair. The femur is almost as long as the three following joints together, the front and inner margins are smooth, the hind margin is armed with thirteen unequal teeth. The short genu has two teeth on the hinder margin. The tibia is half as long as the femur, the hind margin with eleven teeth. The carpus is a little longer than the tibia, the hind margin with fourteen teeth; the joint is richly provided with hairs at the lower apex. The metacarpus is narrow, feebly bent, somewhat longer than the carpus, the hind margin with about twenty-four small teeth; on the sides of the joint there are four or five transversal rows of short hairs. The dactylus as in the preceding pair. The length of the leg is 31 mm. (spec. *B.*), or 31,5 mm. (spec. *A.*).

The *fifth pair* (Pl. III, fig. 11) are much longer than the pereon and pleon together (3: 2), and nearly thrice as long the seventh pair. The femur is linear, narrow, almost ten times as long as broad, and only a little broader than the tibia, serrated along the front, hind, and inner margins, the number of teeth being eleven to fourteen along each margin; the lower anterior corner is a little produced. The genu is short, with two teeth on the front margin, and none on the hinder and inner margins. The tibia has fourteen teeth along the front margin, five to six very small ones on the inner margin, and two or three low teeth on the hind margin. The carpus is much longer than the tibia, and only a little shorter than the femur, with twenty unequal teeth along the front margin, the hinder and inner margins being almost smooth. The metacarpus is somewhat shorter than the carpus, not distinctly prismatic; the front margin is provided with about fifty very low and small teeth; the hinder side is totally smooth. The dactylus is feebly bent, equalling about a tenth of the length of the metacarpus. The length of the whole leg is 46 mm. (spec. *B.*), or 50 mm. (spec. *A.*).

The *sixth pair* (Pl. III, fig. 12) are fully twice as long as the seventh pair. The femur is a little shorter than the femur of the fifth pair, and less produced at the lower anterior corner; it is twice as long as the femur of the seventh pair; the front margin is provided with fourteen teeth, the ten uppermost being very small, the lowest, the produced anterior corner, the largest; the hinder margin carries twenty-one strong teeth; the inner margin is indistinctly denticulated. The genu has two strong teeth on the front margin, none on the hinder and inner margins. The tibia is a little more than half as long as the femur, with fifteen very unequal teeth along the front margin, and twelve along the hinder margin; on the inner there are some few low teeth. The carpus is longer than the tibia, armed along the front margin with twenty-three unequal teeth, some of them very small; the hinder and inner margins are indistinctly denticulated. The metacarpus

is longer than the carpus, feebly bent, the front margin denticulated as in the preceding pair; the hinder margin is microscopically serrated. The dactylus is feebly bent, fully equalling a tenth of the length of the metacarpus. The length of the leg is 35 mm. (spec. *B.*), or 38,5 mm. (spec. *A.*).

The *seventh pair* (Pl. III, fig. 13 and 14) are shorter than the third pair. The femur is much broader than the tibia, somewhat broader above than below; the front margin has twelve teeth; the hinder margin eleven, and the inner margin nine teeth. The genu has two teeth on the front margin, none on the hinder and inner margins. The tibia is half as long as the femur, the front margin with ten unequal teeth, the hind margin with six very low teeth, and the inner margin with seven teeth. The carpus is a little longer than the tibia, the front margin has nine unequal teeth, the hinder two, almost indistinct, low teeth, the inner margin is smooth; on the sides there are some scattered hairs; the under margin is densely fringed with long, stiff hairs. The metacarpus is longer than the carpus, equalling two thirds of the length of the femur, it is somewhat broader below; the front margin shows twelve unequal teeth, the hind margin three or four indistinct ones, the inner margin is smooth; on the sides there are four transversal rows of hairs. The dactylus is almost as long as a fourth of the metacarpus, and distinctly longer than the breadth of the metacarpus,<sup>1)</sup> evenly curved. All the joints contain glands. The length of the leg is 16,2 mm. (spec. *B.*) or 17,5 mm. (spec. *A.*).

The *pleon* is about half as long as the peræon. The dorsal keel shows no distinct spine-like prominences. The lateral ridge is feebly spinulous. The hinder margins of all the segments are fringed with minute teeth. The first segment is the longest, a little longer than the last peræonal segment. The length of the whole pleon is about 11 mm.

The *pleopoda*. The peduncles are long, narrow, decreasing in length backwards. The rami are longer than the peduncles, the outer ramus is more narrow and slender than the inner, the stout first joint is as long as all the following together; the outer ramus of the first pair has seventeen joints; the first joint is provided with thirteen setæ on the outer margin, and nine on the inner, increasing in length from above; the inner ramus has fifteen joints; the first joint has eighteen setæ on the inner margin, and nine on the outer. I could not detect any trace of »coupling spines»<sup>2)</sup> or »cleft setæ».

The *urus* is scarcely carinated, the first segment is shorter than the last pleonal segment but longer than the coalesced second and third ural segment. The first segment is much deeper than the last. The length of the whole urus is 4 mm. (spec. *B.*), or 4,5 mm. (spec. *A.*).

The *first pair of uropoda* (Pl. III, fig. 16) do not reach to the apex of the last pair, scarcely farther than to the middle of the outer ramus of the last pair. The peduncle of the first pair is widening distally; it is longer than the peduncle of the last pair, the outer margin is curved, armed with ten teeth, the anterior margin is smooth, the inner margin is straight, and has nine teeth; the outer ramus is as long as the coalesced inner, but narrower, and twice as long as the breadth of the peduncle, smooth on the margins; the inner, coalesced ramus is about twice as broad as the outer, lanceolate; the outer

<sup>1)</sup> In the specimen *B.* it is a little shorter.

<sup>2)</sup> STEBBING l. c. p. 1324.

and anterior margins are minutely serrated, the inner is strongly serrated, showing four teeth. The peduncle of the *last or third pair* is not twice as long as the outer ramus, the outer margin is almost straight, with nine teeth, the anterior margin smooth, the inner with eight teeth; the outer ramus is scarcely longer than the inner, narrower, and almost twice as long as the breadth of the peduncle, smooth on the margins; the inner, coalesced ramus is fully twice as broad as the outer, minutely serrated along the outer and anterior margins, strongly serrated along the inner, with eight teeth. The uropoda contain large glands. The length of the first pair of uropoda is 9,5 mm. (spec. *B.*), or 10 mm. (spec. *A.*), of the last pair 8 mm.

The *telson* is small, more broad than long, rounded behind, and half as broad as the peduncle of the last pair of uropoda.

### 3. THAUMATOPS LOVÉNI, C. BOVALLIUS, 1886.

Pl. IV, fig. 1—25.

**Diagn.** *Caput* segmenta tria priora *peræi* conjuncta longitudine æquans. Segmenta duo priora *peræi* libera, non coalita. Femur *pedum peræi* primi paris articulis quattuor sequentibus conjunctis brevius. Pedes quinti paris quam *peræon* et *pleon* conjuncta breviores, pedibus septimi paris haud duplo longiores; femur *pedum* quinti paris metacarpo multo longius. Femur *pedum* sexti paris femore *pedum* septimi paris paullo longius. Ramus externus *pedum uri* ultimi paris longitudine latitudinem pedunculi æquans.

The *head* equals the length of the first three *peræonal* segments together. The first two *peræonal* segments are free, not coalesced. The femur of the first pair of *peræopoda* is shorter than the four following joints together. The fifth pair are shorter than the *peræon* and *pleon* together, scarcely twice as long as the seventh pair; the femur of the fifth pair is much longer than the metacarpus. The femur of the sixth pair is a little longer than that of the seventh. The outer ramus of the last pair of *uropoda* is as long as the breadth of the peduncle.

**Colour.** Yellowish, pellucid.

**Length.** 110 mm.

**Hab.** The Indian Ocean (S. M.). One specimen, a male, taken by the Swedish Captain MELLENBORG.

**Syn.** 1886. *Thaumatops Lovéni*, C. BOVALLIUS. — »Remarks on the genus *Cysteosoma* or *Thaumatops*». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 9, p. 10, fig. 1—14.

» » » » 1887. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.

» » » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. CHALLENGER. Zoology. Vol. 29, p. 1334.

How difficult it may be to give good characteristics for distinguishing the two preceding species from one another, I think they must be regarded as different species, or at least varieties, until their identity might happen to be proved by the examination of a greater number of specimens in different stages of development. On the other hand it is easy enough to point out reliable characteristics for the specific distinction of *Thaumatops Lovéni*. The comparatively small head, the length of the seventh pair of peræopoda, the breadth of the peduncles of uropoda, with their short rami make it easy to recognize this species.

The *head* is broader and deeper than the peræon, and equals the length of the first three peræonal segments together. The foremost part of the head is rounded. From the front of the head runs on each side along the lower part of the head a row of about fifteen small teeth to the hinder margin of the head, above the mouth-organs. These teeth are not placed on a crista, as in the preceding species, but rise directly from the surface of the head, and are not visible when the animal is seen from above. On the under side of the head there is no row of smaller teeth as in the preceding species. The under and hinder margins of the head are longer than the upper. The length of the head is 20 mm., the breadth 24 mm., and the depth 25 mm.

The *eyes* occupy the upper parts of the head, they are not contiguous, but separated by a narrow strip of the surface of the head. The ocelli as in the preceding species.

The *first pair of antennæ* (Pl. IV, fig. 3) are a little longer than half the length of the head, fixed somewhat below the denticulated row which runs round the head. The peduncle consists of one joint, very narrow at the base, constricted, forming a neck, the distal part wide, almost cylindrical. The flagellum is more than four times as long as the peduncle, prismatic, feebly bent downwards; on the upper margin there are two obtuse prominences, possibly hinting to a division of the flagellum into three joints, as is the case in GUÉRIN-MÉNEVILLE'S specimen, according to his statement. No smaller terminal joints are to be seen, the apex of the flagellum is provided with two minute hairs. The length of the antennæ is 11 mm.

The *second pair of antennæ* are represented by two spine-like tubercles on the under side of the head just in front of the mouth-organs.

The *labrum* is broad, the under margin almost straight, feebly emarginate in the middle, not hirsute.

The *mandibles*<sup>1)</sup> (Pl. IV, fig. 4 and 5). The stem is stout and robust, the outer side curved, smooth, the molar tubercle is placed a little below the middle of the stem, finely ciliated, the grinding surface with three rows of sharp denticles; the incisive process is strongly denticulated, showing seven triangular, sharp teeth, and one larger at the inner corner; in the left mandible the appendicular process is armed with four sharp teeth.

The *labium* is hirsute, deeply bilobed, the under margins evenly rounded.

The *first pair of maxillæ* (Pl. IV, fig. 6) consist of two laminae; the inner or principal lamina is broad at the base, the process is short, almost truncated at apex, armed

<sup>1)</sup> In »Remarks on the genus *Cysteosoma* or *Thaumatops*», p. 7, fig. 3, I described and figured the apex of a mandible from the young specimen of *Th. longipes*; here above I give some details of the later examined mandibles of the probably fullgrown *Th. Lovéni*.

with strong, feebly curved spines and intermixed slender, short hairs; at the lower corner there is a stronger spine, twice as long as the preceding. The secondary lamina, or the palp, is half as broad as the stem of the principal lamina, curved, longer than the maxillar process; the sharp-pointed apex is crenulated with short, unequal teeth.

The *second pair of maxillæ* (Pl. IV, fig. 7, 8 and 9) consist of a single lamina, the basal portion broad, rounded, the terminal part abruptly narrowed, the outer margin curved, the inner nearly straight, the apex armed with ten to twelve sharp, short teeth.

The *maxillipeds* (Pl. IV, fig. 10) are well developed, consisting of an almost cubical basal joint articulating with the second larger joint. This second joint carries at the middle of the lower margin a median lobe or inner lamina, broader below than at the base, thick, hollowed, forming a kind of tube; the lower, feebly excavated margin is finely serrated. At the sides of this median lobe the second joint carries as usually two lateral lobes or outer laminae, they are feebly curved on the outer margins, smooth, the inner margins are strongly denticulated, each with twelve smaller and larger, sharp teeth.

The *peræon* has higher and more raised dorsal portions of the segments than in the other species. The articulation between the first and second segment is more distinct than in *Thaumatops longipes*, and just as perfect as between the second and third segments. The dorsal keel is very sharp, but does not show any spine-like prominences on the first four segments, on the fifth segment there is a blunt prominence at the anterior corner of the keel, on the sixth two sharper prominences, one at the anterior and one at the hinder corner, on the seventh segment there are three such prominences, two anteriorly and one at the hinder corner. The hinder margins of all the segments are fringed with minute spines. From the anterior margin of the third segment runs a sharp ridge over the lower parts of the peræonal and pleonal segments, ending at the hinder margin of the first ural segment; this ridge is smooth in the third to sixth segment, but feebly spinulous in the seventh, and in the pleon. The peræonal segments are growing rapidly narrower below; the hinder corner of the lower end is produced into a more or less sharp tooth, longest in the first segment. The first two segments reach farther down than the following. The first segment is a little shorter than the second, which is longer than each of the following segments except the seventh. The third to sixth segments are equal in length; the seventh is scarcely longer than the second. The length of the whole peræon is about 48 mm.

The *epimerals* are coalesced with the corresponding segments.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda, those of the second and third pairs are very small, those of the fifth and sixth pairs much longer, as long as half the femur of the corresponding pairs.

The *first pair of peræopoda* (Pl. IV, fig. 11, 12 and 13) equal a third of the length of the third pair. The femur is considerably shorter than the four following joints together, prismatic; along the front margin it carries eight unequal teeth, on the hinder margin two teeth, the lowest formed by the produced, lower hinder corner of the joint; the inner margin is smooth. The genu is broader than long, the lower hinder corner produced into a strong, curved tooth. The tibia is short, the hinder portion broader, produced, embracing the lower part of the carpus. The carpus is long, longer than the

metacarpus; the front margin is curved, smooth, with a small hair at the lower corner, the inner margin is finely serrated; the carpal process is broad, shorter than the rest of the carpus, ending in a long, sharp tooth; the hind margin shows five to six low, depressed teeth, serrulated at their bases, the front margin has four larger, finely serrulated teeth; the front margin is a little shorter than the hind margin of the metacarpus; the sides of the carpus and the carpal process are richly provided with fine, short hairs. The metacarpus is narrower than the carpal process, more than thrice as long as broad; the front margin is feebly curved, the lower corner produced into two strong teeth, the hind margin is straight, armed with seven serrulate teeth; the under margin has only one tolerably large tooth. The dactylus is curved, scarcely equalling a third of the length of the metacarpus; on the hind margin, just below the base, there are four sharp denticles, above this serration opens the outlet from the glands, which are to be seen within all the joints. The length of the leg is 11 mm.

The *second pair* (Pl. IV, fig. 14, 15 and 16) are a third longer than the first pair, and almost half as long as the third pair. The femur is scarcely a third longer than the femur of the first pair, and much shorter than the four following joints together; the front margin is armed with nine equal, long, curved teeth, the hind margin with six, the inner margin with six very small teeth. The genu is broader than long, the hinder lower corner produced into a strong, curved tooth. The tibia has the hinder portion less produced than in the first pair, beset with long slender hairs. The carpus has the front margin provided with some bundles of hairs, it is feebly curved, much shorter than the front margin of the metacarpus, the inner margin is smooth; the carpal process is narrow, sharp-pointed, as long as the rest of the carpus, the hind margin of the process and of the carpus is beset with hairs, at the lower end there are four or five depressed, serrulated teeth; the front margin of the process is shorter than the hind margin of the metacarpus, it carries eleven, finely serrulated teeth. The metacarpus is more than five times as long as broad; the front margin is feebly curved, smooth, the lower produced into two very short but strong teeth in front of the dactylus; the hind margin has fifteen not very prominent teeth, finely serrulated at their bases. The dactylus is feebly curved, with a serration consisting of seven denticles on the hind margin. Glands as in the first pair. The length of the leg is 16 mm.

The *third pair* are scarcely a fourth shorter than the fourth pair. The femur is narrow, linear, the front and inner margins smooth, the hind margin armed with ten teeth, the uppermost the smallest. The genu has two blunt teeth on the hind margin. The tibia is a little shorter than the carpus, the front and inner margins smooth, the hind margin with nine teeth. The carpus is a little longer than the metacarpus, the front margin and the lower apex richly provided with hairs, the inner margin smooth, the hind margin has six unequal teeth. The metacarpus is narrower than the preceding joint, all the margins smooth. The dactylus is short, slender, feebly curved. The length of the leg is 33 mm.

The *fourth pair* (Pl. IV, fig. 17) are scarcely more than a fourth shorter than the fifth pair. The femur is shorter than the three following joints together, the front and inner margins are smooth, the hind margin carries twelve teeth. The genu has two in-

distinct teeth on the hind margin. The tibia is longer than half the femur, provided with hairs, and armed along the hind margin with ten blunt teeth. The carpus is longer than the tibia, richly beset with hairs, especially at the lower anterior corner, and carrying along the hind margin sixteen unequal teeth. The metacarpus is somewhat shorter and much narrower than the carpus, all the margins smooth, but the outer side of the joint showing nine transversal rows of fine hairs. The dactylus is small, slender, feebly curved, a little longer than the breadth of the metacarpus. The length of the leg is 44 mm.

The *fifth pair* (Pl. IV, fig. 18 and 19) are considerably shorter than the peræon and pleon together, and not twice as long as the seventh pair. The femur is dilated, broadly rounded at the upper end, only five times as long as broad; the lower anterior corner is produced into a broad, strong process, tridenticulated at apex, and carrying three teeth on the hinder and three on the front margin; this process is fully as long as the genu; the front margin of the femur is armed with nine teeth, the hinder margin with nineteen, the inner margin is smooth. The femur is not twice as long as the femur of the seventh pair, and only a fourth longer than the femur of the sixth pair. The genu is fully as long as broad, the front margin with one large, apical tooth and two smaller ones above. The tibia is dilated, but a little narrower than the femur, it is not four times as long as broad, the front margin is feebly curved, armed with fifteen unequal teeth, the hind and inner margins are smooth, curved. The carpus is a third longer than the tibia, and much narrower, the margins smooth. The metacarpus is feebly bent, longer than the carpus, cylindrical, not prismatic, totally smooth, and filled with glandular mass more richly than the preceding joint. The dactylus is very small, scarcely as long as the breadth of the metacarpus, fixed subterminally, with a small, circular hole at the anterior corner of the base for the outlet of the glandular secretion. The length of the leg is 63 mm.

The *sixth pair* (Pl. IV, fig. 20) are scarcely a third longer than the seventh pair. The femur is dilated as in the preceding pair, scarcely four times as long as broad; the upper end is broadly rounded, the lower anterior corner produced into a sharp-pointed process, which has two teeth on the front margin and one at the middle of the hinder margin; this process is fully as long as the genu; the front margin of the femur itself carries ten teeth, the hinder margin eighteen, the inner is smooth. The genu is as long as broad, with three teeth, the lowest, the produced hinder corner, the longest. The tibia is dilated, only a little narrower than the femur, not three times as long as broad, the front margin with fourteen teeth, the other margins are smooth. The carpus is dilated, about three times as long as broad, and a little longer than the preceding joint; the front margin with fourteen unequal teeth, the other margins smooth; the sides are provided with hairs. The metacarpus is narrow, prismatic, longer than the carpus; the front margin armed with about forty-five low but sharp, serrulated teeth, the hind margin with about eighteen blunt, low teeth, the inner margin with about twenty-five, almost indistinct, teeth. The dactylus is narrow, almost straight, longer than the breadth of the metacarpus. The length of the leg is 47 mm.

The *seventh pair* (Pl. IV, fig. 21 and 22) are three times as long as the first pair, and fully as long as the third pair. The femur is dilated, broadest above, the upper

end rounded, not three times as long as broad; the lower anterior corner is produced into a sharp-pointed, smooth process, which is half as long as the genu; the front margin has twelve teeth, the hind margin eight teeth, the inner margin is smooth; the femur is as long as the three following joints together. The genu is almost as long as broad, with two teeth on the front margin. The tibia is scarcely more than half as long as the femur, dilated, thrice as long as broad; the front margin with twelve low teeth, the lowest almost indistinct; the other margins are smooth. The carpus is much shorter than the tibia, and narrower; all the margins are smooth. The metacarpus is fully twice as long as the carpus, widening distally, club-shaped, with about twenty low teeth along the lower half of the front margin, the other margins are smooth; there are five bundles of long hairs along the front margin; the apex of the joint is abruptly narrowing, forming a deep excavation behind the lower anterior corner of the joint, the dactylus impinges against the foremost part of this corner. The dactylus is strongly curved, shorter than the breadth of the metacarpus, and armed with four denticles on the anterior side just above the middle. All the joints are provided with glands. The length of the leg is 33 mm.

The *pleon* is longer than half the peræon. The dorsal keel with three small spine-like prominences on the first two segments, and two such prominences on the third segment. The lateral ridge is feebly spinulose, as are also the hinder margins of the segments. The first segment is the longest, a little longer than the last peræonal segment. The length of the whole pleon is about 28 mm.

The *pleopoda* (Pl. IV, fig. 23) have the peduncles a little shorter than the rami; the outer ramus is more slender than the inner. In the first pair the outer ramus consists of twenty joints, the stout first joint is much longer than all the following together; the first joint has thirty-five setæ along the outer margin and twenty on the inner margin; the inner ramus has sixteen joints, and twenty-four setæ on each margin of the first joint. The length of the first pair is 14 mm.

The *urus* has the first segment carinated, the dorsal keel has two small, spine-like prominences, the lateral ridge is finely spinulose, as is also the hinder margin of the segment. The first segment is scarcely more than half as long as the last pleonal segment, but much longer than the coalesced second and third ural segment. The last segment is not carinated. The whole urus equals scarcely more than a fourth of the length of the pleon. The length of the urus is 7,5 mm.

The *uropoda* (Pl. IV, fig. 24). The *first pair* reach fully to the apex of the last pair. The peduncle of the first pair is much dilated, but comparatively narrow at the upper end, it is a little broader and much longer than the peduncle of the last pair; the outer margin is feebly curved, armed with more than twenty sharp teeth, the anterior margin has about fifteen indistinct teeth, the inner margin is curved, and has eleven larger teeth; the outer ramus is fully as long as the coalesced inner one, but much narrower, almost styliform, the margins are smooth; it is as long as the breadth of the peduncle, and equals scarcely a third of the length of the peduncle; the inner ramus is thrice as broad as the outer, the outer and anterior margins are minutely serrated, the inner margin is coarsely serrated. The peduncle of the *last or third pair* is more than twice as long as the outer

ramus, dilated, the outer margin with about twelve low teeth, the anterior margin with fourteen indistinct teeth, and the inner margin with thirteen larger, unequal teeth; the outer ramus is similar in shape to that of the first pair, smooth, somewhat shorter than the inner, and a little shorter than the breadth of the peduncle; the inner ramus is four times as broad as the outer, minutely serrated along the outer and anterior margins, and coarsely serrated along the inner margin. The uropoda contain large glands. The length of the first pair of uropoda is 18 mm., of the second pair 14; the breadth of the peduncle of the last pair is 5 mm., the length of the outer ramus of the same pair is 4,5 mm.

The *telson* is very small, scarcely more broad than long, about as broad as a third of the breadth of the peduncle of the last pair of uropoda.

### Measurements.

	Thaumatops spinosa.									Th. longipes.		Th. Lovéni.
	Spec. Banks.	CHALLENGER							GUÉRIN'S specimen. <sup>1)</sup>	Sp. A.	Sp. B.	Sp. typ.
		Spec. typ. ♂.	Spec. typ. ♀.	Sp. C. and CC.	Sp. D.	Sp. E.	Sp. F.	Sp. G.				
Total length.....	116?	105	84	46	34?	51	52	77	90	55	52	110
Length of antennæ .....	—	17	26	18,5	Broken	16	27	11	15	Broken	25	11
» » head .....	—	26	—	—	—	—	—	22	25	13	12	20
» » peræon.....	—	36	—	—	—	—	—	—	36	22	21,5	48
» » pleon.....	—	24	—	—	—	—	—	—	18,5	11	11	28
» » urus.....	—	8	—	—	—	—	—	—	7	4,5	4	7,5
» » peræop. I.....	—	10	—	—	5,5	—	5	—	6	7	6,5	11
» » peræop. II.....	—	14	—	—	7	—	8,5	—	9	11	10	16
» » peræop. III.....	—	34	—	—	14	16	19	—	30	22	21	33
» » peræop. IV.....	—	51	—	—	20	26	28	—	45	31,5	31	44
» » peræop. V.....	—	71	—	39	27	38	41	63	71	50	46	63
» » peræop. VI.....	—	63	—	25	23	28	34	—	56	38,5	35	47
» » peræop. VII.....	—	31	—	—	12	18	18,5	26	33	17,3	16,2	33
» » pleop. I.....	—	13	—	—	—	—	—	—	14	10	9,5	14
» » urop. I.....	—	20	—	8	8	10	10,5	—	16	10	9,5	18
» » urop. III.....	—	18	—	—	6,2	8,5	9	—	14	8	8	14
» » outer ramus of urop. III.	—	6	—	—	3	3	3	—	4	3	3	4,5
Breadth of the ped. of urop. III.	—	—	—	—	—	—	—	—	2,5?	1,6	1,5	5

<sup>1)</sup> The measurements are taken from the drawing of GUÉRIN-MÉNEVILLE.

The seventh family **MIMONECTIDÆ**, C. BOVALLIUS, 1885.

**Diagn.** *Peræon* simul cum *capite* inflatum, spheram maximam formans. *Ocelli*, non conjuncti, in lateribus capitis dispersi. *Antennæ* primi paris rectæ, flagello elongato instructæ, articulus primus flagelli longus, vix tumidus, articuli sequentes parvi, perpauci, terminales. *Antennæ* secundi paris parvæ, articulis perpaucis, parti inferiori capitis affixæ. *Instrumenta oris* masticatoria, mandibulæ palpo carentes. *Pedes peræi* parium quinque ultimorum ambulatorii; pedes septimi paris non transformati.

The *peræon* together with the *head* is inflated, forming a very large globe. The *ocelli* are not united, but dispersed on each side of the head. The first pair of *antennæ* are straight, provided with an elongate flagellum, the first joint of the flagellum is long, scarcely tumid, the following joints are small, few in number, terminal. The second pair of *antennæ* are small, few-jointed, fixed at the under side of the head. The *mouth-organs* are adapted for mastication, the mandibles without palp. The last five pairs of *peræopoda* are walking legs, the seventh pair are not transformed.

**Syn.** 1885. *Mimonectidæ*, C. BOVALLIUS.

»Mimonectes, a remarkable genus of Amphipoda Hyperidea», p. 2. Nova Acta Soc. Reg. Scient. Upsal. Ser. III. Vol. 13.

»                   »                   1887. »Systematical list of the Amphipoda Hyperiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.

»                   »                   1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 558.

Since I first established this family no further additions to our knowledge of the peculiar animals constituting it have been made, but a re-examination of my scanty material allows me to give some more details, overlooked at the first occasion, and to make some corrections especially in the drawings. Still I believe that the strange and remarkable shape acquired by the *Mimonectidæ* must be looked upon as an instance of mimicry serving them as a protection against voracious foes.

Genus 1. **MIMONECTES**, C. BOVALLIUS, 1885.

**Diagn.** *Caput* magnum, partem spheræ formans. *Pedes peræi* primi et secundi parium simplices non cheliformes. *Pleon* compressum, non inflatum. *Pedes uri* ramis binis liberis instructi.

The *head* is large, forming a part of the wall of the globe. The first and second pairs of *peræopoda* are simple, not cheliform. The *pleon* is narrow, not inflated. The *uropoda* are provided each with two free rami.

Syn. 1885.	<i>Mimonectes</i> , C. BOVALLIUS.	—	»Mimonectes, a remarkable genus of Amphipoda Hyperidea», p. 2. Nova Acta Soc. Reg. Scient. Upsal. Ser. III. Vol. 13.
»	»	A. GERSTAECKER. 1886.	D:r H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Bd. 5. Abth. 2, p. 491.
»	»	C. BOVALLIUS. 1887.	»Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.
»	»	» 1887.	»Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iaktagelser. Bd. 4, p. 558.

Probably the genus *Mimonectes* has its nearest relatives in the families *Thaumtopsida* and *Lanceolida*, agreeing with them in the shape of the first pair of antennæ and in the inflated peræon, which last character, however, is much more exaggerated here than in the representatives of those families. The last five pairs of peræopoda are remarkably like those pairs of the true *Hyperida*, showing that, how strange the appearance of *Mimonectes* may be, it, however, has a close connection with the typical family of the tribe.

- A. The spherical portion of the body is formed of the head and the first five peræonal segments. The metacarpus of the first two pairs of peræopoda is almost conical, hirsute..... 1. *M. Lovéni*.
- B. The spherical portion of the body is formed of the head and the first six peræonal segments. The metacarpus of the first two pairs of peræopoda is provided with a spinulous prominence on the hinder margin, not hirsute..... 2. *M. sphæricus*,
- C. The spherical portion of the body is formed of the head and all the peræonal segments. The metacarpus of the first two pairs of peræopoda is cylindrical, armed with long spines..... 3. *M. Steenstrupi*.

### 1. MIMONECTES LOVÉNI, C. BOVALLIUS, 1885.

**Diagn.** *Caput* dimidio diametri sphaeræ altius. *Articulus primus flagelli antennarum* primi paris pedunculo plus quam duplo longior, crassus, serratus. *Segmenta quinque prima peræi* sphaeram formantia. *Metacarpus pedum peræi* primi et secundi parium fere conicus, hirsutus. *Pedes tertii* paris tertiam partem diametri sphaeræ longitudine æquantes. *Telson* pedunculo pedum uri ultimi paris multo angustius, et plus quam duplo brevius.

The *head* is higher than half the diameter of the globe. The first joint of the flagellum of the first pair of *antenna* is more than twice as long as the peduncle, thick, serrated. The first five segments of the *peræon* form the globe. The metacarpus of the first two pairs of *peræopoda* is almost conical, hirsute. The third pair equal a third of the length of the diameter of the globe. The *telson* is much narrower than the peduncle of the last pair of uropoda, and shorter than half the peduncle.



are glandular cells. The first pair of antennæ are longer than the head, longer in the male than in the female.

The *second pair of antennæ* (Pl. V, fig. 6) are very small, fixed a little behind the first pair at the under side of the head. They consist of four joints; in the female the first joint is thick, almost globular, the second longer, the third shorter, and the fourth still shorter. In the male the last joint is long, narrow, about twice as long as the third. Between the bases of the first and second pairs of antennæ there is on each side a tubercle or prominence (Pl. V, fig. 5) showing a comparatively large opening at the apex, it will be more fully described below in the morphological part of this treatise.

The *labrum* is very small, the lower margin broadly rounded, sparingly beset with minute hairs.

The *mandibles* are comparatively short, the stem is thick, with a small molar tubercle, the incisive process is short, armed with four to five small teeth. They want a palp.

The *labium* is bi-lobed, beset with short hairs.

The *first pair of maxillæ* (Pl. V, fig. 7) have the principal lamina feebly curved, truncated at apex, and armed with four unequal, sharp teeth. The secondary lamina, or the palp, is long, almost straight, narrow at apex, smooth. A small appendicular lamina arises at the inner side of the principal lamina; it is smooth.

The *second pair of maxillæ* (Pl. V, fig. 8) consist of two laminae, the principal one armed with three long, strong spines at apex, and between these three or four very short bristles. The secondary lamina is narrow at apex, with two spines.

The *maxillipeds* (Pl. V, fig. 9) consist of two basal joints, the first short and broad, the second, articulating with the first, is longer, carrying two semicircular, lateral laminae, truncated at apex, and a median lamina or lobe, deeply divided in the middle so that it seems to consist of two laminae.

The *peræon*. Of the segments forming the globe the second is the highest and longest; the first and third segments are almost equal in length and height, the fourth is shorter, the sixth is the shortest and lowest. The following two segments are normal, not inflated; the sixth is longer than the seventh. The more or less ovate base or under surface of the globe is bordered by the under margins of the head and the first five peræonal segments. This under surface is covered with a thin membrane, not marked off transversally for the different segments.

The *epimerals* of the first to fifth pairs are large, and almost as long as the under margins of the corresponding segments, those of the third pair are the largest. The epimerals of the sixth and seventh segments are very small, much shorter than the under margins of the corresponding segments.

The *branchial sacks* (Pl. V, fig. 18) are attached to the second to sixth pairs of peræopoda, those of the second to fifth pairs are half as long as the corresponding legs, that of the sixth pair is shorter.

The *ovitectorices* (Pl. V, fig. 18) are elongated, three to four times as long as broad, fringed with long simple hairs, they are attached to the second to sixth pairs of peræopoda; those of the second to fourth pairs are longer than the branchial sacks, and only

a little shorter than the corresponding legs, those of the fifth and sixth pairs are shorter than the branchial sacks, and not half as long as the corresponding legs.

The *first pair of peraeopoda* (Pl. V, fig. 13). The femur is elongate-ovate, about twice as long as broad, with some slender hairs at the lower hinder corner. The genu is as long as broad, provided with hairs at the lower hinder corner. The hind margin of the tibia is as long as the hind margin of the genu, the under margin is fringed with long hairs. The carpus is more than half as long as the femur, a little broader below, the lower hinder corner not produced; the hind margin is provided with long hairs, the under margin is straight, fringed with stout bristles. The metacarpus is shorter than the carpus, evenly tapering toward apex, which is rounded, the joint is all around beset with short hairs, intermixed with some longer ones on the hind margin; in front of the dactylus the apex projects into a very short tooth. The dactylus is straight slender, equalling a third of the length of the metacarpus. Glands in all joints.

The *second pair* (Pl. V, fig. 14). The femur is narrower than the femur of the first pair, three times as long as broad, with some few hairs at the lower hinder corner. The genu is longer than the tibia, both joints carrying hairs on the lower hinder corners. The carpus is not half as long as the femur, almost linear, about twice as long as broad, not produced at the lower hinder corner, and carrying some few short hairs on the hinder and under margins. The metacarpus is longer than the carpus, evenly tapering, hirsute as in the first pair; the apex projects into a minute tooth in front of the dactylus. The dactylus is straight, slender, equalling a sixth of the length of the metacarpus. Glands in all the joints.

The *third pair* (Pl. V, fig. 15) are the longest of all. The femur is elongate, a little broader below, almost four times as long as broad, and much longer than the three following joints together; both margins are smooth. The genu is as long as broad, smooth. The tibia is tolerably broad, but much narrower than the femur, and scarcely equalling a third of its length; the front margin is curved, with two or three slender hairs, the lower corner is produced, and tipped with two short hairs; the hind margin is feebly curved, with four indistinct teeth, each tipped with a hair. The carpus is much longer, but narrower than the tibia, half as long as the femur; the margins are smooth, but the joint carries a row of long hairs on the outer side, a little before the hind margin. The metacarpus is narrow, slender, shorter than, and not half as broad as the carpus; the front margin is smooth, the hind indistinctly serrated, the outer side is provided with hairs as in the preceding joint. The dactylus is short, feebly curved, scarcely equalling a fifth of the length of the metacarpus. Well developed glands in all the joints, especially in the carpus and metacarpus.

The *fourth pair* (Pl. V, fig. 15) are considerably shorter than the third. The femur is elongate, as long as the three following joints together, and a little more than thrice as long as broad; the margins are smooth. The genu, tibia and carpus as in the preceding pair. The metacarpus is a little shorter and much narrower than the carpus, but almost half as long the femur; it is broader at the base, tapering downwards; the front margin has four to five long hairs, and the lower anterior corner a bundle of hairs in front of the dactylus, all the hairs curved at apex; the hind margin shows thirteen to fourteen

low teeth, each tipped with a similar hair. The dactylus is curved, shorter than the breadth of the metacarpus, and scarcely equalling a fifth of its length. Glands as in the preceding pairs.

The *fifth pair* are longer than the fourth, but shorter than the third pair. The femur is elongate, a little more than three times as long as broad, and considerably shorter than the three following joints together; the front margin carries five to six long hairs, the lower corner is feebly produced, the hind margin is smooth. The genu is as long as broad, the front margin with minute hairs, the hind smooth. The tibia is almost as broad as the femur, and about half as long; the front margin is indistinctly serrated, the teeth tipped with short hairs; the hind margin is smooth, the lower corner strongly produced, tipped with two short hairs. The carpus is only a little shorter than the femur, and more than three times as long as broad; both margins are serrated, the teeth on the front margin are tipped with short hairs. The metacarpus is much shorter and narrower than the carpus, feebly curved, the front margin is finely serrated, the hind smooth. The dactylus is small, curved, scarcely as long as the breadth of the metacarpus, and equalling a fifth of its length. Strongly developed glands, especially in the femur and carpus.

The *sixth pair* are shorter but more slender than the fifth pair. The femur is not three times as long as broad, the hind margin curved, the front margin almost straight or a little excavated, both are smooth. The genu is as long as broad, smooth. The tibia is longer than half the femur, and narrower, the margins are smooth. The carpus is a little shorter than the femur, narrower than the tibia; the margins are smooth. The metacarpus is shorter than the carpus, but longer than half the femur, almost linear, six times as long as broad, with some short hairs around the apex. The dactylus is slender, almost straight, equalling a sixth of the length of the metacarpus. Glands as in the preceding pair.

The *seventh pair* (Pl. V, fig. 16 and 17) are as long as the first pair. The femur is linear, about thrice as long as broad, the margins are smooth. The genu is as long as broad, smooth. The tibia is scarcely half as long as the femur, broader below, smooth. The carpus is very thick and broad, filled with glandular matter; it is only a little shorter than the femur, the margins are smooth. The metacarpus is about half as long as the carpus, and much narrower, linear, the apex broad, dilating behind the base of the dactylus, and fringed with hairs; it is possible that there is an outlet for the glands at this lower hinder corner of the metacarpus. The dactylus is very short, feebly curved at apex. All the joints are provided with glands.

The *pleon* is normal, not inflated, rather more slender than in the most of the true *Hyperidæ*. The first segment is the longest, the third the shortest. The hinder corners of the lateral parts of the segments are rounded. The pleon and urus together are longer than a third of the diameter of the globe.

The *pleopoda* (Pl. V, fig. 19, 20 and 21). The peduncles are longer than the rami, obtusely ovate. At the inner lower front corner of each peduncle there are two short, stout spines, fixed on a common rounded bouton-like desk; these spines are the

»coupling spines» recorded by STEBBING, called »les épines particulières» by G. O. SARS;<sup>1)</sup> the anterior one of these spines is the longest, armed along the hind margin with six retroverted teeth, the shorter spine has five teeth. The lower parts of the peduncles show distinctly that hexagonal plating of the hypodermis alluded to above, p. 61. The rami of the first pair consist each of twelve joints, the first joint is more than half as long as all the following joints together; on the inner ramus it carries a stout bristle, cleft at the apex, it is the »cleft spine» mentioned by STEBBING l. c. p. XIV<sup>2)</sup> or »la soie particulière à bout bifurqué» of G. O. SARS l. c. p. 133; this cleft bristle is feathered, but less densely than the other setæ. Above the cleft bristle there are some tufts of short, fine hairs.

The *urus* has the first segment a little shorter but broader than the coalesced second and third.

The *uropoda* (Pl. V, fig. 22). The peduncle of the *first pair* is narrow, linear, shorter than that of the second pair, and shorter than the inner ramus; it has a short spine just below the middle of the inner margin, and another one at the lower corner. The inner ramus is twice as long as the outer, and much broader at the base, the outer margin is finely serrated, the inner margin is less distinctly serrated; the outer ramus is very narrow, almost styliform, the inner margin is serrated, the outer smooth. The peduncle of the *second pair* is narrow, linear, shorter than the inner ramus, the margins are smooth. The inner ramus is very narrow, elongated, scarcely a third longer than the outer ramus, the outer margin is smooth, the inner finely serrated; the outer ramus is almost as broad at the base as the inner one, tapering; the outer margin is smooth, the inner finely serrated. The *third pair* have the peduncle shorter than the last ural segment, very broad, almost twice as broad as that of the first pair; the peduncle is much shorter than the inner ramus, and a little shorter than the outer. The inner ramus is much broader at the base than the outer one, tapering, serrated on both margins; the outer ramus is more than half as long as the inner, smooth on the outer margin, and finely serrated along the inner margin.

The *telson* is more broad than long, rounded behind, scarcely longer than half the breadth of the peduncle of the last pair of uropoda.

<sup>1)</sup> G. O. SARS. Histoire naturelle des Crustacés d'eau douce de Norvège. I, p. 53 and 133, pl. 5, fig. 8' and 8''.

<sup>2)</sup> I had totally overlooked the existence of the »coupling spines» and the »cleft spine» of the pleopoda until I read about them in STEBBING's work on the Challenger-Amphipoda. He says l. c. p. XIV: »Among the Gammarina occasionally these spines (coupling-spines) are numerous; among the Hyperina there are rarely, normally perhaps never, more than two to each peduncle. In both groups they are clearly spines that have been modified to serve one and the same purpose, namely to hold the peduncles together for the swimming-stroke. For this purpose the apex of each spine is blunted and has backward directed teeth, the edges also often having a retroverted serrature, so that the spines of each pair of peduncles can be interlocked. That both groups, notwithstanding their otherwise extremely divergent forms, should so universally possess these coupling-spines, is surely a note of common ancestry. It is also easy to see that two quite simple spines in this position might be of some service for the object in view by the effect of mere friction, while natural selection would be ready to avail itself of any variation in the direction of the roughening of the spine, until the strongly serrate edges and dentate apices had been at length evolved. In the branches of the pleopods we find another note of community of origin for the two groups above mentioned. Besides the obvious similarity which these branches display in almost all the genera and species, they have in common the less easily noticed feature of carrying one or more cleft spines (see G. O. SARS, l. c.), on the inner margin of the first joint of the inner branch. To this there are only rare exceptions, and those, perhaps, not difficult to explain. Throughout the Hyperina it appears that the

2. **MIMONECTES SPHÆRICUS**, C. BOVALLIUS, 1885.

Pl. VI, fig. 1—10.

**Diagn.** *Caput* dimidium diametri sphaeræ altitudine non æquans. *Articulus primus flagelli antennarum* primi paris pedunculo plus quam quater longior, angustus, serratus. *Segmenta sex prima perævi* sphaeram formantia. *Metacarpi pedum perævi* primi et secundi parium prominentia spinulosa instructi, non hirsuti. *Pedes tertii* paris sextam partem diametri sphaeræ longitudine haud æquant. *Telson* pedunculo pedum uri ultimi paris angustius, sed dimidio pedunculi longius.

The *head* is not half as high as the diameter of the globe. The first joint of the flagellum of the first pair of *antennæ* is more than four times as long as the peduncle, narrow, serrated. The first six segments of the *peræon* form the globe. The metacarpi of the first two pairs of *peræopoda* are provided with a spinulous prominence, not hirsute. The third pair equal a sixth of the diameter of the globe. The *telson* is narrower than the peduncle of the last pair of uropoda, but longer than half the peduncle.

**Colour.** Whitish, with some few minute red spots on the lower parts of the peræonal segments, pellucid.

**Length.** 12—16 mm.

**Diameter of the globe.** 9—14 mm.

**Hab.** The Northern temperate and the tropical regions of the Atlantic (D. M.).

**Syn. 1885.** *Mimonectes sphaericus*, C. BOVALLIUS.

»Mimonectes, a remarkable genus of Amphipoda Hyperidea», p. 11, pl. 2, fig. 12. Nova Acta Soc. Reg. Scient. Upsal. Ser. III. Vol. 13.

»            »            »            1887. »Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.

In *Mimonectes sphaericus* the spherical portion of the body is comparatively larger than in the preceding species, one segment more of the peræon participating in its formation. If there were not any other characteristics to distinguish the species than this greater or smaller development of the globe, it might seem probable that it depended only upon variation owing to age or sexe, but, as will be seen from the following description, there are many and good specific characteristics, better perhaps than in most of the ge-

joint in question never has more than one such spine, while in the *Gammarina* the number varies. The object served by these spines is no doubt similar to that of the coupling-spines. One arm of the cleft apex has a sub-terminal expansion, and the other arm is internally roughened or serrulate. By these contrivances a pair of the spines lying crosswise helps to keep together the branches of the pair of pleopods, and so to add force to the swimming-stroke. But these spines with cleft terminations have plumose shafts, and are evidently plumose setæ modified for a special purpose. Indeed, in some species, in which the pairs of cleft spines are numerous, some of them show a gradational form of combining the flexibility of the seta with the cleft termination of the spine.

nera we have dealt with above. As valuable specific characteristics within the genus *Mimonectes* I do point out, the form of the flagellum of the first pair of antennæ, the shape of the metacarpus of the first two pairs of peræopoda, the uropoda and their armature, and, curiously enough, the form of the ovitrices. The first and last of these characteristics I do not find to be of any value, worth to mention, within the other Hyperiidæan genera; the characteristics derived from the form of the uropoda, on the other hand, seem to be of specific value through the whole group.

The *integument* of the body is thinner and more transparent than in the preceding species, showing a similar hexagonal plating in many parts of the body, but the hexagonal cells are distinctly more oblong than in *Mimonectes Lovéni*.

The *head* is as broad as high, and about four times as high as long; it is higher than a third of the length of the diameter of the globe.

The *ocelli* are six in number on each side.

The *first pair of antennæ* (Pl. VI, fig. 2) are fixed as in the preceding species. The peduncle is two-jointed, the first joint is stout, linear, more than twice as long as the second. The first joint of the flagellum is very long, narrow, cylindrical, bluntly serrated along the upper and under margins, four to six times as long as the whole peduncle, the apex is truncated, not projecting as in the preceding species; thereafter follow three small, cylindrical joints, the last the longest and narrowest, all armed with delicate hairs. In the female the first pair of antennæ are shorter than in the male. No glands are to be seen within the flagellar joints.

The *second pair of antennæ* (Pl. VI, fig. 3) are shorter than the first joint of the peduncle of the first pair. The basal joint forms a rounded tubercle, not distinctly articulating with the surface of the head. The second and third joints are slender, cylindrical, subequal in length; the fourth joint is somewhat longer than the third, tapering.

The *mouth-organs* are similar to those in the preceding species.

The *peræon*. The top of the globe is formed by the second and third segments. The second segment is longer than the first; the third is the longest of all, the sixth is the shortest of the segments forming the globe, and not as high as the first segment. The seventh segment is normal, not inflated, and not half as long as the sixth segment. The almost circular under surface of the globe is bordered by the under margins of the head and the first six peræonal segments.

The *epimerals* of the first and second pairs are a little shorter than the segments, that of the third pair is the deepest of all but scarcely half as long as the under margin of the third segment; that of the fourth pair is half as long as the segment, that of the fifth pair equals the whole length of the under margin of the segment, that of the sixth pair is half as long, that of the seventh a third as long as the under margin of the corresponding segment.

The *branchial sacks* (Pl. VI, fig. 5) are more elongated and narrow than in the preceding species, attached to the second to sixth pairs of peræopoda; they are scarcely longer than the femora of the corresponding legs; that of the second pair is about four times as long as broad.

The *ovitetrices* (Pl. VI, fig. 5) are comparatively much longer and narrower than in *Mimonectes Lovéni*, and much narrower than in *M. Steenstrupi*; that of the second pair is seven times as long as broad, densely fringed with long, simple hairs; it is more than half as long as the second pair of peræopoda; those of the third to sixth pairs are only a little shorter than the corresponding legs.

The *first pair of peræopoda* (Pl. VI, fig. 4) are only a little shorter than the second pair. The femur is elongate, almost linear, fully three times as long as broad, smooth; on the inner side of the front margin is a long narrow groove for the reception of the rest of the leg, when folded up. The genu is more short than broad, with some hairs at the lower, hinder corner. The hind margin of the tibia is longer than the genu, indistinctly serrated, and fringed with long hairs, especially at the lower, produced corner. The carpus is half as long as the femur, very broad, much broader than the metacarpus, the lower, hinder corner is rectangular, armed with strong bristles, the hind margin shows six large teeth, each tipped with a bristle, the front margin is almost straight, with three long hairs. The metacarpus is almost as long as the carpus, the hind margin has between the middle and the apex a low prominence, armed with spines and strong bristles; the front margin is nearly straight, fringed with slender hairs. The dactylus is straight, sharp-pointed, fully equalling a third of the length of the metacarpus; on the hinder side it has at the base a large opening for the outlet of the secretion from the glands, which are to be seen within all the joints.

The *second pair* (Pl. VI, fig. 5 and 6). The femur is about as broad as in the first pair, elongate, thrice as long as broad, with some hairs on the feebly curved hind margin; the front margin is smooth, and provided with such a narrow groove as mentioned in the first pair. The genu is more broad than long, with some short hairs on the under margin. The tibia is longer than the genu, provided with short bristles on the feebly produced lower, hinder corner. The carpus is very short, scarcely equalling a fourth of the length of the femur, it is not broader than the metacarpus, fringed with long bristles on the under margin, the front and hind margins are smooth. The metacarpus is twice as long as the carpus, the front margin smooth; the spinulous prominence on the hind margin is more strongly developed than in the first pair. The dactylus is longer than a third of the metacarpus, feebly bent at apex. Glands as in the preceding pair.

The *third and fourth pairs* are equal in length, more slender than in both the other species, the third pair equal about a sixth of the length of the diameter of the globe.

The *fifth pair* (Pl. VI, fig. 7) are the longest of all, slender. The femur is almost four times as long as broad; the front margin is feebly curved, with six long teeth, each tipped with a short spine, the lower corner is sharp-pointed, carrying a similar spine; the hind margin is straight, with a long, narrow groove for the reception of the three next joints of the leg, when folded up. The genu is fully as long as broad, smooth. The tibia is shorter than half the femur, broader than the carpus; the front margin is fringed with some very short spines; the hind margin is feebly curved, the lower corner is a little produced, sharp-pointed. The carpus is more than half as long as the femur, linear; the front margin with eight low teeth tipped with minute spines; along the outer side there is a row of spines. The metacarpus is shorter and narrower than the carpus, tapering; the

front margin is indistinctly serrated, the hind carries some short spines. The dactylus is straight, equalling a fourth of the length of the metacarpus. Glands in all the joints.

The *sixth pair* are a little shorter than the fifth pair, but almost similar in shape.

The *seventh pair* (Pl. VI, fig. 8 and 9) are longer than the first pair, but considerably shorter than the sixth pair. The femur is almost four times as long as broad, the margins are smooth, with a narrow groove on the inner side of the hind margin. The genu is as long as broad, smooth. The tibia is not half as long as the femur, a little wider at the lower end. The carpus is nearly twice as long as the tibia, linear, smooth. The metacarpus is a little more than half as long as the carpus, linear, with some bristles at the apex. The dactylus is stout, curved, as long as the breadth of the metacarpus. Glands in all the joints.

The *pleon* is twice as long as the dorsal margin of the last peræonal segment; the first segment is the longest. The pleon and urus together are longer than a fifth of the diameter of the globe.

The *pleopoda*. The peduncles are about as long as the rami, cylindrical. The coupling spines and the cleft bristle are similar to those in the preceding species. The outer ramus has nine, the inner eight joints.

The *urus* is a little shorter than the last two pleonal segments; the first ural segment is almost as long as the coalesced second and third together. A little above the middle of the coalesced segment runs a feeble line on the under-side of the segment indicating the limit between the original second and third segments.

The *uropoda* (Pl. VI, fig. 10). The peduncle of the *first pair* is as long as the peduncle of the second, thick, a little broader below, with three short bristles along the inner margin. The inner ramus is elongate-lanceolate, fully eight times as long as broad, much longer than the peduncle, carrying minute spines along both margins; the outer ramus is almost as long as the peduncle, more than half as long as the inner ramus, and only a little narrower, smooth on the outer margin, and armed with minute spines along the inner. The *second pair* has the peduncle similar to that of the first pair. The inner ramus is elongate-lanceolate, five times as long as broad, and much longer than the peduncle, the margins are fringed with minute spines; the outer ramus is shorter than the peduncle, but more than half as long as the inner ramus, and much narrower; it is smooth on the straight, outer margin, and provided with minute spines on the lower half of the inner margin; the second pair reach farther backwards than the first pair. The peduncle of the *third pair* is scarcely a fourth broader than those of the preceding pairs, not twice as long as broad, and shorter than the last ural segment. The inner ramus is elongate-lanceolate, about four times as long as broad, the outer margin is serrated, the inner fringed with minute spines; the outer ramus is as long as the peduncle, more than half as long as the inner ramus, and half as broad; the outer margin is straight and smooth, the inner is finely spinulous.

The *telson* is more long than broad, obtusely rounded behind, fully as long as the breadth of the peduncle of the last pair of uropoda, and more than half as long as the peduncle.

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3. **MIMONECTES STEENSTRUPI**, C. BOVALLIUS, 1885.

Pl. VI, fig. 11—21.

**Diagn.** *Caput* quintam partem diametri sphaeræ altitudine æquans. *Articulus primus flagelli antennarum* primi paris pedunculo paullo longior, crassus, non serratus. *Segmenta omnia peræi* sphaeram formantia. *Metacarpi pedum peræi* primi et secundi parium cylindrati, spinis instructi; non hirsuti. *Pedes tertii* paris octavam partem diametri sphaeræ longitudine æquantes. *Telson* pedunculum pedum uri ultimi paris latitudine æquans, dimidio longitudinis pedunculi paullo brevius, latitudinem autem longitudine valde superans.

The *head* is as high as a fifth of the diameter of the globe. The first joint of the flagellum of the first pair of *antennæ* is only a little longer than the peduncle, thick, not serrated. All the *peræonal* segments form the globe. The *metacarpi* of the first two pairs of *peræopoda* are cylindrical, armed with spines, not hirsute. The third pair equal an eighth of the diameter of the globe. The *telson* is as broad as the peduncle of the last pair of uropoda; it is a little shorter than half the length of the peduncle, but much longer than its breadth.

**Colour.** Whitish, pellucid.

**Length.** 7 to 11 mm.

**Diameter of the globe.** 6 to 10 mm.

**Hab.** The Northern temperate and the Arctic regions of the Atlantic (D. M.). The tropical region of the Atlantic (P. M.; S. M.).

<b>Syn.</b> 1885.	<i>Mimonectes Steenstrupi</i> ,	C. BOVALLIUS.	—	»Mimonectes, a remarkable genus of Amphipoda Hyperideæ», p. 12, pl. 2, fig. 13 and 14. Nova Acta Soc. Reg. Scient. Upsal. Ser. III. Vol. 13.
»	»	»	»	1887. »Systematical list of the Amphipoda Hyperideæ.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.
»	»	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 558, pl. 47, fig. 111—115.
»	»	»	H. J. HANSEN.	1887. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr», p. 56. Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenhavn, 1887.

*Mimonectes Steenstrupi* has the peculiar balloon-like form of the *peræon* more highly developed than both the other species. When floating it resembles more a bladder than an amphipod and it is very difficult to recognize it among the other pelagic animals

caught with the hand-net and put into a glass-tube. I had myself the good luck to get two small specimens of this species in a stroke with a surface-net some twenty miles off Barbadoes at Lat. 13° N. during the expedition of H. Swed. M:s Corvette Balder in 1881, under the command of Captain ANSGAR BROBERG. In the same stroke it happened to be some specimens of *Paraphronima clypeata*, three specimens of *Phronimopsis Sarsi*, one of *Synopia caraibica*, and three more species of common Hyperids.

The *head* is comparatively small, more than three times as high as long, and only a little more high than broad.

The *ocelli* are six to eight on each side.

The *first pair of antennæ* (Pl. VI, fig. 14 and 15) are a little longer than the head, very stout and thick. The peduncle is two-jointed, the first joint is robust, almost twice as long as the second. The first joint of the flagellum is short, thick at the base, slowly tapering towards apex, it is only a little longer than the peduncle; the inner side and the lower margin are richly provided with stout, »olfactory» bristles, articulating on prominent, button-like tubercles; the upper and under margins are smooth, not serrated; the last three flagellar joints together are half as long as the first joint; the second flagellar joint is the shortest, armed with one »olfactory» bristle, the third joint is twice as long as the second, carrying two long, sharp-pointed bristles at the lower anterior corner, the fourth joint is shorter than the third, wider at apex, provided with two very long, sharp-pointed, bristle-like hairs, somewhat curved.

The *second pair of antennæ* (Pl. VI, fig. 14) are almost as long as the peduncle of the first pair, four-jointed; the first joint is the broadest, but much shorter than the second, which is the longest, the third and fourth joints are equal in length, the last tapering, tipped with two minute bristles.

Beneath the bases of the first pair of antennæ there is on each side a rounded protuberance, with a circular hole at the summit, similar to that mentioned in *Mimonectes Lovéni*.

The *peræon*. The top of the globe is formed by the third segment alone. The dorsal margin of the second segment is much the longest, fully twice as long as that of the first segment, and more than four times as long as its own under margin; the seventh segment is the shortest. The circular under surface of the globe is bordered by the under margins of the head and of all the peræonal segment, and by the under margin the first pleonal segment, which however does not participate in forming the globe.

The *epimeral* of the first pair is the longest, as long as the under margin of the segment, that of the second pair equals two thirds of the length of the under margin of the segment, those of the third, fourth and fifth pairs are scarcely as long as half the corresponding segment, that of the sixth pair is almost as long as the segment, the epimeral of the seventh pair is very short.

The *branchial sacks* (Pl. VI, fig. 17) are longer and somewhat broader than in the preceding species, attached to the second to sixth pairs of peræopoda. They are much longer than the femora of the corresponding pairs, each longer than two thirds of the length of the whole leg. That of the second pair is scarcely three times as long as broad.

The *ovitetrices* (Pl. VI, fig. 17) are long, and much broader than in the two preceding species; sparingly fringed with simple hairs. The ovitrix of the second pair is not more than a third longer than broad, and only a little shorter than the whole leg; those of the following pairs are longer than, or as long as the branchial sacks, and only a little shorter than the corresponding legs.

The *first pair of peræopoda* (Pl. VI, fig. 16) are scarcely shorter than the second pair. The femur is almost ovate, twice as long as broad; the front margin is more curved than the hinder, provided with a narrow groove as in the preceding species, it carries two long bristles a little below the middle. The genu is more long than broad, smooth. The tibia is very small, shorter than the genu, with four to five long bristles at the feebly produced, hinder end. The carpus is almost half as long as the femur, linear, broader than the metacarpus, the lower, hinder corner is obtusely rounded, carrying a long stout bristle, and one or two shorter hairs, the hind margin is straight, with a bristle a little below the middle; the front margin is straight, smooth, the lower corner carrying a long bristle, longer than half the metacarpus. The metacarpus is almost cylindrical, the lower anterior corner broadly produced, forming a kind of shield in front of the dactylus, and armed with three strong bristles at the tip, a little above on the front margin there are three more bristles; the hind margin is straight carrying two pairs of bristles below the middle. The metacarpus is shorter than the carpus. The dactylus is more than half as long as the metacarpus, straight, narrow, bristle-like. Glands in all the joints.

The *second pair* (Pl. VI, fig. 17). The femur is much narrower than in the preceding pair, linear, thrice as long as broad; the margins are smooth; along the lower half of the front margin there is a narrow groove. The genu is more long than broad, with a bristle at the lower, hinder corner. The tibia is shorter than the genu, with two bristles at the lower, a little produced, hinder corner. The carpus equals a third of the length of the femur, it is a little broader below, carrying two bristles at the hinder, and one at the anterior corner. The metacarpus is much narrower than the carpus, cylindrical, with a bristle at the middle of the hind margin, and one at the lower corner; at the produced lower corner of the front margin it carries two short spines. The dactylus is long, narrow, straight, half as long as the metacarpus. Glands in all the joints.

The *third pair* (Pl. VI, fig. 18) are a little longer than the second, tolerably robust, equalling an eighth of the diameter of the globe. The femur is almost linear a little more than twice as long as broad, and equalling the length of the three following joints together; at the lower end of the front margin there is a short, narrow groove for the reception of the genu and tibia, when the leg is folded up. The genu is as long as broad, smooth. The tibia is longer than the genu, the front part is dilated, the hind margin is straight, with two bristles below the middle. The carpus is broad, fully half as long as the femur, the front margin is curved, smooth, the hind margin almost straight, with two bristles. The metacarpus is considerably shorter than the metacarpus, the front margin curved, the hind straight, both are smooth. The dactylus is feebly curved, robust, more than half as long as the metacarpus. Glands in the last three joints.

The *fourth pair* are a little shorter than the third pair, but similar in shape.

The *fifth pair* are the longest, and more slender than the two preceding pairs, but with the same relative length of the joints.

The *sixth pair* are shorter than the fifth, but similar in shape.

The *seventh pair* (Pl. VI, fig. 19) are shorter than the sixth, but as long as the first pair. The femur is considerably broader than the following joints, more than twice as long as broad, the margins are smooth. The genu is more long than broad, smooth. The tibia is half as long as the carpus, smooth. The carpus is linear, much more than half as long as the femur, the margins are smooth. The metacarpus is shorter than the carpus, the hind margin is curved, the front margin straight, both are smooth. The dactylus is curved, half as long as the metacarpus.

The *pleon* is only a little longer than the dorsal margin of the last peræonal segment; the first segment is the longest. The pleon and urus together are shorter than a fifth of the diameter of the globe.

The *pleopoda* (Pl. VI, fig. 20). The peduncles are longer than the rami, cylindrical. The coupling spines and the cleft bristle are similar to those in *Mimonectes Lovéni*. The outer ramus has eight, the inner seven joints.

The *urus*. The first segment is much longer than the coalesced second and third, and a little broader. The last segment shows, as in the preceding species, a line of division between the original second and third segments. The urus is scarcely longer than the last pleonal segment.

The *uropoda* (Pl. VI, fig. 21). The peduncle of the *first pair* is almost four times as long as broad, and about twice as long as that of the second pair; it is as broad as the peduncle of the third pair, the margins are smooth. The inner ramus is narrowly elongate, ten times as long as broad, a little broader than the outer ramus, the margins are sharply serrated, almost pectinated, with long, narrow, spine-like teeth; the outer ramus is only a little shorter than the peduncle, and more than half as long as the inner ramus, armed in the same manner. The peduncle of the *second pair* is scarcely three times as long as broad; linear, the margins are smooth. The inner ramus is more than twice as long as the peduncle, narrowly lanceolate, more than ten times as long as broad, and a little broader than the outer ramus; the outer ramus is much longer than the peduncle, and more than half as long as the inner ramus; the outer margins of both rami are smooth, the inner margin is armed as in the preceding pair. The peduncle of the *third pair* is longer than the last ural segment, narrow, linear, fully thrice as long as broad, indistinctly serrated on the inner margin, the outer one is smooth. The inner ramus is somewhat longer than the peduncle, and a little broader than the outer ramus, both margins are pectinated as in the preceding pairs; it is narrowly elongate, eight times as long as broad. The outer ramus is as long as the peduncle, and a little shorter than the inner ramus; the outer margin is smooth, the inner pectinated. Glands in all the pairs.

The *telson* is nearly twice as long as broad, obtusely rounded behind, much longer than the breadth of the peduncle of the last pair of uropoda, but shorter than half the length of the peduncle.

The eighth family, **HYPERIIDÆ**, DANA, 1852.

**Diagn.** *Caput* magnum, tumidum, plus minusve globosum. *Oculi* grandes. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ, articulus primus flagelli crassus, elongatus, ceteri in mare multi, filiformes, in femina perpauci vel nulli. *Antennæ* secundi paris antennis primi paris subsimiles, parti anteriori capitis affixæ. Instrumenta oris masticatoria; mandibulæ palpo instructæ. *Pedes peræi* parium quinque ultimorum ambulatorii, vel plus minusve prehensiles, pedes septimi paris non transformati. *Pedes vri* ramis instructi.

The *head* is large, tumid, more or less globular. The *eyes* are large. The first pair of *antennæ* are straight, fixed at the anterior side of the head, the first joint of the flagellum is thick, elongated, the following ones are many, filiform in the male, in the female they are very few or wanting. The second pair of *antennæ* are rather similar to the first pair, fixed at the anterior side of the head. The *mouth-organs* are adapted for mastication, the mandibles are provided with a palp. The last five pairs of *peræopoda* are walking legs, or some of them are more or less prehensile, the seventh pair are not transformed. The *uropoda* are provided with rami.

<b>Syn. 1852.</b>	<i>Hyperidæ</i> ,	J. D. DANA.	—	»On the Classification of the Crustacea Choristopoda or Tetrade-capoda». The American Journal of Science and Arts. Second Series. Vol. 14, p. 314.
»	»	»	»	1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 980 and 1442.
»	»	SPENCE BATE.	»	1856. »On the British Edriophthalma. Part. 1. The Amphipoda». Report of the 25th meeting of the Brit. Association, - - at Glasgow 1855, p. 59.
»	»	A. BOECK. <sup>1)</sup>	»	1860. »Bemærkninger angaaende de ved de Norske Kyster forekommende Amphipoder». Forhandl. ved de Skandinaviske Naturforskeres 8:de Møde, i Kjøbenhavn, 1860, p. 635.
»	»	SPENCE BATE.	»	1862. Catal. Amph. Crust. Brit. Museum, p. 287.
»	»	A. GOËS.	»	1865. »Crustacea amphipoda maris Spetsbergiam alluentis, cum speciebus aliis arcticis». Öfversigt af K. Sv. Vet. Ak. Förhandl. 1865, N:o 8, p. 17.
»	»	SPENCE BATE and WESTWOOD.	1868.	A History of the British Sessile-eyed Crustacea. Vol. 2, p. 2.

<sup>1)</sup> BOECK calls the *Hyperidæ* here »Første Tribus» and places »*Hyperinæ*» as its second subfamily.

- Hyperidæ*, J. D. DANA. A. BOECK. 1870. »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 84.
- » » » 1872. De Skandinaviske og Arktiske Amphipoder, p. 77.
- » » C. CLAUS. 1872. Grundzüge der Zoologie. 2:te Aufl., p.
- » » » 1875. Grundzüge der Zoologie. 3:te Aufl., p. 517.
- » » TH. STREETS. 1877. »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California», p. 125. Bulletin of the United States National Museum, 1877.
- » » C. CLAUS. 1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 602.
- » » GEO. M. THOMSON.<sup>1)</sup> 1879. »New Zealand Crustacea, with Descriptions of New Species». Trans. and Proc. of the New Zealand Institute. 1878, Vol. 11, p. 242.
- » » G. O. SARS. 1882. »Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter». Christiania Videnskabs Selskabs Forhandl. for 1882, N:o 18, p. 19.
- » » C. CLAUS. 1884. Grundzüge der Zoologie. 4:te Aufl., 1:ster Band, p. 586.
- » » J. S. KINGSLEY. 1884. The Standard Natural History. Vol. 2, p. 74.
- » » J. V. CARUS.<sup>2)</sup> 1885. »Prodromus Faunæ Mediterraneæ». Vol. 1, p. 422.
- » » A. GERSTAECKER. 1886. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Bd. 5. Abth. 2, p. 490.
- Hyperiidæ*, » G. O. SARS. 1886. The Norwegian North-Atlantic Expedition 1876—1878. XV. Zoology. Crustacea. Part. 2, p. 36.
- » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 15.
- » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 559.
- Hyperidæ*, » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1372.

<sup>1)</sup> THOMSON cites SPENCE BATE as author for the family name *Hyperidæ*.

<sup>2)</sup> CARUS quotes: »*Hyperidæ*, (M. EDW.) SP. BATE».

The type for the genus *Hyperia* and thus also for the family Hyperiidæ is the one first described of all Hyperids, viz; »*Pulex cancriformis antennis brevissimis*», of HANS STRØM,<sup>1)</sup> from the year 1762. It was named »*Cancer medusarum*», by O. F. MÜLLER<sup>2)</sup> in 1776. The short diagnosis of MÜLLER and the original drawing of STRØM were reproduced by subsequent authors; and in 1823 we find the generic name *Hyperia* applied to it. The name was given by LATREILLE, but first published by DESMAREST in his »*Malacostracées*» in the »*Dictionnaire des sciences naturelles*», the 28:th volume, p. 347. In 1830 H. MILNE EDWARDS<sup>3)</sup> ranged the whole of the then known Hyperids in the »*Famille des Hypérines*», which thus is a synonym for the name of the tribe »*Amphipoda Hyperiidæ*». Ten years later he<sup>4)</sup> divided the family into three subdivisions, viz; 1, »*Tribu des Hypérines gammaroïdes*», 2, »*Tribu des Hypérines ordinaires*», and 3, »*Tribu des Hypérines anormales*». In the second of these divisions, »*Hypérines ordinaires*», he quoted the genera, *Hyperia*, LATREILLE, *Metoecus*, KROEYER, *Phorcus*, H. MILNE EDWARDS, *Tyro*, n. g., *Primno*, GUÉRIN, *Lestrigonus*, H. MILNE EDWARDS, *Daira*, H. MILNE EDWARDS, *Themisto*, GUÉRIN, *Anchylomera*, H. MILNE EDWARDS, *Phrosina*, RISSO, and *Phronima*, LATREILLE.

In 1852 DANA, see the list of synonyms above, established the family Hyperidæ with three subfamilies including the following genera; the first subfamily »*Vibilinæ*», with *Vibilia*, H. MILNE EDWARDS; the second subfamily »*Hyperinæ*», with *Lestrigonus*, *Tyro*, *Hyperia*, *Metoecus*, *Tauria*, DANA, *Cylopus*, DANA, *Daira* (= *Dairinia* or *Dairilia*, DANA) and *Cystisoma*, GUÉRIN; the third subfamily »*Synopinæ*», with *Synopia*, DANA. He had thus removed from the Hyperidæ, the Phronimids, the Anchylomerids, the Phorcids, and erroneously the genus *Themisto*, which he placed in the family *Phronimidæ*. In fact he also removed *Tyro*, naming its representative »*Clydonia*», and wrongly regarding it as belonging to the Corophids. He did not recognize the identity of *Tyro* and *Clydonia*. Thus the limits of the Hyperidæ were much restricted by DANA, but he committed an error, when he introduced in the genus *Daira*, H. MILNE EDWARDS, and thus in the family Hyperidæ, the new species *Daira* (*Dairinia*) *debilis*, *D. depressa*, and *D. inæquipes*; they belong, as will be shown below, to the Lycæids.

SPENCE BATE in 1856 mentioned as British members of the family Hyperidæ, the genera *Hyperia* and *Lestrigonus*. A. BOECK in 1860 recorded the same genera from the Norwegian coast.

In 1862 SPENCE BATE regarded the following genera as belonging to the family Hyperidæ, viz; *Lestrigonus*, *Hyperia*, *Vibilia*, *Cylopus*, *Tyro*, *Dairinia*, *Cystosoma*, and *Themisto*; he thus restituted *Themisto* to its proper place, but systematically he made a step backwards by uniting the subfamily »*Vibilinæ*» with Hyperidæ.

A. GOËS in 1865 quoted as arctic members of Hyperidæ the genera *Themisto* and *Hyperia*; and A. BOECK in 1870 as arctic and boreal ones *Hyperia*, *Metoecus*, Para-

<sup>1)</sup> HANS STRØM. *Physisk og oekonomisk Beskrivelse over Fogderiet Søndmør*. Vol. 1, p. 188. Sorøe, 1762, 4:o.

<sup>2)</sup> O. F. MÜLLER. *Zoologiæ Danicæ Prodrumus*, p. 196. Copenhagen, 1876.

<sup>3)</sup> H. MILNE EDWARDS. »*Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes*». *Annales des Sciences Naturelles*. Tome 20:me, p. 385. Paris, 1830.

<sup>4)</sup> H. MILNE EDWARDS. *Histoire Naturelle des Crustacés* Tome 3:me, p. 70—102. Paris, 1840.

themisto n. g. and *Themisto*. In 1872 he cited as *true* members of the family, *Hyperia*, *Tauria*, *Parathemisto*, and *Themisto*; as *probably* belonging to the family, *Cyllopus*; and, as *possibly* belonging to it, the genera *Vibilia*, *Dairinia*, *Tyro*, and *Cystosoma*. In the same year CLAUS enumerated the genera *Hyperia*, *Themisto*, *Cyllopus*, and *Cystisoma*, as constituting the family. In 1875 he gave a diagnosis of the family, recording it as the second of the four families constituting the tribe »*Hyperina*»; he enumerated the following eight genera as belonging to the family, *Hyperia*, *Tauria*, *Cyllopus*, *Metoecus*, *Cystosoma*, *Tyro*, *Themisto*, and *Anchylomera*. In 1879 he gave a new diagnosis of the family in his »*Der Organismus der Phronimiden*», mentioning the same genera as in 1872; at the same occasion he described a new genus, *Phronimopsis*, which according to my opinion belongs to *Hyperiidæ*; he placed it, however, in the family *Phronimidæ*.

In the same year GEO. M. THOMSON, describing new Crustaceans from New Zealand, gave a diagnosis of the family *Hyperidæ*, citing SPENCE BATE as author of the family-name.

In 1880 CLAUS repeated the description of the family of 1875, only excluding the genus *Anchylomera* which was transferred to the family *Phronimidæ*.

In 1885 J. V. CARUS translated in latin the diagnosis given by CLAUS in 1879, and cited the genus *Hyperia*. The same year I proved<sup>1)</sup> that *Tauria*, DANA, was not identical with *Metoecus*, KROEYER, and that *Lanceola*, TH. SAY, was a genus of its own, not at all synonymous with *Hyperia*, LATREILLE. At that occasion I did not regard *Metoecus* as generically distinct from *Hyperia*. A. GERSTAECKER in 1886 ranged the following genera in the family *Hyperidæ*: *Themisto*, *Cyllopus*, *Cystosoma*, *Tyro*, *Hyperia* with the synonyms *Metoecus* and *Tauria*, further *Daira*, *Mimonectes*, C. BOVALLIUS, and *Lanceola*, TH. SAY. In 1887, in »*Systematical list of the Amphipoda Hyperiidea*», I excluded from the family all the genera having a few-jointed flagellum in the first pair of antennæ of the male, viz; *Tyro*, *Lanceola*, *Cyllopus*, *Daira*, *Cystosoma*, and *Mimonectes*; from the family *Phronimidæ* I transferred to *Hyperiidæ* the genus *Phronimopsis*, CLAUS, and proposed some new generic names, viz; *Hyperoche* instead of *Metoecus*, KROEYER, *Iulopis*<sup>2)</sup>, *Hyperiella*, and *Themistella*; the name *Themisto* being preoccupied I corrected it to *Euthemisto*, GUÉRIN; thus, according to my systematical views, the family consisted of the genera: *Hyperia*, *Iulopis*, *Hyperoche*, *Tauria*, *Hyperiella*, *Parathemisto*, *Euthemisto*, *Themistella* and *Phronimopsis*. In the same year I gave in another paper, »*Arctic and Antarctic Hyperids*», short diagnoses of the mentioned genera except *Iulopis*, *Themistella* and *Phronimopsis*.

At least TH. STEBBING in his »*Report on the Challenger-Amphipoda*», in 1888, took the family within the limits I had proposed, and described new species of the genera: *Phronimopsis*, *Hyperia*, *Hyperoche*, *Hyperiella*, *Euthemisto*, and *Parathemisto*.

The *Hyperidæ* have by many authors been called parasites, because they have been observed and often taken under and within yellow-fishes, I think this manner of living might

<sup>1)</sup> »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 16.

<sup>2)</sup> Corrected here to *Euiulopis*, to avoid mistake with the earlier name *Iulopsis*, given to a Myriapod.

rather be looked upon as a kind of commensalism or symbiosis, the females taking their abode in such animals during the time of reproduction and the young ones resting there until being sufficiently developed to trust their own swimming and feeding powers. Also in Salpæ and among the tentacles of Actiniæ I have observed females and young ones of *Hyperia*, adult males have never, as far as I know, been recorded inhabiting such hospitable animals, but I have many times seen young males, with tolerably developed first pair of antennæ in considerable number hospiting in a large *Medusa aurita*. Not the females of all the genera of the family have accepted this mode of living; as far as I have seen in the literature or observed in the nature, it is species of *Tauria*, *Hyperia*, *Hyperoche* and *Hyperielli*, which have been accustomed to that manner of seeking protection. Some of the species of *Euthemisto* and *Parathemisto*, on the other hand, occur in numberless shoals in the Arctic and Antarctic seas, probably not often as fully adult, but as young ones in different stages of development. The tropical species seem to be more scarce, occasionally occurring in company with species of Hyperids, belonging to other families, or with other pelagic animals.

From oeconomical point of view some members of the family are of great importance as food for herring and other fishes, there are chiefly species of the genera *Parathemisto* and *Euthemisto* and perhaps also one or another species of *Hyperielli* in the Antarctic region.

The sexual dimorphism within the family is distinctly pronounced in the form of the first and second pair of antennæ, the multi-articulate flagella belong only to the males<sup>1</sup>). Usually the peræon is broader and wider in the female than in the male. The mandibular palps are just as well developed in the females as in the males.

The family has representatives in all the seas round the world, in the Arctic and Antarctic, in the tropical and temperate regions. Its largest representatives, however, seem to be at home in the Arctic, and probably also in the Antarctic region.

The characteristics which I have found to be most useful for distinguishing the **genera** within the family are:

- 1:0. The first pair of peræopoda being *simple*, (*Parathemisto*, *Euthemisto*, *Phronimopsis*), *subcheliform* (*Tauria*, *Euiulopis*, *Hyperia*, *Hyperielli* and *Themistella*), or *cheliform* (*Hyperoche*).
- 2:0. The second pair being *simple* (*Tauria*), *subcheliform* (*Hyperia*), or *cheliform* (the seven remaining genera).
- 3:0. The third and fourth pairs forming a *folding, prehensile organ* (*Parathemisto*, *Euthemisto*, and, more incompletely, *Hyperoche*), or being common *walking legs*.
- 4:0. The fifth pair being *elongated* (*Hyperielli* and *Euthemisto*), or *not longer* than the two following pairs (the seven remaining genera).
- 5:0. The *epimerals being coalesced* with the peræonal segments (*Themistella* and *Phronimopsis*) or *free* (the other genera).
- 6:0. The body being *hirsute* (*Euiulopis*) or *smooth* (all the other genera).

<sup>1</sup>) The question on the supposed difference between *Hyperia* and *Lestrigonus* will be discussed under »*Hyperia*».

The nine genera composing the family may be distributed in the order shown by the following diagram:

- A. The epimerals are distinct, articulating with the segments.
- a 1. The second pair of peræopoda are simple, not subcheliform ..... 1. *Tauria*.
  - a 2. The second pair of peræopoda are subcheliform or cheliform.
    - aa 1. The carpal process of the second pair of peræopoda is compressed, knife-like ..... 2. *Hyperoche*.
    - aa 2. The carpal process of the second pair of peræopoda is gauge- or spoon-shaped.
      - aaa 1. The body is more or less hirsute ..... 3. *Euiulopsis*.
      - aaa 2. The body is smooth.
        - aaaa 1. The carpus of the third and fourth pairs of peræopoda is narrow, not dilated.
          - aaaaa 1. The fifth pair of peræopoda are not elongated, as long as the sixth pair ..... 4. *Hyperia*.
          - aaaaa 2. The fifth pair of peræopoda are elongated, much longer than the sixth pair ..... 5. *Hyperiella*.
        - aaaa 2. The carpus of the third and fourth pairs of peræopoda is dilated, together with the metacarpus forming a folding prehensile organ.
          - aaaaa 3. The fifth pair of peræopoda are not longer than the sixth pair ..... 6. *Parathemisto*.
          - aaaaa 4. The fifth pair of peræopoda are much longer than the sixth pair ..... 7. *Euthemisto*.
- B. The epimerals are coalesced with the segments.
- b 1. The first pair of peræopoda are more or less subcheliform ..... 8. *Themistella*.
  - b 2. The first pair of peræopoda are simple, not subcheliform ..... 9. *Phronimopsis*.

### Genus 1. **TAURIA**, DANA, 1852.

**Diagn.** *Caput* magnum, fere globosum. *Peræon* leve, epimeris distinctis instructum. *Pedes peræi* primi et secundi parium non subcheliformes nec subprehensiles; carpus pedum primi paris dilatatus, non productus; carpus pedum secundi paris non productus. Carpus pedum tertii ac quarti parium non dilatatus. *Pedes* parium trium ultimorum longitudine subæquales. *Pedes uri* longi.

The *head* is large, almost globular. The *peræon* is smooth, the epimerals distinct. The first and second pairs of *peræopoda* are not subcheliform nor subprehensile; the carpus of the first pair is dilated, not produced; the carpus of the second pair is not produced; the carpus of the third and fourth pairs is not dilated. The last three pairs are subequal in length. The *uropoda* are long.

Syn. 1852.	<i>Tauria</i> , J. D. DANA.	—	United States Exploring Expedition. Crustacea. Vol. 2, p. 988.
»	»	C. CLAUS.	1875. Grundzüge der Zoologie. 3:te Aufl., p. 518.
»	»	»	1880. Grundzüge der Zoologie. 4:te Aufl., 1:ster Band, p. 587.
»	»	C. BOVALLIUS.	1885. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 16.
»	»	»	1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 19.
»	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 565.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1373.

The genus *Tauria* has had the bad fortune to be misunderstood by the carcinological authors after DANA, it was, however, well described and the accompanying drawing was a good one. The first time I find it in the literature after its foundation is in SPENCE BATE'S Catalogue of Amphipoda, there, p. 292, he makes it a synonym to *Hyperia*, saying: »The distinction between *Tauria* and *Hyperia* depends upon the opposite extreme of the development of the carpi of the gnathopoda as compared with that of KRÖYER'S genus *Metoechus*, offering, to my mind, nothing more than a specific difference, — namely, in the latter the great, and in the former the small amount of development of the produced angles of the carpi of the gnathopoda». But DANA himself says that »the angles of the carpi of the gnathopoda are not at all produced, and a glance at the drawing, DANA, l. c. pl. 68, fig. 2, makes it evident that the carpus of the second pair has a shape totally different to that pair in a *Hyperia* or a »*Metoechus*». Getting on with the investigation of the fate of the genus we find that in 1868 SPENCE BATE and WESTWOOD in »A History of the British Sessile-eyed Crustacea», vol. 2, p. 519, maintain the earlier view of SPENCE BATE about the identity of *Tauria* with *Hyperia*, but if it is somewhat unclear what SPENCE BATE means in the passage quoted above, speaking about »the development of the carpi» it is fully clear that he and his fellow-author in the last cited work have fallen into a complete error with regard to the characteristics of the genus *Tauria*, DANA. Reasoning about their new species *Hyperia tauriformis*, which is characterized by »the inferior angle of the carpus is anteriorly produced in both pairs of gnathopoda», they say: »DANA established the genus *Tauria* for the reception of those species of *Hyperia*, that have the antero-inferior angle of the carpus of both pairs of gnathopoda so far anteriorly produced as to extend to the extremity of the propodos<sup>1)</sup>, thus forming a tolerably perfect but compound chelate organ». Thus the genus had been disguised to unknowableness.

C. CLAUS in 1875 and 1880 recorded *Tauria* as a genus belonging to the family Hyperidæ, without mentioning anything about its supposed synonymy with *Metoechus*; he quoted from DANA the characteristic concerning the form of the second pair of peræo-

<sup>1)</sup> Propodos = metacarpus.

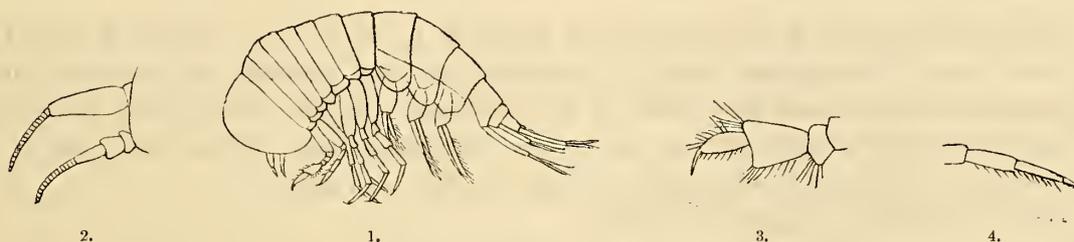
poda, but misunderstood the characteristic regarding the seventh pair, saying that this pair are much shorter than the sixth pair, just as in *Cyllopus*. AXEL BOECK was probably misled by the British authors when he in 1875 took up the name *Tauria* as a synonym to *Metoecus*, KROEYER, rejecting the latter name as being preoccupied. In 1885 I restituted the genus *Tauria*, DANA, within its old limits, as mentioned above, and claimed it as a genus of its own, belonging to the family Hyperiidæ.

*Tauria* is probably closest allied to the genus *Hyperia*; as we know it from DANA's description and drawing it is, however, readily distinguished from all the other genera of the family by the narrow, not produced carpus of the second pair of peræopoda.

The generic diagnosis, given by DANA l. c. p. 988, runs:

»Antennæ four, short, approximate at base, superior rather stout. Feet not subcheliform, nor subprehensile, seventh pair hardly abbreviated».

### 1. TAURIA MACROCEPHALA, DANA, 1852.



*Tauria macrocephala*, DANA.

Facsimile from DANA, U. S. Expl. Exp. Crust., II, pl. 68, fig. 2.

Fig. 1. The animal from the side. 2. The antennæ. 3. The first pair of peræopoda. 4. The second pair of peræopoda.

**Diagn.** *Caput* permagnum. *Peraon* breve, crassum. Epimera quarti paris margine producta et acuta. *Pedes peræi* primi et secundi parium bene pubescentes; carpus pedum primi paris latus, non productus, metacarpum longitudine valde superans. *Pedes* parium quinque ultimorum nudi, subæquales. *Pedes uri* longi; pedes primi paris apicem pedum ultimi paris fere attingentes, pedes secundi paris breviores, apicem pedunculi pedum ultimi paris attingentes.

The *head* is very large. The *peræon* is short and stout. The epimeral of the fourth pair is produced below, and acute. The first two pairs of *peræopoda* are quite pubescent; the carpus of the first pair is broad, not produced, much longer than the metacarpus. The last five pairs are naked, subequal in length. The *uropoda* are long; the first pair reach very nearly to the apex of the last pair, the second pair reach only to the apex of the peduncle of the last pair.

**Colour.** ?

**Length.** 17 mm. (Nine lines, DANA.)

**Hab.** The Antarctic Seas, near Lat. 66° S. and Long. 157° E., taken from the cavity of a Medusa, (DANA).

<b>Syn.</b> 1852.	<i>Tauria macrocephala</i> ,	J. D. DANA.	—	United States Exploring Expedition. Crustacea. Vol. 2, p. 988, pl. 68, fig. 2.
	<i>Hyperia</i>	»	»	SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 296, pl. 49, fig. 2.
	<i>Tauria</i>	»	»	C. BOVALLIUS. 1885. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 17, fig. 4.
	»	»	»	» 1887. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 19.
	»	»	»	» 1887. »Arctic and Antarctic Hyperids». Vega- Exp. Vetensk. Iakttagelser. Bd. 4, p. 565.

To judge from the drawing given by DANA l. c. pl. 68, fig. 2*a*, and 2*e* (fig. 1 and 4 above), the form of the second pair of peræopoda is very peculiar, the carpus being not dilated, much narrower than the carpus of the first pair. In the description, however, l. c. p. 988 and 989, DANA says nothing about the different shape of the both pairs. Thus it must be left to future investigation to clear up this question.

DANA's description contains further:

The *head* is nearly filled with the pigment of the eyes; the head is higher than half the length of the peræon. The antennary area on the front of the head is small, not half the height of the front.

The *antennæ* are short, subequal, hardly as long as half the height of the head, subulate, extremity very closely multiarticulate.

The *epimerals* of the first to third, and fifth to seventh pairs are small, truncate below.

The *first two pairs of peræopoda* have the femur broad, lamellar. The genu and tibia are small, not produced. The carpus is broad, more than twice as long as the tibia, and longer than the metacarpus and dactylus together. The dactylus is small. The first two pairs are much shorter than the following pairs, quite pubescent.

Genus 2. **HYPEROCHE**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* magnum fere globosum. *Peræon* leve, epimeris distinctis instructum. *Pedes peræi* primi et secundi parium cheliformes, carpus dilatatus et valde productus, processus carpi compressus, cultriformis. Carpus pedum tertii ac quarti parium paullo dilatatus. *Pedes* parium trium ultimorum longitudine subæquales, duobus præcedentibus non vel paullo longiores. *Pedes uri* medioeres, non elongati.

The *head* is large, almost globular. The *peræon* is smooth, with distinct epimerals. The first and second pairs of *peræopoda* are cheliform, the carpus is dilated and very produced, the carpal process is compressed, knife-shaped. The carpus of the third and fourth pairs is somewhat dilated. The last three pairs are subequal in length, not, or only a little longer than the two preceding pairs. The *uropoda* are medioere, not elongated.

<b>Syn. 1838.</b>	<i>Metoecus</i> , H. KROEYER.	—	»Grønlands Amphipoder». Det Kongl. Danske Videnskabs-Selskabs Naturvidensk. og Mathemat. Afhandlinger. Deel. 7, p. 288.
	<i>Metoecus</i> ,	»	H. MILNE EDWARDS. 1840. Histoire Naturelle des Crustacés Tome 3:me, p. 78.
	»	»	J. D. DANA. 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 981 and 1442.
	»	»	A. WHITE. 1857. A popular History of the British Crustacea, p. 207.
	»	»	A. BOECK. 1870. »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 86 (6).
<b>1872.</b>	( <i>Tauria</i> , DANA.)	»	1872. De Skandinaviske og Arktiske Amphipoder, p. 82.
	»	»	G. O. SARS. 1882. »Oversigt af Norges Crustacæer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter». Christiania Videnskabs-Selskabs Forhandl. for 1882, p. 19 and 75.
<b>1887.</b>	<i>Hyperoche</i> , C. BOVALLIUS.	—	»Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.
	»	»	— 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 563.
	»	»	TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1398.

When H. KROEYER in 1838 established the genus *Metoecus*, he gave the following generic diagnosis:

»*Pedes* primi et secundi paris reliquis permulto breviores, sed validi, manuqve armati cheliformi. *Articulus* horum pedum quartus, qvi forma præditus est triangulari, manum efficit, a cujus margine inferiori prodeunt pollex biarticularis anterior et di-

gitus posterior. Primus pollicis articulus (v. quintus pedis) magnus, conicus; secundus unguis est pusillus. Digitus conicus, pollice aliquantillum brevior. Margo utriusque pollicis articuli posterior, margoque digiti anterior per totam longitudinem serrati. Cetera cum genere *Hyperia* ferme conveniunt».

From the characteristic »manuque armati cheliformi» and »digitus conicus, pollice aliquantillum brevior», it is clear that KROEYER was quite right in generically separating the animals thus characterised from the old genera *Hyperia*, LATREILLE, and its synonym *Lestrigonus*, H. MILNE EDWARDS, which have the first two pairs of peræopoda *subcheliform*, not cheliform, with the carpal process more or less produced, and the carpal process of the first pair constantly less produced than that of the second pair, or not produced. But as the true character of these carpal processes in *Metoecus*, or *Hyperoche*, and in *Hyperia* had not been more closely examined, and the different building of them thus made out, the identity of the genera was once and again claimed by subsequent authors owing to the supposition that the development of the carpal processes might be gradual and thus the limit between the genera impossible to fix. SPENCE BATE in 1862, SPENCE BATE and WESTWOOD in 1868, and myself in 1885, pronounced this opinion. Later I had the opportunity to make a more careful investigation in the matter and found that the carpal processes in *Hyperoche* were compressed, almost knife-shaped but that in *Hyperia* they were broadly hollowed, spoon-shaped and that in other representatives of the family *Hyperiidæ*, commonly looked upon as distinct genera, the same characteristic reappeared, thus for instance showed *Euthemisto* and *Parathemisto* a narrowly hollowed, gauge-shaped carpal process in the second pair of peræopoda, but *Phronimopsis* a compressed, bluntly knife-shaped, analogue process.

KROEYER regarded his type as identical with *Oniscus medusarum*, of O. FABRICIUS<sup>1)</sup>, and claimed the name *Metoecus medusarum* for it, thus applying on his species the specific name given in 1776 by O. F. MÜLLER<sup>2)</sup> to the typical specimen described and figured in 1762 by STRØM.<sup>3)</sup> It is to be observed that both the description given by STRØM and the name *Cancer medusarum*, O. F. MÜLLER, were quoted by O. FABRICIUS l. c. as synonyms for his *Oniscus medusarum*. The question if *Oniscus medusarum*, O. FABRICIUS and *Cancer medusarum* O. F. MÜLLER really are identical will be treated below, under *Hyperia medusarum*; here it is sufficient to say that the wording of the diagnoses evidently shows that none of them has anything to do with KROEYER's species, thus the specific name *medusarum* was wrongly used by KROEYER, who ought to have given his species a new name.

H. MILNE EDWARDS in 1840 and DANA in 1852 mentioned the genus *Metoecus*, with the characteristics assigned by KROEYER. A. WHITE gave in 1857, l. c. p. 207 the following diagnosis for the genus *Metoecus*, KROEYER: »Two first pairs of legs much shorter than the following, and ending in a little two-toed claw, the movable finger of which has at the end a little rudimentary nail». SPENCE BATE in 1862, as noticed above, united it with *Hyperia*. In 1870 A. BOECK restituted *Metoecus* as a genus by itself. When he in

<sup>1)</sup> Fauna Groenlandica. Copenhagen and Leipzig, 1780, p. 257.

<sup>2)</sup> Zoologiæ Danicæ Prodrômus. Copenhagen, 1776, p. 196.

<sup>3)</sup> Physisk og Oeconomisk Beskrivelse over Føgdriet Søndmør. Vol. 1, p. 188, 4:to, Sorø, 1762.

1872 found that the name *Metoecus* must be rejected, as being preoccupied, he did not substitute it with a new name but accepted *Tauria*, DANA, as the synonym for *Metoecus*, misled, I suppose, by the argumentation of SPENCE BATE and WESTWOOD, p. 519, in the second volume of »The British Sessile-eyed Crustacea»; speaking on *Hyperia tauriformis* n. sp., they say namely:

»DANA established the genus *Tauria* for the reception of those species of *Hyperia* that have the antero-inferior angle of the carpus of both pairs of gnathopoda (= first and second pairs of peræopoda) so far anteriorly produced as to extend to the extremity of the propodos (= metacarpus) thus forming a tolerably perfect but compound chelate organ. But so gradual is the development of this process from one species to another, that we can see no clearly defined limit where one genus may commence and the other end. We have chosen a specific name for our new species, which indicates its affinity with DANA's proposed genus».

BOECK maintained the specific name used by KROEYER and regarded *Tauria medusarum* as the right name.

In 1885<sup>1)</sup> I proved, however, that *Tauria*, DANA, as mentioned above, p. 80, was utterly misunderstood by SPENCE BATE and WESTWOOD and by BOECK, and that it was widely separated from *Metoecus*. Then I did not propose a new generic name but looked upon *Metoecus* as belonging to *Hyperia*.

As it seems to me not only inconvenient but contrary to reason to maintain a name, it may be generic or specific, which depends only on an erroneous determination, and such strictly being the case here with regard to *Tauria medusarum*, I have rejected, for the species in question, the generic name *Tauria* and the specific name *medusarum*, substituting the former with *Hyperoche*<sup>2)</sup> and naming the old *typical species* of H. KROEYER: *Hyperoche Kroeyeri*<sup>4)</sup>, in honour of the eminent Danish Carcinologist.

Among the several species established by H. MILNE EDWARDS and DANA in the genera *Hyperia* and *Lestrigonus* none belongs to the genus *Hyperoche*.

The first new addition to this genus we find in *Hyperia Martinezii*, briefly described by FRITZ MÜLLER in 1864.<sup>3)</sup>

The next addition was made in 1868 by SPENCE BATE and WESTWOOD in the work quoted above. The description of *Hyperia tauriformis*, however, is so meagre, and the drawing so carelessly sketched, that it is quite impossible to judge if it is identical with any one of the later named species, or if it is distinct. If the type specimens are preserved, and according to a passage in a treatise<sup>4)</sup> by the Rev. A. MERLE NORMAN it is probable that such may be the case, we do hope that the species may be reexamined and duly placed in the system. In the same treatise NORMAN speaks about *Hyperia tauriformis* as a synonym of *Metoecus medusarum*, KROEYER, but owing to the different shape

<sup>1)</sup> »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 16.

<sup>2)</sup> »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.

<sup>3)</sup> Für DARWIN. Leipzig, 1864, p. 52.

<sup>4)</sup> »Shetland Final Dredging Report. Part. II. On the Crustacea» etc. Report of the 38:th meeting of the British Association for the Advancement of Science, held at Norwich, 1868. London, 1869, p. 336.

of the first two pairs of peræopoda, as represented in the original corresponding drawings, their identity, in my opinion, is very problematical.

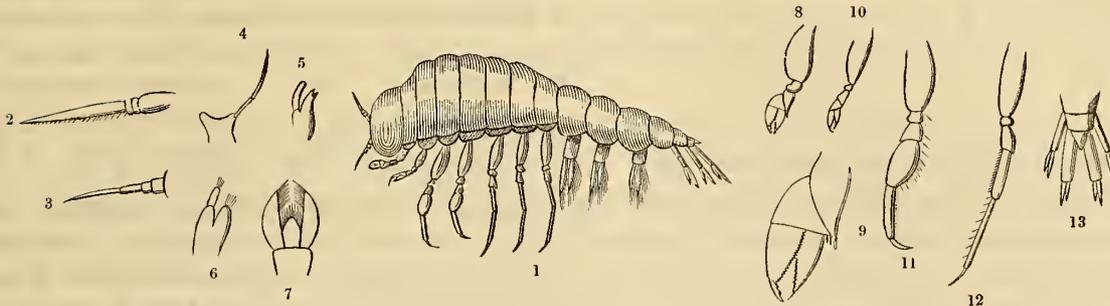
SPENCE BATE and WESTWOOD at the same occasion described another new species, which must be referred to the genus *Hyperoche* viz: *Hyperia prehensilis*.

In 1870 A. BOECK described *Metoecus abyssorum*, afterwards called *Tauria abyssorum*, and here below mentioned as *Hyperoche abyssorum*. The author of this treatise proposed in 1887 the name *Hyperoche Luetkeni*<sup>1)</sup> for the animal more closely described here below, p. 97. STEBBING in his Report on the Challenger Amphipoda gives in 1888 a full description of a new species, for which he proposes the name *Hyperoche cryptodactylus*. Here below I describe a new species under the name *Hyperoche picta*.

Thus the genus includes to-day seven species or eight, if *Hyperoche tauriformis* may be a distinct species.

- |         |   |                               |
|---------|---|-------------------------------|
| A.      | The last three pairs of peræopoda are distinctly longer than the two next preceding pairs .....   | 1. H. <b>Kroeyeri</b> .       |
| B.      | The last three pairs of peræopoda are not longer than the two next preceding pairs.   |                               |
| b 1.    | The anterior margin of the carpal process, and the hind margin of the metacarpus of the first two pairs of peræopoda, are smooth, not serrated                        | 2. H. <b>prehensilis</b> .    |
| b 2.    | The anterior margin of the carpal process, and the hind margin of the metacarpus of the first two pairs of peræopoda are serrated.                                    |                               |
| bb 1.   | The lower anterior corner of the metacarpus of the first and second pairs of peræopoda is not produced.   |                               |
| bbb 1.  | The carpus of the third and fourth pairs of peræopoda is narrow, linear, almost twice as long as the tibia.....   | 3. H. <b>abyssorum</b> .      |
| bbb 2.  | The carpus of the third and fourth pairs of peræopoda is somewhat dilated, only a little longer than the tibia.   |                               |
| bbbb 1. | The tibial process of the first pair of peræopoda is long, reaching nearly to the base of the carpal process. The dactylus of the second pair is not retractile ..... | 4. H. <b>Luetkeni</b> .       |
| bbbb 2. | The tibial process of the first pair of peræopoda is long but not reaching to the base of the carpal process. The dactylus of the second pair is retractile .....     | 5. H. <b>cryptodactylus</b> . |
| bbbb 3. | The tibial process of the first pair of peræopoda is very short. The dactylus of the second pair is not retractile .....  | 6. H. <b>Martinezii</b> .     |
| bb 2.   | The lower anterior corner of the metacarpus of the first and second pairs of peræopoda is produced into a broad curved, spoon-shaped process.....                     | 7. H. <b>picta</b> .          |

<sup>1)</sup> Through a most unhappy inadvertence from my own part at the printing of my »Arctic and Antarctic Hyperids» the drawing of a would be new species was placed on plate 44, fig. 55 to 62, as representing *Hyperoche abyssorum*, A. BOECK; the diagnosis on page 564 is right and belongs to H. abyssorum. The animal represented in the drawing is according to a thoroughly examination the male of *Hyperoche Luetkeni*, and will be recorded here below, p. 99, under this name.

1. **HYPEROCHE KROEYERI**, C. BOVALLIUS, 1885.*Hyperoche Kroeyeri*, C. BOVALLIUS.

Facsimile from KROEYER, Grønlands Amphipoder, pl. 3, fig. 15a—15n.

Fig. 1. The animal from the side. 2. The first pair of antennæ. 3. The second pair of antennæ. 4. The mandible. 5. The first pair of maxillæ. 6. The second pair of maxillæ. 7. The maxillipeds. 8. The first pair of pereopoda. 9. The last joints of the same. 10. The second pair. 11. The third pair. 12. The sixth pair. 13. The urus.

**Diagn.** *Caput* quam segmenta duo priora peræi brevius. Processus tibialis *pedum peræi* primi paris basin processus carpalis attingens vel superans; margo anterior processus carpalis serratus, margine posteriore metacarpi longior. Carpus *pedum* tertii ac quarti parium valde dilatatus, margine posteriore convexo. Pedes trium parium ultimorum pedibus tertii ac quarti parium multo longiores; femur dilatatum; metacarpus valde elongatus, metacarpo *pedum* tertii ac quarti parium multo longior. Lateralia segmentorum *plei* rotundata. *Pedes uri* primi paris apicem *pedum* ultimi paris longe non attingentes; ramus externus interno brevior. Ramus internus ultimi paris latitudinem pedunculi longitudine superans. *Telson* tertiam partem longitudinis pedunculi *pedum uri* ultimi paris æquans.

The *head* is shorter than the first two pereopodal segments. The tibial process of the first pair of *pereopoda* reaches to the base of the carpal process or farther; the front margin of the carpal process is serrated, longer than the hind margin of the metacarpus. The carpus of the third and fourth pairs is very dilated, the hind margin convex. The last three pairs are much longer than the next preceding two pairs; the femur is dilated; the metacarpus is very elongated, much longer than the metacarpus of the third and fourth pairs. The lateral parts of the *pleonal* segments are rounded. The first pair of uropoda are far from reaching to the apex of the last pair; the outer ramus is shorter than the inner. The inner ramus of the last pair is longer than the breadth of the peduncle. The *telson* equals a third of the length of the peduncle of the last pair of uropoda.

**Colour.** ?

**Length.** 3''' til 10''' (KROEYER.)

**Hab.** Upernavik, Omenak and Frederikshaab, West coast of Greenland (KROEYER).  
Coast of Devonshire (GOSSE).

- Syn. 1838.** *Metoecus medusarum*, (O. FABRICIUS.) H. KROEYER. »Grönlands Amphipoder». Det Kongl. Danske Videnskabs-Selskabs Naturvidensk. og Matemat. Afhandlinger. Deel 7, p. 288, pl. 3, fig. 15.
- »       »       »       H. MILNE EDWARDS. 1840. Histoire Naturelle des Crustacés. Tome 3:me, p. 78.
- »       »       »       PH. H. GOSSE. 1853. A Naturalist's rambles on the Devonshire Coast, p. 367.
- »       »       »       A. WHITE. 1857. A popular History of British Crustacea, p. 207.
- »       »       »       A. BOECK. 1870. »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl., for 1870, p. 86 (6).
- Hyperia medusarum*, (H. KROEYER.) A. GOËS. 1865. »Crustacea amphipoda maris Spetsbergiam alluentis cum speciebus aliis arcticis adjectis». Öfversigt af K. Vet. Ak. Förh., 1865, N:o 8, p. 534 (18).
- Tauria medusarum*, (O. FABRICIUS.) A. BOECK. 1872. De Skandinaviske og Arktiske Amphipoder, p. 82.
- »       »       »       G. O. SARS. 1882. »Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre kjendte Arter». Christiania Videnskabs-Selskabs Forh., for 1882, N:o 18, p. 19 and 75.
- Hyperoche medusarum*, (H. KROEYER.) H. J. HANSEN. 1887. »Oversigt over det vestlige Grönlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenh., 1887, p. 58.
- »       »       »       TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1399.
- 1885.** *Hyperia Kroeyeri*, C. BOVALLIUS. — »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 17.
- Hyperoche*       »       »       C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 18.
- »       »       »       »       1887. »Arctic and Antaretic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 564.

As this species, *Hyperoche Kroeyeri*, is the type for the genus some items, relating to its synonymy are already discussed above, p. 84 and 85, under the genus *Hyperoche*,

but still there are more particulars worth mentioning which, I hope, will settle the question about the right and due name of this species.

That the specific name »*medusarum*» by no means can be applied on this species I have showed above, p. 84; here I shall spend some words to prove that, if also »*Oniscus medusarum*, O. FABRICIUS,» may be another species than »*Cancer medusarum*, O. F. MÜLLER,», the species of O. FABRICIUS cannot be identical with *Hyperoche Kroeyeri*. FABRICIUS says:<sup>1)</sup>

»Pedes 14, quorum 8 antici antrorsum, 6 postici retrorsum tendunt; sunt 10 postici ceterum *similes* 3-articulati (femore compresso, tibia tereti tenuiore, apice acuto longiori curuo); 4 antici pro manibus habendi, breuiores, biarticulati, articulo secundo etiam compresso, margine inferiore bis inciso et ungue terminali mobili.» Against the characteristic »*Pedes . . . 10 postici similes*» opposes decidedly the characteristic of *Hyperoche Kroeyeri*, »*Pedes trium parium ultimorum pedibus tertii ac quarti parium multo longiores*», and regarding the characteristic quoted by FABRICIUS (pedes) »*4 antici pro manibus habendi . . . . . margine inferiore bis inciso*», may be pointed out that »*bis inciso*» probably means the tibial and carpal processes such as they are to be seen in *Hyperia galba*, MONTAGU, or *H. Latreillei*, H. MILNE EDWARDS, and not the perfect cheliform hand so distinctly developed in a *Hyperoche*. Such a typical prehensile organ would certainly have attracted attention of such an acute observer as FABRICIUS, who at the next preceding page of »*Fauna Groenlandica*» mentions the hand of *Gammarus (Oniscus) pulex*.

KROEYER in 1838 gives no reason why his species and *Oniscus medusarum*, O. FABRICIUS, should be the same; he only says l. c. p. 63, »That the present species (*Metoecus medusarum*) is identical with FABRICIUS' *Oniscus Medusarum*, seems to be beyond doubt».

H. MILNE EDWARDS in 1840 l. c. p. 78 quoting *Metoecus medusarum*, with the synonymy given by KROEYER, adds that the »*marflue*» of STRØM probably also is a synonym for it, and suggests that *Talitus cyaneæ*, SABINE, very likely comes near to *Metoecus*; for the synonymy of this latter species, see below under *Hyperia medusarum*, O. F. MÜLLER. PH. GOSSE in 1853, l. c. p. 367, mentions *Metoecus medusarum*, KROEYER, and gives some biological notices about it, so he says: »There (in a *Chrysaora*) he snugly ensconces himself, and feels so much at home, that he is not afraid to leave his dwelling now and then, to take a swim in the free water, returning to his chamber after his exercise». However, I am not perfectly sure that the animal he studied was a *Hyperoche Kroeyeri*, possibly it was a *Hyperia medusarum*, O. F. MÜLLER, or a *H. Latreillei*, H. MILNE EDWARDS. A. WHITE in 1857 l. c. p. 207 cites *Metoecus medusarum*, O. FABRICIUS; this animal is not unlikely the true species of KROEYER, according to the characteristic quoted, »Five last pairs of legs very slender, the three last longer than the others».

SPENCE BATE in 1862 in his »*Catalogue*», p. 293, records *Metoecus medusarum*, A. WHITE, as a synonym for *Hyperia galba*, MONTAGU, and again, l. c., p. 295, *M. medusarum*, KROEYER, as a synonym for *H. medusarum*, O. FABRICIUS, in fact KROEYER's species has nothing to do with neither of the two cited species, as is easily seen from the descriptions and drawings given by SPENCE BATE. A. GOËS in 1865 quotes *Hyperia medu-*

<sup>1)</sup> O. FABRICIUS, *Fauna Groenlandica*, p. 257. Copenhagen and Leipsic 1780.

*sarum* (*Metoecus*), KROEYER, and gives as doubtful synonyms *Cancer medusarum*, O. F. MÜLLER, and *Oniscus medusarum*, O. FABRICIUS, it is, however, none of these species but, according to my examination of his specimens, *Hyperoche Luetkeni*, C. BOVALLIUS.

A. MERLE NORMAN in 1869<sup>1)</sup> quotes *Metoecus medusarum*, KROEYER, from the Shetland Isles. To judge from the short description it is clear that the animal in question is not identical with KROEYER's species. If it may be an *Hyperoche abyssorum* or a *H. Luetkeni* I am not able to decide.

A. BOECK in 1870 l. c., p. 86 (6) cites KROEYER's species as *Metoecus medusarum*, O. FABRICIUS, and gives a good diagnosis in latin, which runs:

»*Pedes 1 paris articulo 3tio in margine posteriore ad radicem calcis producto. Pedes 3tii et 4ti paris articulo tertio perbrevis, vix longiore quam lato. Pedes trium parium ultimorum articulo 3tio perbrevis, 4to longitudinem duplam articuli 3tii superanti. Pedes saltatorii ultimi paris pedunculo prælongato fere ter longiore quam ramo exteriori*».

In 1872 l. c., p. 82, he calls it *Tauria medusarum*, O. FABRICIUS; with the same diagnosis as in his earlier work. In 1882 G. O. SARS l. c., p. 75, unites *Tauria abyssorum*, a by BOECK in 1870 established new species, with KROEYER's old species under the name *Tauria medusarum*, O. FABRICIUS. In 1885 l. c., p. 17, I called the present species *Hyperia Kroeyeri*, n. n. and in 1887 l. c., p. 18, *Hyperoche Kroeyeri*. The same year H. J. HANSEN l. c., p. 58, rejects the specific name proposed by me, and takes back that used by KROEYER, uniting with it my new species *Hyperoche Luetkeni*, and calling the whole *Hyperoche medusarum*, KROEYER. In 1888 TH. STEBBING l. c., p. 1399, accepts the views of HANSEN.

*Hyperoche Kroeyeri* is easily distinguished from all the other species of the genus by the length of the last three pairs of peræopoda and by the curved hind margin of the carpus of the third and fourth pairs. Also the form of the first and second pairs is different, according to the drawings of KROEYER, given in facsimile above, p. 87, fig. 8—10, the front margins of the carpus and metacarpus being strongly curved.

Here follows a description of the animal principally taken from the description of KROEYER, with some additions derived from the examination of his drawings:

The *peræon* is thick and tumid, the head large, and the pleon and urus narrow, in habitus just between a *Hyperia* and an *Euthemisto*.

The *head* is large, thick, egg-shaped, much deeper than long, anteriorly truncated, with a distinct antennal groove.

The *first pair of antennæ* (fig. 2) in the female are a little longer than the head; the first joint of the peduncle is twice as long as the two following joints together, the second and third joints are subequal in length; the flagellum shows only one joint, which is more than twice as long as the whole peduncle; it is fringed with long hairs along the under-side.

<sup>1)</sup> »Shetland Final Dredging Report. Part. II. On the Crustacea» etc. Report of the 38th Meeting of the British Association for the Advancement of Science, held at Norwich, 1868. London 1869, p. 287.

The *second pair of antennæ* (fig. 3), in the female, are somewhat shorter than the first pair. The third joint is as long as the first and second, the fourth is fully as long as all the three preceding joints together, narrow, styliform, smooth.

The *first pair of peræopoda* (fig. 8 and 9). The femur is elongate-ovate, almost as long as all the following joints together. The genu is short; the tibia has the hinder, lower corner produced into a process reaching fully to the base of the carpal process, armed at apex with five to six bristles. The carpus is triangular, with the front margin curved, the carpal process is stout and broad, longer than the rest of the carpus, its front margin is longer than the hind margin of the metacarpus, and finely serrated. The metacarpus is not twice as long as broad at the base, the front margin is curved, smooth, the lower corner not produced, the hind margin is finely serrated. The dactylus is stout, curved, serrated on the hind margin; it is shorter than half the metacarpus.

The *second pair* (fig. 10) are somewhat longer than the first pair. The femur is almost longer than all the following joints together. The process of the tibia does not reach fully to the base of the carpal process. The following joints are similar to those of the first pair.

The *third and fourth pairs* (fig. 11) are much longer than the two preceding pairs. The femur is narrow; the genu is short, narrower than the femur; the tibia is twice as long as the genu and much broader. The carpus is dilated, elongate-ovate, the hind margin strongly curved, fringed with bristles. The metacarpus is narrow, linear, about as long as the carpus, the hind margin densely fringed with very short bristles. The dactylus is long, only a little shorter than half the metacarpus.

The *fifth, sixth and seventh pairs* (fig. 12) are very elongate, flat and thin; they are considerably longer than the third and fourth pairs. The femur is narrow, elongate; the genu is very short, the tibia is more than twice as long as the genu, armed at the hinder lower corner with a spine-like bristle. The carpus is longer than the two preceding joints together, linear, the front margin armed with about ten short bristles. The metacarpus is narrower and much longer than the carpus, and also considerably longer than the femur, the front margin is fringed with very short bristles. The dactylus is shorter than a third of the length of the metacarpus.

The *uropoda* are elongate. The outer ramus of the *first pair* is scarcely longer than half the inner; the rami of the *second pair* are almost equal in length. The *third pair* are much longer than the second pair; the peduncle is more than three times as long as the inner ramus; the outer ramus is longer than the inner one.

The *telson* is triangular, longer than broad, equalling a third of the length of the peduncle of the last pair of uropoda.

In order to prove the specific difference between *Hyperoche Kroeyeri* and *H. Luetkeni* I quote here below some of their characteristics arranged parallelly, adding for comparison some of the characteristics of *H. abyssorum*.

1.

**Hyperoche Kroeyeri.**

♀

The *body* is thick, tumid.

The *first pair of antennæ* are fixed high up at the middle of the front side of the head; they are fully as long as the head.

The *third and fourth pairs of peræopoda* have the carpus very dilated, elongate-ovate, narrower at the lower end, not produced, the hind margin is strongly curved, set with long bristles; the metacarpus is as long as the carpus, armed with short bristles.

The *fifth, sixth and seventh pairs* are elongate, considerably longer than the two next preceding pairs; the femur is about seven or eight times as long as the genu; the tibia is more than twice as long as the genu; the carpus is longer than the genu and tibia together; the metacarpus is longer than the femur, the front margin set with bristles.

The outer ramus of the first pair of *uropoda* is considerably shorter than the inner one.<sup>1)</sup>

2.

**Hyperoche Luetkeni.**

♀

The *body* is thick, tumid.

The *first pair of antennæ* are fixed considerably below the middle of the front side of the head; they are shorter than the head.

The *third and fourth pairs of peræopoda* have the carpus somewhat dilated, broader at the lower end, which is produced into a sharp-pointed process, the hind margin is straight, sharply serrated; the metacarpus is considerably longer than the carpus, serrated.

The *fifth, sixth and seventh pairs* are scarcely longer than the two next preceding pairs; the femur is about four times as long as the genu; the tibia is scarcely more than one-third longer than the genu; the carpus is shorter than the genu and tibia together; the metacarpus is much shorter than the femur, the front margin entirely smooth.

The outer ramus of the first pair of *uropoda* is almost as long as the inner one.

3.

**Hyperoche abyssorum.**

♀

The *body* is very compressed.

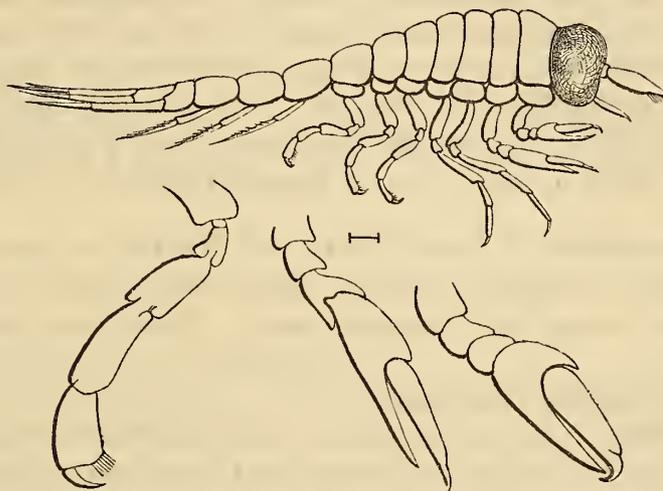
The *third and fourth pairs of peræopoda* have the carpus narrow linear, the lower hinder corner scarcely produced, the hind margin is straight, serrated; the metacarpus is considerably longer than the carpus, serrated.<sup>2)</sup>

The *fifth, sixth and seventh pairs* are scarcely longer than the two next preceding pairs, the femur is about five times as long as the genu; the tibia is nearly twice as long as the genu; the carpus is as long as the genu and tibia together;<sup>3)</sup> the metacarpus is much shorter than the femur, the front margin serrated.

The outer ramus of the first pair of *uropoda* is considerably shorter than the inner one.

<sup>1)</sup> This characteristic is taken from the drawing of KROEYER, reproduced above, p. 87, fig. 1.

<sup>2)</sup> Some of these characteristics are taken from the drawing of BOECK, reproduced below, p. 94; see also the traduction of the original description below, p. 96.

2. **HYPEROCHE PREHENSILIS**, SPENCE BATE and WESTWOOD, 1868.*Hyperocche prehensilis*, SPENCE BATE and WESTWOOD.

Facsimile from SP. BATE and WESTWOOD. Brit. Sessile-eyed Crust. Vol. 2, p. 520.

**Diagn.** *Caput* segmenta duo priora peræi longitudine æquans. Processus tibialis *pedum peræi* primi paris brevissimus; margo anterior processus carpalis non serratus, margine posteriore metacarpi longior. Carpus *pedum tertii ac quarti parium* non dilatatus, margine posteriore recto. *Pedes parium trium ultimorum* subcheliformes, *pedibus parium duorum præcedentium* breviores; femur angustum; metacarpus brevis, metacarpo *pedum tertii ac quarti parium* brevior. *Latera segmentorum plei* leviter rotundata.

The *head* is as long as the first two peræonal segments. The tibial process of the first pair of *peræopoda* is very short; the front margin of the carpal process is not serrated, it is longer than the hind margin of the metacarpus. The carpus of the third and fourth pairs is not dilated, the hind margin straight. The last three pairs are subcheliform, shorter than the two next preceding pairs; the femur is narrow; the metacarpus is short, shorter than the metacarpus of the third and fourth pairs. The lateral parts of the *pleonal* segments are feebly rounded.

**Colour.** ?

**Length.** 4 mm.

**Hab.** »Taken at Banff, by Mr EDWARD». (SP. BATE and WESTWOOD.)

**Syn. 1868.** *Hyperia prehensilis*, SPENCE BATE and WESTWOOD.

— «A History of the British Sessile-eyed Crustacea». Vol. 2, p. 520, fig.

*Hyperoche prehensilis*, SPENCE BATE and WESTWOOD. C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 19.

It is possible that the subcheliform shape of the last three pairs of peræopoda is not a characteristic of specific value, but depending only on the young age of the animal. The statements of FRITZ MÜLLER about *Hyperoche Martinezii*, seem to corroborate this view. The long, narrow hands of the first two pairs of peræopoda, and the shortness of the last three pairs are good characteristics for *Hyperoche prehensilis*, and distinguish it from *H. Kroeyeri*, which it comes near in general habitus of the body.

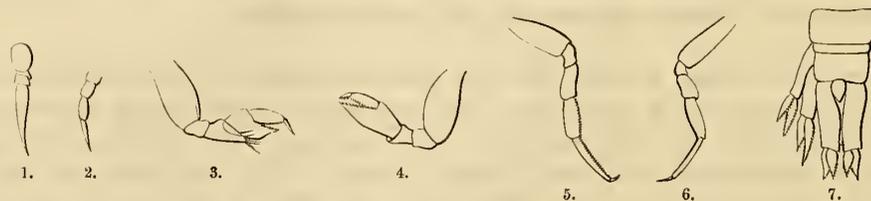
The original description of SPENCE BATE and WESTWOOD runs:

»*Specific character.* Superior antennæ about the length of the head. Both pairs of gnathopoda with the carpus and propodos simple. Three hind pairs of peræopoda sub-prehensile at the tips.

Length, three twentieths of an inch.

This species differs from *H. tauriformis* next described in having longer antennæ, the proximal margins of the carpus and propodos of both pairs of gnathopoda not serrated, and in having the propodos of the last three pairs of peræopoda inferiorly produced and armed with short strong cilia. This gives a prehensile character to the last three pairs of pereopoda that we have not recognized in other species».

### 3. HYPEROCHE ABYSSORUM, A. BOECK, 1870.



*Hyperoche abyssorum*, A. BOECK.

Facsimile from A. BOECK. De Skand. og Arkt. Amphip. Pl. I, fig. 2.

Fig. 1. The first pair of antennæ. 2. The second pair of antennæ. 3. The first pair of peræopoda. 4. The second pair. 5. The third pair. 6. The fifth pair. 7. The urus.

**Diagn.** Processus tibialis *pedum parvi* primi paris basin processus carpalis non attingens; margo anterior processus carpalis serratus, marginem posteriorem metacarpi longitudine fere æquans; dactylus non serratus. Carpus *pedum tertii ac quarti parium* non dilatatus; margo posterior rectus, serratus. Pedes *parium trium ultimorum pedibus parium duorum præcedentium* non longiores; femur angustum; metacarpus medioeris, metacarpum *pedum tertii ac quarti*

parium longitudine non superans. *Pedes uri* primi paris apicem pedum ultimi paris longe non attingentes; ramus externus interno multo brevior. *Telson* tertiam partem longitudinis pedunculi pedum uri ultimi paris fere æquans.

The tibial process of the first pair of *peræopoda* does not reach to the base of the carpal process; the front margin of the carpal process is serrated, almost as long as the hind margin of the metacarpus; the dactylus is not serrated. The carpus of the third and fourth pairs is not dilated; the hind margin is straight, serrated. The last three pairs are not longer than the two next preceding pairs; the femur is narrow; the metacarpus is mediocre, not longer than that in the third and fourth pairs. The first pair of *uropoda* are far from reaching to the apex of the last pair; the outer ramus is much shorter than the inner. The *telson* equals about a third of the length of the peduncle of the last pair of *uropoda*.

**Colour.** Yellowish.

**Length.** About 5 mm.

**Hab.** The west coast of Norway. (A. BOECK.)

<b>Syn. 1870.</b>	<i>Metoecus abyssorum</i> ,	A. BOECK.	—	»Crustacea amphipoda borealia et arctica». Christiania Videnskaps-Selskabs Forhandling for 1870, p. 86 (6).
	<i>Tauria</i>	»	»	— 1872. De Skandinaviske og Arktiske Amphipoder, p. 83, pl. 1, fig. 2.
	<i>Hyperia</i>	»	»	C. BOVALLIUS. 1885. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 17.
	<i>Hyperoche</i>	»	»	» 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 19.
	»	»	»	» 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 564.
<b>1882.</b>	<i>Tauria medusarum</i> ,	O. FABRICIUS (e. p.)	G. O. SARS.	»Oversigt af Norges Crustaæcer med foreløbige Bemærkninger over de nye eller mindre bekjændte Arter». Christiania Videnskaps-Selskabs Forhandling for 1882, p. 75.

As seen from the list of synonyms above G. O. SARS in 1882 regarded the species in question as identical with O. FABRICIUS' (and KROEYER'S) species which he, following BOECK, named *Tauria medusarum*, O. FABRICIUS. From the diagram given above, p. 91 and 92, it is clear, I suppose, that they are two distinct species. *Hyperoche abyssorum* is more closely allied to *H. Luetkeni* than to *H. Kroeyeri*; with both it has in common the

form of the first two pairs of peræopoda, with the former also the narrowness of the femora of the last three pairs and the almost linear carpi of the third and fourth pairs.

The original diagnosis of A. BOECK runs, as follows.

»Pedes 1mi paris articulo 3tio brevi, non ad basin calcis producto; manu ferme duplo longiore quam ad basin lata, in margine interiore serrata, calce carpi perlata, usque ad finem manus porrecta, in margine interiore serrata; ungue parvo, non serrato. Pedes 2di paris ferme ut pedes 1mi paris; sed articulo 3tio perbrevis; carpo angustiore; calce ad finem unguis porrecta; ungue in margine posteriore spinis instructo. Pedes 3tii et 4ti paris articulo 3tio longiore quam apud speciem antecedentem<sup>1)</sup>; articulo 4to longitudinem dimidiam articuli 3tii æquanti, non dilatato, angusto, quater longiore quam lato, parum modo brevior quam articulo 5to gracile. Pedes trium parium ultimorum ungue brevior quam apud speciem antecedentem. Pedes saltatorii ultimi paris pedunculo ter longiore quam lato».

In the characteristic »articulo 4to longitudinem dimidiam articuli 3tii æquanti», the word »dimidiam» is evidently miswritten instead of »duplam», it is, however, repeated in the reprint of the diagnosis in 1872<sup>2)</sup>, but there the wording of the Norwegian text is right, stating that the third joint (= the tibia) is about half as long as the fourth.

BOECK did not mention if he had examined specimens of both sexes of the species, but judging from the drawings of the first pair of antennæ and of the second pair of peræopoda I am pretty sure that he has seen only the female.

Here follows a traduction of the description given by BOECK in 1872 l. c., p. 83 and 84.

The *body* is very compressed.

The *first pair of peræopoda* (fig. 3, p. 94) have the femur tolerably broad, the front margin strongly convex; the tibia is produced into a process tipped with bristles, this process does not reach to the base of the carpal process. The carpus is much broader than the tibia, produced into a sharp-pointed process, serrated along the front margin; this process is shorter than the metacarpus. The metacarpus is about as long as the carpus, or a little shorter, but considerably narrower, and serrated along the hind margin; it reaches about as far as to the apex of the carpal process.

The *second pair* (fig. 4) are similar to the first pair, but the tibia is shorter, and the carpal process is much longer, reaching almost to the apex of the outstretched dactylus, it is thus much longer than the metacarpus.

The *third and fourth pairs* have the tibia about half as long as the carpus; the carpus is linear, somewhat shorter but broader than the metacarpus.

The *last three pairs* have the same form; the femur is not dilated; the tibia is about half as long as the carpus, or a little more than half as long. The carpus of the fifth pair is serrated along the front margin, the lower anterior corner is a little produced.

<sup>1)</sup> *Metoecus medusarum* = *Hyperoche Kroeyeri*.

<sup>2)</sup> De Skandinaviske og Arktiske Amphipoder, p. 84.

The metacarpus is only a little longer than the carpus; in the fifth pair it is serrated along the front margin.

The *last pair of uropoda* have the outer ramus somewhat longer, but narrower than the inner one; this latter is serrated along both margins, and is about half as long as the peduncle. The peduncle is three times as long as broad.

The *telson* is triangular, more long than broad at the base; it equals in length a third of the peduncle of the last pair of uropoda.

#### 4. HYPEROCHE LUETKENI, C. BOVALLIUS, 1887.

Pl. VII, fig. 1—26.

The name given in honour of Professor CHR. FR. LÜTKEN of Copenhagen.

**Diagn.** *Caput* segmenta duo priora peræi longitudine æquans. Processus tibialis *pedum peræi* primi paris basin processus carpalis fere attingens, margo anterior processus carpalis serratus, margine posteriore metacarpi longior. Carpus *pedum tertii ac quarti parium* paullo dilatatus; margo posterior rectus, serratus, angulo inferiore producto. Pedes parium trium ultimorum pedibus parium duorum præcedentium non longiores; femur angustum (♀), vel paullo dilatatum (♂); metacarpus medioeris, metaearpo *pedum tertii ac quarti parium* paullo brevior. *Pedes uri* primi paris apicem *pedum ultimi paris* fere attingentes; ramus externus internum longitudine fere æquans. *Telson* tertia parte longitudinis pedunculi *pedum uri ultimi paris* longius.

The *head* equals in length the first two peræonal segments together. The tibial process of the first pair of *peræopoda* reaches almost to the base of the carpal process; the front margin of the carpal process is serrated; it is longer than the hind margin of the metacarpus. The carpus of the third and fourth pairs is somewhat dilated; the hind margin is straight, serrated, the lower corner is produced. The last three pairs are not longer than the two next preceding pairs; the femur is narrow (♀), or a little dilated (♂); the metacarpus is mediocre, a little shorter than that of the third and fourth pairs. The first pair of *uropoda* reach nearly to the apex of the last pair; the outer ramus is almost as long as the inner one. The *telson* is longer than a third of the length of the peduncle of the last pair.

**Colour.** The younger animals are light red to reddish brown, the elder animals deeply brown.

**Length.** 8 to 15 mm.

**Hab.** The Northern Arctic region, at the west coast of Greenland and at Spetsbergen; the Northern Atlantic. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1887.** *Hyperoche Luetkeni*, C. BOVALLIUS. — »Systematical list of the Amphipoda  
Hyperideæ.» Bih. t. K. Sv. Vet.  
Ak. Handl. Bd. 11. N:o 16,  
p. 19.  
»        »        »        »        1887. »Arctic and Antarctic Hyperids».   
Vega-Exp. Vetensk. Iakttagelser.  
Bd.4, p. 565, pl. 44, fig. 55—71.<sup>1)</sup>

<sup>1)</sup> With regard to fig. 55—62, wrongly cited as belonging to *Hyperoche abyssorum*, see the foot-note 5 on p. 85.

1887. *Hyperoche medusarum*, (H. KROEYER.) H. J. HANSEN. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr», p. 56. Vidensk. Meddel. fra den Naturhist. Forening i København, 1887.

It being impossible to unite the species described here as *Hyperoche Luetkeni* neither with *Hyperoche Kroeyeri* nor with *H. abyssorum*, A. BOECK, I was bound to propose for it a new specific name; then I had examined only female specimens, supposing that the animal described here below as the male of *H. Luetkeni* was a separate species. Since that time the study of young specimens of the male has convinced me that the form in question belongs to *Hyperoche Luetkeni*; there are, however, many small differences between the adult animals, not easily suspected to be only sexual differences until intermediate forms were found to exist in the young animals.

The most striking discrepancies between the fullgrown males and females are, the common sexual difference in form of the antennæ and the peræon left aside;

1:o. The form and armature of the first two pairs of peræopoda, viz; in the male the form of the carpus and its process is more slender, and the armature of the front margin of the process consists of a normal serration, the teeth pointing slightly downwards. In the female the carpus and its process is more robust, with bulging sides, and the armature of the front margin of the process consists of a row of broad, almost truncate teeth, pointing forwards or rather a little upwards. The morphological explanation of this feature is simple enough, the male form of the carpus being the primary only the hind part of the female carpus has increased thus bulging out and pulling the bases of the teeth on the front margin more downwards, thus producing a more powerful grasping organ of the prehensile hand in the female, than of that in the male. The female needs such an instrument more than the male because she, at least during the breeding-time, seeks shelter in a yellow-fish, using probably the first two pairs of peræopoda as a kind of grasping organ.

2:o. The form of the femur of the last three pairs of peræopoda, being very narrow and linear in the female, and somewhat dilated, more or less ovate, in the male. The reason of this difference is also, I think, connected with the different manner of living of the both sexes; the female, secluded within the cavity of a yellow-fish, has not much use for the walking legs, and thus the tensor- and flexor-muscle of the femur remain less developed than in the fullgrown male, living free. In the young male the relative breadth of the femur is scarcely greater than in the fullgrown female.

3:o. The urus and its appendages are relatively more broad in the male than in the female; also this feature may depend on the different mode of living of the both sexes, as the peduncles of the uropoda in the very young males are narrower than those in the adult ones.

I am not able to find any greater differences between *Hyperoche cryptodactylus*, lately described by STEBBING, l. c. p. 1399, and the male of *H. Luetkeni*, but as I have not yet succeeded to prove that the dactylus of the second pair of peræopoda is retractile, as it

is stated by STEBBING to be in his species, I have not here quoted *Hyperoche crypto-dactylus* as a synonym for *H. Luetkeni*. I strongly suspect, however, that the two species may soon be found identical.

#### The male.

The *body* is more slender than in the female. The integument is thick and hard, much thicker in the elder males than in the younger ones, and more darkly coloured. The surface of the segments is smooth and even as if polished.

The *head* is as long as the first two peraeonal segments together, more broad than long; the antennal groove on the front side of the head reaches from the middle of the head to its lower front margin. The head is not twice as deep as long.

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* (Pl. VII, fig. 2 and 3) in the fullgrown male are shorter than the second pair; in young males the relation between the two pairs varies a little, in very young ones the first pair are decidedly the longest. The first joint of the peduncle is thick and stout, longer than the two following joints together; the second joint is shorter than the third. The first joint of the flagellum is almost half as long as the length of the head, and much longer than the whole peduncle; it tapers towards the apex, with bulging sides, the inner side is richly provided with long slender hairs. In the young males the first joint of the flagellum is comparatively much longer than in the fullgrown male. The second and third joints are tolerably short, but the following, twenty-five to thirty-five in number, are elongated, slender, more than six times as long as broad; they are provided with some club-shaped, olfactory bristles. In the young males the second and following joints of the flagellum are short, scarcely as long as broad, and without bristles.

The *second pair of antennæ* (Pl. VII, fig. 4). The peduncle is more slender than in the first pair; the first joint, or rather the first two joints, if the peduncle is considered to be composed of five joints, are coalesced with the integument of the head; the third joint is longer than the fourth, the fifth or last one is longer than the third, almost as long as the third and fourth together. The first joint of the flagellum is about as long as the last joint of the peduncle, but much narrower; it is more broad at the base than at the apex, nearly five times as long as broad at the base. The following joints are more elongate than the first one, cylindrical, six to eight times as long as broad. The joints of the flagellum are twenty-two to twenty-eight in number, in the fullgrown male. In the young males the joints are, as in the first pair, almost as broad as long, and few in number.

The *labrum* is broad, bilobed.

The *mandibles* (Pl. VII, fig. 5) have the stem long and stout, the incisive lamina is armed with a dozen small, sharp teeth, and some bristles, the molar tubercle is very large, situated almost at the apex of the mandible at the inner side of the incisive lamina; at the outer corner of the molar tubercle there is a prominence, richly covered with long hairs and stout bristles. The secondary incisive projection of the left mandible is very

large, triangularly produced, the edge armed with small teeth and very short hairs. The palp is fixed at the lower outer corner of the mandible, the first joint is shorter and scarcely broader than the second joint, in this latter there is a double band-like gland, each half of which is composed of six to seven glandular cells, the outlet for this gland is situated on the interior or hind side of the joint, forming an elongated fissure between the two halves of the gland, and surrounded by a very powerful muscle (Pl. VII, fig. 6); the third joint is considerably longer than the second, evenly tapering towards the apex into a sharp point; on the sides of the last joint there is a row of short curved hairs, at the apex it is fringed with a row of minute microscopical hairs.

The *first pair of maxillæ* (Pl. VII, fig. 7) consist of an almost cubical basal joint and two laminae; the inner or principal lamina is long, the basal portion forming a broad, linear stem, the apical portion forms a gouge-shaped, feebly curved process, the margins are fringed with curved spines; the secondary lamina is broadly rounded, spoon-shaped, bent over the principal lamina, the margins set with spines and bristles; it articulates with the stem just at the base of the gouge-shaped process of the inner lamina.

The *second pair of maxillæ* (Pl. VII, fig. 8) consist of two laminae, the principal lamina is triangular, obtuse, covered with stout bristles; the secondary lamina is more narrowly elongated, covered all around with bristles, and provided at the apex with a strong, feebly curved spine.

The *maxillipeds* (Pl. VII, fig. 9) consist of a strong, broad, basal portion; the lateral laminae are obtusely serrated on the lower half of the inner margin; the median lobe is strongly developed, bent inwards, the apex forming a gouge-shaped projection, richly covered with short, strong bristles.

The *peræon*. The first segment is a little longer than the second, the seventh segment is the longest of all.

The *epimerals* are as long as the under margins of the corresponding segments; the epimeral of the fifth pair is the longest of all.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda; they are as long as the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. VII, fig. 10, 11 and 12). The femur is broadly ovate, the front margin being more convex than the hind one, and showing a long narrow groove for the reception of the following joints. The femur is about twice as long as broad, and nearly as long as the four following joints together. The genu is smooth, scarcely more long than broad. The lower hinder corner of the tibia is strongly produced, forming a spoon-shaped process, not fully reaching to the base of the carpal process; the lower margin of the tibial process is fringed with stout bristles. The carpus is strongly developed, the front margin is almost straight, a little shorter than the front margin of the metacarpus, the hind margin is straight, or rather somewhat excavated; the carpal process is nearly as long as the stem of the joint, robust, knife-shaped; the front margin, the edge of the knife-like process, is armed with more than twenty sharp-pointed teeth, the points of the teeth being directed somewhat downwards. This carpal process, as well as that of the second pair of peræopoda, is formed in a different way than in the other genera of the family as has already been alluded to above, p. 84. In *Hyperia* for instance

the carpal process is spoon-shaped, showing two anterior margins, serrated or fringed with bristles, and distinct from one another; here in *Hyperoche* the original inner margin is coalesced with the outer thus forming only one edge-like margin, just as the blade and edge of a knife. A trace of the inner anterior margin of the carpal process is to be seen at the base of the process, especially in young males, forming a semicircular wall or ridge. The front margin of the carpal process is almost as long as the hind margin of the metacarpus. The metacarpus is feebly tapering towards the apex; it is nearly three times as long as broad at the base; the front margin is almost straight, smooth; the hind margin is feebly convex, armed with more than twenty sharp-pointed teeth, like those on the front margin of the carpal process; the under margin is armed with small, but sharp-pointed teeth. The dactylus (Pl. VII, fig. 12) is gently curved, serrated along the upper part of the hind margin; it equals about a third of the length of the metacarpus. Glands are developed within all the joints, most richly in the femur.

The *second pair* (Pl. VII, fig. 13) are only a little longer than the first pair. The femur is narrower than that of the preceding pair, more than three times as long as broad. The genu is as long as broad, smooth. The process of the tibia is much shorter than in the first pair, fringed with bristles. The front and hind margins of the carpus are almost straight; the carpal process is a little longer than the rest of the joint; the front margin is longer than the hind margin of the metacarpus, somewhat convex, armed with sharp-pointed teeth as in the preceding pair. The metacarpus is more than three times as long as broad at the base, the front and hind margins are somewhat curved; the hind and under margins are armed as in the first pair. The dactylus is feebly curved, serrated along the upper part of the hind margin.<sup>1)</sup>

The *third pair* (Pl. VII, fig. 14). The femur is narrow, more than three times as long as broad, the front margin is a little more curved than the hind one. The front margin shows as usual a long narrow groove for the reception of the next following joints, when they are bent upwards. The lower hinder corner of the femur is a little produced, and tipped with a short bristle. The genu is somewhat more long than broad. The tibia is more than twice as long as the genu, and twice as long as broad; it is broader below than above. The carpus is longer than the tibia, somewhat dilated, three times as long as broad; the front margin is feebly curved, the hind margin straight, sharply serrated. The lower half of the hind margin is divided into two margins or edges by a fissure, or narrow groove, which receives a part of the edge of the metacarpus, the two joints thus forming a kind of scissors; the outer of these carpal edges is produced downwards into a process, more or less long according to the age of the specimens; in the very young ones this process forms only a rectangular, serrated corner. The inner edge or margin of the hind side of the carpus is obliquely truncated, or

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<sup>1)</sup> STEBBING says l. c. p. 1401 about the dactylus of the second pair of peraeopoda of his new species *Hyperoche cryptodactylus*, that it can be retracted into the metacarpus. This is the principal difference between *Hyperoche Luetkeni* and *H. cryptodactylus*; I have examined and reexamined numerous specimens of *H. Luetkeni* in different stages of development but I have never been able to find neither any signs to the retractility of the dactylus, nor the form of the dactylus of the second pair of peraeopoda figured by STEBBING l. c. pl. 170, fig. gn<sup>2</sup>, where the dactylus seems to be cleft at apex. Such being the case I have not dared to unite in one the two species in question, they congrue, however, in almost all the other characteristics.

at least less produced than the outer. The metacarpus is longer than the carpus, and much narrower, evenly tapering towards the apex; the hind margin is straight, sharply serrated, and provided with some few short bristles; the front margin is sparingly set with equidistant, minute hairs. The dactylus is feebly curved, smooth; it equals a fourth of the length of the metacarpus. Glands are distinct in all the joints except in the dactylus.

The *fourth pair* are closely similar to the third pair, but the projection of the lower corner of the hind margin of the carpus is smaller than in the third, it is, however, always at hand, if not accidentally broken.<sup>1)</sup>

The *fifth pair*. The femur of the young male is narrower than that of the full-grown. The front margin is more curved than the hind one, which shows the usual groove for the reception of the following joints. The genu is as long as broad. The tibia is much longer than the genu, narrower at the upper end; the front margin is irregularly set with some few minute hairs. The carpus is longer but narrower than the tibia, almost linear; the front margin is fringed with some few, equidistant, minute hairs. The metacarpus is about as long as the carpus, feebly tapering towards the apex, the front margin is straight, smooth. The dactylus is feebly curved, longer than a fourth of the length of the metacarpus. Glands are richly developed, especially within the femur where they occupy almost the whole hind portion of the joint.

The *sixth and seventh pairs* (Pl. VII, fig. 15) are similar to the fifth pair in shape and relation of joints; but the femur of the seventh pair is broader, and its hind margin more convex than that joint in the fifth and sixth pairs.

The *pleon* is about as long as the peræon, the first segment is somewhat longer than the last two peræonal segments together. The lateral parts of the segments are very deep, rounded below and behind, and forming an angular point at the lower hinder corner.

The *pleopoda* (Pl. VII, fig. 16). The outer ramus of the first pair consists of fourteen to eighteen joints, the inner ramus of twelve to sixteen joints.

The *urus*. The first segment is longer than the last coalesced one. The whole urus is scarcely as long as the last pleonal segment.

The *first pair of uropoda* reach to the apex of the last pair; the peduncle is four times as long as broad, longer than the inner ramus; the outer ramus is scarcely shorter than the inner, smooth on the outer margin, serrated on the inner one; the inner ramus is serrated along both margins; at the bases of the rami, just where they are in contact with one another, there are deep grooves, probably the outlets for the glands, which are to be seen within the peduncle and partly also in the rami. The *second pair* do not reach as far backwards as the first pair; the peduncle is not three times as long as broad, and is only a little longer than the inner ramus, which is serrated along both margins; the outer ramus is shorter and narrower than the inner, smooth on the outer margin and

<sup>1)</sup> H. J. HANSEN says in »Oversigt af det vestlige Grønlands Fauna af malakostrake Havkrebsdyr«, p. 58, that only the carpus of the *third* pair of peræopoda, but not also that joint of the fourth pair, is produced downwards into a serrated process. This statement does not agree with my own observations, but I am not sure that HANSEN has examined specimens of the true *Hyperoche Luetkeni*.

finely serrated along the inner one; there are grooves at the bases of the rami as in the first pair. The *third pair* are broader and stouter than the two preceding pairs; the peduncle is only a little more than twice as long as broad; the inner ramus is scarcely longer than the breadth of the peduncle, serrated along both margins; the outer ramus is rather longer than the inner, and narrower; it is smooth on the outer margin, and serrated along the inner.

The *telson* is broadly rounded, equalling a third of the length of the peduncle of the last pair of uropoda, but it is not as long as the breadth of the same peduncle.

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### The female.

The *body* is broader and wider than in the male, and the colour is lighter.

The *head* is as long as the first two peræonal segments together, much more broad than long. The antennal groove commences below the middle of the front side of the head. The head is fully twice as deep as long.

The *eyes* as in the male.

The *first pair of antennæ* (Pl. VII, fig. 18). The first joint of the peduncle is stout, cylindrical, fully twice as long as the two following joints together, the second joint is thicker and a little longer than the third. The first joint of the flagellum is elongated, tapering, nearly twice as long as the whole peduncle, the inner side is set with equidistant tufts of slender hairs; a second, very small, flagellar joint is always present, tipped with one or two minute hairs.

The *second pair of antennæ* (Pl. VII, fig. 19) consist of four joints, the first three may be regarded as the third, fourth and fifth joints of the peduncle; the third or first free joint is very short, globular, the two following joints are equal in length. The only flagellar joint is elongated, tapering, longer than the whole peduncle, the inner side sparingly provided with minute hairs.

The *mouth-organs* are like those in the male.

The *peræon* is abruptly widening from the second segment, and again gently narrowing from the fourth segment; the third segment is the widest, the third and fourth are the longest, equal in length.

The *epimerals* are as long as the under margins of the corresponding segments; the epimeral of the fourth pair is the longest, a little longer than that of the third pair.

The *branchial sacks* are like those in the male.

The *ovitrices* are a little longer than the femora of the corresponding legs, the margins are smooth.

The *first pair of peræopoda* (Pl. VII, fig. 20 and 21) are more robust and powerful than that pair in the male. The femur is very broad, not twice as long as broad, the front margin is strongly convex. The genu is as long as broad, smooth. The process of the tibia is rather longer than in the male but does not reach fully to the base of the carpal process; the lower margin of the tibial process is fringed with stout bristles.

The carpus is broader and stronger than in the male, the front margin is feebly curved, a little shorter than the front margin of the metacarpus, the hind margin is strongly convex; the carpal process is as long as the stem of the carpus, thick, robust, knife-shaped; the front margin or the edge is armed with more than twenty, broad-edged, retroverted teeth; it is longer than the hind margin of the metacarpus (Pl. VII, fig. 21). The metacarpus is very broad at the base, tapering, scarcely more than twice as long as broad at the base. The front margin is feebly curved, smooth; the hind margin is somewhat convex, armed with more than twenty retroverted teeth, like those on the front margin of the carpal process; the under margin is armed with seven to eight small, sharp-pointed teeth, as in the male. The dactylus is feebly curved, broad at the base, the hind margin is serrated; it is almost half as long as the metacarpus. Glands as in the male.

The *second pair* (Pl. VII, fig. 22) have the femur longer but scarcely narrower than in the first pair. The genu is as long as broad. The process of the tibia is much shorter than in the first pair, fringed with bristles. The front margin of the carpus is curved, the hind margin is more convex than in the first pair; the carpal process is longer than the stem of the joint, the front margin is much longer than the hind margin of the metacarpus, feebly S-shaped, and armed with retroverted teeth as in the preceding pair. The metacarpus is three times as long as broad at the base, the front and hind margins are feebly curved; the hind and under margins are armed as in the first pair. The dactylus is feebly curved, serrated on the hind margin, scarcely equalling more than a fourth of the length of the metacarpus. Glands in all the joints.

The *third and fourth pairs* (Pl. VII, fig. 23 and 24). The femur is comparatively broader than in the male, linear, not three times as long as broad; the lower hinder corner of the femur is a little produced, and tipped with a short bristle. The genu is more long than broad. The tibia is not twice as long as the genu, but twice as long as broad, broader below. The carpus is longer than the tibia, perhaps a little more dilated than in the male, and not three times as long as broad; the front margin is feebly curved, the hind margin is perfectly straight, sharply serrated, the lower half of it is divided into two edges, exactly as in the male, the outer of these edges is produced downwards into a serrated process (Pl. VII, fig. 24), usually a little longer than in the male, and distinctly longer in the third pair than in the fourth. In young females this process is shorter and less serrated than in the adult ones. The metacarpus is longer than the carpus, with the hind, straight margin sharply serrated. The dactylus is feebly curved, smooth, equalling a fourth of the length of the metacarpus. Glands are most richly developed within the femur.

The *fifth, sixth and seventh pairs* (Pl. VII, fig. 25). The femur is considerably narrower than in the male, almost linear, more than three times as long as broad. The genu is somewhat more long than broad. The tibia is much longer than the genu, the front margin is provided with some few minute hairs. The carpus is longer and a little narrower than the tibia, the front margin is fringed with some few minute hairs. The metacarpus is a little longer than the carpus, the front margin is straight, smooth. The dactylus is stout, curved, equalling a third of the length of the metacarpus. Glands as in the male.

The *pleon* is considerably shorter than the *peræon*, equalling in length the last four *peræonal* segments together; the first *pleonal* segment is shorter than the last two *peræonal* segments together. The lateral parts of the segments are not fully as largely developed as in the male, but of the same shape.

The *pleopoda* are like those in the male.

The *urus*. The first segment is longer than the last coalesced one. The whole *urus* is longer than the last *pleonal* segment.

The *first pair of uropoda* (Pl. VII, fig. 26) do not reach fully to the apex of the last pair; the peduncle is four times as long as broad, longer than the inner ramus; the outer ramus is almost as long as the inner one, smooth on the outer margin, and serrated along the inner one; the inner ramus is serrated along both margins; at the bases of the rami there are deep grooves or holes, as described in the male. The *second pair* have the peduncle three times as long as broad, only a little longer than the inner ramus; the outer ramus is shorter and narrower than the inner, smooth on the outer margin, and serrated along the inner one; the inner ramus is serrated along both margins. The *third pair* are less broad and stout than in the male; the peduncle is three times as long as broad; the inner ramus is much longer than the breadth of the peduncle, serrated along both margins; the outer ramus is rather longer than the inner one, and a little narrower, it is smooth on the outer margin and serrated along the inner one.

The *telson* is broadly rounded, equalling a third of the length of the peduncle of the last pair of *uropoda*, it is fully as long as the breadth of the peduncle.

## 5. HYPEROCHE CRYPTODACTYLUS, TH. STEBBING, 1888.

**Diagn.** *Caput* segmenta duo priora *peræi* longitudine æquans. Processus tibialis *pedum peræi* primi paris basin processus carpalis non attingens; margo anterior processus carpalis serratus, margine posteriore metacarpi paullo brevior. Dactylus *pedum secundi* paris in metacarpo retractus. Carpus *pedum tertii* ac *quarti* parium paullo dilatatus, margine posteriore serrato. Pedes parium trium ultimorum pedibus parium duorum præcedentium haud longiores(?); femur dilatatum, metacarpus mediocris. Latera segmentorum *plei* post acute angulata. *Pedes uri* primi paris apicem *pedum ultimi* paris attingentes; ramus externus interno brevior. Ramus internus *pedum ultimi* paris latitudinem pedunculi longitudine vix superans. *Telson* tertiam partem longitudinis pedunculi *pedum uri ultimi* paris æquans.

The *head* equals in length the first two *peræonal* segments together. The tibial process of the first pair of *peræopoda* does not reach to the base of the carpal process; the front margin of the carpal process is serrated, a little shorter than the hind margin of the metacarpus. The dactylus of the second pair is retractile, able to be drawn in into the apex of the metacarpus. The carpus of the third and fourth pairs is a little dilated, the hind margin serrated. The last three pairs are not longer than the two preceding pairs(?); the femur

is dilated, the metacarpus mediocre. The lateral parts of the *pleonal* segments are posteriorly angulated, sharp-pointed. The first pair of *uropoda* reach to the apex of the last pair; the outer ramus is shorter than the inner one. The inner ramus of the last pair is scarcely longer than the breadth of the peduncle. The *telson* equals a third of the length of the peduncle of the last pair of uropoda.

**Colour.** ?

**Length.** About 7 mm.; (»from the front of the head to the back of the second pleon-segment, about one fifth of an inch», STEBBING).

**Hab.** Near the Cape of Good Hope, at Lat. 34° 41' S., and Long. 18° 36' E. (CH. E., Station 141.)

**Syn.** 1888. *Hyperoche cryptodactylus*, TH. STEBBING. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1399, pl. 170.

As mentioned above *Hyperoche cryptodactylus* comes very near to the male form of *H. Luetkeni*, differing from it by the retractile character of the dactylus of the second pair of peræopoda, and by some other characteristics of not very high importance.

For a fuller account of the species I refer to the description and drawings given by STEBBING, l. c. p. 1399 to 1402, plate 170. Here I reproduce only the passage regarding the retractility of the dactylus of the second pair of peræopoda. STEBBING says l. c., p. 1401:

»In these gnathopods, and apparently in the first also, the finger can be retracted into the hand (= metacarpus) for almost its whole length, if not for the whole length.»

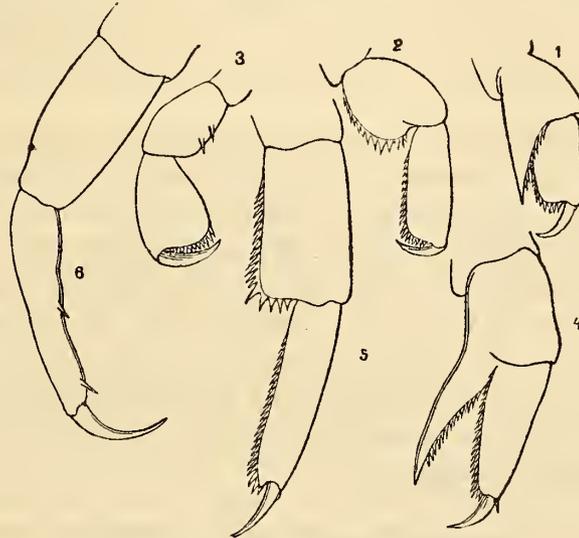
And further, p. 1402:

»It is of course likely enough that the character, though first observed in the present species, may be common to all the species of the genus, since in other respects they are separated only by small distinctions.»

6. **HYPEROCHE MARTINEZII**, FR. MÜLLER, 1864.

Pl. VII, fig. 27—31.

The name given by FR. MÜLLER in honour of the Spanish Zoologist DON FRANCISCO DE PAULA MARTINEZ Y SAES.

*Hyperocche Martinezii*, FR. MÜLLER.

Facsimile from FRITZ MÜLLER, Für Darwin, p. 52, fig. 44—49.

Fig. 1. The second pair of peraeopoda of a young. 2. The third pair of a young. 3. The fifth pair of a young. 4. The second pair of an adult animal. 5. The third pair of an adult. 6. The fifth pair of an adult.

**Diagn.** *Caput* segmenta duo priora peraei longitudine aequans. Processus tibialis pedum peraei primi paris basin processus carpalis longe non attingentes; margo anterior processus carpalis serratus, margine posteriore metacarpi brevior. Carpus pedum tertii ac quarti parium dilatatus; margo posterior rectus, serratus, angulo inferiore producto. Pedes parium trium ultimorum pedibus parium duorum praecedentium non longiores; femur angustum; metacarpus mediocris. Latera segmentorum plei rotundata. *Pedes uri* primi paris apicem pedum ultimi paris non attingentes; ramus externus interno paullulo brevior. Ramus internus pedum ultimi paris latitudinem pedunculi longitudine paullo superans. *Telson* dimidio pedunculi pedum uri ultimi paris paullo brevius.

The head equals the length of the first two peraeonal segments. The tibial process of the first pair of peraeopoda is far from reaching to the base of the carpal process; the front margin of the carpal process is serrated, shorter than the hind margin of the metacarpus. The carpus of the third and fourth pairs is dilated; the hind margin is straight, serrated, the lower corner produced. The last three pairs are not longer than the two next preceding pairs; the femur is narrow; the metacarpus is mediocre. The lateral parts of the pleonal segments are rounded. The first pair of uropoda do not reach to the apex of the last pair; the outer ramus is a little shorter than the inner one. The inner ramus of the last pair is somewhat longer than the breadth of the peduncle. The telson is a little shorter than half the length of the peduncle of the last pair of uropoda.

**Colour.** Light red (?).

**Length.** 5—6 mm.

**Hab.** The east coast of Bresil, at Desterro (FR. MÜLLER) (F. M.).

**Syn.** 1864. *Hyperia Martinezii*, F. MÜLLER. — Für Darwin, p. 51 and 52, fig. 44—49.  
*Hyperoche* ' ' ' ' C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ«. Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 20.

Among the many interesting forms in the precious collection of Hyperids, entrusted to me for examination by Professor ALPHONSE MILNE EDWARDS, is also a specimen of *Hyperoche Martinezii*, presented to the »Musée d'Historie Naturelle» in Paris by the founder of the species, Professor FRITZ MÜLLER himself. Thus I had the opportunity of ascertaining that this species is a true *Hyperoche*, and to draw up the following description, which is the more needed as FR. MÜLLER only through the drawings did characterize the species, when he in 1864 proposed the name *Hyperia Martinezii*. He gave, however, very interesting notes on the legs and their transformation from more prehensile organs in the young ones to the normal form of peræopoda in the adult animals. I cite here all that he says about the matter:

»SPENCE BATE vermisste bei den Jungen der *Hyperia galba* sämtliche Füße des Hinterleibes und die zwei letzten Fusspaare des Mittelleibes; die sehr auffallende Angabe bedarf um so mehr der Bestätigung, da er diese winzigen Thierchen nur im getrocknetem Zustande untersuchte. Nachträglich wurde mir die erwünschte Gelegenheit, die Entwicklung einer an Rippenquallen, besonders *Beroë silva*, Eschr. nicht seltenen *Hyperia* zu verfolgen. Die jüngsten Larven, aus der Bruttasche der Mutter, besitzen schon sämtliche Füße des Mittelleibes; dagegen vermisste ich, wie SPENCE BATE, die des Hinterleibes. Anfangs ziemlich einfach, werden diese Füße bald sämtlich wie die Vorderfüße zu reichgezähnelten Greiffüssen und zwar von dreifach verschiedener Form, indem die Vorderfüße (fig. 1), die beiden folgenden (fig. 2) und endlich die drei letzten Fusspaare (fig. 3) unter sich ähnlich und von den übrigen abweichend gebildet sind. In dieser Gestalt erhalten sich die Füße sehr lange, während die Hinterleibsanhänge zu kräftigen Schwimmwerkzeugen, und die anfangs, wie mir schien, ganz fehlenden Augen zu gewaltigen Halbkugeln heranwachsen. Bei dem Uebergang in die Gestalt des erwachsenen Thieres erleiden namentlich die drei letzten Fusspaare (fig. 6) eine bedeutende Veränderung. Die Verschiedenheit der beiden Geschlechter ist bedeutend; die Weibchen sind durch einen sehr breiten Mittelleib, die Männchen (*Lestrigonus*) durch sehr lange Fühler ausgezeichnet, von denen die vorderen ungemein reichliche Ricchfäden tragen.

Die jüngsten Larven können natürlich nicht schwimmen; es sind unbehilfliche Thierchen, die sich namentlich an die Schwimmblättchen des Wirthes festklammern; die erwachsenen Hyperien, die man nicht selten frei im Meere trifft, sind, wie man weiss, die trefflichsten Schwimmer ihrer Ordnung. (»Il nage avec une rapidité extrême», sagt VAN BENEDEEN von *Hyp. Latreillii* Edw.)

Offenbar ist die Verwandlung der Hyperien als eine erworbene, nicht als eine ererbte zu betrachten, d. h. das späte Auftreten der Hinterleibsanhänge und die eigenthümliche Fussbildung der Jungen sind nicht mit der geschichtlichen Entwicklung der Amphipoden in Verbindung zu bringen, sondern auf Rechnung des Schmarotzerlebens der Jungen zu setzen.»

These interesting statements of FRITZ MÜLLER will be discussed in the morphological part of this treatise. Here follows the description of the male; the only specimen in the collection of »Musée d'Histoire Naturelle de Paris» being a male, I have not seen any female specimen.

The *body* is longer and more slender than in *Hyperoche Luetkeni*, and the integument thinner and softer.

The *head* is as long as the first two peræonal segments together, and somewhat more broad than long. The antennal groove commences above the middle of the front side of the head and reaches to the lower margin. The head is not twice as deep as long.

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* are fully as long as the second pair. The first joint of the peduncle is very large, more long than broad, and almost twice as long as the two following joints together; the second joint is shorter than the third. The first joint of the flagellum is nearly as long as the head, and much longer than the whole peduncle, thick, almost cylindrical, as broad at the apex as at the base, the inner side is richly provided with long hairs. The second flagellar joint is short, equalling about a ninth of the length of the first joint, but much thicker than the following joints, which are eighteen to twenty in number; each joint is five to six times as long as broad.

The *second pair of antennæ*. The first free joint of the peduncle is short and stout, as long as the second, the last joint is almost as long as the two preceding ones together. The flagellar joints are equal in length, about ten times as long as broad; they are twelve in number.

The *peræon*. The first and second segments are equal in length; the seventh segment is the largest of all.

The *epimerals* of the first four pairs are somewhat shorter than the under margins of the corresponding segments, those of the last three pairs are as long as the segments.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda. They are considerably shorter than the corresponding femora.

The *first pair of peræopoda* (Pl. VII, fig. 28). The femur is elongate, fully three times as long as broad, the front and hind margins are feebly curved. The genu is smooth, as long as broad. The lower hinder corner of the tibia is produced, but the spoon-shaped process does not reach farther than to the middle of the stem of the carpus, it is tipped with minute hairs. The front margin of the carpus is feebly curved, the hind margin is a little excavated. The carpal process is shorter than the rest of the carpus; the hind margin is smooth, the front margin forms a knife-like, strongly serrated, edge, like that described in *Hyperoche Luetkeni*, the serration is composed of thirty-four to

thirty-six long, spine-like teeth, the points of the teeth are directed downwards. The metacarpus is almost as long as the stem of the carpus, broadest a little below the base, somewhat tapering towards the apex; it is more than twice as long as broad, the front margin is feebly curved, smooth, as long as the front margin of the carpus; the hind margin is convex, strongly serrated, the teeth are long, spine-like, sharp-pointed, the points directed downwards, they are more than thirty in number; the hind margin is considerably longer than the front margin of the carpal process; the under margin of the metacarpus is armed with smaller teeth. The dactylus is nearly straight, smooth, not fully half as long as the metacarpus. Glands are developed especially in the femur, genu, tibia, and carpus.

The *second pair* (Pl. VII, fig. 29) are a little longer than the first pair. The front margin of the femur is convex, with a narrow groove for the reception of the following joints; the hind margin is straight. The genu is as long as broad, smooth. The tibia is longer than the genu, the lower hind corner is not at all produced, smooth. The carpus is much shorter than the carpus of the first pair, the front and hind margins are straight; the carpal process is narrow, slender, considerably longer than the rest of the joint, the hind margin is convex, smooth, the front margin is nearly straight, as long as the hind margin of the metacarpus, and armed with about forty long, sharp-pointed, spine-like teeth, directed downwards. The metacarpus is much longer than the stem of the carpus, broad at the base, rapidly tapering towards the apex, more than twice as long as broad; the front margin is straight, much longer than the front margin of the carpus; the hind margin is thin, edge-shaped, armed with about forty long, sharp-pointed, spine-like teeth, directed downwards; the under margin is armed with smaller teeth as in the first pair. The dactylus is straight, sharp-pointed, smooth, equalling in length a little more than a third of the metacarpus. Glands as in the first pair.

The *third and fourth pairs* (Pl. VII, fig. 30) are equal in length. The front margin of the femur is curved, provided with the usual narrow groove, the hind margin is straight, the lower corner is produced into a sharp point, tipped with a bristle. The genu is somewhat more long than broad. The tibia is longer than the genu, smooth. The carpus is only a little longer than the tibia, dilated, scarcely twice as long as broad; the front margin is strongly convex, smooth, the hind margin is straight, divided into two parallel edges, as described above in *Hyperoche Luetkeni* p. 101, the outer of the carpal edges is produced into a strong, sharp-pointed process, directed downwards, the inner edge is produced into a much shorter such process, both edges are fringed with very long, sharp-pointed, bristle-like teeth. The metacarpus is longer and much narrower than the carpus, the hind margin is armed with long, bristle-like teeth. The dactylus is feebly curved, scarcely equalling a third of the length of the metacarpus. Glands in all the joints.

The *fifth, sixth and seventh pairs* are equal in length, and scarcely longer than the two next preceding pairs. The femur is narrow, linear, nearly as long as the three following joints together. The genu is somewhat more long than broad, smooth. The tibia is longer than the genu, the hind margin is strongly convex, the front margin straight, smooth. The carpus is longer than the tibia, the margins are smooth. The meta-

carpus is longer than the carpus, feebly tapering towards the apex, the margins are smooth. The dactylus is long, feebly curved, smooth, almost half as long as the metacarpus. Glands in all the joints.

The *pleon* is about as long as the whole peræon, the first segment is considerably longer than the last two peræonal segments together. The lateral parts of the pleonal segments are deep, evenly rounded below.

The peduncles of the *pleopoda* are very large and thick, longer than the rami; the outer ramus has ten joints, the inner nine.

The *urus*; the first joint is longer than the last coalesced one. The whole *urus* is longer than the last pleonal segment.

The *first pair of uropoda* (Pl. VII, fig. 31) do not reach to the apex of the last pair; the peduncle is somewhat broader at the apex, nearly three times as long as broad, and a little longer than the inner ramus; the outer ramus is somewhat shorter than the inner one, the outer margin is smooth, the inner sparingly set with fine, spine-like teeth; the inner ramus is armed in the same manner on both margins. The *second pair* reach almost to the apex of the last pair; the peduncle is considerably broader below than above, three times as long as broad at the apex, and much longer than the inner ramus; the outer ramus is shorter than the inner one; both rami are armed as those of the first pair. The *third pair* have the peduncle broader than in the preceding pairs, not twice as long as broad, but considerably longer than the last ural segment; the outer ramus is longer than the inner one, both margins are set with fine, spine-like teeth; the inner ramus is a little longer than the breadth of the peduncle, armed as the outer one.

The *telson* is triangular, with curved margins, as long as broad; it is shorter than the breadth of the peduncle of the last pair of uropoda.

## 7. HYPEROCHE PICTA, n. sp.

Pl. VII, fig. 32—35.

**Diagn.** *Caput* quam segmenta duo priora peræi longius. Processus tibialis primi paris *pedum peræi* brevissimus; angulus antero-inferior metacarpi productus, processum formans cochlearem; processus carpalis latus, non serratus, spinis instructus, margine posteriore metacarpi multo brevior. Carpus *pedum tertii ac quarti parium* vix dilatatus, margo posterior rectus, spinis minutissimis instructus, angulo inferiore non producto. *Pedes parium trium ultimorum* pedibus parium duorum præcedentium non longiores; femur angustum; metacarpus mediocris, metacarpo *pedum tertii ac quarti parium* brevior. *Pedes uri* primi paris apicem *pedum ultimi* paris non attingentes; ramus externus internum longitudine æquans. *Telson* dimidium longitudinis pedunculi *pedum uri ultimi* paris fere æquans.

The *head* is longer than the first two peræonal segments together. The tibial process of the first pair of *peræopoda* is very short; the antero-inferior corner of the metacarpus is produced, form-

ing a spoon-shaped process; the carpal process is broad, not serrated, fringed with spines; it is much shorter than the hind margin of the metacarpus. The carpus of the third and fourth pairs is scarcely dilated; the hind margin is straight, not serrated, set with very minute spines, the lower corner is not produced. The last three pairs are not longer than the two next preceding pairs; the femur is narrow; the metacarpus is mediocre, shorter than the metacarpus of the third and fourth pairs. The first pair of *uropoda* do not reach to the apex of the last pair; the outer ramus is as long as the inner. The *telson* is half as long as the peduncle of the last pair of *uropoda*.

**Colour.** Yellowish white, with round and star-like spots of a bright red.

**Length.** 4 mm.

**Hab.** The tropical region of the Atlantic, at Lat. 20° N., and Long. 39° W. One specimen, a male, captured by the author during the expedition of H. Swed. M:t'y's Corvette Balder, in 1881. (S. M.)

*Hyperoche picta* differs in many points from the other species of the genus but the building of the carpal process of the first two pairs of *peræopoda*, and the form of the *urus* do allow its introduction in the genus *Hyperoche*. The shape of the carpus of the third and fourth pairs of *peræopoda* is, however, more similar to the shape of that joint in the genus *Hyperia*.

The *body* is comparatively slender, but the *peræon* is distinctly broader and more tumid than in the male of *Hyperoche Luetkeni*.

The *head* is large, tumid, as long as deep, and nearly as long as the first three *peræonal* segments together. The antennal groove commences a little above the middle of the front side of the head, and is very broad, comparatively broader than in any of the other species of *Hyperoche*.

The *eyes* occupy the whole surface of the head, the pigment has a deep reddish colour.

The *first pair of antennæ* are almost as long as the whole body. The first joint of the peduncle is stout and thick, three times as long as the two following joints together. The first joint of the flagellum is very large and thick, tapering towards the apex, the inner and under sides are bulging, and closely set with long olfactory hairs; the first joint is about three times as long as the whole peduncle; the second flagellar joint is very short, the third twice as long as the second, the fourth still longer but narrower; the fifth to seventeenth joints are nearly equal in length, slender, cylindrical, very elongated, about fifteen times as long as broad, and sparingly set with minute hairs; the last five joints are rapidly decreasing in length, the last one being only three times as long as broad, tipped with two very minute hairs.

The *second pair of antennæ* are considerably shorter than the first pair. The first visible joint of the peduncle or the true third joint is very short, the fourth is twice as long, the fifth or last peduncular joint is much longer than the preceding joints together, cylindrical. The flagellar joints are slender, elongated, cylindrical, about ten times as long as broad; they are fifteen in number, smooth, without hairs.

The *peræon*; the first segment is scarcely half as long as the second; the second to sixth segments are almost equal in length, the seventh is the longest.

The *epimerals* are tolerably large, as long as the under margins of the corresponding segments. That of the fourth pair is the longest.

The *branchial sacks* are broad above, almost linear, somewhat shorter than the femora of the corresponding pairs of peræopoda. They are fixed to the second to sixth pairs.

The *first pair of peræopoda* (Pl. VII, fig. 32) are fully as long as the second pair, and somewhat stouter. The femur is broad, only a little more than twice as long as broad, the hind margin is straight, the front margin feebly convex. The genu is as long as broad, smooth. The tibia is longer than the genu, the lower hinder corner is not at all produced. The carpus is broad and stout, the front and hind margins are straight; the carpal process is short and broad, shorter than the rest of the carpus, it ends into a narrow, tooth-like point; the thin and sharp, edge-like, front margin of the process is fringed with spines, as is also the hind margin; the front margin is distinctly shorter than the hind margin of the metacarpus. The metacarpus is broad, somewhat more than twice as long as broad; the front margin is almost straight, feebly convex at the apex, where the joint is produced into a broad, hollowed, spoon-shaped process, overlapping the dactylus for more than half its length; the front side of this spoon-shaped process is densely covered with bristle-like hairs; the margins are set with short spines; the hind margin of the metacarpus forms a thin, sharp edge, finely serrated, with comparatively long, spine-like teeth. The dactylus is straight, slender, sharp-pointed, not fully half as long as the metacarpus. A long glandular string runs through the femur, and continues through the following joints to the apex of the metacarpus where it seems to end in the spoon-shaped metacarpal process, just at the base of the dactylus. All the joints, except the dactylus, are irregularly sprinkled with more or less round, deeply red spots.

The *second pair* (Pl. VII, fig. 33 and 34) have the femur narrower than that of the first pair, fully three times as long as broad; the front and hind margins are almost straight, without hairs or bristles. The genu is somewhat more long than broad. The tibia is nearly twice as long as the genu, considerably broader below, the lower anterior corner is not produced but provided with a tuft of minute hairs; the front and hind margins are feebly convex, smooth. The carpus is not as broad as that of the first pair, the front margin is straight, fringed with minute hairs, the hind margin is a little concavated, fringed with minute hairs; the carpal process is strongly developed, scarcely shorter than the rest of the joint, ending in a sharp point, this sharp-pointed apex is somewhat shorter than that in the first pair; the hind margin of the carpal process is feebly convex, fringed with minute bristles; the front margin is fully as long as the hind margin of the metacarpus, forming a broad, very thin, sharply serrated edge, the teeth in this serration are narrow, sharp-pointed, spine-like, directed downwards. The metacarpus is very broad owing to the largely developed, thin, edge-like, hind margin, which is serrated in the same manner as the front margin of the carpal process; the metacarpus is scarcely more than a third longer than it is broad; the front margin is feebly convex, the lower corner produced into a spoon-shaped process which is narrower and shorter than in the first pair,

and almost rectangularly bent over the base of the dactylus; the apex of this process is tipped with four to five bristles, the inner hind margins of the process, especially at the base, are provided with some short, sharp teeth. The dactylus is straight, slender, sharp-pointed, nearly half as long as the metacarpus. It is not unlikely that the dactylus here as also in the first pair is able of being retracted in the interior of the metacarpus, in the same way as described by STEBBING for *Hyperoche cryptodactylus*, because the end of the metacarpus seems to form a wide hole around the base of the dactylus, and does not show any distinct points of articulation with it. Well developed glands exist in all the joints, except in the dactylus.

The *third and fourth pairs* are equal in length and similar in shape. The femur is narrow, almost linear, more than three times as long as broad, smooth. The genu is almost as broad as long. The tibia is twice as long as the genu, the margins are smooth. The carpus is scarcely longer than the tibia, somewhat dilated, the hind margin is straight, longitudinally cleft into two thin edges, just as in *Hyperoche Luetkeni*, the outer edge is sparingly set with hairs, the inner one is microscopically serrated, the teeth being rounded, not sharp-pointed; between these edges a part of the hind margin of the metacarpus is received, thus forming a kind of cutting organ; the lower corners of the edges are almost rectangular, not produced into serrated processes as in *Hyperoche Luetkeni*. The metacarpus is long, not fully as long as the tibia and carpus together, the sides of the joint are richly covered with long, sharp, spine-like bristles, the hind margin forms a thin edge, microscopically serrated, with rounded teeth. The dactylus is straight, it equals in length fully a third of the metacarpus. Powerful glands as in the two preceding pairs.

The *fifth, sixth and seventh pairs* equal the two next preceding pairs in length. The femur is narrow, linear, more than three times as long as broad. The genu is more long than broad. The tibia is somewhat longer than the genu. The carpus is much longer than the tibia, linear; the margins are smooth. The metacarpus is longer than the carpus, but not as long as the metacarpus of the third and fourth pairs; the front margin is somewhat concavated, smooth. The dactylus is straight, scarcely equalling in length a third of the metacarpus. Glands in all the joints, except in the dactylus.

The *pleon* is a little shorter than the peræon; the segments are equal in length, the lateral parts are deep, rounded.

The *pleopoda* have the peduncles almost globular, shorter than the rami, the outer ramus has nine, the inner eight joints. The coupling spines are stout, the tip bent as a hook, the cleft bristle is very thick and stout.

The *urus* is scarcely longer than the last pleonal segment; the last coalesced segment is almost as long as the first one, and nearly twice as broad as long.

The *uropoda* (Pl. VII, fig. 35). The *first pair* reach to the middle of the outer ramus of the last pair; the peduncle is broader below, considerably longer than the inner ramus; the rami are narrowly lanceolate, equal in length; the outer ramus is fully as long as the inner, the outer margin is smooth, the inner one sharply serrated; the inner ramus is sharply serrated along both margins. The *second pair* reach fully as far as the first pair; the peduncle is as broad as that of the preceding pair, only a little longer than

the inner ramus; the outer ramus is distinctly longer than the inner one, the outer margin is smooth, the inner one sharply serrated; the inner ramus is serrated along both margins. The *third pair* have the peduncle broad, linear, a little longer than the inner ramus; the outer ramus is as long as the inner one, the outer margin is smooth, the inner sharply serrated; the inner ramus is somewhat broader than the inner ramus of the two preceding pairs, and considerably longer than the breadth of the peduncle, both margins are sharply serrated.

The *telson* is more long than broad, triangular, with curved sides, it is exactly as long as the *breadth* of the peduncle of the last pairs of uropoda, and half as long as the *length* of the same peduncle.

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### HYPEROCHE TAURIFORMIS, SPENCE BATE and WESTWOOD, 1868.



*Hyperocche tauriformis*, SPENCE BATE and WESTWOOD.

Facsimile from SP. BATE and WESTWOOD, Brit. Sessile-eyed Crust., II, p. 519.

As mentioned above, p. 85, the description and drawings given by the authors are entirely insufficient to identify the species. I repeat here below the original description, taken from the work, »British Sessile-eyed Crustacea», Vol. 2, p. 519.

»*Specific character.* Antennæ very short. Both pairs of gnathopoda with the proximate margins of the propodos and carpus strongly serrated, as well as the dactylos of the second pair.

Length, four-twentieths of an inch.

The antennæ of this species are very short. The inferior angle of the carpus is anteriorly produced in both pairs of gnathopoda, and the proximal margins of the propodos and carpus are strongly serrated, as also is the dactylos of the second pair.<sup>1)</sup> —

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The animal above described was taken at Banff by Mr. EDWARD.»

<sup>1)</sup> The following lines are reproduced above, p. 85.

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Genus 3. **EUIULOPIS**, C. BOVALLIUS, 1887.<sup>1)</sup>

**Diagn.** *Caput* magnum, plus minusve globosum. *Peræon* hirsutum, epimeris distinctis instructum. *Pedes peræi* primi paris subcheliformes, pedes secundi paris plus minusve cheliformes; carpus dilatatus, carpus primi paris non productus, vel multo minus quam carpus secundi paris productus, processus carpi, vel angulus postero-inferior carpi, anguste excavatus, in formam cochlearis redactus. Carpus pedum tertii ac quarti parium non dilatatus. Pedes parium trium ultimorum longitudine subæquales, præcedentibus aut non, aut paullo, longiores. *Pedes uri* mediocres, non elongati.

The *head* is large, more or less globular. The *peræon* is hirsute, provided with distinct epimerals. The first pair of peræopoda are subcheliform, the second pair are more or less cheliform; the carpus is broad, that of the first pair is not produced, or much less produced than that of the second pair; the carpal process, or the hinder lower corner of the carpus, is narrowly hollowed, gouge-shaped. The carpus of the third and fourth pairs is not dilated. The last three pairs are subequal in length, not longer than the two next preceding pairs, or only a little longer. The *uropoda* are mediocre, not elongated.

**Syn. 1887.** *Iulopis*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiidæ«. Bih. t. K. Sv. Vet. Ak. Handl. Bd. 16. N:o 16, p. 17.

The genus *Euiulopis* is easily distinguished from all the other genera of the family, and also from all the other Hyperiidæan genera, by the hirsute character of the integument of the body. Something pointing to this remarkable feature is, however, to be seen in some other representatives of the family Hyperiidæ, but there in a much smaller scale, and limited only to a certain part of one or more of the appendages of the body, as for instance, in the metacarpus of the third and fourth pairs of peræopoda of *Hyperoche picta*, described next above, in the first two pairs of peræopoda of *Tauria macrocephala*, in the carpus, and especially in the metacarpus of the first two pairs of *Hyperia medusarum*, O. F. MÜLLER, and in some extent also in the legs of some other species of *Hyperia*, but there it is rather bristles than hairs which cover the surface of the integument. Also the hairs fringing the rami of the uropoda of *Phronimopsis* may be mentioned as perhaps homologue with the strongly developed hair-covering existing in *Euiulopis*.

Also the *form* of the carpus of the first two pairs of peræopoda is characteristic for this genus, being narrowly hollowed, and having the carpal process gouge-shaped. The carpal process, or the lower hinder corner of the carpus, is namely more compressed than in *Hyperiella*, *Parathemisto* and *Euthemisto*, most resembling that in *Themistella*, but on the other hand the carpus in *Euiulopis* is much more dilated than that in *Themistella*.

<sup>1)</sup> As a zoological name, most closely resembling *Iulopis*, *Iulopsis*, was used already in 1874 by HEER for a genus of Myriopoda, I have corrected the later Hyperiidæan name to *Euiulopis*, in order to avoid confusion.

The form of the second pair of antennæ in the female is peculiar to this genus. They consist namely of two very short joints, the terminal the larger, almost globular in shape. In the young female they are a little more conspicuous than in the adult one.

The sexual dimorphism is more strongly pronounced in *Euiulopsis* than in the other genera of the family. Except in the different form of the two pairs of antennæ, and in the broader peræon of the female, it is also shown in the form of the last three pairs of peræopoda — at least in *Euiulopsis Lovéni* — the femora of the female being less developed, and the tips of the legs transformed into a kind of subcheliform, grasping organ. All the specimens of the two species, that I have examined, are taken swimming free in the sea but this peculiar form of the tips of the last three pairs of peræopoda makes it probable that the female of *Euiulopsis*, as well as the female of *Hyperoche* and *Hyperia*, takes its abode within, or under, some larger marine animals, at least during the breeding time. It is, however, a noticeable feature that in young females of *Euiulopsis Lovéni*, taken at two different occasions, the tips of the last three pairs of peræopoda are exactly like those of the young and adult males (Pl. VIII, fig. 14). This feature seems to be contrary to the state in *Hyperoche Martinezii* (see above, p. 108) where the young ones of both sexes have the tips of the last three pairs of legs formed as similar grasping organs, and corroborates in some way the supposition that the adult female of *Euiulopsis* for some time is hospiting in some marine animal.

In general habitus *Euiulopsis* comes near to *Hyperoche* and *Hyperia*, and is by this reason placed between those two genera, forming an intermediate link between them also by the form of the carpus of the first two pairs of peræopoda, alluded to above.

Hitherto I know two species of the genus, easily to be distinguished from one another.

- A.** The lower hinder corner of the carpus of the first pair of peræopoda, and the apex of the carpal process of the second pair, are armed with a strong, terminal spine. The rami of the uropoda are narrow, elongate, fringed with hairs..... **1. E. Lovéni.**
- B.** The lower hinder corner of the carpus of the first pair of peræopoda, and the apex of the carpal process of the second pair, without terminal spine. The rami of the uropoda are broadly lanceolate, without hairs, serrated..... **2. E. mirabilis.**
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1. **EUIULOPIS LOVÉNI**, C. BOVALLIUS, 1887.

Pl. VIII, fig. 1—18.

The name is given in honour of Professor SVEN LOVÉN.

**Diagn.** *Caput* hirsutum, segmentis tribus primis peræi brevius. Segmenta *peræi* valde hirsuta, segmenta quinque intermedia elevata, depressionibus interrupta, segmentum primum et septimum non elevata. Angulus infero-posterior carpi *pedum peræi*, primi paris breviter productus, spina terminali instructus. Processus carpalis *pedum secundi* paris dimidium metacarpi superans, spina terminali instructus. Pedes parium trium ultimorum duobus præcedentibus non longiores. *Pleon* quam *peræon* brevius. Rami *pedum uri* anguste elongati, marginibus hirsutis. *Telson* pedunculo *pedum uri* ultimi paris latius.

The *head* is hirsute, shorter than the first three *peræonal* segments together. The *peræonal* segments are strongly hirsute, the second to sixth ones are elevated, separated from one another by depressions; the first and seventh segments are not elevated. The lower hinder corner of the carpus of the first pair of *peræopoda* is shortly produced, armed with a terminal spine. The carpal process of the second pair is more than half as long as the metacarpus, armed with a terminal spine. The last three pairs are not longer than the two next preceding pairs. The *pleon* is shorter than the *peræon*. The rami of the *uropoda* are narrowly elongated, with hirsute margins. The *telson* is broader than the peduncle of the last pair of *uropoda*.

**Colour.** Light red, sparingly spotted with black.

**Length.** 4—6 mm.

**Hab.** The tropical region of the Atlantic, at Lat. 17° 22' N. and Long. 37° 23' W., taken by the author in 1881 during the expedition of H. Swcd. Majty's Corvette *Balder*; the Mediterranean, at Lat. 36° 20' N. and Long. 4° 30' W., taken by Captain G. C. ECKMAN, of the Swedish Ship *Engelbrekt*, in 1888. (D. M.; S. M.; U. M.)

**Syn. 1887.** *Iulopis Lovéni*, C. BOVALLIUS. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.

This beautiful animal seems to live free in the sea not hospiting in yellowfishes, at least the specimens I captured were swimming free in the surface of the tropical Atlantic; the swimmèd with great rapidity, and showed a considerable vivacity the short time I could keep them alive in a glass of salt water. Also the female specimen taken in the Mediterranean by Captain ECKMAN was taken swimming free in the surface together with some specimens of *Scina Sarsi* and *Eupronoë maculata*. *E. Lovéni* is readily distinguished from the other species, *Euiulopis mirabilis*, by the hirsute head, and by being more richly covered with hairs on the body and on the legs, these hairs are also much longer and softer than in *E. mirabilis*. Good characteristics are further the armature of the carpi of the first two pairs of *peræopoda*, and that of the rami of the *uropoda*.

### The male.

The *body* is more compressed than in the female, the *peræon* is a little shorter, and the *pleon* somewhat longer but still shorter than the *peræon*. The *hirsute* covering is more dense on the *forepart* of the *body*, the *pleon* and the *urus* being only sparingly set with *hairs*.

The *head* is considerably more deep than long, and scarcely as long as broad. On the upper side of the head there is a longitudinal depression, like the depression on the side of a peach, dividing as it were the head into a right and a left portion. This depression continues on the front side to the upper margin of the antennal groove, which commences a little below the middle of the front side. The head is as long as the first, second, and half the third *peræonal* segments together. All around on the surface of the head there are a covering of slender hairs, a twentieth of a millimeter long; they are placed in the angles of the facets of the eyes; from this feature the generic name has been chosen, *Ἰουλωπίς* means literally »a woolly eye».

The *eyes* occupy the whole surface of the head. The *ocelli* are larger than in *Hyperoche* and *Hyperia*, about two hundred in number in each half of the head.

The *first pair of antennæ* (Pl. VIII, fig. 2) are shorter than the second pair. The first joint of the peduncle is very stout, a little more long than thick, smooth, more than twice as long as the two following joints together. The second and third joints are equal in length. The first joint of the flagellum is tumid, about as long as the whole peduncle, feebly tapering towards the apex; the inner and under sides are richly covered with long, slender, olfactory hairs, fixed on button-like disks. The second flagellar joint is very short, the third is more than twice as long as the second, the fourth still longer, the following ones are slowly increasing in length; the last one is about twelve times as long as broad. In all the flagellar joints are thirteen in number.

The *second pair of antennæ* (Pl. VIII, fig. 2) are fixed in the antennal groove just at the limit between the front and under margins of the head. The first free joint of the peduncle is a little shorter and narrower than the first peduncular joint of the first pair, and scarcely longer than the two following joints together; the last peduncular joint is somewhat shorter than the next preceding one. The flagellum consists of thirteen joints; the first joint is the shortest but stoutest, it is more than twice as long as the last peduncular joint. The following joints are narrowly cylindrical, increasing in length, the last, or thirteenth, is about twenty times as long as broad.

The *labrum* is small, irregularly bilobed, and richly covered with short, slender hairs.

The *mandibles* (Pl. VIII, fig. 5) are more elongated than in *Hyperoche*, the stem is straight, almost linear; the incisive lamina is strong, armed with eight sharp teeth, the molar tubercle is very protuding, large, the grinding surface elongate-ovate, no hairs or bristles are to be seen between the molar tubercle and the incisive lamina. The secondary incisive lamina of the left mandible is small, armed with five teeth, it is placed in almost right angle with the principal lamina. The *palp* is fixed near to the apex of the

mandible, the first joint is short and stout, the second is twice as long, cylindrical, the third is still longer, tapering towards the apex. The palp is entirely smooth.

The *first pair of maxillæ* (Pl. VIII, fig. 6) consist of a short, globular, basal joint, from it arises the principal lamina, forming a long, linear stem, the apical portion, or the inner lower corner, is produced into a narrowing process, armed at the apex with six or seven sharp teeth. The secondary lamina is round, deeply hollowed, almost scoop-shaped, covering the process of the principal lamina as a helmet, the margins are fringed with short, spine-like bristles.

The *second pair of maxillæ* (Pl. VIII, fig. 7) have the principal lamina short and stout, the inner lower corner is produced into a narrow, pointed process, fringed with short bristles; the secondary lamina is elongate-triangular, sparingly set with short bristles.

The *maxillipeds* (Pl. VIII, fig. 8) consist of a long, almost triangular, basal joint, bent forwards; at the unusually narrowed apex arise the two lateral laminae, between these laminae projects a very short and feeble median lobe, bent somewhat inwards. The lateral laminae are very narrow, elongated, fringed with short hairs.

The *peræon* shows a peculiar form, the anterior parts of some of the segments being elevated, forming rolls, raised high above the hinder parts of the same segments. These rolls are somewhat flattened in the male, and comparatively broader than in the female. The first segment is not elevated, and scarcely more than half as long as the second. The second segment is a little longer than the third, and nearly as long as the seventh segment, which is the longest of all; the anterior half of the second segment is elevated. The anterior elevated part of the third segment is more than twice as long as the hinder depressed part. The elevated parts of the fourth and fifth segments are much longer than the corresponding hinder parts. The whole sixth segment is elevated but is not as high as the preceding ones. All the elevated parts of the second to sixth segments are densely covered with long hairs, the depressed parts are also hirsute, but the hairs are very short. The seventh segment is not elevated, but covered with long hairs, as the preceding ones.

The *epimerals* are as long as the under margins of the corresponding segments. The epimeral of the first pair is twice as deep as long; that of the second pair is about a third more deep than long, the following epimerals decrease in depth, the last one being more than twice as long as deep.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda; they are almost as long as the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. VIII, fig. 9) are a little shorter than the second pair. The femur is nearly as long as all the following joints together, more than three times as long as broad; the front margin is feebly convex, the hind margin almost straight. The genu is as long as broad, scarcely shorter than the tibia. The tibia is a little broader below than above, the hinder lower corner is not at all produced. The carpus is considerably shorter than the two preceding joints together, dilated, much broader below than above, the hinder lower corner is produced into a very short, gouge-shaped process, armed at the apex with a long, strong, terminal spine. This carpal process is so short that the metacarpus impinges against it in an angle of almost 90°; the leg is thus fully *subcheliform*. The metacarpus is a little longer than the carpus, scarcely narrower at the apex than at

the base; it is nearly three times as long as broad. The front margin is straight, the hind margin is feebly curved at the apex; it is not serrated but the hairs fringing it are thicker, stouter, and more spine-like, than the hairs covering the sides of the joint. All the preceding joints, as well as the metacarpus, are richly covered with hairs all around; the hairs fringing the front margins of the joints are much longer than the hairs on the sides and along the hind margins, being very slender and soft, curved at the apex. The dactylus is stout, curved, half as long as the metacarpus; along the middle of the hind, concave margin it is armed with about a dozen bristle-like spines. The base of the dactylus forms a thick heel, at the hind corner of this heel there is a circular hole, the outlet for the glands which are richly developed within the other joints of the leg.

The *second pair* (Pl. VIII, fig. 10 and 11), reach a little beyond the apex of the tibia of the third pair. The femur is somewhat shorter than the four following joints together, a little narrower at the apex, and more than three times as long as broad at the base. The genu is more long than broad. The tibia is longer than the genu, narrow at the base, with bulging sides; the hinder lower corner is rounded, not at all produced. The carpus, without the carpal process, is much shorter than the two preceding joints together; the front margin is convex, as long as the front margin of the metacarpus, the hind margin is nearly straight. The carpal process is strongly developed, longer than the rest of the joint; the hind margin is straight, closely set with a great number of very short spines; the front side is narrowly hollowed, gouge-shaped, both the edges or margins are closely set with numerous short spines; the apex is rounded, armed with a long, strong, terminal spine, as in the first pair; the front margin, with the terminal spine, is just as long as the hind margin of the metacarpus. The metaearpus is almost linear, more than three times as long as broad; the front and hind margins are straight, the hind margin is closely set with short, spine-like hairs. The hair-covering of all the joints is similar to that in the preceding pair. The dactylus is more strongly curved than in the first pair, but armed in the same manner; it equals a third of the metacarpus. Glands as in the preceding pair.

The *third and fourth pairs* (Pl. VIII, fig. 12) are equal in length and similar in shape. The femur is only a little longer than the femur of the second pair, the upper half is narrow, the lower half more dilated, the joint being twice as broad at the apex as at the base; at the front margin there is a long, narrow groove for the reception of the next following joints when the leg is bent upwards. The genu is considerably more long than broad. The tibia is as long as the genu. The carpus is somewhat longer than the tibia, the hind margin is straight, not serrated. The metacarpus is as long as the carpus, and only a little narrower; the front margin is feebly curved, the hind margin is straight, not serrated, but closely set with short, spine-like hairs. The hair-covering is more rich on the first four joints than on the metacarpus, especially is the lower part of the metaearpus comparatively naked, and the hairs upon it are shorter. The dactylus is curved, smooth, about a fourth as long as the metacarpus; at the base it shows a broad heel, with a circular hole, the outlet of the glands. The glands are richly developed within all the joints.

The *fifth, sixth, and seventh pairs* are equal in length and similar in shape; they are a little shorter than the third and fourth pairs. The femur is somewhat dilated, as broad at the base as at the apex. The genu is more long than broad. The tibia is scarcely longer than the genu; the hind margin is somewhat curved. The carpus is longer than the tibia, but much shorter than the genu and tibia together. These first four joints are richly provided with long hairs all around. The metacarpus is shorter than the carpus, but only a little narrower; the front margin is straight, the hind margin feebly curved; it is not dilated at the apex as that in the adult female. The hair-covering is less rich and the hairs are shorter on this joint than on the four preceding ones. The dactylus is stout, strongly curved, equalling in length a third of the metacarpus, at its base there is an outlet for the glands as in the preceding pairs. The glands are well developed in all the joints, except in the dactylus.

The *pleon* is somewhat longer than the last four peræonal segments together. The first pleonal segment is considerably longer than the last peræonal one, but shorter than the last two peræonal segments together. The segments of the pleon are equal in length, the lateral parts are evenly rounded. The hair-covering is not as rich as on the peræon; it is more dense on the first pleonal segment than on the two last ones.

The *pleopoda* (Pl. VIII, fig. 15—17) are robust. The peduncle is longer than the rami, the front side is very convex, bulging, the hind side is flat; from the inner lower corner projects downwards a broad, tongue-shaped process; at the inner angle between this process and the stem of the peduncle there arise two short, stout coupling-spines (Pl. VIII, fig. 16), each consisting of a somewhat bulging, thick stem and a button-like head, just at the base of this head extend two feebly bent, sharp-pointed hooks. On the first or basal joint of the inner ramus there is a well developed cleft bristle (Pl. VIII, fig. 17). The inner ramus of the first pair consists of ten joints, the outer of eleven.

The *urus* is longer than the last pleonal segment and very sparingly provided with hairs. The first segment is longer than the last coalesced one. The last segment is more broad than long and shows at the middle on each side a deep notch marking off the limit between the coalesced second and third ural segments; there exists, however no line of division on the dorsal, nor on the ventral side.

The *uropoda*. The *first pair* do not reach to the apex of the last pair; the peduncle is tolerably broad, feebly bent, linear, nearly four times as long as broad; the outer and inner margins are fringed with short, slender hairs. The rami are narrowly elongate, sharp-pointed, fringed along both margins with short, slender hairs; the outer ramus is longer than the inner, it equals in length four fifths of the peduncle; the inner ramus equals three fourths of the same peduncle. The *second pair* reach only a little beyond the apex of the peduncle of the last pair; the peduncle is scarcely more than half as broad as that of the first pair, and is more strongly bent; the margins are fringed with short hairs. The rami are narrower than those of the first pair; the margins are fringed with short hairs; the outer ramus is longer than the inner, and equals the peduncle in length. The *third pair* are more robust than the second pair; the peduncle is broad, a little narrowed at the base; the outer margin is feebly curved, the inner is straight, both are fringed with short hairs. The rami are comparatively a little broader

than those of the two preceding pairs, but of the same elongate form; the outer margin of the outer ramus and the inner margin of the inner ramus are fringed with short hairs, the two other margins, which are in contact, are armed with short spines; the outer ramus is longer than the inner one, and equals in length about three fourths of the peduncle.

The *telson* is large, bluntly triangular and as long as broad; it is much broader than the peduncle of the last pair of uropoda and half as long; it is also longer than half the last, coalesced, ural segment. A rounded process projects from the under side of the telson between the bases of the last pair of peduncles.

### The female.

Pl. VIII, fig. 1, 3, 4, 13, 14 and 18.

The *body* is only a little wider than in the male, the hind part is comparatively shorter.

The *head* is larger than in the male, as long as the first three peræonal segments together and not fully twice as deep as long. The antennal groove is comparatively small.

The *eyes* are similar to those in the male, but hairs are more densely set between the facets.

The *first pair of antennæ* (Pl. VIII, fig. 3 and 4). The first joint of the peduncle is very large and thick, irregularly globular, longer than the two following peduncular joints together; the second joint is cylindrical, as long as broad; the third joint is a little longer than the second, somewhat wider at the apex. The only flagellar joint is longer than the whole peduncle, comparatively slender, and feebly tapering towards the apex, where it is rounded. On the inner side of the flagellum there are some few olfactory bristles, which seem to be two-jointed (Pl. VIII, fig. 4).

The *second pair of antennæ* are unusually small, and feebly developed. They consist of only two short joints, and are fixed at the limit between the front and under margins of the head, not visible in a side-view of the animal.

The *mouth-organs* are like those in the male.

The *peræon* is built in the same peculiar manner as in the male, the anterior parts of the second to sixth segments being elevated, but the rolls thus formed are higher and more strongly convex. The first segment is not fully half as long as the second segment, the seventh one is the longest of all.

The *epimerals* are as long as the under margins of the corresponding segments. The epimeral of the first pair is as deep as long, that of the second pair is a little longer than it is deep, those of the following pairs are more than twice as long as deep.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda, they are a little longer than the femora of the corresponding pairs.

The *ovitrectrices* are fixed to the second to fifth pairs; they are irregularly triangular, broadest at the apex, somewhat longer than the branchial sacks.

The *first and second pairs of peræopoda* are similar to those pairs in the male.

The *third and fourth pairs* are comparatively longer than in the male. The femur is much longer than the femur of the second pair, the base is very narrow, the lower part very dilated, the joint being more than twice as broad below as at the base. The genu is twice as long as broad. The tibia is a little longer than the genu, broader below. The carpus is longer than the tibia, the hind margin is straight, not serrated. The metacarpus is somewhat shorter than the carpus, and much narrower, the hind margin is straight, not serrated. The dactylus is curved, smooth, equalling in length a third of the metacarpus. Hair-covering as in the male. The glands are larger and more developed than in the male.

The *fifth, sixth and seventh pairs* are equal in length and similar in shape; they are shorter than the third and fourth pairs. The femur is narrow at the base and broader below, nearly twice as broad below as at the base. The genu and tibia are equal in length. The carpus is longer than the tibia, but much shorter than the genu and tibia together. The metacarpus is shorter than the carpus, dilated at the apex, the dactylus impinges against this dilated part of the joint, thus forming a kind of grasping organ. The dactylus is strongly curved, equalling in length a third of the metacarpus. Hair-covering and glands as in the male. (Pl. VIII, fig. 13 and 14.)

The *pleon* is scarcely longer than the last three peræonal segments together. The first pleonal segment is as long as the last peræonal one; it is a little longer than the second segment.

The *pleopoda* are like those in the male.

The *urus* is a little shorter than the last two pleonal segments together; it is somewhat more richly provided with hairs than is that in the male. The first segment is a little longer than the last coalesced one. The last segment is almost twice as broad as long, and of the same shape as in the male; the margins are fringed with short hairs; the hind corners are broadly rounded.

The *uropoda* (Pl. VIII, fig. 18). The *first pair* reach almost to the apex of the last pair; the peduncle is somewhat broader than that in the male, fully three times as long as broad; the margins are densely fringed with short, slender hairs. The rami as in the male. The *second pair* do not reach fully to the middle of the outer ramus of the last pair; the outer ramus is a little longer than the inner one, and about as long as the peduncle; the margins are fringed with hairs as in the male. The peduncle of the *third pair* is as broad as that of the first pair, densely fringed with short, slender hairs; it is about a third longer than the last coalesced ural segment. The rami as in the male.

The *telson* is about half as long as the peduncle of the last pair of uropoda, and much broader than the same peduncle. The margins are entirely smooth.

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2. *EUIULOPIS MIRABILIS*, C. BOVALLIUS, 1887.

Pl. VIII, fig. 19—33.

**Diagn.** *Caput* paullo hirsutum, segmentis tribus primis peræi longius. Segmenta *peræi* breviter hirsuta, segmenta sex ultima elevata, depressionibus interrupta. Angulus infero-posterior carpi *pedum peræi* primi paris non productus, spina terminali destitutus. Processus carpalis *pedum secundi* paris dimidium metacarpi haud superans, spina terminali destitutus. Pedes parium trium ultimorum duobus præcedentibus longiores. *Pleon* quam *peræon* haud brevius. Rami *pedum uri* lanceolati, marginibus serratis. *Telson* pedunculo *pedum uri* ultimi paris angustius.

The *head* is a little hirsute, longer than the first three peræonal segments together. The segments of the *peræon* are shortly hirsute, the second to seventh segments are elevated, one elevation separated from another by a depression. The lower hinder corner of the carpus of the first pair of *peræopoda* is not produced, and wants a terminal spine. The carpal process of the second pair is about half as long as the metacarpus; it wants a terminal spine. The last three pairs are longer than the two next preceding pairs. The *pleon* is about as long as the *peræon*. The rami of the *uropoda* are lanceolate, with serrated margins. The *telson* is narrower than the peduncle of the last pair of *uropoda*.

**Colour.** Red, with darker spots, especially on the hind part of the body, and on the *peræopoda*, the eyes are deep brown with a metallic lustre.

**Length.** 6—8 mm.

**Hab.** The tropical region of the Pacific, in the Bay of Panamá; taken in 1882 by the author among the Islas de las Perlas, at San José, and in the Bahía de Tycho, Isla del Rey. (F. M.; S. M.)

*Euiulopis mirabilis* is a well defined species, very easily distinguished from the other known species of the genus by the form and armature of the first two pairs of *peræopoda*, and by the form and serration of the rami of the *uropoda*. By this latter characteristic the present species comes nearer to the genus *Hyperia* than *Euiulopis Lovéni* does, and may be looked upon as connecting *Euiulopis* with *Hyperia*. The hair-covering is less spread out over the body, the hairs are much shorter, and, in some parts, more spine-like, than in *E. Lovéni*. Unhappily I have not seen any female specimens, but it is likely enough that the same sexual dimorphism may appear in this species as in the above described one.

The *body* is not compressed, tolerably wide; the hind part of the body is comparatively much longer than in the preceding species, the *pleon* being fully as long as the *peræon*.

The *head* is almost as long as the first three peræonal segments together; it is as broad as long, and about a third more deep than long. The antennal groove commences just at the middle of the front side, and continues on the under side to the buccal region.

The *eyes* occupy the whole surface of the head, forming a distinct right and left eye, separated by a very narrow strip along the top of the head. The ocelli are comparatively smaller and more numerous than in *Euiulopsis Lovéni*; the hair-covering is reduced to minute hairs on the upper parts of the head.

The *first pair of antennæ* (Pl. VIII, fig. 21) in the adult male are as long as the second pair. The first joint of the peduncle is thick, almost globular, a third longer than the two following joints together; the second peduncular joint is three times more broad or thick than long and a little longer than the third joint. The first joint of the flagellum is longer than the whole peduncle, thick at the base, tumid, rapidly tapering towards the apex; the inner and under sides are richly provided with simple, olfactory bristles. The second flagellar joint is more broad than long; the third is more long than broad; the following joints are elongated, increasing in length from the fourth joint, which is four times as long as broad, to the last one, which is tapering, nine times as long as broad. The joints of the flagellum are in all twenty-one in number.

The *second pair of antennæ* (Pl. VIII, fig. 22) are fixed just at the angle between the front and the under side of the head. The first distinct joint of the peduncle is as long as broad; the second joint is more broad than long, the third or last peduncular joint is longer, tapering, a little tumid. The first joint of the flagellum is broad at the base, the following joints are almost equal in length, cylindrical, six to seven times as long as broad. The joints of the flagellum are twenty in number.

The *mouth-organs* are like those in the preceding species.

The *peræon* (Pl. VIII, fig. 20) shows those peculiar elevations on the segments, mentioned above in *Euiulopsis Lovéni*, but here the anterior parts of the second to sixth segments, and the whole seventh segment are elevated; the hinder, depressed parts of the second to sixth segments are about equal in length, each much shorter than half the segment. The first segment is very short, not equalling in length a third of the second one. The sixth segment is the longest of all. The hair-covering on the segments is very dense, but consists of minute hairs; the hairs on the depressed parts of the segments are not shorter than those on the elevations or rolls. These rolls are higher than those in the male of *E. Lovéni*, but not as strongly rounded as those in the female of the same species. Behind the elevated part of the seventh segment there is to be seen a very short depressed part.

The *epimerals* are a little longer than the under margins of the corresponding segments. The epimeral of the first pair is the shortest, about as long as deep; the others are more long than deep, with evenly rounded corners.

The *branchial sacks* are fixed to the second to sixth pairs of peræopoda, they are ovate, shorter than the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. VIII, fig. 23) are smaller and shorter than the second pair. The femur is not three times as long as broad, equalling in length the three following joints together; the front margin is curved at the apex, showing the usual narrow groove; the hind margin is straight. The genu is as long as broad, much shorter than the tibia. The tibia is more long than broad; the hinder lower corner is not produced, rounded and armed with two bristles. The carpus is comparatively narrow, very

long, fully as long as the two preceding joints together; the front margin is feebly curved, the hind margin is almost straight, fringed below with some sharp bristles; the hinder lower corner is not produced, rounded, armed with some few bristles, and narrowly hollowed for the reception of a part of the front margin of the metacarpus, forming a *subcheliform* organ. The metacarpus is considerably shorter than the carpus, broad at the base, tapering towards the apex, a little more than twice as long as broad at the base; the front margin is slightly curved, armed with a row of teeth-like spines; on each side of the joint there are two strong bristles. All the joints are densely covered with minute, stout hairs. Within the joints there are well developed glands. The dactylus is stout, curved, more than half as long as the metacarpus; along the hind margin it is closely set with strong, teeth-like spines; at the hind corner of the base there is a perforated heel, as in the preceding species.

The *second pair* (Pl. VIII, fig. 24—26) reach to the middle of the carpus of the third pair. The femur is exactly as long as the three following joints together, inclusive the carpal process; it is much broader at the apex than at the base, scarcely more than twice as long as broad at the base. The genu is a little more long than broad. The tibia is somewhat longer than the genu, narrow at the base, with bulging sides; the hinder lower corner is nearly rectangular, not produced. The carpus, without the carpal process, is about as long as the two preceding joints together; the front margin is convex, the hind margin a little excavated and armed with stout bristles. The carpal process is well developed, but much shorter than the rest of the joint; the hind margin is almost straight, set with three equidistant, strong bristles; the front side is narrowly hollowed, gouge-shaped, both the edges are closely set with short, spine-like hairs; the outer edge carries also three tolerably long, sharp bristles; the apex of the process is broadly rounded, without terminal spine, but provided with three strong bristles. The front side of the carpal process is only a little longer than half the hind margin of the metacarpus. The metacarpus is broad at the base, tapering, nearly three times as long as broad at the base; the front margin is straight, the hind margin slightly curved, both are closely set with short spines or spine-like hairs; on the hind margin there are also some few bristles; on the outer and inner sides of the joint three very long, strong spines are fixed. The hair-covering of all the joints (Pl. VIII, fig. 25 and 26) is like that of the first pair. The dactylus is slightly curved, armed at the hind margin with some few, teeth-like spines; it is almost half as long as the metacarpus. Glands as in the preceding pair.

The *third and fourth pairs* (Pl. VIII, fig. 27) are equal in length and similar in shape. The femur is more dilated than that of the preceding species, scarcely more than twice as long as broad, and somewhat longer than the femur and tibia of the second pair together; the front margin is very convex, the hind margin is straight. The genu is more long than broad. The tibia is much longer than the genu. The carpus is considerably longer than the tibia; the hind margin is straight, not serrated. The metacarpus is feebly bent, longer than the carpus, and much narrower. The joints of these pairs are less densely covered with hairs than the joints of the first and second pairs. The dactylus is slightly curved, smooth, scarcely equalling a third of the metacarpus; at its base there is an oblong hole, the outlet for the glands which are present in all the joints.

The *fifth, sixth and seventh pairs* (Pl. VIII, fig. 28—31) are equal in length and distinctly longer than the two next preceding pairs. The femur is dilated, that of the fifth pair is almost as broad at the base as at the apex, that of the sixth and seventh pairs is distinctly broader at the base than at the apex, fully twice as long as broad. The genu is somewhat more long than broad. The tibia is longer than the genu. The carpus of the fifth and sixth pairs is about as long as the two preceding joints together, that of the seventh pair is somewhat shorter; the front margin is straight. The metacarpus of the fifth and sixth pairs is a little shorter than the carpus, that of the seventh pair is longer than the carpus; the metacarpus is feebly bent, armed with some few equidistant bristles along the front margin; the hind margin is somewhat convex; the lower end is not dilated. The dactylus equals in length scarcely more than a fourth of the metacarpus; at the front corner of its base there is an outlet for the glands, larger than in the third and fourth pairs. Glands as in the preceding pairs.

The *pleon* is fully as long as the whole peræon; the first segment is somewhat longer than the last two peræonal segments together. The last pleonal segment is a little shorter than the first one; the lateral parts are obtusely rounded. The hair-covering is thin on the first two segments, and almost wanting on the last one.

The *pleopoda* (Pl. VIII, fig. 32) are similar in shape to those in *Euiulopsis Lovéni*, but the tongue-shaped process projecting from the inner lower corner of the peduncle is shorter. The coupling spines and the cleft bristle are like those in the preceding species. The inner ramus of the first pair consists of eleven joints, the outer one of twelve.

The *urus* is as long as the last pleonal segment, almost entirely naked. The first segment is about twice as long as the last coalesced one. The last segment is more broad than long, showing a deep notch on each side, as in the preceding species.

The *uropoda* (Pl. VIII, fig. 33). The *first pair* reach to the apex of the last pair; the peduncle is broad, almost linear, three times as long as broad; the margins are entirely smooth. The rami are lanceolate; the outer ramus is shorter and somewhat narrower than the inner, half as long as the peduncle, the outer margin is smooth, the inner one finely serrated; the inner ramus is serrated along both margins. The *second pair* reach to the middle of the rami of the last pair; the peduncle is narrower than that of the first pair, broader at the apex than at the base; the outer margin is curved, the inner straight; both are smooth. The rami are narrower than those of the preceding pair, equal in length and scarcely longer than half the peduncle; the outer ramus has the outer margin smooth, the inner one serrated; the inner ramus is serrated along both margins. The *third pair*; the peduncle is broader than that of the first pair, about twice as long as broad; the margins are smooth. The rami are lanceolate, equal in length and more than half as long as the peduncle; the outer ramus is smooth on the outer margin and serrated along the inner one; the inner ramus is smooth on the inner margin and serrated along the outer one.

The *telson* is spade-shaped, as long as broad; it is considerably shorter than half the peduncle of the last pair of uropoda, but longer than half the last coalesced ural segment. A broadly rounded process projects from its under side between the bases of the last pair of peduncles.

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Genus 4. **HYPERIA**, LATREILLE, 1823.

**Diagn.** *Caput* magnum, plus minusve globosum. *Perwon* leve, epimeris distinctis instructum. *Pedes perwi* primi paris plus minusve subcheliformes, pedes secundi paris subcheliformes vel eheliformes, carpus dilatatus; carpus primi paris vix productus, vel minus quam carpus secundi paris productus, processus carpi concavus, in formam ligulæ redactus. Carpus pedum tertii ac quarti parium non dilatatus. Pedes parium trium ultimorum longitudine subæquales, duobus præcedentibus non longiores, vel paullo solum longiores. *Pedes uri* plus minusve lati.

The *head* is large, more or less globular. The *perwon* is smooth, with distinct epimerals. The first pair of *perwopoda* are more or less subcheliform, the second pair are subcheliform or cheliform; the carpus is dilated; the carpus of the first pair is not produced, or less produced than that of the second pair, the carpal process is concavated, spoon-shaped. The carpus of the third and fourth pairs is not dilated. The last three pairs are subequal in length, not longer than the two next preceding pairs, or only a little longer. The *uropoda* are more or less broad.

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*Lestrigonus*, H. MILNE EDWARDS. G. M. GILES.

1887. »On six new Amphipods from the Bay of Bengal». Journal of the Asiatic Society of Bengal. Vol. 56. Part 2. Natural History, p. 224.

The typical species of the genus *Hyperia*, is, as mentioned above, the first determinable Hyperiidæan animal recorded in literature. It is the »Marflue under Gopler» or »*Pulex cancriformis antennis brevissimis, corpore latiore*» of H. STRØM, described and delineated in his »Physisk og Oeconomisk Beskrivelse over Fogderiet Søndmør», printed in 1762. The drawing was reproduced in 1818 by LATREILLE<sup>1)</sup>, and cited by H. MILNE EDWARDS<sup>2)</sup> as the type for LATREILLE's generic name *Hyperia*.

The original generic diagnosis of LATREILLE, as cited by DESMAREST in 1823, runs:

»Quatre antennes sétacées. Les dix pieds, proprement dits, médiocrement longs, et tous terminés par un article simple et pointu. Tête assez petite, ronde, plane en devant, point prolongée en rostre. Corps conique, terminé par deux lames triangulaires, alongées, horizontales.»

In 1825 DESMAREST reprinted the same diagnosis. The same year AUDOUIN, quoting LATREILLE and DESMAREST, reproduced it with a few insignificant verbal alterations.

In 1829 LATREILLE gave a new generic description remarkable for his observation that the antennæ were multi-articulate. It is thus probable, or at least possible that he included both the male and the female form in his genus *Hyperia*, the description of which runs:

»Les Hypéries, *Hyperia*, LATR., dont le corps est plus épais en devant; dont la tête est occupée, en majeure partie, par des yeux oblongs et un peu échancrés au bord interne; dont deux des antennes sont aussi longues au moins que la moitié du corps, et terminées par une tige sétacée, longue et composée de plusieurs petits articles.»

This diagnosis in 1836 was translated into German by F. S. VOIGT.<sup>3)</sup>

In 1829 STRAUS-DURCKHEIM gave a good diagnosis of his new genus *Hiella*, which in the following year was recognized by H. MILNE EDWARDS as a synonym for *Hyperia*, LATREILLE. The description seems however to regard only the female:

»Tête hémisphérique, quatre antennes courtes en alène de quatre articles; bouche saillante, composée d'un labre, d'une paire de mandibules, de deux paires de mâchoires et d'une lèvre inférieure terminée par deux lobules; le tronc et l'abdomen chacun de sept segmens mobiles; sept paires de pates ambulatoires, dont quatre dirigées en avant et trois en arrière; une pair de fausses pates à chaque segment abdominal.»

<sup>1)</sup> Crustacés, Arachnides et Insectes». Tableau encyclopédique et méthodique de trois règnes de la nature 24<sup>me</sup> partie, pl. 328, fig. 17—19.

<sup>2)</sup> Le règne animal, distribué d'après son organisation — — —, par GEORGES CUVIER. Edition accompagnée des planches gravées. Paris (1849), p. 172, footnote 1.

<sup>3)</sup> Das Thierreich . . . vom Baron VON CUVIER . . . übers. Von F. S. VOIGT. 4:ter Band, p. 201. Leipzig, 1836.

In 1830 H. MILNE EDWARDS gave the following new diagnosis, accepting the name *Hyperia*, LATREILLE:

»Tête très-grosse et arrondie; thorax renflé et divisé en sept segmens qui ont tous à peu près la même longueur; antennes subulées, sans tige terminale annellée; pattes grêles, non préhensiles et ayant toutes à peu près la même forme; abdomen portant comme d'ordinaire six paires de fausses pattes.»

By this definition he confined the genus to the female forms only instituting at the same time a new genus *Lestrigonus* for a male form of a true *Hyperia*, with the following diagnosis:

»Tête très-grosse et renflée; premier segment du thorax rudimentaire; abdomen plus grand que le thorax; antennes à peu près de même longueur, terminées toutes par une longue tige subulée, multi-articulée. Aucune patte n'est préhensile, mais celles de la seconde paire presentent une espèce de petite main formée par l'antépénultième article, etc., etc.»

It may be observed that not only LATREILLE seems to have noticed the different form of the antennæ in the two sexes, but that MONTAGU<sup>1)</sup> as early as in 1813, when describing »*Cancer Gammarus galba*» expressly called attention to the sexual dimorphism in the form of the antennæ, and in 1824 E. SABINE<sup>2)</sup>, speaking about »*Talitrus Cyaneæ*», recorded and figured both male and female antennæ, not recognizing, however, the sexual difference. Particulars of these early, but valuable, descriptions will be found below under »*Hyperia galba*» and »*H. medusarum*». Thus it was H. MILNE EDWARDS who gave rise to the misunderstanding of the sexual forms of *Hyperia*, which have caused so much difficulty that the matter has remained an open question among carcinologists up to the present time.

In 1838 H. MILNE EDWARDS gave generic diagnoses of *Hyperia* and *Lestrigonus*, without adding any new characteristics. In 1840 he gave a new, elaborate and excellent description of *Hyperia*; this description however contains many purely specific characteristics relating to *Hyperia Latreillei*; these specific characteristics will be accounted for below under that species. At the same time he repeated his former description of *Lestrigonus*. It must be noticed that he (l. c. p. 77) described as belonging to *Hyperia* a new species *H. Gaudichaudii*, with the characteristic: »*Antennes égales et terminées par un filet multi-articulé assez long pour atteindre le quatrième segment du thorax*», but according to his view he ought rather to have ranged it in the genus *Lestrigonus*, as SPENCE BATE subsequently did in his »*Catalogue*». <sup>3)</sup>

I quote here a part of his generic description:

»— — La tête est très-grosse, renflée et verticale; les yeux en occupent la plus grande partie, et present un grand nombre de petites facettes ou cornéules, au milieu de chacune des-

<sup>1)</sup> »GEORGE MONTAGU. Descriptions of several new or rare Animals, principally marine, discovered on the South Coast of Devonshire.» Transactions of the Linnean Society of London. Vol. 11, part 1, p. 4. (Here I may remark that the author confounds the sexes, calling the male female, and vice versa.)

<sup>2)</sup> E. SABINE. »Invertebrate Animals», in A supplement to the appendix of Captain PARRY's voyage for the discovery of a North-West passage in the years 1819—20. Containing an account of the subjects of Natural History, p. CCXXXIV. London, 1824, 4:to.

<sup>3)</sup> C. SPENCE BATE. Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 289.

quelles ou distingue un petit renflement lenticulaire. A la face antérieure de la tête on remarque une fossette assez profonde dans laquelle s'insèrent les *antennes*. Celles de la première paire naissent près de la ligne médiane, à peu près au niveau du milieu des yeux et de l'articulation des pièces épimériennes, avec les pièces tergaux des anneaux thoraciques; ces organes sont placés, par conséquent, très-loin du sommet de la tête; ils sont très-courts, styloïdes, et composés de quatre articles dont le premier est cylindrique est assez développé, les deux suivans rudimentaires, et le dernier plus long que les trois précédens réunis, et en général non annelé. Les antennes inférieures, insérées à quelque distance au-dessous des supérieures; et près du bord inférieur de la tête, sont à peu près de la même longueur et de la même forme que celles de la première paire; seulement leur premier article est presque globuleux. — — — Les pattes sont de médiocre grandeur, et aucune d'elles n'est clypéiforme; toutes sont étroites, un peu crochues, et terminées par un ongle aigu. — — — Les pattes suivantes (de la troisième à la septième paire) sont également non préhensiles, et portent comme ces dernières (les pattes de la seconde paire), au côté interne de leur base, chacune un grand appendice vésiculeux, membraneux et aplati, qui chez le mâle pend jusqu'au niveau de leur second article; et qui chez la femelle, et relevé contre le thorax de manière à former une poche pour recevoir les oeufs. Les trois premiers anneaux de l'*abdomen* sont grands et portent des fausses pattes natatoires, dont le pedoncule est très-large et dont les lames terminales sont allongées, ponctuées, striées en travers et dentelées sur les bords, comme si elles étaient multi-articulées, et garnies sur les bords de long poils ciliés à la manière d'une plume. Le quatrième anneau de l'*abdomen* est brusquement recourbé en bas, et les deux suivans sont peu développés et soudés entre eux; l'espèce de queue ainsi formée est terminée par une petite lame horizontale et présente de chaque côté trois fausses pattes qui se recouvrent l'une l'autre de façon à constituer une sorte de nageoire caudale, et qui sont formées par un grand pedoncule allongé et deux petites lames terminales de forme lanceolée.»

From this description it seems probable that H. MILNE EDWARDS had also seen young males, and it is also clear that he had already observed the fusion of the second and third ural segments.

In 1841 GOULD recorded a Hyperid with multi-articulate flagellum which had been taken together with *Hyperia galba*, saying that it might be either a *Hyperia* or a *Hieraconyx*, GUÉRIN.

In 1849 NICOLET gave the following diagnosis of the genus:

»Corpus gibbosum, latum, anterius obtusum, posterius fortiter angustatum. Caput crassissimum, inflatum, verticale. Oculi magni, compositi. Antennæ minimæ in fossula capitis insertæ. Mandibulæ robustæ, palpigeræ, duabus cristatis masticatoribus terminatæ. Thorax septem annulatus. Pedes mediocres, angustati, ungue acuto terminati. Abdomen tribus primis segmentis magnis, appendicibus natatoribus elongatis munitis. Segmento quarto fortiter curvato, duobus ultimis caudiformibus.»

In 1849 and 1851 LUCAS repeated the descriptions of the two genera given by H. MILNE EDWARDS in 1830.

In 1852 DANA<sup>1)</sup> gave the following short diagnoses in Latin:

»*Lestrigonus*, EDW. Antennæ 1mæ 2dæque flagello longo confectæ. Pedes 1mi 2dique paulo prehensiles», and

»*Hyperia*, LATR. Antennæ 1mæ 2dæque conspicuæ, 2dis gracilioribus. Pedes 2di sæpiusque 1mi subprehensiles, manibus multum imperfectis, articulo 4to ad apicem inferiorem paulo producto tantum.»

He also gave the following more dilated descriptions of the genera:

»*Lestrigonus*, EDWARDS. The thorax in this genus is short and tumid; often the first segment is more or less concealed, and the following two or three are quite short. The head is large

<sup>1)</sup> In »United States Exploring Expedition. Crustacea.» Vol. 2, p. 980. We find the same description in his paper in the American Journal of Science and Arts. Second Series. Vol. 14.

and rounded, but usually obliquely truncated in front, about the base of the antennæ. Nearly the whole is covered with hexagonal facets, and the pigment constitutes a large dark-coloured mass, about half as long as the height of the head. The upper antennæ have the base rather stout and geniculated at the second articulation; the part of the base beyond is ciliate on the lower side. The flagella of both pairs of antennæ are long and very slender. The abdomen consists of seven segments; but the last three are more or less soldered together, being marked in outline by sutures. Of the three pairs of stylets, the first and third extend about equally far backward, while the second pair falls short of this distance. The six posterior legs are slender and subequal, and end in a slender claw; the third and fourth pairs are equally slender and subequal; the first and second are much the smallest.

These animals move with very quick motion, with head down, turning over and over.»

»*Hyperia*, LATREILLE. The *Hyperia* occur principally in the colder temperate and frigid zones. The species have usually a tumid cephalothorax, rounded above; but, in one species, it is much compressed, and rises above to an edge. The four anterior thoracic legs are much shorter than in the others, and the second pair with usually the first, is subprehensile. This prehensile character is produced by a prolongation of the lower apex of the fourth joint, the fifth and sixth constituting the moveable finger. This finger, exclusive of the claw, or sixth joint, is commonly much longer than the process against which it plays; yet the transition appears to be so gradual to species in which the finger is short, and the hand well formed, that we have doubted the propriety of sustaining the genus *Metoecus*, of KRÖYER, based on this distinction, — that is, on having well-formed hands terminating the second pair of feet. In our *Hyperia trigona* the legs of the first pair are not at all prehensile, the lower apex of the fourth joint not projecting.»

From the above it is clear not only that DANA retained the genus *Lestrignonus* at the side of *Hyperia*, but also that he included in this latter genus the forms now transferred to the genus *Parathemisto*, A. BOECK.

SPENCE BATE was the next author who, in 1862, gave new diagnoses of *Hyperia* and *Lestrignonus*, and he suspected that the two genera were only sexually different, as will be seen from the quotation below, but still he retained the latter genus. His diagnoses run:

»*Lestrignonus*. Cephalon large, deeper than broad. Pereion short; segments subequal, three times as deep as long. Pleon longer than the pereion; first three segments long and deep; fifth very short. Eyes large, occupying the entire lateral walls of the cephalon. Antennæ longer than the cephalon, subequal, having articulate flagella. Mandibles having an appendage. Gnathopoda completely subchelate. Pereiopoda subequal. Pleopoda biramous. Telson squamiform, simple.»

»*Hyperia*. Cephalon large, deeper than broad. Eyes large, occupying most of the lateral, and encroaching considerably upon the frontal walls of the cephalon. Antennæ subequal, short. Gnathopoda subuniform, complexly subchelate, having the carpi produced inferiorly, and forming a process to antagonize with the extremities of the dactyla. Pereiopoda subequal and moderately robust. Three posterior pairs of pleopoda biramous. Telson squamiform.

»The separation of *Hyperia* from *Lestrignonus* is very doubtful, and depends only upon the length of the flagella of the antennæ; in each genus this is so variable, that it is difficult to say where *Lestrignonus* ends, and *Hyperia* commences. In both genera the first articulus consists of several articuli, coalesced together. I have a strong suspicion that they will be found to be sexually rather than generically distinct. They are frequently met with associated; and I am not aware that a single female of *Lestrignonus* has been recorded, while all the specimens of which I have been able to detect the sex in *Hyperia* have been females.»

The definitions of the genus *Hyperia* given by the predecessors to SPENCE BATE, were all too wide as they admitted species belonging to other Hyperiidæan genera, but on the other hand the definition given by SPENCE BATE was too narrow because the characteristic »*Gnathopoda subuniform, complexly subchelate, having the carpi produced*

*inferiorly*» etc., excludes just the type-species *Hyperia medusarum*, and some other good species from the genus. SPENCE BATE also wrongly attached as synonyms to *Hyperia* the genus *Tauria*, DANA, and *Metoecus*, KROEYER.

In 1868 he and WESTWOOD gave diagnoses of *Lestrigonus* and *Hyperia* almost in the same terms as in 1862 though with an important alteration with regard to the first pair of peræopoda, saying »*first pair nearly simple, the second complexly subchelate*». They had the same suspicions as to the relation of *Hyperia* and *Lestrigonus* which occurred to SPENCE BATE in 1862, but still they maintained *Lestrigonus* as a genus by itself.

A. GOËS in 1865, was the first<sup>1)</sup> who took *Lestrigonus* to be synonymous with, and a male form of *Hyperia*. He was followed in 1869 by A. MERLE NORMAN, and in 1870 by A. BOECK who gave a good diagnosis of the genus *Hyperia* in its true limitation<sup>2)</sup>:

»— — — Antennæ perfectæ, superioris pedunculo perbrevis, 3articulato; flagello apud marem multiarticulato et longiore, apud feminam perbrevis, articulis carenti.»

»Pedes 1mi et 2di paris manu subcheliformi carentes; carpo in angulo inferiore posteriore in calcem brevem producto; manu apicem versus attenuata. Pedes 3tii et 4ti paris articulo 4to perbrevis, non dilatato. Pedes trium parium ultimorum breves, invicem ferme eadem longitudine; articulo 1mo subdilatato.»

As a synonym for *Hyperia* he erroneously cited *Tauria*, DANA. In 1872 he repeated the above diagnosis, saying expressly that the difference between *Hyperia* and *Lestrigonus* is only sexual, the latter being the male of the former.

CLAUS gave in his »Grundzüge der Zoologie», in 1875, the following generic description of *Hyperia*:

»Beide Antennenpaare beim Weibchen ziemlich kurz, beim Männchen (*Lestrigonus* EDW.) mit longer vielgliedriger Geißel. Die beiden vordern Beinpaare schwächig und mit schwacher Greifhand. Die drei hintern Beinpaare von gleicher Gestalt.»

In 1877 STREETS<sup>3)</sup> strongly argued that *Hyperia* and *Lestrigonus* were different genera, misled by the discovery of what he supposed to be a new species of *Hyperia*, with male and female having short uni-articulate flagellum of the first pair of antennæ. The animal in question, however, belonged not to the family Hyperiidæ but to *Cylopodidæ* (see above p. 19).

In 1885 CARUS gave a short diagnosis of *Hyperia*, probably translated from that of CLAUS in 1875; it runs:

»*Hyperia*, LATR. (♀; ♂ *Lestrigonus*, M. EDW., incl. *Metoecus*, KR.) Antenna utraque in ♀ sat brevis, in ♂ flagello longo pluriarticulato; pedes I. et II. graciles, manu debili prehensili, pedes tres posteriores forma æqua.»

<sup>1)</sup> In fact FR. MÜLLER had pronounced the same opinion the preceding year speaking about his new species *Hyperia (Hyperoche) Martinezii*, (see above p. 108), but as this animal does not belong to the genus *Hyperia* I cannot cite him here.

<sup>2)</sup> The first part of the diagnosis here quoted is with full right placed by BOECK in the diagnosis of the family *Hyperidæ* and cited here only to show that he fully understood the question.

<sup>3)</sup> TH. H. STREETS »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. No 7. 1877, p. 127.

The following year GERSTAECKER described the genus as follows:

»Kopf plump kuglig gewölbt oder vorn abgeflacht. Männliche Fühler mit sehr langer, fadenförmiger, weibliche mit kurzer, *enggliedriger* Geissel. Kiefertaster mit schmal sichelförmigem Endgliede. Sieben freie und am Länge wenig verschiedene Mittelleibsringe. Beine mit deutlich abgesetztem Hüftgliede, bald nicht von auffallend verschiedener Länge, bald die beiden vorderen Paare beträchtlich kürzer und die drei hinteren ansehnlich länger als das dritte und vierte. Die beiden ersten Paare entweder gleich allen folgenden mit einfacher Endklaue oder mit schwach ausgebildeter Greifhand. Die Spaltbeine der drei vergrößerten vorderen Hinterleibsringe mit langen, geisselförmigen Aesten. Weibchen sehr viel plumper und besonders im Bereich des Mittelleibs bauchiger als die Männchen.»

As synonyms to *Hyperia* he gave *Hiella*, STRAUS, and *Lestrigonus*, M. EDW., as male forms, and *Metoeucus*, KROEYER, and *Tauria*, DANA, as female forms.

In 1887 I gave a short generic diagnosis, which was quoted by STEBBING in the following year.

In 1888 too GILES, acknowledging *Hyperia* and *Lestrigonus* to be one and the same genus, claimed *Lestrigonus* as the proper name for the genus, though without giving his reasons.

The first described species belonging to *Hyperia* was, as I have already said, *Cancer Medusarum*. It was named in 1776 by O. F. MÜLLER<sup>1)</sup> from the description and drawing of HANS STRØM, and possibly also from specimens collected by STRØM. This species was however not recognized by subsequent authors for more than hundred years, and the name was made a synonym for various other species of *Hyperia* and allied genera, as will be seen from the more detailed account of it below under »*Hyperia medusarum*». The next new species was *Cancer Gammarus galba*, described by MONTAGU in 1813 from the coast of Devonshire, recorded below as *Hyperia galba*. Then comes the name *Hyperia Sueurii*, LATREILLE, first published by DESMAREST in 1823<sup>2)</sup> but never, as far as I know, accompanied by any specific description. From the quotations of LATREILLE, DESMAREST, and H. MILNE EDWARDS, I am inclined to believe that the name was simply applied to the figure of STRØM's »Marflue under gopler», which was reproduced by LATREILLE as mentioned above (p. 134), and in this case *Hyperia Sueurii* would be only a synonym for *Hyperia medusarum*, O. F. MÜLLER. The following year SABINE<sup>3)</sup> described *Talitrus Cyanæ*, which doubtless is synonymous with *Hyperia medusarum*, O. F. MÜLLER. The next addition was *Hiella Orbigny*, named by STRAUS DURCKHEIM in 1829, this is in my opinion, a synonym of *Hyperia galba*, MONTAGU.

In 1830 H. MILNE EDWARDS founded two new species *Hyperia Latreillei*, and *Lestrigonus Fabrei*, the latter recorded below as *Hyperia Fabrei*.

*Hyperia pedestris* described in 1836 by GUÉRIN-MÉNEVILLE<sup>4)</sup> belongs not to *Hyperia* but is a *Paraphronima*, as proved above (p. 24).

In 1838 KROEYER described a new species *Lestrigonus exulans* from Greenland; it is probably synonymous with *Hyperia galba*, but as the original description is very in-

<sup>1)</sup> O. F. MÜLLER. Zoologiæ Danicæ Prodomus, p. 196.

<sup>2)</sup> A. G. DESMAREST. »Malacostracés.» Dictionnaire des Sciences naturelles. Tome 28<sup>me</sup>, p. 347.

<sup>3)</sup> E. SABINE. »Invertebrate Animals», in A supplement to the appendix of Captain PARRY's voyage, etc., p. CCXXXIV.

<sup>4)</sup> F. E. GUÉRIN MÉNEVILLE. Iconographie du Règne Animal de GEORGES CUVIER. Crustacés, p. 22.

complete it is impossible to prove this with any degree of certainty. On the same occasion he proposed the new name *Hyperia oblivia* for a Hyperid, which however certainly is a *Parathemisto*.

H. MILNE EDWARDS in 1840 gave an elaborate description of *Hyperia Latreillei* and proposed a new species with the name *H. Gaudichaudii*.

DANA in 1852 in his fundamental work »Crustacea of the United States Exploring Expedition 1835—42» described three new species under the generic name *Lestrignus* and two new ones under the name *Hyperia*. Of the former *Lestrignus ferus* is probably a *Hyperia*, here below recorded as *H. fera*, DANA; the second, *Lestrignus fuscus*, is a *Themistella*, described below as *T. fusca*, DANA; the third, *Lestrignus rubescens*, is most likely a *Parathemisto*, given as *P. rubescens*, DANA, below; moreover he described with some hesitation as *Lestrignus Fabrei*, H. MILNE EDWARDS, an animal which is not identical with that species, but is here renamed as *Hyperia Danae* n. n. Of the two species ascribed to the genus *Hyperia* the first is a true *Hyperia*, *H. agilis*, the second *H. trigona* is a distinct *Parathemisto*, given as *P. trigona*, DANA, below.

COSTA in 1857<sup>1)</sup> described a new species, *Hyperia pupa*, which if it belongs to the family Hyperiidæ at all, probably may be a *Themistella*, but the description is so meagre that it is very uncertain if I am right in this supposition, and it is possible that STEBBING is right in interpreting it as a Lycæid (l. c. p. 299).

In 1861 A. BOECK instituted two new species. The first, *Hyperia spinipes*, is undoubtedly a synonym for *Hyperia medusarum*, O. F. MÜLLER, the second, *Lestrignus Boeckii*, was withdrawn by the author himself, who in 1872 made it synonymous with *Hyperia medusarum*, but it is probably identical with *Hyperia Latreillei*, as will be seen below.

SPENCE BATE in 1862 recorded and figured all previously described species of *Hyperia* and *Lestrignus*, but unfortunately he was not very successful in his identifications and thus gave rise to a great confusion in the nomenclature, and for this reason I think it necessary to make a revision of his species and to place them under their right names. The first species mentioned *Lestrignus exulans*, KROEYER, is possibly identical with KROEYER'S species, and most likely synonymous with *Hyperia galba*, MONTAGU. The second species *Lestrignus Gaudichaudii*, H. MILNE EDWARDS, is probably the true *Hyperia Gaudichaudii*. The third, *Lestrignus Kinahani*, n. sp., is, as far as it is possible to judge from the meagre description and the rough drawing synonymous with *Hyperia Latreillei*. The fourth species *Lestrignus rubescens*, DANA, is certainly not identical with DANA'S species, which I above supposed to be a *Parathemisto*, but a true *Hyperia*, nearly related to *H. Latreillei*, but according to the description of SPENCE BATE a distinct species, given below as *Hyperia Normani*, n. n. The fifth species, *Lestrignus Fabreii*, H. MILNE EDWARDS, is not identical with MILNE EDWARDS' species, but with that of DANA, the description and drawing being copied from him, and for this reason I give it below as a synonym of *Hyperia Danae*. Of the sixth and seventh species, *Lestrignus ferus*, DANA, and *L. fuscus*, DANA, both descriptions and drawings are copied from DANA, and thus

<sup>1)</sup> ACHILLE COSTA. »Ricerche sui crostacei Amfipodi del regno di Napoli.» Memorie della Reale Accademia de Scienze di Napoli. Vol. 1, p. 165, pl. 4, fig. 11.

they are, according to what is said above, synonymous the former with *Hyperia fera*, DANA, the latter with *Themistella fusca*, DANA. The eighth species *Hyperia galba*, MONTAGU, is not *H. galba* but *H. Latreillei*, H. MILNE EDWARDS, though it must be remembered that SPENCE BATE cited *H. Latreillei* as a synonym of his species. The ninth species *Hyperia Cyaneæ*, SABINE, is certainly not identical with the species described by SABINE, as I have had occasion to mention in a previous paper<sup>1)</sup> but synonymous with *Euthemisto Nordenskiöldi*, C. BOVALLIUS. As a synonym of *Hyperia Cyaneæ* he erroneously cites »*Metoechus Cyaneæ*, MILNE EDWARDS, 1840», but this author says only that *Talitrus Cyaneæ*, SABINE »semble se rapprocher davantage des *Métoéques*, mais devra peut-être former un genre particulier.» The tenth species, *Hyperia Medusarum*, O. FABRICIUS, and KROEYER, is possibly identical with O. FABRICIUS' species, but certainly widely different from KROEYER's, and most likely synonymous with *H. galba*, MONTAGU. The eleventh species, *Hyperia macrocephala*, DANA, is above (p. 80) shown to be generically distinct from *Hyperia* and to be properly named *Tauria macrocephala*, DANA. The twelfth species, *Hyperia agilis*, DANA, is with regard to the description as well as to the drawing a copy from DANA, and bears its proper name. The thirteenth species, *Hyperia trigona*, DANA, is specifically different from DANA's species, but also a *Parathemisto*, recorded here below as *P. Batei*, n. n. The fifteenth species *Hyperia oblivia*, KROEYER, is not identical with KROEYER's species, and belongs not to *Hyperia*, but is a *Parathemisto*<sup>2)</sup> given below as *P. gracilipes*, NORMAN. The sixteenth, *Hyperia pupa*, COSTA, is according to the very incomplete description translated from COSTA, very difficult to determine, but probably it belongs, as mentioned above (p. 140), to the genus *Themistella*. The seventeenth and last species *Hyperia Lesueurii*, LATREILLE, I have already supposed to be a synonym for *Hyperia medusarum*, O. F. MÜLLER, and the description is a translation from DESMAREST.

The reasons for my transposition of the species of SPENCE BATE to the above specific names will be given below under each of these species.

FRITZ MÜLLER in 1864 instituted the new species *Hyperia Martinezii*, but it is proved above (p. 108), to be a *Hyperoche*.

GOËS in 1865 recorded *Hyperia exulans*, KROEYER from Spitzbergen, but it is according to my examination *Hyperia Latreillei*. He also mentioned a variety of *H. exulans*, which is the true *Hyperia medusarum*, O. F. MÜLLER; lastly he gave as *H. medusarum*, KROEYER, a species which is identical with *Hyperoche Luetkeni*, C. BOVALLIUS, (see above, p. 88 and 90). In the same year COSTA<sup>3)</sup> proposed the name *Lestrigonus mediterraneus* for a new species, but with so few and insignificant characteristics that it is quite impossible to judge of its identity.

In 1868 SPENCE BATE and WESTWOOD enumerated the following British species of *Lestrigonus* and *Hyperia*. *Lestrigonus exulans*, KROEYER, = *Hyperia galba*, MONTAGU; *Lestrigonus Kinahani*, SPENCE BATE, = *Hyperia Latreillei*, H. MILNE EDWARDS; Hy-

1) C. BOVALLIUS. »Arctic and Antarctic Hyperids». Vega-Expeditionens Vetenskapliga Iakttagelser. Band 4, p. 561.

2) In my »Systematical list of the Amphipoda Hyperidea», (p. 21). I named it *Parathemisto longipes* not being then aware of the fact that the Rev. A. MERLE NORMAN as early as in 1869 in a footnote to his »Shetland Final Dredging, Report, Part II», p. 287, had proposed for it the new name *Hyperia gracilipes*.

3) ACHILLE COSTA. »Sopra una specie mediterranea del genere *Lestrigonus*». Rendiconto dell'Accademia delle scienze fisiche e matematiche. Anno 4<sup>to</sup>, p. 34.

peria galba, MONTAGU, according to my opinion the true species, but not identical with the *H. galba* of SPENCE BATE's Catalogue, (see above, p. 141); and lastly *Hyperia oblivia*, KROEYER = *Parathemisto gracilipes*, NORMAN; and in the appendix: *Hyperia tauriformis*, n. sp., and *H. prehensiles*, n. sp., both, as shown above (p. 93 and 115), belonging to the genus *Hyperoche*, and *Hyperia Cyaneæ*, SABINE = *Euthemisto Nordenskiöldi*.

In 1869 TH. EDWARD<sup>1)</sup> the ardent and devoted zoologist<sup>2)</sup> of Banff, proposed a new species, *Hyperia minuta*, but which he himself probably dropped, as he does not mention it in his list of Banffshire Crustacea.

In the same year NORMAN reported *Hyperia galba*, MONTAGU, from the Shetland Isles and *Hyperia oblivia*, KROEYER, = *Parathemisto oblivia*, KROEYER, and on the same occasion he proposed, as mentioned above, the name *Hyperia gracilipes* for *H. oblivia*, SPENCE BATE.

In 1870 and 1872 A. BOECK included under the name *Hyperia Medusarum*, O. F. MÜLLER, a vast number of the above enumerated species, but not the true one, his own *Hyperia spinipes*. According to his description and drawing his *H. medusarum* is nothing but a synonym for *H. Latreillei*. His *H. spinipes* is of course the true *H. medusarum*, O. F. MÜLLER.

STREETS in 1877<sup>3)</sup> cited *Lestrigonus rubescens*, DANA, from the Pacific, quoting also SPENCE BATE for it; but as he had not recognized the specific difference between DANA's and SPENCE BATE's *L. rubescens*, it is quite impossible to decide if the specimen examined by him was a *Hyperia* or a *Parathemisto*. As to his *Hyperia tricuspidata*, see above (p. 20).

In the following year SPENCE BATE<sup>4)</sup> described a new species, *Lestrigonus spinidorsalis*, which name he later changed into *Hyperia spinidorsalis*, though it is no *Hyperia*, but probably identical with *Parathemisto compressa*, GOËS.

In 1885 CARUS gave diagnoses in Latin of the two Mediterranean species, *Hyperia pupa*, previously established by COSTA, as to the systematical place of which see above, (p. 140), and *H. mediterranea*.

In the same year I proposed the name *Hyperia Kroeyeri* for *Tauria medusarum*, KROEYER (see above, p. 85).

In 1887 GILES established a new well defined species *Lestrigonus bengalensis*, recorded below as *Hyperia bengalensis*, GILES.

Lastly in 1888 STEBBING instituted the following new species, giving very good descriptions and drawings, *Hyperia sibaginis*, *H. luzoni*, *H. promontorii*, *H. dyschistus*, and *H. schizogeneios*. He further gave an elaborate description and a good drawing of *H. Gaudichaudii*, H. MILNE EDWARDS.

<sup>1)</sup> TH. EDWARD. »Stray notes on the smaller Crustaceans. Note I. On the Habits &c. of the Hyperiidæ. »The Journal of the Linnean Society of London. Zoology. Vol. 9, p. 144.

<sup>2)</sup> TH. EDWARD. »Selections from the Fauna of Banffshire», in Life of a Scotch Naturalist by SAMUEL SMILES. London 1879.

<sup>3)</sup> TH. H. STREETS. »Contributions to the Natural history of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. No 7. 1877, p. 125.

<sup>4)</sup> C. SPENCE BATE. »Two new Crustacea from the coast of Aberdeen». Ann. and Mag. of Nat. Hist. Fifth Ser. Vol. 1. 1878, p. 411, fig. 2.

After summing up and valuing the characteristics of all the above enumerated species we have thus left fifteen good species and two doubtful ones, which follow here in chronological order:

<i>Hyperia medusarum</i> , O. F. MÜLLER,	? <i>H. mediterranea</i> , COSTA,
<i>H. galba</i> , MONTAGU,	? <i>H. minuta</i> , TH. EDWARD,
<i>H. Latreillei</i> , H. MILNE EDWARDS,	<i>H. bengalensis</i> , GILES,
<i>H. Fabrei</i> , H. MILNE EDWARDS,	<i>H. sibaginis</i> , STEBBING,
<i>H. Gaudichaudii</i> , H. MILNE EDWARDS,	<i>H. luzoni</i> , STEBBING,
<i>H. fera</i> , DANA,	<i>H. promontorii</i> , STEBBING,
<i>H. Danaë</i> , n. n.,	<i>H. dysschistus</i> , STEBBING, and
<i>H. agilis</i> , DANA,	<i>H. schizogeneios</i> , STEBBING.
<i>H. Normani</i> , n. n.,	

To this number I am adding the descriptions of some new species, *Hyperia hystrix*, *H. spinigera*, *H. crucipes*, *H. thoracica*, *H. latissima*, and *H. Gilesi*.

The sexual difference within the genus is shown:

1. In the general form of the body, the males being more slender and having the hind part of the body comparatively longer.
2. In the length of the head, the head of the female being usually somewhat shorter and broader than that of the male.
3. In the form of both pairs of antennæ, those of the males being more or less elongated and provided with a multi-articulate flagellum, those of the female being short with the flagellum composed of one or very few joints. I may venture the supposition that this reduced form of the female antennæ is connected with the habit which the females, at least of most species of the genus *Hyperia* as well as of other genera of the family, have of living within yellowfishes or other pelagic animals.
4. In the form of the uropoda, those of the female being often somewhat shorter than those of the male.

Among the species of *Hyperia* we find many with some of the peræonal segments coalesced on the dorsal side. At first I believed that this feature depended upon the age of the animals in question, supposing those with coalesced peræonal segments to be young and not fully developed individuals. But a further investigation into the matter has made me inclined to look upon them as adult animals, and, at least with regard to some of them, as good species. The reasons why I think so are:

1. The young ones of species of *Hyperia*, with seven free peræonal segments, as for instance *H. medusarum*, *H. Latreillei*, *H. spinigera* and *H. Gaudichaudii*, have when leaving the egg seven distinct peræonal segments, the sutures between the segments being plainly visible on the dorsal side as well as at the lower margin of the peræon.

2. The young ones of species of *Hyperia*, with two or more peræonal segments coalesced, as far I have had opportunity of observing them, leave the egg with as many peræonal segments coalesced, as the adult animal shows. Thus I have seen young ones of *Hyperia Fabrei* with the first two peræonal segments coalesced, young ones of *H. crucipes* with the first three segments coalesced, and lastly young ones of *H. thoracica* with the first five segments thus united.
3. I have seen and examined ovigerous females and females with newly hatched young ones, enclosed between the ovitetrices, of the following species and with the characteristics assigned to them below, *Hyperia crucipes*, *H. thoracica* and *H. latissima*.
4. I have examined males of *Hyperia Fabrei* and *H. promontorii* with the antennæ as well developed as in the adult males of the larger species, *H. Latreillei*, *H. galba* and *H. spinigera*, and the former must thus be regarded as adults, just as much as the latter; (both of the former species had the first two peræonal segments coalesced).
5. We have homologies, that is to say persisting coalesced peræonal segments, from other Hyperiidæan genera as *Thaumatops*, *Phronimopsis*, *Dairella*, *Phronima*, *Phronimella* and *Phrosina*.
6. If this coalescence were only a stage in the growth of the individual it seems very difficult to explain why the sutures between segments so enormously enlarged as those composing the balloon-like peræon of *Mimonectes* should not be obliterated and the segments thus be united into a smooth surface as they are in a *Hyperia thoracica*.

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The glands in the joints of the peræopoda occur in all the species, but occupy different places in different species and show many peculiarities in the form of the outlets, these outlets usually occurring on a bulb-like enlargement of the base of the dactylus. In some cases the concave side of the dactylus is channelled so as to conduct the secretion to the very tip of the dactylus and thus transfer it to other places. Sometimes the outlet is covered by a cross-shaped projection from the base of the dactylus, as in *Hyperia crucipes*, and sometimes the dactylus is entirely transformed performing the function of a spout. Such transformations occur for instance in the third pair of peræopoda of *H. latissima* and in the seventh pair of *H. medusarum* and of *H. crucipes*. These peculiar organs will be discussed in the third or morphological part of this treatise.

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For distinguishing the many species of the genus *Hyperia*, I have found the following characteristics to be most useful.

1. The form of the head, if more or less *rounded* — or *produced downwards* into a broad or pointed process.
2. The peræonal segments, if *all free* — or *some of them coalesced*.
3. The form of the carpus of the first and second pairs of peræopoda, if only *a little produced* — or *much produced*.

4. The armature of the metacarpus of the first and second pairs of peræopoda, if *smooth* on the hind margin — or *serrated*; if more or less thickly *set with bristles* — or *naked*.
5. The carpus of the third and fourth pairs, if *smooth*, — *set with bristles* — or *serrated*.
6. The carpus and metacarpus of the fifth to seventh pairs, if *smooth*, — or *serrated*.
7. The peduncle of the last pair of uropoda, if *broad* — or *narrow*.
8. The relation of the telson to the *last ural segment*, and to the *breadth* and the *length* of the peduncle of the last pair of uropoda.

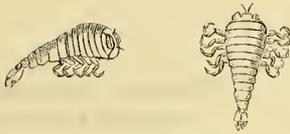
The following synoptical table will show the systematical order of the species according to my views as to their mutual relations.

- A.** All the peræonal segments are distinct, free.
- a 1.** The metacarpus of the first and second pairs of peræopoda is densely covered all over with longer or shorter bristles. The carpus also of the third and fourth pairs is thickly set with bristles.
- aa 1.** The dactylus of the first pair of peræopoda is shorter than the surrounding bristles. The bristles are very long ..... **1. II. medusarum.**
- aa 2.** The dactylus of the first pair of peræopoda is much longer than the surrounding bristles. The bristles are very short, spine-like ..... **2. II. hystrix.**
- a 2.** The metacarpus of the first and second pairs of peræopoda is sparingly provided with bristles on the sides. The carpus of the third and fourth pairs without bristles or with few.
- aa 3.** The first peræonal segment is shorter than or equal to the second in length.
- aaa 1.** The front side of the carpal process of the first pair of peræopoda is not more than half as long as the hind margin of the metacarpus.
- aaaa 1.** The uropoda are broad and stout.
- aaaaa 1.** The telson is more than half as long as the peduncle of the last pair of uropoda ..... **3. II. Latreillei.**
- aaaaa 2.** The telson is not half as long as the peduncle of the last pair of uropoda.
- aaaaaa 1.** The hind margin of the metacarpus of the first two pairs of peræopoda is serrated, but not notched, nor fringed with spines.
- aaaaaaa 1.** The front side of the carpal process of the first pair of peræopoda is much shorter than half the hind margin of the metacarpus.
- aaaaaaaa 1.** The serration on the hind margin of the metacarpus of the first pair of peræopoda consists of simple teeth..... **4. II. Gaudichaudii.**

- aaaaaaaaa 2. The serration on the hind margin of the metacarpus of the first pair of peræopoda consists of three-pointed teeth ..... 5. *H. galba*.
- aaaaaaa 2. The front side of the carpal process of the first pair of peræopoda is half as long as the hind margin of the metacarpus ..... 6. *H. Normani*.
- aaaaaa 2. The hind margin of the metacarpus of the first two pairs of peræopoda is notched and fringed with long spines ..... 7. *H. spinigera*.
- aaaa 2. The uropoda are narrow and slender.
- aaaaa 3. The last five pairs of peræopoda are sparingly provided with short hairs ..... 8. *H. agilis*.
- aaaaa 4. The last five pairs of peræopoda are naked ..... 9. *H. fera*.
- aaa 2. The front side of the carpal process of the first pair of peræopoda is more than half as long as the hind margin of the metacarpus ..... 10. *H. bengalensis*.
- aa 4. The first peræonal segments is much longer than the second one.... 11. *H. sibaginis*.
- B.** The first peræonal segment is free, the second, third, fourth and fifth coalesced, the last two free ..... 12. *H. dyschistus*.
- C.** The first and second peræonal segments are coalesced, the following free.
- c 1. The carpus of the first pair of peræopoda is only a little dilated and scarcely produced.
- cc 1. The telson is not more than half as long as the peduncle of the last pair of uropoda ..... 13. *H. Fabrei*.
- cc 2. The telson is much more than half as long as the peduncle of the last pair of uropoda ..... 14. *H. luzoni*.
- c 2. The carpus of the first pair of peræopoda is very dilated and distinctly produced ..... 15. *H. promontorii*.
- D.** The first three peræonal segments are coalesced, the last four free.
- d 1. The telson is only a little broader than the peduncle of the last pair of uropoda, and not half as long as the same peduncle ..... 16. *H. Danae*.
- d 2. The telson is twice as broad as the peduncle of the last pair of uropoda, and more than half as long as the same peduncle.
- dd 1. The front margin of the carpal process of the first pair of peræopoda is not half as long as the hind margin of the metacarpus ..... 17. *H. schizogeneios*.
- dd 2. The front margin of the carpal process of the first pair of peræopoda is more than half as long as the hind margin of the metacarpus ..... 18. *H. crucipes*.
- E.** The first four peræonal segments are coalesced, the last three free ..... 19. *H. latissima*.
- F.** The first five peræonal segments are coalesced, the last two free.
- f 1. The carpal process of the first pair of peræopoda is very short, much shorter than half the hind margin of the metacarpus ..... 20. *H. thoracica*.
- f 2. The carpal process of the first pair of peræopoda is long, the front side more than half as long as the hind margin of the metacarpus ..... 21. *H. Gilesi*.

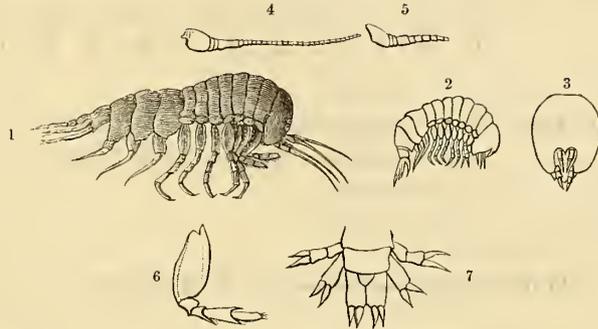
1. *HYPERIA MEDUSARUM*, O. F. MÜLLER, 1776.

Pl. IX, fig. 1—21.



*Pulex cancriformis*, antennis brevissimis,  
H. STRØM.

Facsimile from STRØM, Søndmør, pl. 1, fig. 12 and 13.



*Talitrus cyanea*, SABINE.

Facsimile from SABINE, Crust. of Supp. to Append. of Parry's  
voyage, pl. 1, fig. 12—18.

Fig. 1. The male. 2. The female. 3. The head of the  
same. 4. The first pair of antennæ of an adult male.  
5. The same pair of a younger male. 6. The second  
pair of peræopoda. 7. The urus.

**Diagn.** *Caput* curtum, latum, segmenta duo priora peræi longitudine æquans. Segmenta omnia *peræi* libera. *Carpus pedum peræi* primi paris dilatatus, non productus, spinis longissimis indutus, margo posterior leviter incisus. *Carpus pedum secundi* paris paullo productus, spinis longissimis indutus. *Metacarpus pedum primi* et *secundi* parium ovatus, spinis longissimis indutus, margo posterior incisus, non serratus; *dactylus* parvus, spinis obtectus. *Pedes tertii* ac *quarti* parium pedibus parium duorum præcedentium paullo longiores, spinis longis liberaliter instructi. *Pedes parium trium ultimorum* duobus præcedentibus non longiores; *femur* angustum, *carpus metacarpusque* leves, non serrati. *Latera segmentorum plei* duorum ultimorum angulata. *Pedunculus pedum uri* ultimi paris latissimus. *Telson* non longius quam latius, segmentum ultimum uri longitudine æquans, *pedunculo pedum uri* ultimi paris non angustius, ac dimidio *pedunculi* ejusdem longius.

The *head* is short and broad, as long as the first two peræonal segments together. All the *peræonal* segments are free. The *carpus* of the first pair of *peræopoda* is dilated, not produced, covered with very long bristles; the hind margin is feebly notched. The *carpus* of the second pair is a little produced, covered with very long bristles. The *metacarpus* of the first and second pairs is egg-shaped, covered with very long bristles, the hind margin is notched, not serrated; the *dactylus* is small, hidden by bristles. The third and fourth pairs are only a little longer than the two preceding pairs, thickly set with long bristles. The last three pairs are not longer than the two preceding pairs; the *femur* is narrow, the *carpus* and *metacarpus* are smooth, not serrated. The lateral parts of the last two pleonal segments are angulated. The *peduncle* of the last pair of *uropoda* is very broad. The *telson* is not longer than broad, equalling in length the last ural segment; it is not narrower than the *peduncle* of the last pair of *uropoda*, and more than half as long as the same *peduncle*.

**Colour.** Brownish; the young animals of a rather light yellow, speckled with deep brown or red spots; the largest adult animals deep brown.

**Length.** 8—18 mm.

**Hab.** The Arctic region: the west coast of Greenland, Spitzbergen, Tromsø. The Northern temperate region: the west coast of Sweden and Norway, the Northern Sea. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1762.** »*Pulex cancriformis antennis*

*brevissimis corpore latiore*, H. STRØM. —

Physisk og Oeconomisk Beskrivelse over Fogderiet Søndmør. Første Part, p. 188, pl. 1, fig. 12 and 13. Sorøe 1762. 4:to.

**1776.** *Cancer medusarum*, O. F. MÜLLER. —

Zoologiæ Danicæ Prodomus, p. 196.

*Gammarus* » » J. CHR. FABRICIUS.

1779. Reise nach Norwegen mit Bemerkungen aus der Naturhistorie und Oekonomie, p. 326 and 354.

» » » »

1781. Species Insectorum. Tom. 1, p. 518.

*Oniscus* » » J. F. GMELIN.

1780. Caroli Linnæi Systema Naturæ. Editio decima tertia. Tom. 1. Pars 5, p. 3014.

*Gammarus* » » J. CHR. FABRICIUS.

1787. Mantissa Insectorum. Tom. 1, p. 335.

» » » »

1793. Entomologia Systematica. Tom. 2, p. 519.

*Cancer (Gamarellus)* » » J. F. V. HERBST.

1796. Versuch einer Naturgeschichte der Krabben und Krebsen nebst einer systematischen Beschreibung ihrer verschiedenen Arten. 2<sup>ter</sup> Band, p. 139.

*Gammarus* » » (J. CHR. FABRICIUS.)

1797. Epitome Entomologiæ Fabricianæ, p. 119.

» » » L. A. G. BOSC.

1802. Histoire naturelle des Crustacées, contenant leur Description et leurs Mœurs. Tome 2<sup>me</sup>, p. 148.

*Cancer* » » W. TURTON.<sup>1)</sup>

1802. A general system of Nature. Vol. 3.

*Oniscus* » » »<sup>1)</sup> » »

*Talitrus* » » P. A. LATREILLE.

1803. Histoire naturelle générale et particulière des Crustacés et des Insectes. Tome 6<sup>me</sup>, p. 302.

*Gammarus* » » L. A. G. BOSC.

1829. Histoire naturelle des Crustacés.

<sup>1)</sup> Cited from STEBBING l. c. p. 69.

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- 1781.** *Oniscus quadricornis*, J. CHR. FABRICIUS. — »Malacostracés», par A. G. Desmarest. Dictionnaire des Sciences naturelles. Tome 28<sup>me</sup>, p. 348.
- 1823.** *Hyperia Sueurii*, P. A. LATREILLE. — 1825. Considérations générales sur la classe de Crustacés, p. 258.
- » » » A. G. DESMAREST. 1825. »Uroptère.» Encyclopédie Méthodique. Histoire naturelle. Tome 10<sup>me</sup>, p. 771.
- » » » F. E. GUÉRIN. 1829. Le Regne Animal, par G. Cuvier. 2<sup>me</sup> éd. Tome 4<sup>me</sup>, p. 117.
- » » » P. A. LATREILLE. 1838. Histoire naturelle des Animaux sans vertèbres, par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 304.
- » » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 369.
- » » » » 1840. Histoire naturelle des Crustacés. Tom 3<sup>me</sup>, p. 77.
- » *Lesueurii*, » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 299.
- 1824.** *Talitrus Cyaneæ*, E. SABINE. — »Invertebrate Animals.» A Supplement to the Appendix of Captain Parry's Voyage for the discovery of a North-West passage in the years 1819—20, p. CCXXXIV, pl. 1, fig. 12—18.
- Hyperia* » » H. MILNE EDWARDS. 1830. »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences nat. Tome 20<sup>me</sup>, p. 387.
- » » » » 1838. Histoire naturelle des Animaux sans vertèbres, par J. B. P.

			A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 304.
<i>Hyperia Cyanea</i> , E. SABINE.	H. MILNE EDWARDS.	1839.	» 3 <sup>me</sup> éd. Tome 2 <sup>me</sup> , p. 369.
<i>Talitrus</i> " "	" "	1840.	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 78.
<i>Metoecus</i> " "	A. WHITE.	1847.	List of the Specimens of Cru- stacea in the Collection of the British Museum, p. 91.
<b>1861.</b> <i>Hyperia spinipes</i> , A. BOECK.	—		» Bemærkninger angaaende de ved de norske Kyster forekom- mende Amphipoder». For- handl. ved de Skandinaviske Naturforskeres 8 <sup>de</sup> Møde, i Kjøbenhavn, 1860, p. 636.
" " "	A. BOECK.	1870.	» Crustacea amphipoda borealia et arctica». Christiania Viden- skabs-Selskabs Forhandl. for 1870, p. 86 (6).
" " "	"	1872.	De Skandinaviske og Arktiske Amphipoder, p. 81.
" " "	G. O. SARS.	1882.	» Oversigt af Norges Crustacéer med foreløbige Bemærknin- ger over de nye eller mindre bekjendte Arter». Christiania Videnskabs-Selskabs For- handl. for 1882, N:o 18, p. 19.

Here follows a translation of the original description given in 1762 by HANS STRØM, which is also the earliest known description of a Hyperid:

»Under the large yellowfishes, known as *Medusæ orbiculi margine sedecies emarginato*, you will sometimes find a little insect, which is very similar to the »Marflue»<sup>1)</sup> and which I shall call *Pulex caneriformis antennis brevissimis, corpore latiore* (because I hardly think it has been described before). Its body is not so thin and compressed as that of the »Marflue», but it is broad and rounded above. The head, which is very truncated, has two oblong eyes, almost like crescents, and between these two pairs of antennæ, the upper pair turning upwards, the lower pair downwards. The anterior, broader part of the body consists of seven narrow joints or annuli, the hind, narrow part of the body consists of three broader annuli; thereafter follows the tail which (beside a pair of small scales on the upper side) has at the distal end first two thin lancet-like laminae, cleft at the apex and then a similar pair on each side, though these are to be seen only when the tail is expanded. The legs are many and of three kinds: the first two pairs are hirsute or fluffy, truncated at the apex, and they consist of four joints; the five following pairs are less thick and hirsute, but they are provided with five joints, the last of which is a sharp-pointed claw; the last three pairs, which are concealed by the tail, have only two joints, the last of which is cleft into two parts, which are fringed with hairs and like feathers. The insect swims either on the back or on the side, contracting itself during its progress just like the »Marflue», but it then uses only the last three pairs of legs, which are fixed under the tail, the other legs being at rest. When it stands still the first two pairs and the last three pairs are concealed, and only the five intermediate pairs are stretched out, as is shown on Plate 1, fig. 12 and 13.<sup>2)</sup> The colour is reddish, especially on the dorsal side; but the eyes are either blue or green, and very large.»

<sup>1)</sup> Gammarus.

<sup>2)</sup> See above, p. 147.

From the drawing given by STRØM and reproduced above (p. 147), it is clear that he has examined only the female of the species. Some years later or in 1776 O. F. MÜLLER gave the first scientific name *Cancer medusarum* to the species, though his diagnosis consists only in the few Latin words applied to it by STRØM and would have been entirely insufficient for the recognition of the species if he had not referred to STRØM's description.

J. CHR. FABRICIUS in 1779 gave (l. c. p. 326) the following diagnosis, calling the species *Gammarus medusarum*:

»Gammarus medusarum, manibus quatuor, monodactylis, capite obtusissimo. — — — —  
Corpus paruum, incuruum, antice obtusissimum. Antennæ quatuor breuissimæ, filiformes, simplicies. Abdomen postice attenuatum. Cauda foliolis quatuor bifidis. Pedes septem parui, breues. Natatorii utrinque tres.»

He mentions further (l. c. p. 354) that he found the same species on a *Gadus virens*. In 1781 he mentioned *Gammarus medusarum* and diagnosed at the same time a new species, *Oniscus quadricornis*, with the following words:

»*Oniscus quadricornis* oblongus, stylis caudalibus senis, antennis quatuor.»

In 1787 he himself made this latter species a synonym of *Gammarus medusarum* (l. c. p. 335).

LATREILLE in 1823 gave the name *Hyperia Sueurii* through DESMAREST in his article »Malacostracés» (l. c. p. 348), where reference is made to a copy of STRØM's drawing published in »Encyclopedie Méthodique»; no specific description nor any other drawing of *H. Sueurii*, was given then or later and such being the case I think I am fully right in taking the name *Hyperia Sueurii* to be a synonym for the old species of STRØM and MÜLLER.

In 1824 E. SABINE published a good description and tolerably good drawings of our species under the new name *Talitrus Cyaneæ*, (see above, p. 147, fig. 1—7). His description runs:

»T. capite obtusissimo, antennis subæqualibus, corpore latiore, pedibus quatuor antice inunguiculatis.

Parasitic on the *Cyanea Arctica*, the individuals varying in length from two to eight-tenths of an inch; colour pale yellowish red, sprinkled with innumerable minute spots of deeper red; in about half the specimens, the number of which was considerable, the antennæ were equal in length to the five first segments of the body; in the others they were scarcely one-fifth as long, but otherwise similar; there was no other perceptible difference in the specimens. The two pair of antennæ are so very nearly of the same length, that it has been by no means easy to decide whether the species should be considered a *Gammarus* or a *Talitrus*; those of an individual, however, in which the greatest disproportion existed, have been figured (fig. 3, 4, and 5, p. 147, above) for the purpose of justifying the ultimate decision; the remarkable conformation of the head will doubtless be considered by many naturalists as a peculiarity requiring the establishment of a new genus.

Head rounded, and very obtuse; eyes extremely large, lunate, of a brownish red colour; antennæ four-articulate, the second and third members very small, and the terminal setaceous, flexible by annular articulations; the last joint of the superior pair is thick and fleshy at the base; body of seven segments, broader and less compressed than is usual in its congeners; caudal segments four exclusive of the tail itself, more attenuated than those of the body, but larger; legs fourteen, the four anterior equal and similar, five-jointed, being a long compressed thigh with four much shorter articulations, hirsute, and unarmed; the ten posterior legs similar and equal in size, five-jointed, the thigh being long and much compressed, followed by three short

fleshy joints, (the first of which is the shortest,) and by a long and curved member, terminated by a nail; the six posterior legs are directed backward; the three anterior caudal segments with each a pair of swimmers; the fourth caudal segment has on each side a pair of foliaceous styles borne on a two-jointed cylindrical footstalk; the tail consists of two foliaceous plates, each terminated by two smaller ones, strongly pointed and articulated to the larger; and is also furnished with a second pair of lateral style process.

This description differs from that of the Cancer Medusarum, OTHO FABRICIUS, *Faun. Groen.* N:o 232, in the number of joints of the legs, and in the four anterior being unarmed; the conformation of these legs distinguishes it also from Gammarus Medusarum, of J. C. FABRICIUS, of which a part of the specific character is »manibus quatuor monodactylis.»

This last remark of SABINE about the »unarmed» first two pairs of peræopoda is doubtless due to the fact that the dactyli of these pairs of legs are very small and shorter than the bristles densely surrounding them and are thus easily overlooked if the animal cannot be microscopically examined. In all other respects the description is quite adequate, and the strange statement regarding the two-jointed peduncle of the first pair of uropoda is most probably a good observation, because I have observed the same feature in another member of the family Hyperiidæ, *Parathemisto Goësi*. In my opinion it is due to the moulting process.

From this time the species occurs in literature only as a mere citate under one or other of the names quoted above until 1861 when A. BOECK rediscovered the animal. He did not, however, recognise its identity with O. F. MÜLLER's *Cancer medusarum*, but looked upon it as a new species, naming it *Hyperia spinipes* (l. c. p. 636), and distinguishing it from *H. galba* (= *H. Latreillei*) by »the first two pairs of legs being more strongly built; the fifth joint or the hand (= metacarpus) being densely set with tolerably long, straight and strong bristles, and the angle of the head between the upper and lower antennæ being much larger and more protruding.»

In 1865 GOËS<sup>1)</sup>, not knowing the new species of BOECK, also found the animal among the Arctic amphipods and gave it as a variety of *Hyperia exulans* (= *H. Latreillei*), saying: »Ad nostras oras alia etiam forma occurrit panllum diversa, pedum primi ordinis articulo quinto fere cylindrico undique setoso, ungue minuto.» I have examined his very specimens and found them to be males and females of the true *Hyperia medusarum*, O. F. MÜLLER.

In 1870 A. BOECK gave the following diagnosis of his *Hyperia spinipes*:

»Pedes 1mi paris manu ovali, spinis longis multis armata; calce perbrevis. Pedes 2di paris calce parum longiore quam apud pedes 1mi paris; manu spinis longis instructa. Appendix caudalis longior quam lata, ad pedunculi pedum saltatorium ultimi paris tertiam partem porrecta. Pedes saltatorii ultimi paris pedunculo duplo longiore quam lato.»

Two years later he added good drawings of the animal and the following description, which I translate:

»The length of the animal is 10 mm. The body is very similar to that of the preceding species (*Hyperia Latreillei*). The head is, viewed from front somewhat longer and narrower. The angle of the head between the upper and lower antennæ is produced and broad. The first two pairs of legs are more strongly built than those of the preceding species. The fourth joint (carpus)

<sup>1)</sup> A. GOËS. »Crustacea amphipoda maris Spetsbergiam alluentis» etc. Öfvers. af K. Vet. Ak. Förhandlingar för 1865, p. 534.

of the first pair is narrower, and the lower hinder corner is not much produced. The hand (metacarpus) is elongate-ovate; the fourth joint, but especially the hand are densely set with long, straight, and strong bristles. The fourth joint of the second pair is a little more produced at the lower hinder corner than the first pair, but much less than in the preceding species (*H. Latreillei*); the fourth joint and the hand of this pair also are set with long and strong bristles. The peduncle of the last pair of uropoda is more than twice as long as broad, and the inner ramus is somewhat longer than half the length of the peduncle. The telson is longer than broad at the base, and rounded at the apex.»

In 1887<sup>1)</sup> I expressed the opinion that *Hyperia spinipes*, A. BOECK, was the true *Hyperia medusarum*, O. F. MÜLLER, and that *Talitrus Cyaneæ*, SABINE, and *Hyperia Sueurii*, LATREILLE, were synonyms for the same species. At the same time I gave drawings of the animal, and of some of its details.

The same year H. J. HANSEN (see above) acknowledged the probability of my view of the identity of *Hyperia spinipes* with *H. medusarum*.

In the above list of synonyms I have not given *Oniscus medusarum*, O. FABRICIUS,<sup>2)</sup> because the characteristics »(*pedes*) 4 *antici, pro manibus habendi, breviores, biarticulati, articulo secundo etiam compresso, margine inferiore bis inciso et ungue terminali mobile,*» make it very probable that the description of O. FABRICIUS refers not to a true *Hyperia medusarum*, O. F. MÜLLER, but rather to a *Hyperia galba* or a *H. Latreillei*. I for my part was first<sup>1)</sup> inclined to consider it as a synonym of *H. galba*, chiefly on the ground of the shortness of the first two pairs of peræopoda, but after the statement of HANSEN in 1887, (l. c. p. 225), that he himself had seen an original drawing of O. FABRICIUS, representing his *Oniscus medusarum*, which proved that it »is certainly = *Hyperia Latreillei*, M. EDW.», I am of course bound to give it as synonymous with *H. Latreillei*.

*Hyperia medusarum* comes in general appearance nearest to *H. Latreillei*, but is easily distinguished by the thick covering of bristles on the first two pairs of peræopoda and by the shape of the metacarpus and dactylus of the same pairs. A characteristic separating it from the other species of the genus is the great length of the first two pairs of peræopoda, which are only a trifle shorter than the third and fourth.

### The male.

Pl. IX, fig. 1—16.

The *body* is very broad and thick, being only a little more slender than in the female; the peræon is as long as the pleon and urus together. The surface of all the segments is smooth and even, and somewhat transversely convex.

The *head* is as long as the first two peræonal segments together, broader than long, and almost as deep as it is broad. The antennal groove on the front side commences a little below the middle and is broader than high.

<sup>1)</sup> C. BOVALLIUS. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 561, pl. 42, fig. 26—33.

<sup>2)</sup> O. FABRICIUS. Fauna Groenlandica, p. 258. 1781.

The *eyes* occupy almost the whole surface of the head; they are divided into a right and left portion, which are separated from one another by a very narrow strip at the top of the head.

The *first pair of antennæ* (Pl. IX, fig. 2) in the adult male are scarcely half as long as the whole length of the animal, somewhat shorter than the head and peræon together, and about as long as the second pair. The first joint of the peduncle is stout, somewhat longer than broad, and almost three times as long as the two following joints together; the second joint is a little longer and broader than the third. The first joint of the flagellum is much longer than the whole peduncle, nearly conical, with the sides somewhat bulging; the inner and under sides are thickly covered with long olfactory hairs; the second and third joints are very short, broader than long; the fourth joint is as long as the two preceding together; the fifth and following joints are longer, equal in length, cylindrical, about six times as long as broad. In all the flagellum has from twenty-seven to thirty joints.

The *second pair of antennæ* (Pl. IX, fig. 3). The peduncle is considerably longer than the peduncle of the first pair. The first visible joint is thick, with bulging sides, longer than broad, and at its side projects the glandular cone, which is only a little shorter than the joint itself; the next joint is not half as long as the first; the last peduncular joint is a little shorter than the two preceding ones together, and slightly tapering. The first flagellar joint is much shorter than the last peduncular joint, thick at the base and evenly tapering towards the apex; the second joint is a little shorter than the first, cylindrical; the following joints are equal in length to the second, cylindrical, about six times as long as broad, and each provided with some few very short hairs. The joints of the flagellum are about twenty-eight in number.

The *labrum* (Pl. IX, fig. 4) is almost as long as broad, and bilobed, the incision between the lobes being very deep; it is thickly covered with short, curved hairs.

The *mandibles* (Pl. IX, fig. 5) have a thick, cylindrical stem, the incisive lamina is almost triangular, armed with seven to nine sharp, unequal teeth, and densely set with short hairs; the molar tubercle is very large; the grinding surface is ovate consisting of rows of small extant tubercles, each tubercle being tipped with a short hair bent at the apex. Between the incisive lamina and the molar tubercle there is a tuft of long, strong bristles. The secondary incisive projection of the left mandible is narrowly triangular, and sharp-pointed. The palp articulates with the mandible in a deep notch or groove at the lower outer corner of the stem. The first joint of the palp is short, thick, and irregularly egg-shaped; the second joint is nearly cylindrical, not fully twice as long as the first; the third joint is longer than the second, narrow, elongate-lanceolate; the tip is set with minute hairs. (Pl. IX, fig. 6).

The *labium* is broad; the median projection is broadly rounded; the lateral projections are semicircular and covered with short hairs.

The *first pair of maxillæ* (Pl. IX, fig. 7) consist of a thick basal joint and two laminae; the principal lamina is tolerably long; the basal portion is almost cylindrical; the apical portion forms a spoon-shaped, strongly curved process; the margins and the sides of this process are thickly covered with bristles; and at the middle of the under

margin there are also three very strong, slightly curved, spines. The secondary lamina is narrowly concave, covered with short bristles, and at each of the corners of the under margin there is a short, thick, hooked spine.

The *second pair of maxillæ* (Pl. IX, fig. 8) consist of two laminae. The principal lamina is very broad at the base; the projecting portion of it is almost cylindrical, and all over covered with short bristles; the apex is rounded, and provided with a terminal, strong spine. The secondary lamina is more slender, and covered with bristles; the apex is truncated, and armed with two strong spines.

The *maxillipeds* (Pl. IX, fig. 9). The basal portion is very broad, rapidly tapering downwards, and as long as it is broad at the base. The lateral laminae are ovate, somewhat narrower at the apex; the inner margins are fringed with four long and some shorter bristles. The median lobe forms a strong process directed inwards; the apex is densely set with short, curved bristles.

The *peræon*. The first segment is almost as long as the second; the seventh segment is the longest, but only a little longer than the sixth.

The *epimerals* are as long as the under margins of the corresponding segments, and rounded below. Those of the first and second pairs are deeper than long, the following longer than deep.

The *branchial sacks* (Pl. IX, fig. 13) are large and thick, showing a tendency to divide into two portions. They are fixed to the second and four following pairs of peræopoda, are somewhat longer than the femora of the corresponding pairs, and obliquely truncated below.

The *first pair of peræopoda* (Pl. IX, fig. 10). The femur is shorter than the four following joints together; the hind margin is slightly convex, and armed at the lower corner with three bristles; the front margin is curved backwards at the base; the rest of the margin is straight, showing a very long narrow groove for the reception of the following joints. The genu is as long as broad, armed at the lower hind margin with five or six long bristles. The tibia is longer than the genu; the lower hind part is produced; the under margin is fringed with eight or ten long bristles. The carpus is a little shorter than the two preceding joints together, dilated, and covered all over with long bristles; the front margin is nearly straight; the hind margin is convex, showing three slight notches; the carpus is not produced; the under margins are straight, and fringed with long bristles. The metacarpus is almost egg-shaped, densely covered with very long bristles, and as long as the carpus; the front and hind margins are notched, the hind margin not being serrated. The dactylus is slightly curved, and irregularly serrated on the hind margin; it is shorter than the surrounding bristles, and almost entirely hidden by them; it is scarcely as long as the breadth of the metacarpus, and is less than a third the length of the same joint. Glands are present in all the joints, except in the dactylus.

The *second pair* (Pl. IX, fig. 11) are not longer than the first pair and reach farther than to the middle of the metacarpus of the third pair. The femur is broader than in the first pair, and shorter than the four following joints together; the front margin is strongly convex, with the usual narrow groove; the hind margin is slightly convex, the lower corner being provided with two long bristles. The genu is as long as broad; at the

lower hind corner there are four long bristles. The tibia is much longer than the genu; the lower hind part is more produced than in the first pair; the under margin fringed with about ten long bristles. The carpus is somewhat shorter than the two preceding joints together, dilated, and a little produced, covered with long bristles; the front margin is convex, slightly notched; the hind margin is nearly straight; the front side of the carpal process is spoon-shaped, much shorter than a third of the hind margin of the metacarpus; the margins are fringed with very long bristles. The metacarpus and the dactylus are exactly similar to those joints in the first pair. Glands as in the first pair.

The *third and fourth pairs* (Pl. IX, fig. 12) are robust, with thick joints. The femur is ovate; the hind margin is smooth, armed at the lower corner with two long bristles and a third one a little above. The genu is as long as broad, the hind corner being set with three bristles. The tibia is much longer than the genu, the hind margin with four to five long bristles. The carpus is only a little longer than the tibia (5: 4); the hind margin is straight, not serrated, set with six long bristles; these bristles are almost as long as the breadth of the joint. The metacarpus is somewhat longer than the carpus (6: 5) and more slender; the hind margin is nearly straight, not serrated, armed with six or eight long bristles. The dactylus is robust, almost straight, shorter than a third of the metacarpus. Glands are especially well developed in the femur.

The *fifth, sixth and seventh pairs* (Pl. IX, fig. 13) are a little shorter than the two preceding and robust, with thick joints. The femur is oblong, not much dilated; the front margin is slightly convex, smooth; the hind margin is almost straight. The genu is somewhat broader than long, and smooth. The tibia is considerably longer than the genu, very thick and broad, and smooth. The carpus is as long as the tibia, and more slender; the front margin is straight, not serrated, without bristles. The metacarpus is a little longer than the tibia (5: 6), and half as long as the femur, but shorter than the metacarpus of the third and fourth pairs; the front margin is not serrated, and without bristles. The dactylus is thick and stout, slightly curved, and about equal in length to a fourth of the metacarpus; at the base it shows a large oblong opening, the outlet for the glands which are present in all the joints.

The *pleon* equals in length the last five peræonal segments together. The lateral parts of the last two pleonal segments are straight below; the hind corner is angular. The lateral part of the first segment is obtusely rounded below.

The *pleopoda* (Pl. IX, fig. 14) are comparatively slender. The peduncle is oblong, with nearly flat sides; it is scarcely longer than the rami. The coupling spines (Pl. IX, fig. 15) are hook-shaped, with two spine-like teeth below the hooked apex. The cleft bristle is slender, not very stout; the basal portion densely fringed with long hairs. The outer ramus of the first pair has seventeen joints, the inner fifteen.

The *urus* is a little longer than the last ural segment; the first ural segment is somewhat longer than the last coalesced one; this latter is almost twice as broad as long, with the hind corners rounded.

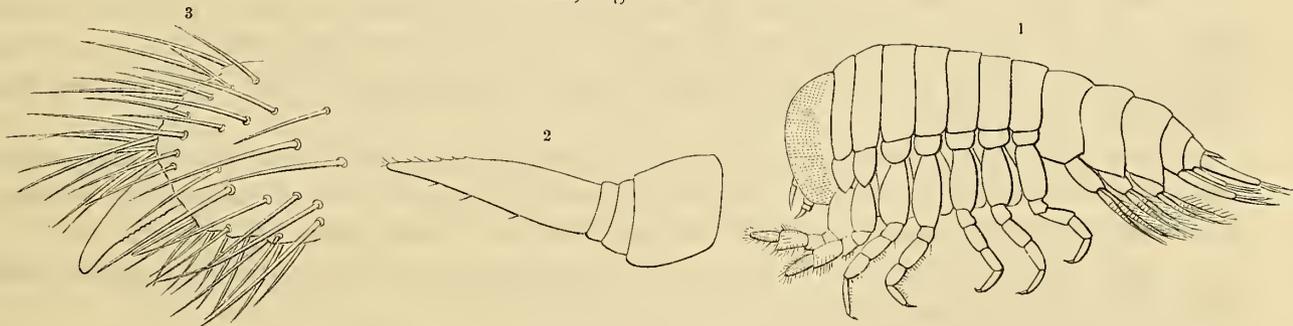
The *uropoda* (Pl. IX, fig. 16). The *first pair* reach almost to the apex of the last pair; the peduncle is linear, three times as long as broad, and a little longer than the inner ramus; the outer ramus is narrow, elongate, scarcely shorter than the inner;

the outer margin is smooth; the inner margin is serrated along the lower half of its length, with spine-like teeth; the inner ramus is elongate-lanceolate, serrated on the lower parts of both margins with spine-like teeth. The *second pair* reach to the apex of the peduncle of the last pair; the peduncle is linear, twice as long as broad, scarcely longer than the inner ramus; the outer ramus is elongate, sharp-pointed; the outer margin is smooth, the inner serrated as in the first pair; the inner ramus is elongate-lanceolate, serrated as in the preceding pair. The *third pair* have the peduncle very broad, abruptly constricted at the base, scarcely more than a third longer than broad at the apex; the outer ramus is lanceolate, longer than the breadth of the peduncle, but not equal to its length; the inner ramus is nearly as long as the outer; both rami are serrated as in the first pair.

The *telson* is as broad as long, obtusely triangular, equalling in length the last uroal segment; it is a little broader than the peduncle of the last pair of uropoda, and more than half as long as the same peduncle.

### The female.

Pl. IX, fig. 17—19.



*Hyperia medusarum*, O. F. MÜLLER.<sup>1)</sup>

Fig. 1. The animal from the side. 2. The first pair of antennæ. 3. The dactylus of the first pair of pereopoda.

The *body*, especially the peræon, is only a little wider than in the male; the pleon and urus together are much shorter than the peræon.

The *head* is a little broader than deep.

The *first pair of antennæ* (Fig. 2 above) reach scarcely below the under margin of the head; the peduncle is thick and stout; the first joint is cylindrical, as long as broad, and twice as long as the two following joints together; the second joint is only a little longer than the third. The flagellum is one-jointed, much longer than the whole peduncle, but not fully twice as long; it is broad at the base, tapering towards the apex, not tumid, with almost flat sides; the margins are set with short, fine hairs, especially at the apex; on the inner side there are some few long olfactory hairs; no trace of ter-

<sup>1)</sup> The original of this figure is the typical specimen for *Hyperia spinipes*, A. BOECK, most kindly sent to me by the late author in exchange for male specimens of the same species, which I had captured in 1869 of the »Koster» Islands, the west coast of Sweden.

minal joints is to be seen. In very young females the flagellum is thicker, and a little tumid.

The *second pair of antennæ* are shorter than the first pair, but reach farther downwards. The first visible joint of the peduncle is broader than long, the glandular cone is distinct; the second joint is as long as the first; the third is scarcely shorter but much narrower. The flagellum is one-jointed, conical and much narrower than that of the first pair; it is equal in length to the whole peduncle; at the apex there are some few minute hairs.

The *mandibles* (Pl. IX, fig. 17) are exactly like those in the male, but a little more robust. The last joint of the palp<sup>1)</sup> is somewhat broader and more densely provided with hairs.

The *peræon* has the first segment somewhat shorter than the second, and the second, third and fourth segments are a little longer comparatively than in the male.

The *epimerals* are somewhat deeper than in the male, but in other respects like.

The *ovitetrices* are elongate-ovate, a little broader below; they are longer than the branchial sacks.

The *first and second pairs of peræopoda* are exactly like those pairs in the male.

The *third and fourth pairs* are like those in the male, but the glands are often more strongly developed and the dactylus is sometimes transformed into a spout-like instrument, no doubt in order to procure an easier transmission of the secretion from the glands (Pl. IX, fig. 18).

The *fifth, sixth and seventh pairs* are shorter than the third and fourth and somewhat thicker than in the male. The dactylus of one or another of these pairs is often transformed in the same manner as in the third and fourth pairs (Pl. IX, fig. 19).

The *pleon* is less powerful than in the male, and somewhat shorter than the last four peræonal segments together.

The *pleopoda* are a little shorter comparatively than in the male.

The *urus* is exactly as long as the last pleonal segment.

The *uropoda* and the telson are like those organs in the male.

### The young just hatched.

Pl. IX, fig. 20 and 21.

The *head* is deep and broad but scarcely longer than the first peræonal segment.

The *peræon* shows seven distinct segments, the sixth longest.

The *epimerals* form small extant tubercles.

The *peræopoda* (Pl. IX, fig. 21) of the first and five following pairs are equal in length, composed of five joints each; the first joint is the longest, the following are equal in length, and as broad as long; the dactylus is very long, and curved. The seventh

<sup>1)</sup> I give a drawing of the mandibles of the female of this species, the type for the genus, because CLAUS in his »Platysceliden», p. 3, suggests that the females of all the Hyperids, like the females of *Oxycephalidæ*, and its nearest relatives should want a mandibular palp.

pair consist of only two joints without claw or dactylus, and are scarcely longer than the first joint of the sixth pair.

The *pleopoda* consist of small sack-like prominences on the under side of the three pleonal segments.

The *urus* consists of three segments, each with a pair of small sack-like appendages without any trace of rami.

## 2. HYPERIA HYSTRIX, n. sp.

Pl. IX, fig. 22—30.

**Diagn.** *Caput* curtum, latum, segmentis duobus primis peræi brevius. Segmenta omnia *peræi* libera. *Carpus pedum peræi* primi paris dilatatus, paullo productus, spinis brevibus indutus. *Carpus pedum secundi* paris productus, margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo brevius; margo posterior rectus. *Metacarpus pedum primi et secundi* parium fere conicus, spinis brevibus indutus, margo posterior incisus, non serratus; *dactylus longus* e spinis exstans. *Pedes tertii ac quarti* parium pedibus parium duorum præcedentium paullo longiores, spinis brevibus instructi. *Pedes parium trium ultimorum* duobus præcedentibus non longiores; *femur paullo dilatatum*; *carpus metacarpusque indistincte serrati*. *Latera segmentorum plei* infra rotundata, post angulata. *Pedunculus pedum uri* ultimi paris latus. *Telson* non longius quam latius, dimidio segmenti ultimi uri longius, *pedunculo pedum uri* ultimi paris angustius, ac dimidio *pedunculi ejusdem* brevius.

The *head* is short and broad, shorter than the first two peræonal segments together. All the *peræonal* segments are free. The *carpus* of the first pair of *peræopoda* is dilated, a little produced, covered with short bristles. The *carpus* of the second pair is produced, covered with short bristles; the front margin of the carpal process is a little shorter than half the hind margin of the metacarpus; the hind margin of the *carpus* is straight. The *metacarpus* of the first and second pairs is slightly conical, covered with short bristles; the hind margin is notched but not serrated; the *dactylus* is long, protruding from the bristles. The third and fourth pairs are a little longer than the two preceding pairs, provided with short bristles. The last three pairs are not longer than the two preceding pairs; the *femur* is a little dilated; the *carpus* and *metacarpus* are indistinctly serrated. The lateral parts of the *pleonal* segments are rounded below, and angulated behind. The *peduncle* of the last pair of *uropoda* is broad. The *telson* is as long as broad, longer than half the last ural segment; it is narrower than the *peduncle* of the last pair of *uropoda*, and shorter than half the same *peduncle*.

**Colour.** Yellowish red.

**Length.** 13—16 mm.

**Hab.** The Sea of Japan: Lat. 39° N., Long. 133° E.; taken by the Danish Captain ANDRÉA, in 1869. The Northern temperate region of the Pacific: Lat. 46° N., Long. 165° E. (WESSEL). (D. M.; S. M.)

*Hyperia hystrix* is an intermediate form between *H. medusarum* and *H. galba*, easily to be distinguished from both: from the former by the short bristles on the first two pairs of peræopoda, by the produced carpus of the first pair and by the short telson; from the latter by the notched not serrated hind margin of the metacarpus of the first two pairs and by the dense covering of short bristles on the same pair.

The *body* is more elongated and compressed than in the preceding species; the peræon is shorter than the pleon and urus together. The surface of the segments is smooth and even as if polished, flat or rather somewhat transversely concave.

The *head* is somewhat shorter than the first two peræonal segments together, as long as broad, and much deeper than broad. The antennal groove is large, commencing a little above the middle of the front side of the head, and fully as high as broad.

The *eyes* occupy almost the whole surface of the head.

The *first pair of antennæ* (Pl. IX, fig. 23) in the adult male are a little longer than the second pair, equal in length to the head and the first six peræonal segments together. The first joint is thick, a little broader than long, and more than twice as long as the two following joints together; the second joint is twice as long as the third. The first joint of the flagellum is not quite twice as long as the whole peduncle, thick at the base, with bulging sides, tapering towards the apex; the inner and under sides are densely covered with long olfactory hairs; the two following joints are small, the fourth longer, the fifth and sixth increasing in length, the seventh and following still longer, equal in length, about eight times as long as broad. The flagellar joints are twenty-two to twenty-four in number.

The *second pair of antennæ* (Pl. IX, fig. 24). The first visible joint of the peduncle is thick, nearly twice as long as the second, at the side of it projects the glandular cone; the last peduncular joint is longer than the first, but shorter than the first and second together. The first flagellar joint is somewhat shorter than the last joint of the peduncle; the second and following joints are equal in length, about eight times as long as broad. The flagellar joints are about twenty in number.

The *labrum* is protruding, longer than broad, deeply bilobed.

The *mandibles* have a very thick and egg-shaped stem which at the outer margin, below the middle, shows a broad tubercular projection, serving for the insertion of the palp. The incisive lamina extends just below the molar tubercle, is narrow, and armed with half a dozen sharp teeth. The first joint of the palp is short and thick, the second is scarcely half as thick as the first and much longer, the third is still longer, fully twice as long as the first, narrowly lanceolate, sharp-pointed, the outer margin densely fringed with minute hairs.

The *first pair of maxillæ*. The apical portion of the principal lamina is smaller than that part in the preceding species but more strongly armed with teeth and bristles. The outer convex margin of the secondary lamina is densely set with teeth-like spines and minute bristles.

The *second pair of maxillæ*. The projecting portion of the principal lamina is conical, and covered with long slender bristles on its lower part; the secondary la-

mina is irregularly conical; the lower part is covered with long bristles, and the apex armed with a strong spine.

The *maxillipeds*. The basal portion is like that in the preceding species, but the lateral laminae are somewhat broader at the apex, and the median lobe is a little larger.

The *peræon*. The first segment is a little shorter than the second; the seventh segment is the longest of all.

The *epimerals* in the first four and seventh pairs of peræopoda are as long as the under margins of the corresponding segments; those of the fifth and sixth pairs are a little longer. The epimerals in the first four pairs are about as deep as long; those of the fifth and sixth pairs are longer than deep; that of the seventh pair is fully twice as long as deep.

The *branchial sacks* are fixed to the second and four following pairs of peræopoda; they are very broad and thick, and a little shorter than the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. IX, fig. 25) are fully as long as the second. The femur is not very broad, with almost straight margins; the upper and anterior parts are occupied by strongly developed glands; the front side is cleft by a long narrow groove as usual; the lower hind corner is armed with five or six strong bristles. The genu is as long as broad; the lower hind corner is provided with six long bristles. The tibia is much longer than the genu; the lower hind part is produced, and the produced portion is longer than the rest of the joint, the margins being fringed with long bristles. The carpus is considerably longer than the two preceding joints together, and less dilated than in the preceding species; the front margin is straight, armed at the apex with two long bristles and some shorter ones; the hind margin is slightly convex showing some few notches, each notch carrying a stout bristle; the lower corner is a little produced, rounded, and armed with a great number of strong, but comparatively short, bristles; the sides of the joint are densely covered with short spine-like bristles. The metacarpus is considerably shorter than the carpus, and covered all over with short, strong, spine-like bristles; the front margin is strongly convex; the hind margin is slightly concave, without notches, and strongly serrated, the teeth being minute and equal. The dactylus is long, curved, and half as long as the metacarpus; the hind margin is serrated. From the femur the glands reach through the intermediate joints to the apex of the metacarpus.

The *second pair* (Pl. IX, fig. 26) reach only a little farther than to the apex of the tibia of the third pair. The femur is broad, and almost as long as the four following joints together; the front margin is strongly convex; the hind margin is irregularly curved, and the lower corner is provided with five or six tolerably long bristles. The genu is as long as broad; the lower hind corner set with five or six bristles. The tibia is much longer than the genu; the lower hind part is produced, but not as much as in the first pair; the margins are densely fringed with long bristles. The carpus is fully as long as the two preceding joints together, dilated, and produced; the front side of the carpal process is only a little shorter than half the hind margin of the metacarpus, and densely fringed with stout bristles; the front margin of the carpus is nearly straight, scarcely notched, and armed at the apex with half a dozen long bristles; the hind margin is slightly concave without

notches; the sides of the joint are densely covered with spine-like bristles. The metacarpus is more slender than in the first pair, broad at the base, tapering, and densely covered all over with short spine-like bristles; the front margin is nearly straight, and the lower half of it is feebly notched; the hind margin is straight, and minutely serrated. The dactylus is long, curved, not fully half as long as the metacarpus, and minutely serrated on the hind margin. Glands as in the first pair.

The *third and fourth pairs* (Pl. IX, fig. 27) are more slender than in the preceding species. The femur is elongate-ovate, and somewhat longer than the three following joints together; the hind margin is set with seven or eight very short bristles, the lower corner with about six short, spine-like bristles. The genu is longer than broad; the lower hind corner is armed with short bristles, and one standing singly a little above. The tibia is longer than the genu; the hind margin is fringed with a row of minute, teeth-like spines, and has three short bristles along its lower half. The carpus is much longer than the tibia; the hind margin is armed in the same way, but the number of short bristles is about twelve; these bristles are much shorter than half the breadth of the joint. The metacarpus is much longer than the carpus, and only a little shorter than the tibia and carpus together; it is more slender, and about half as broad as the carpus; the hind margin is almost straight, minutely serrated and set with eight equidistant pairs of very short, spine-like bristles. The dactylus is slightly curved, equalling in length a third of the metacarpus. Glands are most fully developed within the femur but are also present in the four following joints.

The *fifth pair* (Pl. IX, fig. 28) are fully as long as the two preceding pairs. The femur is tolerably broad, quite as broad as that of the fourth pair; it is about as long as the three following joints together; the front margin is smooth and slightly convex; the hind margin is nearly straight. The genu is longer than broad, and is smooth. The tibia is much longer than the genu; the front margin is set with some minute hairs or feeble bristles. The carpus is somewhat longer than the tibia and considerably more slender; it is feebly bent near the base; the front margin is densely fringed with a row of very minute, slender bristles, and eight equidistant hairs, very short and curved. The metacarpus is a little longer than the carpus, and more than half as long as the femur, but it is considerably shorter than the metacarpus of the third and fourth pairs. The dactylus is slightly curved, and fully as long as a fourth of the metacarpus. Glands as in the preceding pair.

The *sixth and seventh pairs* (Pl. IX, fig. 29) are as long as the fifth pair, but a little more robust. The tibia is as long as broad. The tibia and carpus are equal in length, and armed as in the fifth pair; the carpus is more strongly bent at the base than in the preceding pair.

The *pleon* is quite as long as the peræon; the lateral parts of the segments are very deep, and rounded below; that of the first segment is broadly rounded at the hind corner; the hind corners of the last two segments are sharp-pointed; the segments are subequal in length.

The *pleopoda* are very stout, the peduncle is thick, egg-shaped, and longer than the rami. The coupling spines are thick, with tuberculous heads and three strongly curved

teeth on each side of the stem. The cleft bristle is stout, and the basal portion thickly fringed with long hairs. The rami consist of sixteen joints each.

The *urus* is a little shorter than the last pleonal segment; the first ural segment is much longer than the last coalesced segment, which is a third part broader than long.

The *uropoda* (Pl. IX, fig. 30). The *first pair* do not reach fully to the apex of the last pair; the peduncle is linear, three times as broad as long and half as long again as the inner ramus; the rami are equal in length, narrowly lanceolate, and sharp-pointed; the outer ramus is smooth on the outer margin, and finely serrated along the inner; the inner ramus is finely serrated on the lower parts of both margins. The *second pair* reach to the middle of the rami of the last pair; the peduncle is broader at the apex than at the base, twice as long as broad at the apex, and only a little longer than the inner ramus; the inner ramus is much longer than the outer one, and twice as broad, ovate, with narrow, sharp-pointed apex, and it is finely serrated on the lower parts of both margins; the outer ramus is elongate, broadest at the base, serrated on the inner margin, and smooth on the outer. The *third pair* are the broadest; the peduncle is twice as long as broad, but not twice as long as the inner ramus; the rami are equal in length and longer than the breadth of the peduncle; the inner ramus is a third part broader than the outer, heart-shaped, and serrated on the lower parts of both margins; the outer ramus is almost lanceolate, smooth on the outer margin, and serrated on the inner.

The *telson* is scarcely longer than broad, spade-shaped, and much shorter than the last ural segment; it is much narrower than the peduncle of the last pair of uropoda, and not half as long as the same peduncle.

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3. **HYPERIA LATREILLEI**, H. MILNE EDWARDS, 1830.

Pl. IX, fig. 31—43 and Pl. X, fig. 1—17.

*Hyperia Latreillei*, H. MILNE EDWARDS.

Facsimile from H. MILNE EDWARDS. Recherches sur les Amphip., pl. 11.

**Diagn.** *Caput* curtum, latum, segmentis duobus primis peræi brevius. Segmenta omnia peræi libera. Carpus pedum peræi primi paris dilatatus, vix productus, margine posteriore ter inciso, spinisque instructo. Carpus pedum secundi paris paullo productus. Metacarpus primi et secundi parium spinis parce instructus, margine posteriore serrato, dentibus inæqualibus; dactylus longus. Pedes tertii et quarti parium pedibus parium duorum præcedentium paullo longiores, spinis nonnullis instructi. Pedes parium trium ultimorum duobus præcedentibus non longiores; carpus pedum quinti paris tibia paullo longior, nec serratus. Latera segmentorum plei post angulata. Pedunculus pedum uri latus. Telson latum, segmentum ultimum uri longitudine æquans, pedunculo pedum uri ultimi paris latius, ac dimidio pedunculi ejusdem longius.

The *head* is short and broad, a little shorter than the first two peræonal segments together. All the peræonal segments are free. The carpus of the first pair of peræopoda is dilated, scarcely produced; the hind margin is thrice notched, and provided with bristles. The carpus of the second pair is somewhat produced. The metacarpus of the first and second pairs is sparingly provided with bristles; the hind margin is serrated, with unequal teeth; the dactylus is long. The third and fourth pairs are only a little longer than the first two pairs, and are provided with a few spines. The last three pairs are not longer than the two preceding; the carpus of the fifth pair is a little longer than the tibia, and not serrated. The lateral parts of the pleonal segments are posteriorly angulated. The peduncle of the last pair of uropoda is broad. The telson is broad, and as long as the last ural segment; it is broader than the peduncle of the last pair of uropoda, and more than half as long as the same peduncle.

**Colour.** Yellowish to brown, the older animals darker than the young ones.

**Length.** 15—25 mm.

**Hab.** The Arctic region of the Atlantic; the Northern and Southern temperate regions of the Atlantic; the tropical region of the Atlantic; the Baltic; the Mediterranean. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

- Syn. 1780.** *Oniscus medusarum*, O. F. MÜLLER. O. FABRICIUS.<sup>1)</sup> Fauna Groenlandica, p. p. 257.
- Hyperia medusarum*, O. F. MÜLLER. A. BOECK. 1870. »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandlingar, for 1870, p. 85 (5).
- » » » » 1872. De Skandinaviske og Arktiske Amphipoder, p. 79, pl. 1, fig. 1.
- » » » A. METZGER. 1875. »Crustacea». Nordseefahrt der Pommerania, p. 284.
- 1830.** *Hyperia Latreillei*, H. MILNE EDWARDS. — »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés Amphipodes». Ann. des Sciences nat. Tom. 20<sup>me</sup>, p. 388, pl. 11, fig. 1—7.
- » » » F. E. GUERIN-MÈNEVILLE. 1836. Iconographie du Règne Animal de G. Cuvier. Crustacés, p. 22, pl. 25, fig. 5. Paris 1829—43.
- » » » H. LUCAS. 1836. »Hypérie». Dictionnaire pittoresque d'Histoire naturelle. Tome 4<sup>me</sup>, p. 97.
- » » » H. MILNE EDWARDS. 1838. Histoire des Animaux sans vertèbres, par J. B. P. A. de Lamarck. 2<sup>me</sup> Ed. Tome 5<sup>me</sup>, p. 304.
- » » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 369.
- » » » » 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 76, pl. 30, fig. 16.
- » » » A. WHITE. 1847. List of the specimens of Crustacea in the Collection of the British Museum, p. 90.
- » » » H. MILNE EDWARDS. 1849. Le Règne Animal — — —, par G. Cuvier. Ed. acc. des pl., pl. 58, fig. 1.
- » » » H. LUCAS. 1849. »Hypérie». Dictionnaire universel d'Histoire naturelle — — —, par Ch. d'Orbigny. Tome 6<sup>me</sup>, p. 782.

<sup>1)</sup> Teste H. J. HANSEN. Grønl. malakost. Havkrebsdyr, p. 225.

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| <i>Hyperia Latreillei</i> , H. MILNE EDWARDS. W. LILLJEBORG. |                    | 1852. »Hafs-Crustacéer vid Kul-<br>laberg». Öfvers. af K.<br>Sv. Vet. Ak. Förhandl.,<br>1852, p. 11.   |
| » » »  | PH. H. GOSSE.      | 1855. A Manual of Marine Zoo-<br>logy. Vol. 1, p. 139, fig.<br>251.  |
| » » »  | W. THOMPSON.       | 1856. The Natural History of<br>Ireland. Vol. 4, p. 397.   |
| » » »  | A. WHITE.          | 1857. A popular History of the<br>British Crustacea, p.<br>206, pl. 11, fig. 3.  |
| » » »  | P. J. VAN BENEDEN. | 1861. Recherches sur la faune<br>littorale de Belgique.<br>Crustacés, p. 145.  |
| » » »  | C. BOVALLIUS.      | 1887. »Systematical list of the<br>Amphipoda Hyperiidea». Bih. t. K. Sv. Vet. Ak.<br>Handl. Bd. 11. N:o<br>16, p. 16.  |
| » » »  | »                  | 1887. »Arctic and Antarctic<br>Hyperids». Vega-Exp.<br>Vetensk. Iakttagelser.<br>Bd. 4, p. 561, pl. 42,<br>fig. 34—39, pl. 43, fig.<br>40—46.  |
| » » »  | H. J. HANSEN.      | 1887. »Oversigt over det vestlige<br>Grønlands Fauna af ma-<br>lakostrake Havkrebs-<br>dyr», p. 56. Vidensk.<br>Meddel. fra den Natur-<br>hist. Forening i Kjø-<br>benh., 1887.              |
| 1861. <i>Hyperia galba</i> , (MONTAGU.)                      | A. BOECK.          | 1861. »Bemærkninger angaaen-<br>de de ved de norske Kys-<br>ter forekommende Am-<br>phipoder». Forhandl. ved<br>de Skandinaviske Natur-<br>forskeres 8:de Møde, i<br>Kjøbenh., 1860, p. 636. |
| » » »  | SPENCE BATE.       | 1862. Catal. Amph. Crust. Brit.<br>Museum, p. 292, pl. 48,<br>fig. 9.  |
| » » »  | FR. MEINERT.       | 1877. »Crustacea Isopoda Am-<br>phipoda et Decapoda Da-<br>niæ». Naturhist. Tid-<br>skrift. 3:die Række. Bd<br>11, p. 91.  |
| » » »  | H. BLANC.          | 1884. »Die Amphipoden der<br>Kieler Bucht». Nova<br>Acta Acad. Cæsar Leop.-  |

- ? 1862 *Lestrigonus Kinahani*, SPENCE BATE. — Carol. Germanicæ Naturæ Curiosorum. Tom. 47<sup>mus</sup>, N:o 2, p. 52 (16), pl. 6, fig. 7—17.  
Catal. Amph. Crust. Brit. Museum, p. 289, pl. 48, fig. 4.
- ? " " " SPENCE BATE and WESTWOOD. 1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 8, fig.
- ? " " " TH. EDWARD. 1868. »Stray Notes on some of the smaller Crustaceans». 1. Habits &c of the Hyperiidæ. The Journal of the Linnean Society. Zoology. Vol. 9, p. 143.  
»Crustacea amphipoda maris Spetsbergiam alluentis cum speciebus aliis arcticis». Öfversigt af K. Vet. Ak. Förhandl. för 1865, p. 534.
1865. *Hyperia exulans*, (H. KROEYER.) A. Goës.

The original specific description given by H. MILNE EDWARDS in 1830 is elaborate, and the accompanying figure excellent (see above, p. 164) so there is no doubt about the identity of the species. Of the description I reproduce the following lines:

«— — — A la face antérieure de la tête on remarque une fossette assez profonde et allongée dans laquelle s'insèrent les antennes; ces appendices sont courts, styloformes et placés par paires près de la ligne médiane, mais assez loin les uns au-dessus des autres; ceux de la première paire sont un peu plus longs que les inférieurs, et lorsqu'ils s'infléchissent en bas, ils ne dépassent pas le labre; on leur distingue quatre articles: le premier est assez gros, les deux suivans sont très-courts, enfin le dernier est conique, et sans divisions annulaires. Les antennes inférieures ou de la seconde paire sont également styloformes et portées sur un tubercule ovalaire qui est placé au-dessus du labre et qui paraît être formé par la soudure de leur premier article avec la tête; leur portion mobile se compose de quatre articles, dont le premier est le plus court et le dernier est le plus long et sans divisions annulaires. La bouche est assez saillante; on y distingue 1° un labre qui est bilobé et inséré à la base d'un tubercule arrondi, qu'au premier abord on pourrait prendre pour cet appendice lui-même; 2° d'une paire de mandibules très-fortes, portant chacune une longue tige palpiforme qui, dans la position naturelle, fait saillie au-devant de la tête entre les deux antennes de la seconde paire; 3° d'une languette bilobée; 4° d'une première paire de mâchoires qui se terminent par deux grandes lames cornées dont l'interne est armée des dents sur le bord antérieur; 5° d'une paire de mâchoires externes qui sont moins développées et moins lamellaires que les antérieures, mais également bifides; et 6° d'une paire de pattes-mâchoires qui sont réunies entre elles de manière à former (comme chez toutes les Hyperines) une espèce de lèvre inférieure unique terminée par trois petites lames cornées et ne recouvrant qu'une très-faible partie de la bouche. — — — — Les pattes de la première paire sont les plus petites de toutes, et leur antépénultième article est assez large; il en est de même pour les pattes de la seconde paire, tandis que pour les suivantes cette pièce ne présente aucune dilatation notable; enfin ces dernières pattes sont toutes à peu près de la même longueur.»

In 1840 he gave the following diagnosis of the *species*:

»Article terminal des antennes styloforme et sans divisions annulaires. Antennes inférieures de la longueur des supérieures et de même forme. Pates des cinq dernières paires ayant toutes

à peu près les mêmes dimensions. Lame terminale de l'abdomen triangulaire, mais obtuse au bout. Article basilaire des dernières fausses pates très-élargi en dedans et presque quadrilatère. Longueur, environ 8 lignes. Couleur brunâtre. Habite nos mers.»

From the *generic* description of *Hyperia*, given on the same occasion the following passage may be quoted, as certainly belonging to *H. Latreillei*, and not to the whole genus:

»(Les pates) de la première pair s'avancent de chaque côté de la bouche, et ne sont pas beaucoup plus petites que les autres; leur antépénultième article est un peu élargi en dessous, et son angle antéro-inférieur s'avance en forme de dent au dessous de l'article suivant; mais ce dernier se prolonge beaucoup plus loin et ne constitue pas avec cette dent immobile une pince didactyle. Les pates de la seconde paire offrent à peu près le même mode de conformation; mais leur antépénultième article et moins développé, et elles sont encore moins propres à agir comme des organes de préhension.»

From the last quotation it is clear that the author mistook the first pair of peraeopoda for the second. In all other respects the description is adequate.

In 1857 A. WHITE characterized *Hyperia Latreillei* with the following words:

»Of a brownish colour, about eight lines long; the lower antennæ as long as the upper, and of the same form; the first six or seven joints of the filament of upper and lower antennæ fused; five last pairs of legs nearly all of the same size; terminal abdominal plate triangular, blunt at the end.»

To judge from his reference to »the filament of upper and lower antennæ» it is probable that he had examined a young male of the species. He gave on the same occasion a recognisable drawing of the animal, and there also the flagellum of the antennæ is indicated as multi-articulate.

In 1862 SPENCE BATE described under the name *Hyperia galba* an animal which must be identified with *H. Latreillei*, as far as the imperfect description and drawing allow any identification. From his description I quote:

»First pair of gnathopoda having the inferior angle of the meros but slightly produced; the inferior angle of the carpus but little produced anteriorly, though somewhat deeply inferiorly, and having the margin furnished with strong stiff spines; propodos cylindrical, shorter than the carpus, but less stout, armed along the inferior margin with a few very minute but sharp denticles. Second pair of gnathopoda longer than the first, having the inferior angles of both the meros and carpus more advanced anteriorly than those of the first pair, and armed with a few straight stiff spines; propodos as long as the carpus, but much more slender, unarmed along the inferior margin; dactylos short, slender, sharp. Pereiopoda subequal, tolerably robust. Peduncle of the posterior pair of pleopoda reaching to the apex of the rami of the preceding pair. Telson lanceolate.»

In the same work he described a new species, *Lestrigonus Kinahani*, which probably is a male of *Hyperia Latreillei*. The description does not allow of a final judgement in this case, but from the drawing it seems more likely to be *H. Latreillei* than *H. galba*. In 1868 SPENCE BATE and WESTWOOD gave a new drawing and description of the same species, but not sufficiently clearly to settle the question. In this latter drawing the authors represent the second and third ural segments as not coalesced. Their specific diagnosis which is applicable to more than half the number of known species of *Hyperia*, runs:

»Antennæ subequal; the superior being rather the longer, equally (sic) the entire length of the animal.»

In 1870 A. BOECK gave a new diagnosis of *Hyperia Latreillei*, using the name *H. medusarum*:

»Pedes 1mi paris manu non lata, extrorsum gradatim angustiore, in margine posteriore serrata et spinis nonnullis armata; carpo extrorsum multo latiore; calce non ad mediam manum porrecta. Pedes 2di paris manu paulo angustiore; calce multo longiore quam 1mi paris. Pedes saltatorii ultimi paris pedunculo duplo longiore quam lato. Appendix caudalis parum longior quam ad basin lata, et ad medium pedunculum pedum saltatorium ultimi paris porrecta.»

In 1872 he repeated the same Latin diagnosis and gave an elaborate description and drawings of the species, which doubtless prove that the animal he described under the name *Hyperia medusarum* was a true *H. Latreillei*. I translate here below the most important part of his description:

»The first joint of the first pair of legs is very broad and flattened, with the front margin strongly convex. The second and third joints are very short, with slender bristles on the hind part of the hind margin. The third joint grows broader distally, and is provided at the lower hind corner with a small heel, which is rounded at the apex; its hinder and lower margin are armed with bristles. The fifth joint is somewhat curved, is narrower towards the apex, and is set with many small bristles on the inner margin, and some larger ones on the outer side. The second pair of legs are similar to the first pair, but the heel of the carpus is much longer, and the hand (= metacarpus) more slender, with a longer claw. The third joint of the third and fourth pairs is a little broader, but shorter than the fourth joint, which again is shorter than the fifth. The last three pairs of legs are of about the same shape and length. Their first joint is dilated, and about twice as long as broad, or a little longer. The third joint is only a little dilated, and about as long as the fourth joint, which is shorter than the fifth. The first pair of uropoda reach farther back than the second pair. The rami are elongated, lanceolate, the outer being a little shorter than the inner. The rami of the second pair are shorter than those of the first pair, and somewhat broader in comparison. The outer ramus of the third pair is a little longer than the inner one and only a little shorter than the peduncle; the inner ramus is lanceolate, and provided on both margins with small spines. The telson is somewhat longer than it is broad at the base, rounded at the apex, and a little more than half as long as the peduncle of the last pair of uropoda.»<sup>1)</sup>

In 1884 H. BLANC described our species under the name *Hyperia galba*, from the west part of the Baltic, giving a good account of the glands within the peræopoda, and illustrating it by drawings.

In 1887 I briefly pointed out the specific difference between *Hyperia medusarum*, *H. Latreillei*, and *H. galba*.<sup>2)</sup> The same year H. J. HANSEN recorded *Hyperia Latreillei*, but without giving any description.

<sup>1)</sup> The wording, l. c. p. 81, is »Halevedhænget er — — — ubetydelig længere end Skaftet paa det sidste Par af Springfødder», but this is evidently a misprint for »— — — ubetydelig længere end halvdelen af Skaftet etc.»; compare his Latin diagnosis quoted above.

<sup>2)</sup> C. BOVALLIUS. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 561—563.

### The male.

Pl. IX, fig. 31—43, and Pl. X, fig. 1—13.

The *body* is broad and thick, but the peræon is not at all tumid as in the female. The pleon and urus together are a little longer than the peræon. The surface of all the segments is even and lustrous as if polished; the segments of the peræon are somewhat convex transversely, those of the pleon a little concave laterally.

The *head* is almost as long as the first two peræonal segments together; it is as long as the head of the female but much narrower and less deep; the depth about equals the first two and half the third peræonal segments. The antennal groove commences below the middle of the front side of the head, and is about as broad as high.

The *eyes* occupy the whole surface of the head; they are separated at the top of the head by a narrow strip.

The *first pair of antennæ* (Pl. IX, fig. 31—34) in the adult male are longer than the head and peræon together, and distinctly shorter than the second pair. The first peduncular joint is stout and thick, somewhat broader than long, and about twice as long as the two following joints together; these two last are equal in length. The first joint of the flagellum is more than twice as long as the whole peduncle, conical, and about three times as broad at the base as at the apex; it is thickly covered with olfactory hairs; the second and third joints are somewhat shorter than the following ones, but nevertheless longer than broad; the fourth joint is much shorter than the two preceding joints together; the fifth and following joints are almost equal in length, cylindrical, about fifteen times as long as broad, and sparingly set with short hairs; the last joint is somewhat shorter, nine times as long as broad, with bulging sides; it is tipped at the apex with four stout hairs (Pl. IX, fig. 32). The flagellar joints are twenty-eight or thirty in number.

In the young male (Pl. IX, fig. 33 and 34) the antennæ are of course much shorter and comparatively thicker, but of the same form. The first flagellar joint is scarcely twice as long as the whole peduncle, and sparingly set with some few short hairs; the five or six following joints are about as long as broad; the next ten to fifteen joints are nearly twice as long as broad, all without hairs. When the animal grows older the number of flagellar joints is increased by the formation of new ones at the apex of the first flagellar joint, which slowly increases in length itself. In very young males just hatched the first pair of antennæ are very similar to that pair in the female, but comparatively longer; at a closer examination the tip of the single flagellar joint will be found faintly divided into two or three small articuli; the epidermis however does not at this early stage indicate any articulation between these small articuli, or between them and the large basal portion of the flagellum.

The *second pair of antennæ* (Pl. IX, fig. 35 and 36). The peduncle is scarcely as long as the peduncle of the first pair. The first free joint is thick, as broad as long, and at its side projects the glandular cone, which is very low. The second joint is only a little shorter

than the first, and broader than long; the third or last peduncular joint is shorter than the two preceding ones together, tapering, and with somewhat bulging sides. The first joint of the flagellum is about as long as the last peduncular joint; the second joint is not half as long as the first; the following joints are equal in length, as long as the second, cylindrical, and about twelve times as long as broad; each joint is provided with a few hairs; the last flagellar joint tapers towards the apex, and is about ten times as long as broad at the base. The number of flagellar joints is about the same as in the first pair.

The *labrum* (Pl. IX, fig. 37) is broader than long, and bilobed; the incision between the lobes is not deep; it is sparingly provided with minute hairs.

The *mandibles* (Pl. IX, fig. 38—40) have a thick and stout stem, feebly bent inwards at the apex. The incisive lamina is curved, and armed with three longer and four smaller sharp teeth. The molar tubercle is very large; the grinding surface is ovate, fringed with a dense row of long stout spines; the outer margin is armed with a row of simple or double-pointed teeth; between these teeth and the spines the grinding surface shows regular rows of small rounded tubercles like pebbles (Pl. IX, fig. 40). The secondary incisive projection of the left mandible is irregularly triangular, and armed with four sharp teeth. On the outer side of the stem of the mandible there is a tubercular prominence on which the palp articulates; the first joint is slender, cylindrical, and nearly four times as long as broad; the second joint is only a little more slender than the first and somewhat longer; the third joint is narrower and shorter than the second, tapering, feebly curved, and fringed along the convex upper margin with very minute hairs (Pl. IX, fig. 38).

The *labium* is broad, the median projection is rounded, and almost as deep as the lateral projections which are tongue-shaped, and smooth.

The *first pair of maxillæ* (Pl. IX, fig. 41) consist of a very short, thick, basal joint and two laminae. The principal lamina is much longer than the basal joint; the apical portion is broad, feebly curved and concave; the margins are provided with hairs and bristles; on the under, almost truncated margin there are three equidistant, strong spines. The secondary lamina is feebly concave and bent over the apical process of the principal lamina; the convex margin is armed with irregular teeth, and the lower inner corner with a short, stout spine.

The *second pair of maxillæ* (Pl. IX, fig. 42 and 43) consist of two laminae. The principal lamina is broad at the base; the apical portion is strongly curved and tapering; the rounded tip is covered with long hairs, most of which are club-shaped; just at the apex there are a few long, strong spines. The secondary lamina is fully as thick as the principal, armed at the apex with two strong spines, and provided with long club-shaped hairs. (Pl. IX, fig. 43).

The *maxillipeds* (Pl. X, fig. 2 and 3). The basal portion is very broad at the base, tapering, and strongly bent. The lateral laminae are ovate; the inner margins are feebly undulate, and set with a few small tufts of very short hairs. The median lobe forms a large triangular process; the inner or front margin is densely set with long hairs.

The *peræon*. The first segment is fully as long as the second; the seventh segment is as long as the sixth.

The *epimerals* of the first and five following pairs of peræopoda are somewhat longer than the under margins of the corresponding segments; that of the seventh pair is a little shorter. They are all longer than deep, and rounded below.

The *branchial sacks* are fixed to the second and four following pairs of peræopoda; they are a little shorter than the femora of the corresponding legs.

The *first pair of peræopoda* (Pl. X, fig. 4—6). The femur is almost as long as the four following joints together; the hind margin is feebly convex, having the lower corner fringed with long bristles; the front margin is convex. The genu is somewhat broader than long; the lower hind corner is fringed with long bristles. The tibia is longer than the genu; the hind portion is produced downwards, spoon-shaped, and the margins are fringed with long bristles. The carpus is as long as the two preceding joints together, dilated, and faintly produced at the lower hind corner; the front margin is straight, the lower corner is set with five or six long bristles, and two shorter ones are placed on the front margin a little above; the hind margin is irregularly convex, with three distinct notches below the middle, from each of which rises a long bristle; a few bristles are fixed on the sides of the joint; the under margins of the joint are a little convex, and fringed with long bristles. The metacarpus is shorter than the carpus, feebly tapering towards the apex, and scarcely more than twice as long as broad; the front margin is strongly convex, the lower half being set with four or five bristles; the hind margin is almost straight, and strongly serrated, the teeth being irregularly denticulated at their bases, but not regularly three-pointed as in *Hyperia galba*; a few bristles are to be seen on the sides of the joint and some are fixed near to the hind margin, but none into its edge or notching it and interrupting the serration as in *Hyperia spinigera*. The dactylus (Pl. X, fig. 5) is long, curved, and serrated along the upper half of the hind margin; it is much longer than the breadth of the metacarpus, and more than half as long as its length. Glands are richly developed within the femur, running through the other joints to the base of the dactylus.

The *second pair* (Pl. X, fig. 7 and 8) are a little longer than the first, and do not fully reach to the middle of the metacarpus of the third pair. The femur is a little broader and longer than that in the first pair and fully as long as the four following joints together; the front margin is somewhat more convex than the hind margin, the lower corner of which is set with long bristles. The genu is broader than long, the lower hind corner being fringed with long bristles. The tibia is twice as long as the genu; the lower hind portion is produced as in the first pair, and fringed with long bristles. The carpus is fully as long as the two preceding joints together, dilated and produced; the front margin is straight, the lower corner being provided with long bristles; the hind margin is almost straight or rather a little excavated, without bristles; the front side of the carpal process is broadly spoon-shaped, and not half as long as the hind margin of the metacarpus; the margins are fringed with long bristles. The metacarpus is as long as the carpus without the carpal process, feebly tapering, and somewhat more than twice as long as broad; the front margin is convex, and provided with a few bristles below the middle; the hind margin is almost straight, and armed as in the first pair.

The dactylus is more than half as long as the metacarpus, and serrated along the upper half of the hind margin. Glands as in the first pair.

The *third and fourth pairs* (Pl. X, fig. 9). The femur is elongate-ovate; the hind margin is feebly notched, and set with from six to nine very short spines; the lower corner carries three or four unequal bristles; the front margin is smooth. The genu is about as long as broad; the lower hind corner with three or four bristles. The tibia is considerably longer than the genu; the hind margin carries four or five very short bristles. The carpus is a little longer than the tibia; the hind margin is armed with six or eight unequal bristles in the third pair, and with three or four bristles in the fourth pair; the longest of these bristles are much shorter than the breadth of the joint. The metacarpus is more slender than the carpus, and much longer, but not as long as the carpus and tibia together; the hind margin is slightly curved, without bristles; it is minutely serrated in the third pair and less distinctly serrated in the fourth. The dactylus is curved, and somewhat shorter than a third of the metacarpus. Glands are present in all the joints, except in the dactylus.

The *fifth, sixth, and seventh pairs* (Pl. X, fig. 10—12) are a little shorter than the third and fourth pairs. The femur is shorter and not broader than that in the preceding pair; the front margin is slightly curved and smooth; the hind margin is almost straight. The genu is as long as broad. The tibia is much longer than the genu, and smooth. The carpus is longer than the tibia, and smooth; it is a little thicker and shorter in the seventh pair than in the two preceding, but nevertheless longer than the tibia. The metacarpus is longer than the carpus and more than half as long as the femur, but shorter than the metacarpus in the third and fourth pairs; the front margin is entirely smooth. The dactylus is slightly curved, smooth, and equal in length to about a fourth of the metacarpus. Glands as in the preceding pairs.

The *pleon* equals in length the last five peræonal segments together. The lateral parts of the pleonal segments are feebly rounded below; the hind corners are angular.

The *pleopoda*. The outer ramus of the first pair has fifteen joints, the inner fourteen.

The *urus* is as long as the last pleonal segment and half the preceding. The first ural segment is a little longer the last coalesced one; this latter is about twice as broad as long.

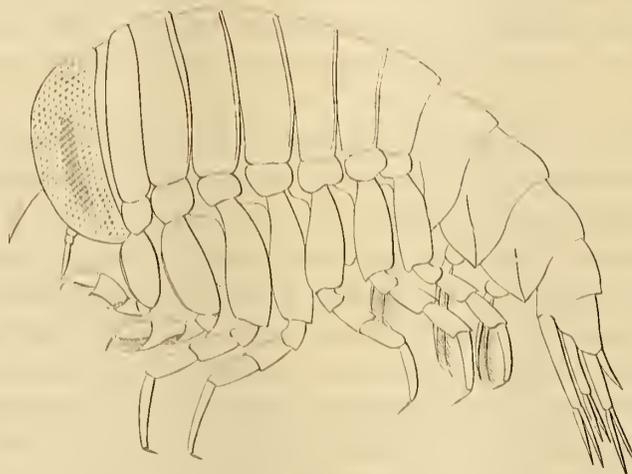
The *wropoda* (Pl. X, fig. 13). The *first pair* reach to the middle of the outer ramus of the last pair; the peduncle is linear and more than three times as long as broad; the rami are almost equal in length, elongate-lanceolate, and nearly as long as the peduncle; the outer ramus is smooth along the outer margin and serrated along the inner; the inner ramus is serrated along both margins. The *second pair* come short of the middle of the outer ramus of the last pair; the peduncle is broader at the apex than that of the first pair, narrower at the base, and more than twice as long as broad at the apex; the outer ramus is shorter and narrower than the inner, serrated on the inner margin and smooth along the outer; the inner ramus is lanceolate, sharp-pointed, serrated along both margins, and only a little shorter than the peduncle. In the *third pair* the peduncle is very broad at the middle and at the apex, but narrowed at the base; it is scarcely more than a third

longer than the breadth at the apex, and distinctly longer than the inner ramus; the outer ramus is longer but narrower than the inner, serrated along the inner margin, and smooth on the outer; the inner ramus is broadly lanceolate, narrow and sharp-pointed at the apex, and serrated along both margins; it is a little longer than the breadth of the peduncle.

The *telson* is broader than long, spade-shaped; it is broader than, and more than half as long as the peduncle of the last pair of uropoda; it equals in length the last urol segment.

### The Female.

Pl. X, fig. 14-17.



*Hyperia Latreillei*, H. MULNE EDWARDS.

Drawn from the supposed type-specimen in the collection of the «Musée d'Histoire Naturelle» in Paris.

The *body*, especially the *peraeon*, is much broader and wider than in the male. The *pleon* and *urus* together are a little shorter than the *peraeon*.

The *head* is as long as the first two *peraeonal* segments together, and as deep as broad; the depth equals the length of the first four *peraeonal* segments together.

The *first pair of antennæ* (Pl. X, fig. 14 and 15) do not reach to the under margin of the head. The first joint of the peduncle is thick and stout, cylindrical, and longer than broad; it is twice as long as the two following joints together, which are nearly equal in length. The single flagellar joint is more slender than the peduncle, and much longer, slightly curved downwards, and set with hairs along the under margin.

The *second pair of antennæ* (Pl. X, fig. 16 and 17) are nearly as long as the first pair. The three peduncular joints are almost equal in length, the first being much the thickest. The single flagellar joint is slender, evenly tapering towards the apex; it is about as long as the whole peduncle, and is fringed along the margins with minute hairs (Pl. X, fig. 17).

The *mouth-organs* are like those in the male.

The *epimerals* are somewhat deeper than in the male.

The *ovitrices* are elongate-triangular, truncated below, and as long as the branchial sacks.

The *first and second pairs of peræopoda* are like those pairs in the male but the femur is comparatively broader.

The *third and four following pairs* are similar to those in the male but the four last joints of the sixth and seventh pairs are somewhat thicker and stouter.

The *pleon* is scarcely as long as the last four peræonal segments together.

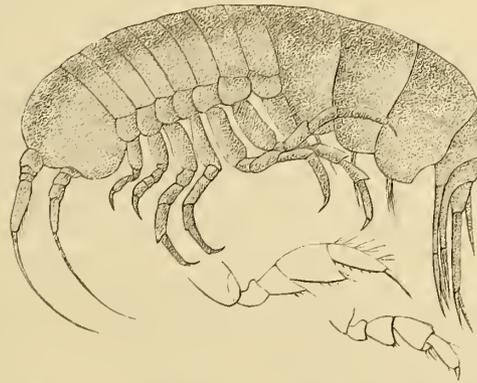
The *urus*; the first segment is scarcely longer than the last coalesced one.

The *uropoda*; the peduncles are a trifle shorter than those in the male.

The *telson* is comparatively longer than that in the male, being nearly as long as broad.

#### 4. *HYPERIA GAUDICHAUDII*, H. MILNE EDWARDS, 1830.

Pl. X, fig. 18—24.



*Hyperia Gaudichaudii*, H. MILNE EDWARDS.

Facsimile from SP. BATE, Catal. Amph. Crust. Brit. Museum, pl. 48, fig. 3.

**Diagn.** *Caput* curtum, latum, segmenta duo priora peræi longitudine æquans. Segmenta omnia peræi libera. Carpus *pedum peræi* primi paris dilatatus, paululo productus; margo posterior bis incisus, spinisque instructus. Carpus *pedum secundi* paris productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi brevior. Metacarpus primi et secundi parium spinis parce instructus; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores, spinis nonnullis brevibus instructi. Pedes parium trium ultimorum duobus præcedentibus non longiores; carpus *pedum quinti* paris tibia paullo longior, non serratus. Latera segmentorum *plei* duorum ultimorum post angulata. Pedunculus *pedum uri* ultimi paris latus. *Telson* longius quam latius, segmento ultimo uri brevius, pedunculum *pedum uri* ultimi paris latitudine æquans, ac dimidio pedunculi ejusdem brevius.

The *head* is short and broad, as long as the first two peræonal segments together. All the *peræonal* segments are free. The carpus of the first pair of *peræopoda* is dilated, very little produced; the hind margin is twice notched, and provided with bristles; the carpus of

the second pair is produced; the front margin of the carpal process is shorter than half the hind margin of the metacarpus. The metacarpus of the first and second pairs is sparingly provided with bristles; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are somewhat longer than the first two, and provided with a few short bristles. The last three pairs are not longer than the two preceding; the carpus of the fifth pair is a little longer than the tibia, and not serrated. The lateral parts of the last two *pleonal* segments are posteriorly angulated. The peduncle of the last pair of *uropoda* is broad. The *telson* is longer than broad, and shorter than the last ural segment; it is as broad as the peduncle of the last pair of *uropoda* and shorter than half the same peduncle.

**Colour.** Brownish.

**Length.** 10—20 mm.

**Hab.** The Southern temperate region of the Pacific; the Antarctic region: the Strait of Magellan. (F. M.; D. M.; S. M.)

<b>Syn. 1840.</b>	<i>Hyperia Gaudichaudii</i> ,	H. MILNE EDWARDS.	—	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 77.
	»	»	H. NICOLET.	1849. Historia fisica y politica de Chile, por Claudio Gay. Zoologia. Tomo 3 <sup>ro</sup> , p. 245.
	<i>Lestrigonus</i>	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 289, pl. 48, fig. 3.
	<i>Hyperia</i>	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 16.
	»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1394, pl. 169.

*Hyperia Gaudichaudii* comes extremely near to *H. Latreillei* and could almost with as much right be called a local variety as a species, but as the small differences between the two species seem to be constant it may be retained as a species by itself and placed here as a link between *H. Latreillei* and *H. galba*. From the former it may be distinguished principally by the more elongated peduncles of the *uropoda* and the shorter *telson*, and possibly also the serration of the metacarpus of the first and second pairs of *peræopoda* may prove to be a characteristic of specific value. From *H. galba* it is to be distinguished by the shorter carpal process of the first two pairs of *peræopoda*, by the greater length of the same pairs of legs, by the narrower femora of the last three pairs and by the hind corner of the first *pleonal* segment being rounded not angulated.

The original diagnosis given by H. MILNE EDWARDS in 1840 runs:

»Antennes égales et terminées par un filet multiarticulé assez long pour atteindre le quatrième segment du thorax. Pates et abdomen comme chez l'H. de Latreille. Longueur, environ sept lignes. Habite les mers du Chili.»

From this diagnosis it would have been impossible to identify the species — and the more so as the author did not give any drawing of it — if the typical specimen had not been preserved in the collection of the »Musée du Jardin des Plantes». It is one of the precious specimens in the fine collection entrusted to me by Professor ALPHONSE MILNE EDWARDS. From this specimen the description below and the drawing on plate X are taken.

In 1849 NICOLET gave the following diagnosis and description:

»H. antennis superioribus inferioribusque æqualibus, seta multiarticulata terminatis; lamina terminali abdominis triangulari, apice obtusa.»

»Antenas iguales, terminadas por un filete multiarticulado, bastante largo para llegar al cuarto segmento torácico; patas de los cinco últimos pares casi de igual dimension; el abdómen concluye en una lámina triangular, obtusa en la punta; artículo basilar de las últimas falsas patas muy ensanchado por dentro y casi cuadrilátero. Longitud, 7 lín.»

This description is however only a translation from H. MILNE EDWARDS.

In 1862 SPENCE BATE gave for the first time a more elaborate description and the first drawing of the animal, probably taking them from the very same specimen that I have examined.<sup>1)</sup> His description runs:

»*Lestrigonus Gaudichaudii*. Cephalon transversely ovate. Superior antennæ reaching to the fourth or fifth segment of the pereion; first joint of the peduncle short, but longer than the second and third together; first articulus of the flagellum twice as long as the peduncle, and tapering to the distal extremity, the other articuli of the flagellum being short — those near the base not longer than broad. Inferior antennæ a little shorter than the superior; the peduncle concealed as far as the extremity of the fourth joint; fifth joint slightly curved, and reaching to the extremity of the peduncle of the superior antennæ: first articulus of the flagellum as long as the last joint of the peduncle: the remaining articuli, being very short, resemble those of the superior antennæ. First pair of gnathopoda small, having the carpus and meros but slightly produced inferiorly, and the antero-inferior margin fringed with hairs; propodos of the same length as the carpus, much narrower, and almost cylindrical; dactylos very short — too short to antagonize with the produced extremity of the carpus. Second pair of gnathopoda rather longer than the first, and having the carpus and meros more produced than those of the first; propodos scarcely longer than the carpus, not half its width, and having the superior and inferior margins fringed with hairs; dactylos about half the length of the propodos, and capable of reaching the extremity of the produced carpus. Pereiopoda subequal and tolerably robust. Antepenultimate and penultimate pairs of pleopoda short, subequal: ultimate pair longer, the peduncle extending to the extremity of the preceding pair; rami half the length of the peduncle. Telson broadly lanceolate.»

In 1888 STEBBING gave a complete description and excellent drawings of the male of *Hyperia Gaudichaudii*, with respect to which I shall merely restrict myself to a few characteristics which are especially important for the distinction of this species from the two closely allied *H. Latreillei* and *H. galba*.

<sup>1)</sup> See SPENCE BATE'S »Catalogue» p. 289.

**The male.**

Pl. X, fig. 18—23.

The *body* is comparatively wider than in the preceding species, and the legs a little shorter and thicker.

The *head* is shorter than the first two peræonal segments together, fully twice as deep as long, and comparatively less broad than in *Hyperia galba*.

The *epimeral* of the first pair is much deeper than long, that of the second pair as long as deep, and those of the following pairs longer than deep.

The *first pair of peræopoda* (Pl. X, fig. 19). The femur is somewhat longer than the four following joints together. The carpus is almost exactly like that joint in *Hyperia Latreillei*; the hind margin shows two notches set with bristles. The metacarpus is shorter than the carpus; the hind margin is serrated, not notched, the serration is formed by simple, equal teeth (Pl. X, fig. 20). The dactylus is more than half as long as the metacarpus.

The *second pair* (Pl. X, fig. 21) are somewhat longer than the first pair, but do not reach fully to the apex of the carpus of the third pair. Thus the first two pairs are comparatively a little shorter than in *Hyperia Latreillei*, but longer than in *H. galba*. The femur is somewhat longer than the four following joints together. The front side of the carpal process is shorter than half the hind margin of the metacarpus, which is serrated as in the first pair. The dactylus is more than half as long as the metacarpus.

The *third and fourth pairs* (Pl. X, fig. 22) are similar to those pairs in *Hyperia Latreillei*; the femur is perhaps somewhat broader than that in *H. galba*.

The *fifth, sixth and seventh pairs* (Pl. X, fig. 23). The femur is a little shorter than that of the third and fourth pairs, but not broader. The metacarpus is longer than the carpus, and scarcely more than half as long as the femur; the front margin is smooth, not serrated.

The *pleon* equals in length the last six peræonal segments together; the lateral parts of the last two pleonal segments are rounded below, the hind corner angulated, and sharp-pointed. The first segment is rounded below and behind.

The *urus* is a little longer than the last pleonal segment; the first ural segment is somewhat longer than the last coalesced one.

The *uropoda*. The *first pair* do not reach to the apex of the last pair; the rami are about equal in length, elongate-lanceolate, and much shorter than the peduncle. The *second pair* reach beyond the apex of the peduncle of the last pair; the peduncle is much longer than the inner ramus; the outer ramus is shorter and narrower than the inner one. In the *third pair* the peduncle is fully twice as long as broad, and much longer than the inner ramus, but not twice as long; the rami are equal in length, serrated as in the preceding species; the inner ramus is much longer than the breadth of the peduncle.

The *telson* is tongue-shaped, somewhat longer than broad, and a little narrower than the peduncle of the last pair of uropoda; it is shorter than the last ural segment, and quite half as long as the peduncle of the last pair of uropoda.

### The female.

Pl. X, fig. 24.

The *body* is very broad, especially the peræon, which, where it is broadest, is almost twice as broad as the head.

The *head* is a little shorter than the first two peræonal segments together and somewhat broader than in the male.

The *first pair of peræopoda*. The femur is longer than the four following joints together. The carpus is comparatively long, quite as long as the two preceding joints together and almost twice as long as broad at the lower end; the two notches on the hind margin are set with stout bristles; the front margin is straight. The metacarpus equals in length three fourths of the carpus; the front margin is strongly curved, and set with some bristles; the hind margin is straight and serrated, the teeth being simple as in the male. The dactylus is stout, and about half as long as the metacarpus; the hind margin is serrated.

The *second pair* reach somewhat beyond the apex of the carpus of the third pair. The femur is broadly ovate, and longer than the four following joints together. The carpus with the carpal process is longer than the two preceding joints together; the front side of the carpal process is a little shorter than half the hind margin of the metacarpus, and fringed with stout bristles. The metacarpus is shorter than the carpus; the front margin is curved, and set with a few bristles; the hind margin is straight, and serrated as in the male. The dactylus is more than half as long as the metacarpus.

The *third and fourth pairs* have the femur ovate, and somewhat longer than the three following joints together. The tibia is as long as the carpus; both are smooth. The metacarpus is longer than the carpus.

The *fifth, sixth, and seventh pairs* are rather shorter than the two preceding pairs. The femur is not broader than that of the two preceding. The tibia is as long as the carpus. The metacarpus is longer than the carpus, but somewhat shorter than the metacarpus of the third and fourth pairs; the front margin is not serrated.

The *pleon* equals in length the last four peræonal segments together.

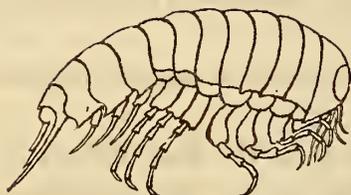
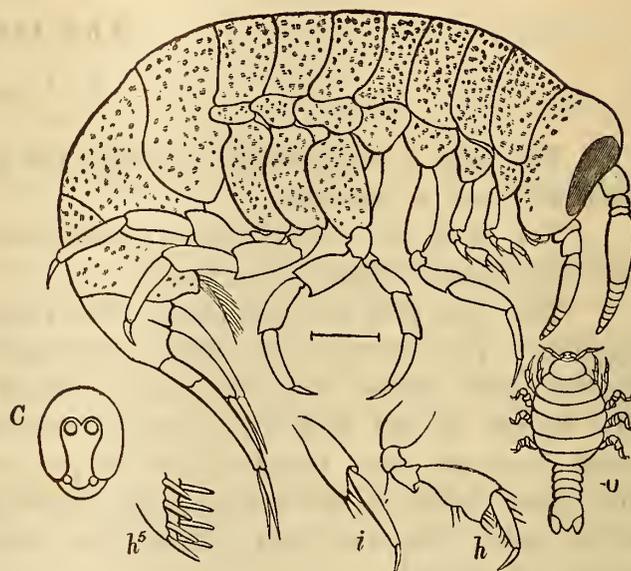
The *urus* is longer than the last pleonal segment.

The peduncle of the last pair of *uropoda* (Pl. X, fig. 24) is nearly twice as long as broad.

The *telson* is tongue-shaped, and half as long as the peduncle of the last pair of uropoda.

5. *HYPERIA GALBA*, MONTAGU, 1813.

Pl. X, fig. 25—32.

*Cancer Gammarus Galba*, MONTAGU.Facsimile from MONTAGU. Trans. Linn. Soc. Vol. 11,  
pl. 2, fig. 2.*Hyperia galba*, MONTAGU.Facsimile from SP. BATE and WESTWOOD, Brit. Sessile-eyed Crust.,  
Vol. 2, p. 2.

**Diagn.** *Caput* curtum, latum, segmentis duobus primis peræi brevius. Segmenta omnia peræi libera. Carpus pedum peræi primi parvis dilatatus, productus, margine posteriore semel inciso, spinisque instructo. Carpus pedum secundi parvis productus, margo anterior processus carpalis dimidio marginis posterioris metacarpi longior. Metacarpus pedum primi et secundi parvis spinis parce instructus, margine posteriore serrato, dentibus tri-cuspidatis; dactylus longus. Pedes tertii ac quarti parvis pedibus parvis duorum præcedentium multo longiores, spinis destituti; metacarpus serratus. Pedes parvis trium ultimorum duobus præcedentibus paululo longiores, femore latiore; carpus pedum quinti parvis tibia non longior, nec serratus. Latera segmentorum plei post angulata. Pedunculus pedum uri ultimi parvis plus quam duplo longior quam latior. Telson longius quam latius, segmento ultimo uri brevius; pedunculo pedum uri ultimi parvis latius, sed dimidio pedunculi ejusdem brevius.

The *head* is short and broad, shorter than the first two peræonal segments together. All the *peræonal* segments are free. The carpus of the first pair of *peræopoda* is dilated and produced, the hind margin showing one single notch, and being provided with bristles. The carpus of the second pair is produced; the front margin of the carpal process is more than half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs is sparingly set with bristles; the hind margin is serrated, the teeth being three-pointed; the dactylus is long. The third and fourth pairs are much longer than the first two pairs, without bristles, but with the metacarpus serrated. The last three pairs are a little longer than the two preceding pairs, and have the femur broader; the carpus of

the fifth pair is not longer than the tibia, and is not serrated. The lateral parts of the *pleonal* segments are angulated behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is longer than broad, and shorter than the last ural segment; it is broader than the peduncle of the last pair of *uropoda*, but not half as long as the same peduncle.

**Colour.** Yellowish green speckled with dark red.

**Length.** 9—15 mm.

**Hab.** The Northern temperate region of the Atlantic: the North Sea, and off the South coast of England. The tropical region of the Atlantic: the West-Indies. (D. M.; F. M.; S. M.)

**Syn. 1813.** *Cancer Gammarus galba*, MONTAGU.

			—	Descriptions of several new or rare Animals, principally marine, discovered on the South Coast of Devonshire.» Trans. of the Linnean Society of London. Vol. 11, Part 1, p. 4, pl. 2, fig. 2.
<i>Hyperia galba</i> ,	»	F. E. GUÉRIN.	1825.	»Uroptère.» Encyclopédie Méthodique. Histoire naturelle. Tome 10 <sup>me</sup> , p. 771.
»	»	A. WHITE.	1847.	List of the Specimens of Crustacea in the Collection of the British Museum, p. 90.
»	»	SPENCE BATE.	1856.	»On the British Edriophthalma.» Report on the 25 <sup>th</sup> Meeting of the British Association for the Advancement of Science, at Glasgow, 1855, p. 59.
»	»	W. THOMPSON.	1856.	The Natural History of Ireland. Vol. 4, p. 397.
»	»	KINAHAN.	1859.	»Notes on dredging in Belfast Bay.» The Natural History Review. Vol. 6, p. 83.
»	»	SPENCE BATE and WESTWOOD.	1868.	A History of the British Sessile-eyed Crustacea. Vol. 2, p. 12, fig.
»	»	TH. EDWARD.	1868.	»Stray Notes on some of the smaller Crustaceans. 1. On the habits etc. of the Hyperiidæ.» The Journal of the Linnean Society. Zoology. Vol. 9, p. 143.
»	»	A. MERLE NORMAN.	1869.	»Shetland Final Dredging Report.» Part. 2. On the Crustacea etc. Report of the 38 <sup>th</sup> Meeting of the British Asso-

- ciation for the Advancement of Science; held at Norwich, 1868, p. 286.
- Hyperia galba*, MONTAGU. J. RITZEMA BOS. 1874. Bijdrage tot de kennis van de Crustacea Hedriophthalmata van Nederland en zijne kusten, p. 54.
- » » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.
- » » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd 4, p. 562, pl. 43, fig. 47—54.
1829. *Hiella Orbignyi*, H. STRAUS DURCKHEIM. — »Mémoire sur les Hiella». Mémoires du Muséum d'Hist. Nat. Tome 18<sup>me</sup>, p. 65, pl. 4.
1838. *Lestrigonus exulans*, H. KROEYER. — »Grønlands Amphipoder». Det K. Danske Videnskabs-Selskabs Naturvidensk. og Mathemat. Afhandlinger. Deel 7, p. (68).
- » » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 287, pl. 48, fig. 2.
- » » » SPENCE BATE and WESTWOOD. 1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 12, fig.
- » » » TH. EDWARD. 1868. »Stray Notes on some of the smaller Crustaceans. 1. On the habits etc. of the Hyperiidæ». The Journal of the Linnean Society. Zoology. Vol. 9, p. 143.
1862. *Hyperia medusarum*, (O. FABRICIUS.) SPENCE BATE. Catal. Amph. Crust. Brit. Museum, p. 295, pl. 49, fig. 1.
1874. *Hyperia medusarum*, O. F. MÜLLER. W. C. M'INTOSH. »On the Invertebrate Marine Fauna and Fishes of St. Andrews». Ann. and Mag. of Natural History. 4<sup>th</sup> series. Vol. 14, p. 271.
- » » » P. P. C. HOEK. 1889. »Crustacea Neerlandica, Nieuwe lijst van tot de Fauna van Nederland behoorende schaaldieren». Tijdschrift der Nederlandsche Dierkundige Vereeniging. 2<sup>de</sup> Reek. Deel 2, 1889, p. (15).

MONTAGU gave in 1813, when he proposed the new species *Cancer Gammarus galba*, the following description:

»Body ovate, somewhat elongated at the tail, smooth, glossy, and when alive of an olive-green minutely speckled with brown, but by drying becomes rufous-brown: antennæ of the male remarkably short; in the female two pairs extremely long, and slender, nearly equal to the length of the body: joints of the body, independent of the head, and the joint to which the caudal fins are attached, eleven; the head is large, and much resembles that of a maggot, and in the male appears to have no division between the eyes, but a continuation of the same transparent membrane covers the whole: the eyes of the female are very large, but distinctly marked by a division: the two pairs of anterior legs, like those of *C. spinosus*, are small, and not subcheliferous, but occupy the place of arms, and scarcely differing in any respect from the other five pairs, all of which are furnished with a very small claw: abdominal fins three pairs; caudal fins five, flat, and bifid; the middle one very broad, concealing the others which are capable of spreading laterally. Length half an inch or more.

The female is rather more slender in the body, and does not so suddenly decrease towards the tail: the eyes, as before mentioned, are distinct, and are of a bright red when alive, reticulated and marked with two streaks of black, one each side the eye, probably the reflection of a pupil.»

It must be observed here that MONTAGU mistook the sexes and called the male female and the female male, but more remarkable is the fact that he expressly claimed the difference in length of the antennæ as only a sexual characteristic, and it is to be regretted that subsequent authors did not study his description enough to avoid the mistake of making two separate genera of the two sexes. The value of MONTAGU'S description as to the specific distinction of the animal in question is not very high, and it would have been almost impossible to identify his species if we had not the statements of WHITE and SPENCE BATE, that his very specimens were preserved in the collection of the British Museum.

The tracing of the history of the species has, however, not been easy because SPENCE BATE when he drew up his description of *Hyperia galba* in his »Catalogue» of 1862, without further examination took *H. galba* and *H. Latreillei* to be synonymous, and used a specimen of the latter species as the type for his description (see above p. 168). When he and WESTWOOD in 1868 gave a new description and drawing of *H. galba*, they had for a type a specimen of the same species which SPENCE BATE in 1862 called *H. medusarum*, and which I suppose to be the true *H. galba*. My reasons for this supposition are not very strong and only negative for I cannot find any other Northern species, which is provided with the broad femora given by MONTAGU in the drawing reproduced above (p. 180). Under these circumstances it would probably have been more strictly correct to drop the old name given by MONTAGU in favour of a new, but, as no other species is known which can claim the name with better right than this, I have preferred to retain it. *Hyperia galba* seems also to have been accepted by TH. EDWARD and NORMAN within about the same limits as I give below.

From SPENCE BATE'S description of *Hyperia medusarum* in 1862 I quote the following lines:

»First pair of gnathopoda short and robust, having the meros inferiorly produced and tipped anteriorly with a few stiff hairs: carpus long, broad, and widening anteriorly, being inferiorly (but not anteriorly) produced along the inferior margin of the propodos; anterior margin fringed with a few stiff hairs: propodos not more than half the length of the carpus; superior margin slightly arcuate, and fringed with four or five equidistant hairs; inferior margin straight, armed with several small denticles: dactylos about half the length of the propodos, slender and sharp. Second pair of gnathopoda having the meros inferiorly produced and tipped with a few

hairs: carpus infero-anteriorly produced to quite half the length of the propodos, having the margin fringed with stiff hairs; propodos slender, long, rather longer than the carpus, cylindrical, slightly curved, more so on the superior than on the inferior margin; dactylos slender, sharp. Pereiopoda subequal. Penultimate pair of pleopoda shorter than the preceding or ultimate: ultimate pair having the peduncle as long again as the telson; rami about half the length of the peduncle, serrated. Telson broadly lanceolate. Length  $\frac{9}{20}$  of an inch.»

In 1868 SPENCE BATE and WESTWOOD gave the following description:

»— — — — The arms are small, and differ but slightly; the second pair have the hand somewhat the longer, and the wrist somewhat more infero-anteriorly developed than in the first pair; both have the margin of the wrist fringed with strong but not very sharp spines. The walking legs are nearly of one length, and tolerably robust. The caudal appendages are broad and flat, and have the rami serrated at the margins. The peduncle of the last pair reaches quite to the extremity of the preceding, and the middle piece consists of a small lanceolate scale. The colour of the species, except the green eyes is fawn, or faint yellow, passing into a salmon tint soon after the animal is put into spirits; it is also dotted all over with small specks of red.»

»*Specific character.* Cephalon large; pereion distended; pleon compressed. Antennæ short, having the flagella terminating in a few scarcely-visible articuli. First pair of gnathopoda having the carpus broad, but not obliquely produced; second pair having the carpus infero-anteriorly produced. Peduncle of the posterior pair of pleopoda reaching to the apex of the rami of the preceding pair. Telson lanceolate. Length  $\frac{1}{2}$  inch.»

That the authors themselves had some suspicion of the closer relationship of their *Hyperia galba* to *H. medusarum* of SPENCE BATE is clear from the following passage which concludes their description:

»Among the several specimens sent to us from Banff, were a few of smaller size, which differed from the others in having much shorter antennæ, the inferior being the shortest, and terminating in a more obtuse extremity than in the larger specimens. We were at first inclined to describe them as a distinct species, but, all other conditions being considered, we feel certain that they are only immature specimens, a circumstance which induces us to think that probably *H. medusarum* (FABR.) of the Arctic sea may likewise be but the young of this or some other species.»

In 1869 NORMAN recorded *Hyperia galba* from the Shetland Islands and in 1874 M'INTOSH from St. Andrews, but in the latter case under the name *H. medusarum*, O. F. MÜLLER.

In 1874 too J. RITZEMA BOS recorded *Hyperia galba* from Walcheren, on the coast of the Netherlands, expressly referring to the description of SPENCE BATE and WESTWOOD, but, as he did not give any characteristics of the species, it is impossible to tell if it were the true *H. galba*, which he had observed. The same may be said with regard to *H. medusarum* (O. F. MÜLLER), given by HOEK the present year in his list of the Crustacea of the Netherlands, which is cited above under *H. galba* only because he refers to RITZEMA BOS as the first who recorded the species from the Netherlands.

Within the limits I am here assigning the species may be distinguished from its allies by the relative shortness of the first two pairs of peræopoda, by the carpus of the first pair being a little produced and provided with a single notch on the hind margin, by the carpal process of the second pair being fully half as long as the hind margin of the metacarpus, by the femur of the last three pairs being comparatively broad, considerably

broader than that of the third and fourth pairs, and by the telson being shorter than half the peduncle of the last pair of uropoda.

### The male.

Pl. X, fig. 25—29.

The *body* is broad but not tumid, the hind part not being more compressed than the peræon; the pleon and urus together are considerably longer than the peræon.

The *head* is deeper than long, and a little deeper than broad. The antennal groove on the front side commences above the middle and is somewhat higher than broad.

The *first pair of antennæ* in the adult male are much more than half as long as the whole length of the animal, longer than the head and peræon together, and shorter than the second pair. The first joint of the peduncle is about as long as broad, and not fully twice as long as the two following joints together. The first joint of the flagellum is about as long as the whole peduncle, not very tumid and slowly tapering towards the apex; the under and inner sides are thickly covered with olfactory hairs; the second and third joints are very short; the following joints increase in length to the eighth, the next are equal in length, the last is somewhat shorter; in all the flagellar joints are twenty-four in number.

The *second pair of antennæ*. The peduncle is stout; the first free joint is as long as broad; the glandular cone is very large and obtusely rounded at the apex. The second peduncular joint is a little more than half as long as the first; the third is almost cylindrical, and scarcely as long as the two preceding together. The first joint of the flagellum is longer than the last peduncular joint, broad at the base and evenly tapering towards the apex; the following joints are subequal in length. The flagellum has in all twenty-five joints.

The *mouth-organs* are like those in *Hyperia Latreillei*.

The *peræon*. The first segment is fully as long as the second; the third is a little longer; the seventh is the longest of all and considerably longer than the sixth.

The *epimerals* are about as long as the under margins of the corresponding segments, and irregularly rounded below. Those of the first four pairs are fully as deep as long; the following are longer than deep.

The *branchial sacks* are large, ovate, and almost as long as the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. X, fig. 26 and 27). The femur is as long as the four following joints together. The genu is broader than long, with a few comparatively short bristles at the lower hind corner. The tibia is broadly produced at the lower hind corner, gouge-shaped, truncated at the apex, and fringed with tolerably short bristles. The carpus is longer than the two preceding joints together, dilated, and much longer than broad at the lower end; it is distinctly produced, and the margins of the front side

of the carpal process are fringed with stout but short bristles; the front margin of the carpus is straight with one or two short spines near to the lower corner; the hind margin shows one notch, and is sparingly provided with bristles. The metacarpus is as long as the carpus, evenly tapering towards the apex; the front margin is convex showing three or four slight notches, each notch with a short spine; the hind margin is straight and strongly serrated, the teeth being regularly three-pointed. The dactylus is slightly curved, serrated on the hind margin, and nearly half as long as the metacarpus. In this and the following pairs of peræopoda the glands are similar to those in the four preceding species.

The *second pair* (Pl. X, fig. 28 and 29) are a little longer than the first and do not reach farther than to the middle of the carpus of the third pair. The femur is a little longer than the four following joints together; the lower hind corner is set with a few short bristles. The genu is as long as broad, with a few short bristles at the lower hind corner. The tibia is longer than the genu; the produced portion is evenly rounded, spoon-shaped, and fringed with bristles. The carpus is long, dilated, and strongly produced, the carpal process being more than half as long as the rest of the joint; the front and hind margins of the carpus are straight, and without bristles; the front side of the carpal process is more than half as long as the hind margin of the metacarpus; the margins are fringed with comparatively short bristles. The metacarpus is slender, feebly tapering towards the apex, and considerably longer than the carpus without the carpal process; it is more than three times as long as broad at the base; the front margin is almost straight, without spines or bristles; the hind margin is straight, not notched, but strongly serrated, the teeth being regularly three-pointed as in the first pair. The dactylus is slightly curved, serrated on the hind margin, and equals a little more than a third part of the length of the metacarpus, and is considerably longer than the breadth of the same joint.

The *third and fourth pairs*. The femur is elongated, somewhat more than three times as long as broad; the hind margin is smooth, without spines; the lower corner carries one single short spine. The genu is as long as broad. The tibia is much longer than the genu, with the margins entirely smooth. The carpus is longer than the tibia, and carries two short, spine-like bristles on the hind margin. The metacarpus is much more slender and much longer than the carpus; it is twice as long as the tibia, but much shorter than the femur; the front and hind margins are entirely smooth. The dactylus is slightly curved, smooth, and scarcely longer than a fifth part of the length of the metacarpus.

The *fifth, sixth and seventh pairs* are somewhat longer than the two preceding pairs. The femur is considerably broader than that in the third and fourth pairs, twice as long as broad; the front margin is convex, and smooth; the whole of the hind side forms a long groove for the reception of the following joints. The genu is longer than broad. The tibia is half as long again as the genu, with the margins smooth. The carpus is a little longer than the tibia in the fifth and sixth pairs, but quite as long as the tibia in the seventh. The metacarpus is longer than the carpus and quite as long as the metacarpus in the third and fourth pairs; it is not twice as long as the tibia, and con-

siderably shorter than the femur; the margins are smooth. The dactylus is slightly curved, and smooth; it is as long as a fifth part of the metacarpus.

The *pleon* equals the whole peræon in length. The lateral parts of the pleonal segments are strongly rounded below; the hind corners of the last two segments are angular and sharp-pointed, that of the first segment is obtuse.

The *pleopoda*. The outer ramus of the first pair has fourteen joints, the inner thirteen.

The *urus* is somewhat longer than the last peræonal segment. The first ural segment is as long as the last coalesced one; this latter is about a third part broader than long.

The *uropoda*. The *first pair* reach below the middle of the outer ramus of the last pair; the peduncle is narrow, linear, and almost five times as long as broad; the rami are equal in length, narrowly elongated and sharp-pointed; at the upper end of the rami, where they are in contact with one another, excavations, with what are probably outlets for glands, are distinctly to be seen; the rami are considerably shorter than the peduncle; the inner ramus is serrated on the outer margin, the outer ramus on the inner. The *second pair* do not reach as far down as the first; the peduncle is broader than that of the preceding pair, almost linear, and more than twice as long as it is broad at the apex; the outer ramus is a little shorter and much narrower than the inner, sharp-pointed, and having the outer margin smooth and the inner serrated; the inner ramus is broadly ovate, with the apex produced, and sharp-pointed; both margins are serrated; the inner ramus is much shorter than the peduncle. The *third pair* are more elongated than in the four preceding species; the peduncle is scarcely broader than that of the second pair, almost linear, and much more than twice as long as broad at the apex; the inner ramus is a little more than half as long as the peduncle, and much longer than its breadth; it is broadly ovate, with produced, sharp-pointed apex, and has both the margins serrated; the outer ramus is scarcely longer than the inner, and about half as broad; it is serrated along the inner margin, and smooth on the outer.

The *telson* is a little longer than broad, and obtusely triangular; it is somewhat broader than the peduncle of the last pair of uropoda, and not half as long; it is much shorter than the last ural segment.

### The female.

Pl. X, fig. 30—32.

The forepart of the *body* is tumid in the ovigerous female; the middle of the peræon is about twice as broad as the pleon; the pleon and urus together are scarcely shorter than the peræon.

The *head* is much shorter than the first two peræonal segments together, but broader and deeper than in the male.

The *first pair of antennæ* reach below the under margin of the head; the single flagellar joint is narrowly lanceolate, and almost twice as long as the whole peduncle.

The *second pair of antennæ* are longer than the first pair. The single flagellar joint is like that of the first pair in form, and fully twice as long as the whole peduncle.

The *first and second pairs of peræopoda* are like those in the male.

The *third and fourth pairs* (Pl. X, fig. 30) are somewhat stouter than in the male. The femur is not fully three times as long as broad, as long as the genu and tibia and half the carpus together, but scarcely broader than the tibia. The carpus is armed with one single spine at the lower hind corner. The metacarpus is comparatively shorter than in the male, and not twice as long as the tibia. The dactylus is a fourth part as long as the metacarpus.

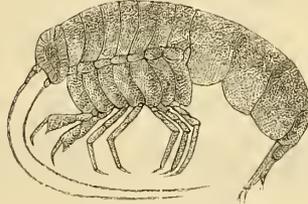
The *fifth, sixth and seventh pairs* (Pl. X, fig. 31) are longer than the two preceding pairs. The femur is scarcely twice as long as broad, nearly twice as broad as the femur in the third and fourth pairs, and considerably longer than the two following joints together. The carpus is longer than the tibia in the fifth pair, and quite as long as the tibia in the sixth and seventh pairs. The metacarpus is as long as that of the two preceding pairs, but comparatively shorter than that in the male, and not twice as long as the tibia. The dactylus is a fourth as long as the metacarpus.

The *uropoda* (Pl. X, fig. 32) are somewhat stouter and comparatively shorter than in the male. The peduncle of the *first pair* is fully four times as long as broad; the rami are narrowly elongate, equal in length, and only a fourth part shorter than the peduncle. The peduncle of the *second pair* is fully twice as long as broad, considerably longer than the inner ramus, and much broader than the peduncle of the first pair; the inner ramus is broadly ovate, sharp-pointed, serrated on both margins, and broader and longer than the outer ramus. The peduncle of the *third pair* is not fully twice as long as the last ural segment, and more than twice as long as broad; the rami are about equal in length, and much longer than the breadth of the peduncle; the inner ramus is nearly twice as long as the outer, broadly ovate, sharp-pointed, and has both the margins serrated; the outer ramus is serrated along the inner margin and smooth on the outer.

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6. **HYPERIA NORMANI**, n. n.

The name given in honour of the Rev. ALFRED MERLE NORMAN.



*Hyperia Normani*, n. n.

Facsimile from SP. BATE. Catal. Amph. Crust. Brit. Museum, pl. 48, fig. 5.

**Diagn.** *Caput* curtum, segmentis duobus primis peræi brevius. Segmenta omnia peræi libera. Carpus pedum peræi primi et secundi parium dilatatus, productus; margo anterior processus carpalis dimidium marginis posterioris metacarpi longitudine æquans; dactylus eurtus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores, spinis destituti; femur latum. Pedes parium trium ultimorum duobus præcedentibus paullulo longiores; femur latum; femur pedum septimi paris reetangulare, angulo infero-posteriore acuto; metacarpus longus. Latera segmentorum plei post obtusa. *Pedes uri* secundi paris pedes primi paris longitudine superantes, apicem pedum ultimi paris fere attingentes. Pedunculus pedum ultimi paris plus quam duplo longior quam lator. *Telson* lanceolatum, tertiam partem pedunculi pedum uri ultimi paris longitudine æquans.

The *head* is short, shorter than the first two peræonal segments together. All the *peræonal* segments are free. The carpus of the first two pairs of *peræopoda* is dilated and produced; the front side of the carpal process is half as long as the hind margin of the metacarpus; the dactylus is short. The third and fourth pairs are only a little longer than the two preceding, without spines; the femur is broad. The last three pairs are a little longer than the third and fourth; the femur is broad; the femur of the seventh pair is rectangular, with the lower hind corner sharp-pointed; the metacarpus is long. The lateral parts of the *pleonal* segments are obtuse behind. The second pair of *uropoda* are longer than the first, and reach almost to the apex of the last pair. The peduncle of the last pair is more than twice as long as broad. The *telson* is lanceolate, as long as a third part of the peduncle of the last pair of *uropoda*.

**Colour.** ?

**Length.**  $\frac{8}{20}$ ths of an inch (SPENCE BATE).

**Hab.** The Southern subtropical region of the Pacific: off Peru (KINAHAN, acc. to SPENCE BATE).

**Syn. 1862.** *Lestrigonus rubescens*, (J. D. DANA.) SPENCE BATE. Catal. Amph. Crust. Brit. Museum, p. 290; pl. 48, fig. 5.

In order to show how impossible it is to accept *Lestrigonus rubescens* of SPENCE BATE as the same species as *L. rubescens* of DANA, I give here below some of the characteristics of the two animals. These characteristics are taken, partly from the descriptions given by the two authors, and partly from the original drawings.

***Lestrigonus rubescens*, DANA.**

The *head* is longer than the first five peræonal segments together.

The first *peræonal* segment is much shorter than the second, and nearly concealed.

The first two pairs of *peræopoda* are scarcely more than half as long as the third and fourth pairs.

The femur of the third and fourth pairs is very narrow, linear.

The last three pairs are nearly twice as long as the two preceding pairs; the femur is three or four times broader than that of those pairs; the lower hind corner of the femur of all these three pairs is rectangular and acute.

The dactylus of the last three pairs is half as long as the metacarpus.

The *pleon* is much longer than the head and peræon together.

The lateral parts of the pleonal segments are angulated behind.

The first pair of *wropoda* are longer than the second, and reach to the apex of the last pair.

***Lestrigonus rubescens*, SPENCE BATE.**

The *head* is shorter than the first two peræonal segments together.

The first *peræonal* segment is fully as long as the second.

The first two pairs of *peræopoda* are nearly as long as the third and fourth pairs.

The femur of the third and fourth pairs is laminar and broadly ovate.

The last three pairs are only a little longer than the two preceding pairs; the femur is not broader than that of those pairs; the lower hind corner of the femur of the fifth and sixth pairs is rounded; that of the femur of the seventh is rectangular and subacute.

The dactylus of the last three pairs is scarcely as long as fourth part of the metacarpus.

The *pleon* is shorter than the head and peræon together.

The lateral parts of the first and third pleonal segments are rounded behind, that of the second is angulated.

The first pair of *wropoda* are shorter than the second and do not reach to the apex of the last pair, but the second pair reach nearly to that apex.

In my opinion *Lestrigonus rubescens*, DANA, is a *Parathemisto*, and as the animal to which SPENCE BATE has applied DANA's name is widely different I have proposed a new name for the animal which was the type for SPENCE BATE's description and drawing.

Here follows the original description of SPENCE BATE:

»Cephalon transversely ovate, flattened in front. Antennæ subequal: superior pair nearly as long as the animal, having the peduncle but half the length of the cephalon; first articulus

of the flagellum as long as the peduncle, tapering: inferior pair rather longer than the superior. First pair of gnathopoda having the carpus inferiorly advanced to quite half the length of the propodus; dactylos short: second pair closely resembling the first. Pereiopoda subequal; posterior pair having the basos nearly reetangular, the infero-posterior distal angle subacute. Penultimate pair of pleopoda longer than the preceding and nearly as long as the ultimate; ultimate pair having the peduncle three times as long as the telson, and not serrated upon the interior distal margin. Telson lanceolate.»

## 7. HYPERIA SPINIGERA, n. sp.

Pl. X, fig. 33—39.

**Diagn.** *Caput* eurtum, latum, segmenta duo priora peræi longitudine æquans. Segmenta omnia *peræi* libera. Carpus *pedum peræi* primi paris dilatatus, paullo productus; margo posterior vix vel indistincte incisus, spinis validis instructus. Carpus *pedum secundi* paris productus; margo anterior processus carpalis dimidium marginis posterioris metacarpi longitudine fere æquans. Metacarpus *pedum primi et secundi* parium spinis validis parce instructus; margo posterior incisus, spinigerus, minute serratus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores, spinis destituti. Pedes parium trium ultimorum duobus præcedentibus non longiores; carpus *pedum quinti* paris tibia brevior, non serratus, sed capillis brevissimis fimbriatus. Lateralia segmentorum *plei* post rotundata. Pedunculus *pedum uri* ultimi paris duplo longius quam latus. Telson longius quam latus, segmento ultimo uri brevius, pedunculum *pedum uri* ultimi paris latitudine fere æquans, sed dimidio pedunculi ejusdem longius.

The *head* is short and broad, as long as the first two peræonal segments together. All the *peræonal* segments are free. The carpus of the first pair of *peræopoda* is dilated, somewhat produced; the hind margin is scarcely notched, provided with strong spines. The carpus of the second pair is produced; the front margin of the carpal process is produced and is almost half as long as the hind margin of the metacarpus. The metacarpus of the first two pairs is sparingly set with strong spines; the hind margin is notched and minutely serrated, each notch carrying a spine; the dactylus is long. The third and fourth pairs are only a little longer than the two preceding pairs, and without spines. The last three pairs are not longer than the third and fourth pairs; the carpus of the fifth pair is shorter than the tibia, not serrated but fringed with very short hairs. The lateral parts of the *pleonal* segments are rounded. The peduncle of the last pair of *uropoda* is twice as long as broad. The *telson* is longer than broad, and shorter than the last uroal segment; it is almost as broad as the peduncle of the last pair of *uropoda*, but more than half as long as the same peduncle.

**Colour.** Yellowish.

**Length.** 12—22 mm.

**Hab.** The Arctic region: Spitzbergen, off the Northern coast of Norway. The Northern temperate region: off the South coast of England. (D. M.; F. M.; S. M.)

*Hyperia spinigera* is one of the largest species of the genus and seems to be a true Arctic form, only occasionally migrating into the temperate region. It comes near to *H. medusarum* and *H. Latreillei*, but is easily distinguished from both by the armature of the hind margin of the metacarpus of the first and second pairs of peræopoda. In the form of the rami of the uropoda it somewhat resembles *H. galba*, but it differs by the broader rami and the shorter and stouter peduncles.

### The male.

Pl. X, fig. 33—39.

The *body* is broad and stout with a very thick and hard integument. The pleon and urus together are considerably longer than the head and peræon together. The pleon is quite as long as the peræon.

The *head* is fully as long as the first two peræonal segments together; it is scarcely broader than long, but deeper. The antennal groove on the front side commences a little above the middle, and is higher than broad.

The *first pair of antennæ* in the adult male are fully as long as the head, the peræon, and the pleon together. The first joint of the peduncle is more than twice as long as the two following together. The first flagellar joint is almost twice as long as the whole peduncle, tumid, and with bulging sides; the second, third, and fourth flagellar joints are short; the fifth, sixth and seventh are increasing in length; the following are subequal in length, slender, cylindrical, and about six times as long as broad. In all the flagellum has about forty joints.

The *second pair of antennæ* are somewhat shorter than the first. The first free joint of the peduncle is unusually thick and long, almost as long as the two following joints together; the glandular cone is long and well developed. The first joint of the flagellum is shorter than the last peduncular. The joints of the flagellum are about thirty-five in number.

The *mouth-organs* are like those in *Hyperia Latreillei*.

The *peræon*. The first and second segments are equal in length; the following four are a little longer and equal; the seventh is the longest but only a little longer than the sixth.

The *epimerals* are longer than deep; those of the first two pairs are as long as the under margins of the corresponding segments, but the rest are a little shorter.

The *branchial sacks* are broadly ovate, and somewhat shorter than the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. X, fig. 34 and 35) are almost stouter than the second pair. The femur is very large, broadly ovate, with the front margin strongly convex; it is fully as long as all the following joints together, and scarcely a third part longer than broad. The genu is broader than long, with some long bristles at the lower hind corner. The tibia is longer than the genu; the lower hind corner is not much

produced, is truncated, and fringed with half a dozen stout bristles. The carpus is a little shorter than the two preceding joints together, dilated, and a little longer than it is broad at the lower end; it is scarcely produced, but the margins of the under side of the joint are densely fringed with long stout bristles; those surrounding the base of the metacarpus are especially long, about half as long as the metacarpus itself; the front margin of the carpus is feebly curved at the lower corner; the hind margin is almost straight, without notches. The metacarpus is as long as the carpus, very broad at the base, abruptly narrowing towards the apex, and scarcely twice as long as broad at the base; the front margin is strongly convex, indistinctly notched, and armed with three or four long bristles; the hind margin is almost straight, showing five or six strong notches, and minutely serrated between the notches; each notch carries a stout spine-like bristle which is feathered, that is to say provided with a minute serration consisting of very fine, spine-like teeth along its lower half (Pl. X, fig. 35). The metacarpus carries a few bristles on the sides, some longer and some shorter. The dactylus is curved, armed with six or seven low, sharp, triangular teeth along the hind margin, and provided with a large ovate hole at the base as usual. The dactylus is more than half as long as the metacarpus, and considerably longer than the greatest breadth of the metacarpus. Large glands are fully developed in the femur and also present in the four following joints.

The *second pair* (Pl. X, fig. 36) are almost shorter and less stout than the first pair, and reach to the apex of the tibia of the third pair. The femur is as broad as in the first pair and somewhat longer than the four following joints together; it is nearly twice as long as broad; the front margin is strongly convex. The genu is as long as broad. The tibia is longer than the genu; the lower hind corner is produced and fringed with half a dozen long bristles. The carpus is strongly produced at the lower hind corner and is with the process quite as long as the two preceding joints together; the front and hind margins are slightly convex, without bristles; the lower margin is fringed with long stout bristles round the base of the metacarpus; the carpal process is broad, truncated at the apex and much shorter than the rest of the joint; its margins, especially at the apex are fringed with long bristles. The metacarpus is more slender than in the first pair, evenly tapering and much more than twice as long as it is broad at the base; the front margin is convex, smooth; the hind margin is straight, notched, serrated, and armed with stout spine-like bristles as in the first pair. The dactylus is nearly half as long as the carpus, the hind margin is armed with low, sharp, and triangular teeth. The glands are less developed than in the first pair.

The *third and fourth pairs* are more slender than in *Hyperia medusarum*. The femur is elongate-ovate, more than twice as long as broad. The genu is somewhat longer than broad, and smooth. The tibia is twice as long as the genu, without bristles, but the hind margin is fringed with minute spines. The carpus is a little longer than the tibia and armed in the same way. The metacarpus is long, slender and considerably longer than the carpus, and fully half as long as the femur; the hind margin is fringed with minute spines. The dactylus is feebly curved, and about a fourth part as long as the metacarpus. Glands are present in all the joints except in the dactylus.

The *fifth, sixth and seventh pairs* are not longer than the two preceding pairs. The femur is somewhat shorter and narrower than that in the third and fourth pairs, having the margins smooth. The genu is longer than broad, and smooth. The tibia is not fully twice as long as the genu, and has the margins smooth; it is somewhat broader in the last two pairs than in the fifth. The carpus is as long as the tibia; in the fifth pair the front margin is fringed with minute spines, but is smooth in the two last pairs. The metacarpus is as long as in the third and fourth pairs, with the margins smooth. The dactylus is longer than a fourth part of the metacarpus. Glands as in the preceding pairs.

The *pleon* is as long as the whole peræon; the first segment is quite as long as the last two peræonal segments together. The lateral parts of the pleonal segments are rounded below and behind.

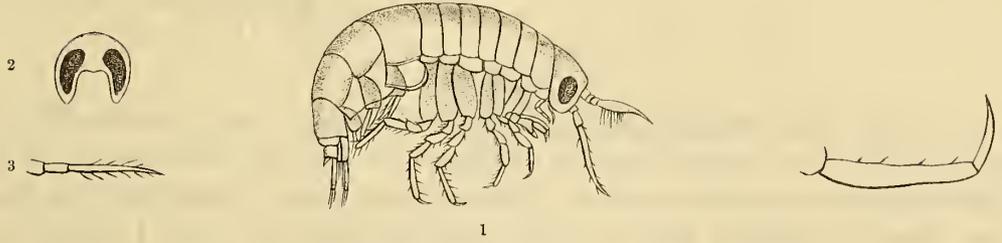
The *pleopoda* (Pl. X, fig. 37 and 38). The peduncles are compressed, with the front and hind sides strongly convex. The coupling spines are stout, but dissimilar in form, at least in the type-specimen examined, (Pl. X, fig. 37). The outer ramus has eighteen joints, the inner seventeen.

The *urus* is fully as long as the last pleonal segment; the first ural segment is considerably longer than the last coalesced, which is more than half as long as it is broad.

The *uropoda* (Pl. X, fig. 39). The *first pair* do not reach to the apex of the last pair; the peduncle is linear, three times as long as broad, and much longer than the inner ramus; the outer ramus is somewhat shorter than the inner, narrower at the base than it is a little below the middle, and suddenly narrowing at the apex which is very sharp-pointed; the inner margin is finely serrated; the inner ramus has the same form as the outer and is finely serrated along the outer margin, while the inner margin is smooth. The *second pair* reach almost as far back as the first pair; the peduncle is broader; it is scarcely twice as long as broad, but longer than the inner ramus; the outer ramus is much shorter and narrower than the inner, elongate-ovate, with abruptly narrowed, sharp-pointed apex; the inner margin is serrated; the inner ramus is constricted at the base and apex, the sides running parallel between them; the apex is sharp-pointed; the outer margin and the lowest part of the inner are finely serrated. The peduncle in the *third pair* is much broader than that in the second, narrower at the base than at the apex, and twice as long as it is broad at the apex; it is not fully twice as long as the inner ramus; the outer ramus is as long as the inner, but narrower, and of the same form as in the second pair; the inner ramus is only a little longer than the breadth of the peduncle, very broad and almost circular, with both margins finely serrated and the apex abruptly narrowed and sharp-pointed.

The *telson* is longer than broad, tongue-shaped, and somewhat shorter than the last ural segment; it is nearly as broad, and more than half as long, as the peduncle of the last pair of uropoda.

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8. **HYPERIA AGILIS**, J. D. DANA, 1852.*Hyperia agilis*, DANA.

Facsimile from DANA. U. S. Expl. Exp. Crust. II, pl. 67, fig. 11, a—d.

Fig. 1. The animal from the side. 2. Front-view of the head. 3. The second pair of antennæ. 4. The seventh pair of peræopoda.

**Diagn.** *Caput* mediocres, segmentis duobus primis peræi longius. Segmenta omnia *peræi* libera. Carpus *pedum peræi* primi paris dilatatus, paullo productus(?). Carpus *pedum secundi* paris productus; margo anterior processus carpi dimidio marginis posterioris metacarpi non longius. Femur *pedum primi et secundi* parium angustum; dactylus longus, rectus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium multo longiores, spinis brevibus instructi. Pedes parium trium ultimarum duobus præcedentibus longiores, spinis brevibus instructi; carpus *pedum quinti* paris tibia longior, non serratus sed spinis paucis instructus. Lateral segmentorum *plei* post angulata. Pedunculus *pedum uri* ultimi paris plusquam duplo longior quam lator. *Telson* segmento ultimo uri brevius ac tertiam partem pedunculi *pedum uri* ultimi paris longitudine non æquans.

The head is moderately large, longer than the first two peræonal segments together. All the *peræonal* segments are free. The carpus of the first pair of *peræopoda* is dilated, and a little produced(?). The carpus of the second pair is produced; the front margin of the carpal process is half as long as the hind margin of the metacarpus. The femur of the first two pairs is narrow; the dactylus is long and straight. The third and fourth pairs are much longer than the two preceding pairs, set with short bristles. The last three pairs are longer than the two preceding pairs, and are set with short bristles; the carpus of the fifth pair is longer than the tibia, not serrated, but set with a few short bristles. The lateral parts of the *pleonal* segments are angulated behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is shorter than the last urol segment, and not a third as long as the peduncle of the last pair of *uropoda*.

**Colour.** »Mostly dirty purple, with purplish red in basal joints of legs.» (DANA.)

**Length.** »Three to four lines.» (DANA.)

**Hab.** »The Pacific, Lat. 41° South; Long. 76° 25' West. Collected several specimens, April 5, 1839, some of which were in the water-cavity of Salpas; also between New Zealand and New Holland.» (DANA.)

Syn. 1852.	<i>Hyperia agilis</i> , J. D. DANA.	—	United States Exploring Expedition. Crustacea. Vol. 2, p. 986, pl. 67, fig. 11a—11d.
»	»	»	SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 296, pl. 49, fig. 3.
»	»	»	C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiiidæ.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.

I have not met with any specimen of this species in the collections which I have examined hitherto, but judging from the description and the drawings given by DANA I believe that it may be a good species. SPENCE BATE says in 1862 that the description of DANA »so closely resembles that of *Lestrigonus Gaudichaudii*, that I should have united them, had not DANA described the flagella of this species as being uniaarticulate».

For that reason I for my part should not hesitate to unite them if the other characteristics agreed, the less so because DANA in his diagnosis expressly says »*articulo ultimo — — interdum obsolete articulatø*». But, as may be seen from the above diagnosis, there are other distinctions between the two species as for instance, the narrow femur of the first two pairs of peræopoda, the relation between the length of the two first pairs and the third and fourth pairs, and between the length of these last and the fifth, sixth, and seventh pairs, etc.

The Latin diagnosis of DANA runs:

»Caput mediocre, pigmentis oculorum angustis. Thorax longus, epimeris totis brevibus, truncatis. Antennæ longiusculæ, dimidii thoracis longitudine subæquæ; 2dæ parce longiores, 3-articulatæ, non teretes, articulo ultimo longo et remote pubescente, interdum obsolete articulatø; 1næ 5-articulatæ, articulo 4to crasso longoque et infra ciliato, ultimo minuto. Pedes 4 antici subæqui, coxis angustis; 6 postici mediocres; setis brevibus et paucis.»

From the short description of DANA I give the following details:

In front view of the *head*, the antennary area is large, nearly square, and the pigment occupies nearly all the space on the side of it.

»Pigment of *eyes* much smaller than usual, black.

*Antennæ* rather long (half as long as thorax), subequal; superior five-jointed, fourth joint stout, long, ciliate below, the last minute; inferior slightly the longest, three-jointed, not terete, last joint long, and remotely hairy. — —

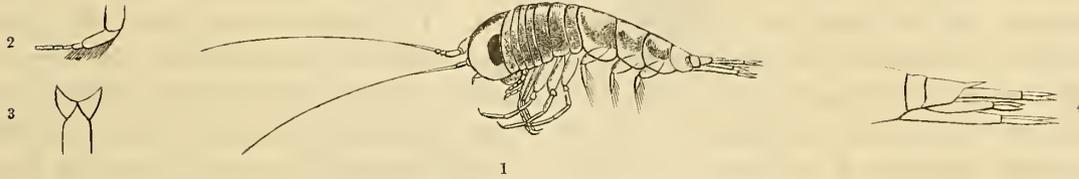
The inferior antennæ have two short basal joints, and then a long, compressed, subulate joint, which is a little hairy.

*Thorax* long, all the epimerals short, truncate. The seven thoracic segments about equal.

The four anterior *legs* have the last three joints, or the terminal portion straight, and apparently admitting of upward flexion alone; they terminate in a nearly straight spine. Four anterior feet subequal, coxæ narrow. Six posterior of moderate length, setæ short and few.

First three *abdominal* segments with the posterior angle on either side of each, prominent and acute.

While swimming, the legs are generally folded up across the venter; it swims by means of the abdominal legs, and the extremity of the abdomen.»

9. **HYPERIA FERA**, J. D. DANA, 1852.*Hyperia fera*, DANA.

Facsimile from DANA, U. S. Expl. Exp. Crust. II, pl. 67, fig. 6a–6d.

Fig. 1. The animal from the side. 2. The first pair of antennæ. 3. The maxillipeds. 4. The urus.

**Diagn.** *Caput* magnum, segmentis quinque primis peræi paullo brevius. Segmenta omnia *peræi* libera. *Pedes peræi* primi paris pedibus secundi paris breviores. Pedes tertii ac quarti parium pedibus secundi paris plus quam duplo longiores. Pedes parium trium ultimorum duobus præcedentibus paullo longiores; daetylus dimidium metacarpi longitudine æquans; carpus pedum quinti paris tibia non longior. Latera segmentorum *plei* post rotundata. Pedunculus *pedum uri* ultimi paris plus quam duplo longior quam latior. *Telson* segmento ultimo uri brevius, æ dimidio pedunculi pedum uri ultimi paris multo brevius.

The *head* is large, and only a little shorter than the first five *peræonal* segments together. All the *peræonal* segments are free. The first pair of *peræopoda* are shorter than the second pair. The third and fourth pairs are more than twice as long as the second pair. The last three pairs are somewhat longer than the two preceding pairs; the daetylus is half as long as the metacarpus; the carpus of the fifth pair is not longer than the tibia. The lateral parts of the *pleonal* segments are rounded behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is shorter than the last ural segment, and much shorter than half the peduncle of the last pair of *uropoda*.

**Colour.** »Brownish, or brownish red in irregular spots, partly colourless; basal joints of six posterior legs, brownish red.» (DANA.)

**Length.** About 3 mm. »One-eighth inch.» (DANA.)

**Hab.** The tropical region of the Atlantic: »Lat. 2° N. to 1° S., Long. 18° to 17° W.» (DANA.)

<b>Syn. 1852.</b>	<i>Lestrigonus ferus</i> , J. D. DANA.	—	United States Exploring Expedition. Crustacea. Vol. 2, p. 982, pl. 67, fig. 6a–6d.
»	»	»	SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 291, pl. 48, fig. 7.
	<i>Hyperia fera</i> ,	»	C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 16.

*Hyperia fera* is one of those species of *Hyperia* which must be regarded as imperfectly known at present, and the description of DANA is very short and incomplete. Also the figures, which are usually so satisfactory in his splendid work, are in this case on a small scale and give few details. Still I think that the animal in question is a true *Hyperia*; on the other hand I am not sure that I am right in placing it just here between *Hyperia agilis* and *H. bengalensis*; because nothing is known about the special structure of the first two pairs of peræopoda. The characteristic given by DANA in his diagnosis, »segmentis anticis paulo indistinctis», suggests the suspicion that *Hyperia fera* might possibly be more closely related to any one of the last ten species which are characterised by two or more peræonal segments being coalesced, but as the drawing shows seven peræonal segments I am bound to place the species among those which have all the peræonal segments free. From all the preceding species it is however distinguished by the length and slenderness of the last five pairs of peræopoda, and by the length of the uropoda, and also by the great length of the head. From the following species, *Hyperia bengalensis*, GILES, it differs by the shortness of the first two pairs of peræopoda, and from *H. sibaginis*, STEBBING, by the first and second peræonal segments being almost equal in length.

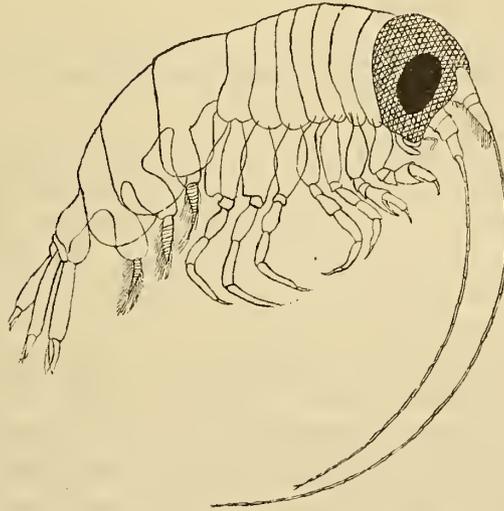
The Latin diagnosis of DANA runs:

»Thorax tumidus, segmentis anticis paulo indistinctis. Caput fronte rotundatum. Antennæ ferme corporis longitudine, Imæ paulo breviores. Pedes 6 postici subæqui, coxa ad apicem rotundata, ungue dimidii tarsi longitudine.»

Here follows the short description given by DANA.

»Head about one-third of whole cephalo-thorax.  
Pigment of *eye*, deep brownish red nearly black.  
Third joint of base of inferior *antennæ* oblong, two preceding short.  
First pair of *legs* smaller than second pair.  
Ciliæ of *natatory legs* as long as the lamellæ to which they are attached.»

SPENCE BATE in 1862 only gave of DANA'S diagnosis without further remark.

10. **HYPERIA BENGALENSIS**, G. M. GILES, 1887.*Hyperia bengalensis*, G. M. GILES.

Diminished copy from GILES, Amphip. Beng. pl. 6, fig. 1.

**Diagn.** *Caput* magnum, segmenta quattuor prima peræi longitudine æquans. Segmenta omnia *peræi* libera. Carpus *pedum peræi* primi paris dilatatus, productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi haud brevius. Carpus *pedum* secundi paris valde productus; margo anterior processus carpalis marginem posteriorem metacarpi longitudine æquans. Metacarpus *pedum* primi et secundi parium spinis destitutus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium longiores, spinis destituti. Pedes parium trium ultimorum duobus præcedentibus longiores spinis destituti; dactylus dimidio metacarpi brevior; carpus *pedum* quinti paris tibia paullo longior. Latera segmentorum *plei* rotundata. Pedunculus *pedum uri* ultimi paris ter longior quam latior. Pedes *uri* secundi paris pedibus tertii paris longiores(?). *Telson* latius quam longius(?), dimidio peduneuli *pedum uri* ultimi paris brevis.

The *head* is large, as long as the first four *peræonal* segments together. All the *peræonal* segments are free. The carpus of the first pair of *peræopoda* is dilated and produced; the front margin of the carpal process is almost half as long as the hind margin of the metacarpus. The carpus of the second pair is much produced; the front margin of the carpal process is as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs is naked, without spines; the dactylus is long. The third and fourth pairs are longer than the two preceding pairs, and without spines. The last three pairs are longer than the two preceding pairs, and without spines; the dactylus is not half as long as the metacarpus. The lateral parts of the *pleonal* segments are rounded. The peduncle of the last pair of *uropoda* is three times as long as broad. The second pair of *uropoda* are longer than the third pair(?). The *telson* is broader than it is long(?), and shorter than half the peduncle of the last pair of *uropoda*.

**Colour.** »The greater part of the surface of the body and appendages is liberally besprinkled with patches of black pigment, so that, seen in the water, they appeared of a dark reddish grey tint. The pigmentation is deepest on the pleura of the thoracic segments, on the basipodites of their appendages, and on the abdomen.» (GILES.)

**Length.** »2,5 mm.» (GILES.)

**Hab.** The tropical region of the Indian Sea: »the Bay of Bengal.» (GILES.)

**Syn. 1887.** *Lestrigonus bengalensis*, G. M. GILES. — »On six new Amphipods from the Bay of Bengal». Journal of the Asiatic Society of Bengal. Vol. 56. Part 2, no 2, p. 224, pl. 6, fig. 1—10.

The description of GILES does not give many characteristics useful for the definition of his species, but contains some statements which, if they are not due to mis-observation, are entirely new, and important for our knowledge of the phylogenetic relations of the Hyperids. He says for instance that the last ural segment is »*united without suture to the short, accurately semicircular telson*»; and that *the second and third ural segments are free, not coalesced*. The latter feature is not improbable because it is known to exist in the genus *Vibilia*, where some species have the segments in question free and others have them coalesced. The former statement on the other hand I am much inclined to think may be due to an erroneous observation, as I have myself often found the telson in species of *Hyperia* and allied genera to be very thin, and perfectly hyaline, so that it may easily escape observation when examined in the microscope by transmitted light. I have also found that in many species the middle part of the hind side of the last ural segment projects more or less to give support for the articulation of the telson. I may venture the supposition that GILES saw and delineated such a projection — which naturally is united without suture to the last ural segment — instead of the true telson. Also the statement that the second pair of uropoda are longer than the third pair seems to need corroboration, as such a fact is not known from any other species in the whole tribe.

As it is figured by GILES the species is easily distinguished from its allies by the length of the carpal process of the second pair of pereopoda.

From his description I quote the following passages:

»The *head* is the broadest portion of the animal, the two immense eyes projecting considerably beyond the very narrow thorax when seen from above.»

»The *eyes* are of large size and distinctly faceted, the anterior faceted membrane being easily separable, and they cover the entire upper and lateral aspects of the head, the anterior aspect of which is deeply excavated for the reception of the antennæ.»

»The *thorax* is composed of seven distinct, but very short, segments; the junction between the pleura and the coxal plates being hard to make out, as also are the junctions of the terga of the first 5 thoracic segments. The segments increase in length slightly from before backwards, but not to any very marked extent; the entire thorax forming less than a third of the entire length of the animal.»

»The first three *abdominal* segments are of very large size, especially the first two, either of which is as long as any three of the thoracic segments. The fourth abdominal segment is much shorter and narrowed in front, so as to be freely movable under the much excavated posterior border of the third. The fifth and sixth abdominal segments are very small, and the latter is united without suture to the short accurately semicircular telson.»

»The second of *the thoracic appendages* (= *the first pair of peraeopoda*) is short and stout and provided with a somewhat incomplete subchela. The third (= *the second pair*), longer and somewhat slighter, has the subchela very well developed, the opposable prolongation of their carpopodites (= *the carpal process*) being distinctly hollowed out for the reception of the cylindrical propodite. The remaining thoracic appendages are of the usual type, increasing regularly in size to the seventh (= *the sixth pair*), which is longest; the sixth and eighth being subequal. The eighth (= *the seventh pair*) has its posterior border provided with a strong buttress-like plate. Some of the posterior thoracic appendages are provided with gill-sacs, but I was unable to satisfy myself as to their exact number and position in this stage of the animal, although they are probably identical with those of the *Hyperia*-stage.»

»The first three *abdominal appendages* are subequal and on the usual amphipod plan. The remaining three have long protopodites (= *peduncles*) and small equal rami, the first two being subequal, while the last is a quarter shorter than the preceding two pairs.»

»In swimming, it progresses by a series of jerks, lying on its side and moving in small circles.»

»The present species is one of the commonest surface organisms of the Bay of Bengal, and is especially so in the more truly pelagic portion of its area.»

»I notice that the pelagic *Lestrigoni* are very generally credited with being parasitic on medusæ, etc. In the present species this is not the case. I have occasionally seen them ensconced in the cavity of a *Salpa*, but believe this to have been an accidental circumstance, as by far the larger number were captured swimming freely.»

»The specimen figured was taken in the drift-net about 100 miles from land in the Bay of Bengal, the depth of the water in the locality being 850 fathoms. Seven specimens were obtained on this occasion and some hundreds have since been taken.»

## 11. *HYPERIA SIBAGINIS*, TH. STEBBING, 1888.

**Diagn.** *Caput* curtum, segmenta duo priora peræi longitudine æquans. Segmenta omnia *peræi* libera, primum longissimum. Carpus *pedum peræi* primi paris paullo dilatatus et productus, processum formans tertia parte marginis posterioris metacarpi brevior. Carpus *pedum secundi* paris paullo dilatatus et productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo brevior. Metacarpus *pedum primi* et *secundi* parium spinas binas margini anteriori affixas gerens; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium longiores; carpus metacarpusque serrati, carpus spinam singulam gerens; dactylus longissimus. Pedes parium trium ultimorum duobus præcedentibus longiores; tibia, carpus, metacarpusque serrati; carpus *pedum quinti* ac *sexti* parium tibia longior. Latera segmentorum *plei* post angulata. Pedunculus *pedum uri* ultimi paris latus, duplo longior quam latior. *Telson* rotundatum, latius quam longius, segmento ultimo uri multo brevius, pedunculum *pedum uri* ultimi paris latitudine æquans, ac dimidio pedunculi ejusdem multo brevius.

The *head* is short, as long as the first two peræonal segments together. All the segments of the *peræon* are free, the first is very long. The carpus of the first pair of *peræopoda* is a little dilated and produced, forming a process which is shorter than a third part of the hind margin of the metacarpus. The carpus of the second pair is a little dilated and produced; the front margin of the carpal process is somewhat shorter than half the hind margin of the metacarpus. The metacarpus of the first and second pairs has two bristles fixed on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are longer than the first and second; the carpus and metacarpus are serrated; the carpus is also provided with a single bristle; the dactylus is very long. The last three pairs are longer than the two preceding; the tibia, carpus, and metacarpus are serrated. The carpus of the fifth and sixth pairs is longer than the tibia. The lateral parts of the *pleonal* segments are angular behind. The peduncle of the last pair of *uropoda* is broad, but twice as long as broad. The *telson* is rounded, broader than long, and much shorter than the last ural segment; it is as broad as the peduncle of the last pair of *uropoda* and not nearly half as long.

**Colour.** Whitish with a few red spots on the epimerals and femora of the peræopoda.

**Length.** 6—7 mm. »Less than a fifth of an inch.» (STEBBING.)

**Hab.** The tropical region of the Pacific: »off Sibago, Philippines; Lat. 6° 47' N., Long. 122° 28' E.; daytime, 80 fathoms.» (Ch. E. stat. 200. STEBBING.) China Sea: Lat. 9° 50' N., Long. 118° 20' E. (S. M.)

**Syn. 1888.** *Hyperia sibaginis*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1379, pl. 165.

*Hyperia sibaginis* is easily distinguished from all its congeners by the unusual length of the first peræonal segment. In the form of the legs it comes near to the next species *H. dysschistus*. As the drawings published by STEBBING are very good and complete I do not give any new ones here, but I supplement his description with a few remarks which are of some importance for the distinction of the species. These characteristics are taken from male specimens only as I have not examined any females of the species.

#### The male.

The *body* is tolerably stout, but not very broad; the head and peræon together are shorter than the pleon and urus together.

The *head* is quite as long as the first two peræonal segments together; the antennal groove is very large and commences immediately below the upper front corner of the head.

The *first pair of antennæ* are much shorter than the second, and do not reach to the hind margin of the second pleonal segment.

The *second pair of antennæ* reach fully to the apex of the telson.

The *peræon*. The first segment is unusually long, much longer than the three following segments together, and about four times as long on the dorsal side as on the ventral.

The *first pair of peræopoda*. The carpus is very little dilated, with a very short carpal process; the front side of the carpal process is somewhat shorter than a third part of the hind margin of the metacarpus, and is armed at the apex with two slender bristles. The metacarpus is almost conical, with bulging sides, twice as long as it is broad at the base, and serrated along the hind margin, with simple teeth; on the lower half of the front margin it carries two stout bristles.

The *second pair* reach fully to the apex of the carpus of the third pair. The carpus is scarcely more dilated than that in the first pair; the carpal process runs almost in a straight line with the stem of the joint, and has the front side not fully half as long as the hind margin of the metacarpus. The metacarpus is more slender than that in the first pair, longer than the stem of the carpus, and serrated as in the first pair.

The *third and fourth pairs*. The femur is scarcely longer than the three following joints together. The carpus is nearly twice as long as the tibia; the hind margins of both joints are serrated, and provided with one or two bristles. The metacarpus is scarcely longer than the carpus, and has the hind margin finely serrated. The dactylus is very long, about as long as three fourths of the metacarpus.

The *fifth, sixth and seventh pairs* are about a fifth part longer than the third and fourth. The femur of the fifth pair is narrower than that in the seventh, serrated along the front margin, and considerably shorter than the three following joints together; that of the sixth pair is fully as long as the three following joints, that of the seventh much longer, the front margin being serrated and armed with four or five equidistant bristles. The carpus of the fifth and sixth pairs is longer than the tibia, that of the seventh pair is about half as long as the tibia. The metacarpus is longer than that in the third and fourth pairs. The front margins of the tibia, carpus and metacarpus are finely serrated. The dactylus is slender, not fully half as long as the metacarpus.

The *pleon* is only a little shorter than the head and *peræon* together.

The *urus* is shorter than the last pleonal segment; the first ural segment is much longer than the last coalesced, which is about twice as broad as long.

The *wropoda*. The *first pair* do not reach fully to the apex of the last pair; the peduncle is more than three times as long as broad, and considerably longer than the inner ramus, which is longer than the outer; the outer ramus shows three notches on the outer margin, the inner margin is serrated. The peduncle of the *second pair* is more than twice as long as broad, and quite as long as the inner ramus; the outer ramus is a little shorter than the inner, with the inner margin serrated and the outer provided with two notches. The peduncle of the *third pair* is fully twice as long as broad, with curved margins, and almost twice as long as the inner ramus; the outer ramus is fully as long as the inner, having the inner margin serrated and the outer twice notched.

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12. **HYPERIA DYSSCHISTUS**, TH. STEBBING, 1888.

**Diagn.** *Caput* curtum, altum, dimidium segmentorum coalitorum peræi longitudine superans. Segmentum primum, sextum ac septimum *peræi* libera, segmentum secundum, tertium, quartum ac quintum coalita. Carpus *pedum peræi* primi paris dilatatus et paullo productus, processum formans tertiam partem longitudinis marginis posterioris metacarpi haud æquantem. Carpus pedum secundi paris paullo dilatatus et productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo longior. Metacarpus pedum primi et secundi parium, spinam singulam margini anteriori affixam gerens; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores; carpus metacarpusque serrati; tibia carpusque spinam singulam gerentes; dactylus longus. Pedes parium trium ultimorum duobus præcedentibus multo longiores; carpus metacarpusque pectinati vel minute serrati; carpus pedum quinti ac sexti parium tibia non brevior. Latera segmentorum *plei* post obtuse angulata. Pedunculus *pedum uri* ultimi paris angustus, plus quam ter longior quam lator. *Telson* late lanceolatum, longius quam latus; segmento ultimo uri paullulo brevius, pedunculo pedum uri ultimi paris duplo fere latus ac dimidio pedunculi ejusdem paullulo longius.

The *head* is short, deep, and more than half as long as the coalesced portion of the peræon. The first, sixth, and seventh *peræonal* segments are free, the second, third, fourth, and fifth are coalesced. The carpus of the first pair of *peræopoda* is dilated and a little produced, forming a process which scarcely is as long as the third part of the hind margin of the metacarpus. The carpus of the second pair is a little dilated and produced; the front margin of the carpal process is a little more than half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs has one single bristle fixed on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are a little longer than the first and second; the carpus and metacarpus are serrated; the tibia and carpus are provided each with a single bristle; the dactylus is long. The last three pairs are much longer than the two preceding; the carpus and metacarpus are pectinated or minutely serrated; the carpus of the fifth and sixth pairs is not shorter than the tibia. The lateral parts of the *pleonal* segments are obtusely angular behind. The peduncle of the last pair of *uropoda* is narrow, and more than three times as long as broad. The *telson* is broadly lanceolate, as long as broad, and only a little shorter than the last ural segment; it is about twice as broad, and a little more than half as long, as the peduncle of the last pair of *uropoda*.

**Colour.** Light red.

**Length.** 3—5 mm.

**Hab.** The Southern temperate region of the Pacific: off Auckland, New Zealand; »off Cape Howe, Australia, Lat. 37° 33' S., Long. 149° 54'; surface, night». (STEBBING.) (Ch, E.; S. M.; U. M.)

*Hyperia dysschistus* is a very remarkable species owing to the first *peræonal* segment being free and the four following coalesced. The author of the species,

STEBBING, does not point out this peculiarity in his description, but in the drawing it is distinctly expressed. If I had not had myself access to specimens strictly agreeing with the features shown in his drawing I should have hesitated to use the non-coalescence of the first peræonal segment as a specific characteristic, and I should have placed *H. dys-schistus* in the neighbourhood of *H. thoracica* which has the first five peræonal segments coalesced. But as in my specimens the suture between the first and the following segments is to be plainly seen running all the way from the right epimeral to the left, I have adopted this characteristic as most easily distinguishing *H. dys-schistus* from its congeners. STEBBING's figures being very good I give here only two drawings from a young male specimen, together with some supplementary characteristics as in the case of the preceding species.

#### The male.

The *body* is thick and stout, comparatively broader than in any of the preceding species, except *Hyperia medusarum*. The head and peræon together are shorter than the pleon and urus together. The surface of the body is hard and shining.

The *head* is longer than in the female, almost half as long as the coalesced portion of the peræon.

The *peræon*. The first segment is longer than the sixth, and fully as long as the seventh.

The *epimerals* are as long as the under margins of the corresponding segments, and almost as deep as long.

The *first pair of peræopoda* (Pl. XI, fig. 1). The femur is as long as the three following joints and half the fourth. The carpus is dilated and produced; the front margin of the carpal process is scarcely a third part as long as the hind margin of the metacarpus. The metacarpus is elongate-ovate, and much longer than the stem of the carpus; the front margin carries a single bristle a little below the middle; the hind margin is finely serrated, with simple teeth. The dactylus is half as long as the metacarpus, being finely serrated on the hind margin.

The *second pair* (Pl. XI, fig. 2) are somewhat longer than the first pair, and reach a little below the middle of the carpus of the third pair. The femur is somewhat shorter than the four following joints together. The front margin of the carpal process is fully half as long as the hind margin of the metacarpus. The metacarpus is a little longer than the stem of the carpus; the front margin carries a single bristle; the hind margin is serrated as in the first pair.

The *third and fourth pairs*. The femur is fully as long as the three following joints. The tibia is longer than the genu, and a little dilated, with a bristle at the lower hind corner; the hind margin is smooth. The carpus is as broad as the tibia and only a little longer; the hind margin is finely serrated, and has a single bristle at the lower corner. The metacarpus is about as long as the two preceding joints together, and only a little shorter than the femur; the hind margin is serrated, without bristles. The dactylus is about half as long as the metacarpus.

The *fifth, sixth and seventh pairs* are considerably longer than the two preceding pairs. The femur is not fully as long as the three following joints together, and the front margin is provided with a few short bristles. The carpus of the fifth pair is longer than the tibia, that of the sixth quite as long as, and that of the seventh pair shorter than, the tibia. The metacarpus is about as long as that joint in the third and fourth pairs, and shorter than the two preceding joints together; the hind margins of the carpus and metacarpus are serrated and provided with a few bristles. The dactylus is about a third as long as the metacarpus.

The *pleon* is a little longer than the whole peræon; the first segment is quite as long as the last two pleonal segments together.

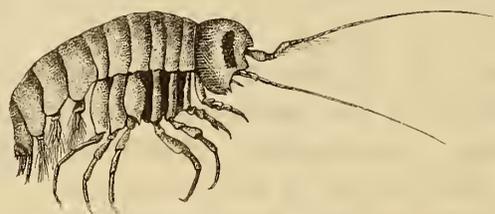
The *urus* is a little longer than the last pleonal segment.

The *uropoda*. The *first pair* reach fully to the apex of the last pair; the peduncle is narrow, linear and more than four times as long as broad; the inner ramus is much more than half as long as the peduncle, elongate, acute, and serrated along the outer margin; the outer ramus is much shorter than the inner. The *second pair* reach a little beyond the apex of the peduncle of the last pair; the peduncle is narrow, more than three times as long as broad, and a little longer than the inner ramus; the outer ramus is much shorter than the inner; both rami are serrated as in the first pair. The peduncle of the *third pair* is narrow, linear, not fully four times as long as broad, and nearly twice as long as the inner ramus; the rami are equal in length.

The *telson* is spade-shaped, twice as broad, and a little more than half as long, as the peduncle of the last pair of uropoda.

### 13. **HYPERIA FABREI**, H. MILNE EDWARDS, 1830.

Pl. X, fig. 40—55.



*Hyperia Fabrei*, H. MILNE EDWARDS.

Facsimile from H. MILNE EDWARDS. Hist. nat. des Crust., III, pl. 30, fig. 18.

**Diagn.** *Caput* magnum, altum, segmentis quattuor primis peræi multo longius. Segmenta duo priora peræi coalita, cetera libera. Carpus *pedum peræi* primi paris vix dilatatus et paullulo productus. Carpus *pedum secundi* paris paullo dilatatus, productus; margo anterior processus carpalis dimidium marginis posterioris metacarpi longitudine æquans. Metacarpus *pedum primi et secundi* parium spinam singulam margini anteriori affixam gerens; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium

pedibus parium duorum præcedentium longiores; carpus spinis binis longis instructus; metacarpus non serratus; dactylus longus. Pedes parium trium ultimorum duobus præcedentibus vix longiores; femur quinti paris latissimum; carpus tibia multo brevior; metacarpus serratus; dactylus longus. Latera segmentorum *plei* post obtuse rotundata. Pedunculus *pedum uri* ultimi paris plus quam duplo longior quam latior. *Telson* semicirculare, latius quam longius, dimidium segmenti ultimi uri longitudine æquans, pedunculo *pedum uri* ultimi paris latius, ac dimidio pedunculi ejusdem multo brevius.

The *head* is large, deep, and much longer than the first four peræonal segments together. The first two *peræonal* segments are coalesced, the following are free. The carpus of the first pair of *peræopoda* is scarcely dilated and very little produced. The carpus of the second pair is only a little dilated, but produced; the front margin of the carpal process is half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs has a single spine fixed on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are longer than the first and second; the carpus is provided with two long bristles; the metacarpus is not serrated; the dactylus is long. The last three pairs are scarcely longer than the two preceding; the femur of the fifth pair is very broad; the carpus of all the three pairs is much shorter than the tibia. The metacarpus is serrated; the dactylus is long. The lateral parts of the *pleonal* segments are obtusely rounded behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is semicircular, broader than long, and not more than half as long as the last ural segment; it is broader than, and not half as long as, the peduncle of the last pair of uropoda.

**Colour.** Whitish red.

**Length.** 4—6 mm.

**Hab.** The tropical region of the Atlantic: off Barbadoes; the Caribbean Sea. The Indian Ocean. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

- Syn. 1830.** *Lestrigonus Fabrei*, H. MILNE EDWARDS. — »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes.» Ann. des sciences nat. Tome 20<sup>me</sup>, p. 392.
- » » » — 1838. Histoire naturelle des Animaux sans vertèbres par J. B. T. A. de Lamarek, 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 305.
- » » » — 1839. » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 369.
- » » » — 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 82, pl. 30, fig. 18.
- » » » R. LUCAS 1849. »Lestrigon». Dictionnaire universel d'Histoire naturelle, par Ch. d'Orbigny. Tome 7<sup>me</sup>, p. 320.
- » » » » 1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 235.

- Lestrigonus Fabrei*, H. MILNE EDWARDS. SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 291.
- Hyperia Fabrei*, » C. BOVALLIUS 1887. »Systematical list of the Amphipoda Hyperiidæa». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 16.

The original *generic* diagnosis of H. MILNE EDWARDS in 1830 is quoted above (p. 135). The characteristics: »premier segment du thorax rudimentaire», et »aucune patte n'est préhensile, mais celles de la seconde paire presentent une espèce de petite main formée par l'antépénultième article», are purely specific, and referable to the species *Lestrigonus Fabrei* which then had not any other description. His specific description of 1840 runs:

»Les antennes supérieures, plus longues que le corps, ont un pédoncule gros et coudé; le premier article est grand et cylindrique; le second est très-court; le troisième, presque aussi longue que le premier, s'amincit beaucoup vers le bout, et porte sur le bord inférieur une rangée de grands poils; enfin le cinquième et le sixième sont très-petits; la tige terminale est extrêmement longue, filiforme, ayant presque la même grosseur dans toute son étendue, et divisée en un grand nombre de petits articles. Les antennes inférieures ont à peu près la même longueur, es leur pédoncule est gros, conique et composé de trois articles; enfin la tige terminale est grêle et filiforme comme celle des antennes supérieures. Les palpes mandibulaires sont petits. Les pates de la première paire sont très-courtes et cylindriques; celles de la seconde paire, ont la même forme que chez les Hypéries; enfin le premier article des six dernières est large et lamelleux. Ce petit crustacé, long d'environ cinq lignes, a été trouvé dans la mer des Indes par M. FABRÉ».

In 1852 DANA described under the name *Lestrigonus Fabrei* an animal which however is not identical with H. MILNE EDWARDS' species, as I have already said above (p. 140), and which will be described below as the type for *Hyperia Danae*. When SPENCE BATE in 1862 recorded *Lestrigonus Fabrei* he reproduced DANA's drawing and applied to it the description given by H. MILNE EDWARDS, and thus he failed to recognise the true species.

Among all the forms of *Hyperia* which I have examined that described here below most closely agrees with *Lestrigonus Fabrei*, H. MILNE EDWARDS, and therefore I have adopted the specific name *Fabrei* for it, the more so as there are specimens of this species in the collection of the »Musée du Jardin des Plantes» from Indian Sea, but without specific name. Of the other specimens of *Hyperia* in the same collection none agrees with the original description of *Lestrigonus Fabrei*.

In general appearance and some characteristics *Hyperia Fabrei* closely agrees with *H. luzoni*, but is easily distinguished by the small but distinct carpal process, and the serrated, not notched hind margin of the metacarpus, of the first pair of peræopoda, and by the telson being much shorter than half the peduncle of the last pair of uropoda.

#### The male.

The *body* is slender; the head and peræon together are much shorter than the pleon and urus together.

The *head* is very large, and nearly as long as the five first peræonal segments together; it is more than a third part deeper than long, the depth fully equalling the

length of the six first peræonal segments together. The antennal groove commences above the middle of the front side of the head, and is higher than broad.

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* (Pl. X, fig. 41 and 42) are about as long as the head, the peræon, and the pleon together. The first joint of the peduncle is large, stout, and cylindrical, and more than three times as long as the two following; the second joint is more than three times as long as the third, which is for a large part concealed under the second. The first joint of the flagellum is about as long as the whole peduncle, evenly tapering towards the apex, and having the inner and under sides bulging, and densely set with long olfactory hairs; the lower front corner projects into a short cylindrical process, which is tipped with two strongly developed olfactory hairs; the upper margin of the joint is straight, and provided with two or three equidistant pairs of short hairs. The second flagellar joint is unusually well developed, longer than a third of the first joint, and much broader than the following flagellar joints; on the lower side near to the apex projects a cylindrical process, similar to that of the first joint, and tipped with two similar hairs. The following joints are cylindrical, subequal in length, and about five times as long as broad; each joint is set with two minute hairs on the upper side. The flagellar joints are in all twenty-four in number.

The *second pair of antennæ* (Pl. X, fig. 43) are only a little longer than the first. The first free joint of the peduncle is somewhat broader than long, the second is shorter, the third longer, but not fully as long as the two preceding joints together. The first joint of the flagellum is considerably longer than the last peduncular joint, but much narrower, cylindrical, and fully six times as long as broad; the following are subequal in length, only a little shorter than the first, and nearly six times as long as broad; the flagellar joints are twenty-six in number.

The *labium* is much longer than broad, deeply bilobed.

The *mandibles* have a very large molar tubercle; the incisive lamina is short, with six rounded, sharp teeth. The first joint of the palp is short and stout; the second and third are longer, and equal in length; the third is fringed with minute hairs.

The *first pair of maxillæ*. The apex of the secondary lamina is armed with four strong spines.

The *second pair of maxillæ*. The secondary lamina is very broad, and more than three times as long as the principal lamina.

The *maxillipeds*. The basal portion is comparatively narrow; the lateral laminae are elongate, fringed with hairs along the inner margins, and about as long as the basal portion; the median lobe is strongly bent inwards.

The *peræon*. The first two coalesced segments are a little shorter than the third and fourth together, and are also shorter than the seventh segment, which is the longest of all.

The *epimerals* are somewhat shorter than the under margins of the corresponding segments; those of the first four pairs are about as deep as long; those of the last three are longer than deep.

The *branchial sacks* are shorter than the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. X, fig. 44 and 45). The femur is not much dilated more than twice as long as broad, and fully as long as the four following joints. The genu is broader than long, with a bristle at the lower hind corner. The tibia is longer than the genu, and is armed in the same way. The carpus is scarcely dilated and only a little produced; the front margin is nearly straight, and smooth; the hind margin shows a feeble notch in the middle, with a stout bristle; the minute carpal process is tipped with a strong bristle, and its front margin is scarcely as long as a seventh part of the hind margin of the metacarpus. The metacarpus is considerably longer than the stem of the carpus, evenly tapering towards the apex, and more than twice as long as it is broad at the base; the front margin carries a single bristle below the middle; the hind margin is finely serrated, with simple teeth. The dactylus is curved, and more than half as long as the metacarpus; the hind margin is smooth (Pl. X, fig. 45).

The *second pair* (Pl. X, fig. 46) are a little longer than the first, and reach a little beyond the middle of the carpus of the third pair. The femur is nearly as long as all the following joints together, broader below, and more than three times as long as it is broad at the apex. The genu is broader than long. The tibia is more than twice as long as the genu; the lower hind portion is produced, and tipped with a long, stout bristle. The carpus is only a little dilated, with the margins smooth; the carpal process runs in a straight line with the stem of the joint, and forms with the metacarpus a cheliform hand; the front side of the carpal process is quite half as long as the hind margin of the metacarpus, and the margins are set with seven long bristles. The metacarpus is considerably longer than the stem of the carpus, evenly tapering towards the apex, and more than twice as long as it is broad at the base; the front margin has a single bristle just below the middle; the hind margin is serrated as in the first pair. The dactylus is curved, smooth, and half as long as the metacarpus.

The *third and fourth pairs* (Pl. X, fig. 47). The upper portion of the femur is strongly bent, and narrow, the lower part the broadest; it is considerably longer than the three following joints together, and fully four times as long as it is broad at the base. The genu is longer than broad. The tibia is longer than the genu, and tolerably broad; the hind margin is straight, and smooth, with a long bristle at the lower corner and a small spine above the middle. The carpus is scarcely longer than the tibia; the hind margin is straight, with a long bristle in the middle and another at the lower corner. The metacarpus is shorter than the two preceding joints together, but more than half as long as the femur; the hind margin is not serrated but provided with four equidistant, short spines. The dactylus is feebly curved, and more than half as long as the metacarpus.

The *fifth, sixth, and seventh pairs* (Pl. X, fig. 48—51) are scarcely longer than the two preceding pairs. The femur has the hind margin straight, and shows no narrow groove for the reception of the following joints as usual, but the hind portion of the joint is developed into a thin lamina which overlaps and protects the following joints when they are folded up. The femur of the fifth pair is much broader than in the two following pairs, with the front margin strongly convex, and quite smooth; the front margin of the joint in the two following pairs is feebly convex, and set with two spines. The genu

is longer than broad. The tibia is longer than the genu, with the front margin smooth. The carpus is much shorter than the tibia; the front margin is smooth. The metacarpus is about as long as that in the third and fourth pairs, shorter than the two preceding joints together, and only a little more than half as long as the femur; the front margin is finely serrated. The dactylus is about half as long as the metacarpus.

The *pleon* is much longer than the whole peræon, but shorter than the head and peræon together. The first segment is longer than the last two peræonal segments together. The lateral parts of the segments are almost square behind, with the angles obtuse.

The *pleopoda*. The outer ramus has ten joints, the inner nine.

The *urus* is not quite as long as the last pleonal segment. The first ural segment is considerably longer and broader than the last coalesced, which has a very deep incision on each side for the insertion of the second pair of uropoda; this last segment is more than a third part broader at the base than it is long, and shows a broadly rounded projection at the middle of the hind margin for the support of the telson (Pl. X, fig. 52).

The *uropoda* (Pl. X, fig. 52—53). The *first pair* reach almost to the apex of the third pair; the peduncle is tolerably broad, not three times as long as broad, and only a little longer than the inner ramus; the rami are elongate, sharp-pointed, and each shows a deep semicircular incision (Pl. X, fig. 53) at the base where they are in contact with one another; this incision opens into the interior of the ramus, and is densely set with short, spine-like hairs; wheter this incision is only an outlet for the secretion from the glands, as I have supposed above, or wheter it contains a peculiar sensitive organ is a riddle not to be solved without careful investigation of fresh material. The fact that I have observed at the apex of one or more of the sharp-pointed rami in this and other species a minute, circular hole or outlet, seems to make it doubtful wheter the semi-circular incisions just mentioned are likely to prove to be only glandular outlets. The outer ramus is somewhat shorter than the inner, smooth on the outer margin, and finely serrated along the inner; the inner ramus is serrated along the outer margin, and smooth on the inner. The *second pair* reach to the middle of the outer ramus of the last pair; the peduncle is a little more than twice as long as broad, and scarcely longer than the inner ramus; the rami have the same form and serration as in the first pair, and show similar semicircular incisions; the outer ramus is considerably shorter than the inner. The peduncle of the *third pair* is tolerably broad, somewhat more than twice as long as broad, and a little longer than the last ural segment; the inner ramus is much longer than the breadth, and than half the length, of the peduncle; the outer margin is serrated, the inner smooth; the outer ramus is shorter than the inner, and has the outer margin smooth, and the inner serrated.

The *telson* is semicircular, somewhat broader than long, and quite half as long as the last ural segment; it is broader than, but not half as long as, the peduncle of the last pair of uropoda.

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14. **HYPERIA LUZONI**, TH. STEBBING, 1888.

**Diagn.** *Caput* longum et altum, segmenta quattuor prima peræi longitudine æquans. Segmenta duo priora *peræi* coalita, cetera libera. Carpus *pedum peræi* primi paris vix dilatatus, non productus. Carpus *pedum secundi* paris paullo dilatatus, productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi brevior. Metacarpus *pedum primi* paris spinam unam margini anteriori affixam gerens; margo posterior incisus, indistincte serratus, spinis tribus brevissimis instructus; metacarpus *pedum secundi* paris spinas duas margini anteriori affixas gerens, margo posterior non serratus, levis; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium longiores; carpus spinis duabus longis instructus; metacarpus indistincte serratus. Pedes parium trium ultimorum duobus præcedentibus non longiores; femur *pedum septimi* paris latum; carpus *pedum quinti* ac *sexti* parium tibiam longitudine æquans; carpus *pedum septimi* paris tibia brevior; metacarpus non serratus. Latera segmentorum *plei* post angulata. Pedunculus *pedum uri* ultimi paris plus quam duplo longior quam lator. *Telson* rotundatum, non latius quam longius, segmentum ultimum *uri* longitudine æquans, pedunculo *pedum uri* ultimi paris multo latius, ac dimidio pedunculi ejusdem multo longius.

The *head* is long and deep, as long as the first four peræonal segments together. The first two *peræonal* segments are coalesced, the following free. The carpus of the first pair of *peræopoda* is scarcely dilated, and not produced. The carpus of the second pair is a little dilated, and produced; the front side of the carpal process is not half as long as the hind margin of the metacarpus. The metacarpus of the first pair has a single bristle on the front margin, and the hind margin is notched and provided with three very short spines, and faintly serrated. The metacarpus of the second pair has two bristles on the front margin, and the hind margin is smooth, not serrated; the dactylus is long. The third and fourth pairs are longer than the two preceding; the carpus has two bristles; the metacarpus is faintly serrated. The last three pairs are not longer than the third and fourth; the femur of the seventh pair is broad; the carpus of the fifth and sixth pairs is as long as the tibia, that of the seventh is shorter than the tibia; the metacarpus is not serrated. The lateral parts of the *pleonal* segments are angulated. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is rounded, not broader than long, and fully as long as the last ural segment; it is much broader than, and much more than half as long as, the peduncle of the last pair of *uropoda*.

**Colour.** ?

**Length.** 3 or 4 mm, (»three-twentieths of an inch, exclusive of the antennæ». STEBBING).

**Hab.** »China Sea, off Luzon; Lat. 16° 35' N.; Long. 117° 47' E.; surface; surface temperature 76° 5'; one specimen, young male. January 1875; Zebu Harbour, Phillippines; surface. Two specimens from this locality appear also to belong to this species» (CH E. STEBBING).

**Syn.** 1888. *Hyperia luzoni*, TH. STEBBING. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1382, pl. 166 A.

As I have not seen any specimen of this species I take from STEBBING the characteristics which are necessary for distinguishing *Hyperia luzoni* from its nearest

allies, *H. Fabrei* and *H. promontorii*. The species doubtfully given by STEBBING (l. c. p. 1384) as »*Hyperia luzoni*, young male?» belongs probably not to this species, but from the shortness of the description it is impossible to judge where it ought to be placed if it were to be made an independant species. The statement that the mandibles want a palp is curious, and contrary to what is known of all the other species of *Hyperia*. The unusual length of the telson is also a striking feature.

### The male.

The *body*. The head and peræon together are scarcely longer than the pleon.

The *head* is longer than the first four peræonal segments together. The antennal groove commences at the middle of the front side.

The *first pair of peræopoda*. The femur is shorter than the four following joints together. The carpus is only a little dilated, and scarcely produced. The metacarpus has three distinct notches on the hind margin, each carrying a short spine; the front margin has a single, long bristle. The dactylus is much more than half as long as the metacarpus, and is smooth.

The *second pair* reach fully to the apex of the carpus of the third pair. The femur is as long as the four following joints together. The carpal process is only a little longer than a third of the hind margin of the metacarpus. The metacarpus is longer than the stem of the carpus; the hind margin is smooth; the front margin carries two long bristles. The dactylus is nearly as long as the metacarpus.

The *third and fourth pairs*. The femur is longer than the three following joints together. The carpus has one shorter bristle in the middle of the hind margin, and one longer at the lower corner, which last bristle is longer than the breadth of the joint. The metacarpus is not much narrower than the carpus, and about as long as the two preceding joints together; the hind margin is faintly serrated. The dactylus is as long as two-thirds of the metacarpus.

The *fifth, sixth, and seventh pairs*. The femora of the fifth and seventh pairs have the same breadth, while that of the sixth is narrower; the femur is fully as long as the three following joints together. The carpus of the fifth and sixth pairs is as long as the tibia, that of the seventh is considerably shorter. The metacarpus is shorter than that joint in the third and fourth pairs, and much shorter than the two preceding joints together, and is smooth. The dactylus is more than half as long as the metacarpus.

The *pleon*. The first segment is only a little shorter than the last three peræonal segments together.

The *urus* is considerably longer than the last pleonal segment. The first ural segment is almost twice as long as the last coalesced, which is much broader than long.

The *uropoda*. The *first pair* reach further back than the third; the peduncle is three times as long as broad; the inner ramus is shorter than the peduncle, but longer than the outer ramus; the rami are elongate, sharp-pointed. The *second pair* reach almost to the middle of the outer ramus of the last pair; the inner ramus is longer than the outer,

and longer than the peduncle. The peduncle of the *third pair* is nearly three times as long as broad, and scarcely longer than the inner ramus; the rami are equal in length, and are elongate and sharp-pointed as in the two preceding pairs.

The *telson* is almost twice as broad as the peduncle of the last pair of uropoda, and fully as long as two thirds of the same peduncle.

### 15. *HYPERIA PROMONTORII*, TH. STEBBING, 1888.

Pl. XI, fig. 3—13.

**Diagn.** *Caput* longum et altum, segmentis quattuor primis peræi multo longius. Segmenta duo priora *peræi* coalita, cetera libera. Carpus *pedum peræi* primi paris dilatatus, productus, processum formans dimidium marginis posterioris metacarpi longitudine æquantem. Carpus *pedum secundi* paris productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo longior. Metacarpus *pedum primi et secundi* parium spinas binas margini anteriori affixas gerens; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes *tertii ac quarti* parium pedibus parium duorum præcedentium longiores; carpus metacarpusque serrati; dactylus longus. Pedes *parium trium ultimorum* duobus præcedentibus paullo longiores; femur latum; carpus tibia longior; carpus metacarpusque serrati. Latera segmentorum *plei* post obtuse rotundata. Pedunculas *pedum uri* ultimi paris plus quam duplo longior quam latior. *Telson* paullo longius quam latius, segmento ultimo uri brevius, pedunculum *pedum uri* ultimi paris latitudine fere æquans, ac dimidio pedunculi ejusdem brevius.

The *head* is long and deep, and much longer than the first four peræonal segments together. The first two *peræonal* segments are coalesced, the following are free. The carpus of the first pair of *peræopoda* is dilated and produced, forming a process, which is half as long as the hind margin of the metacarpus. The carpus of the second pair is produced; the front side of the carpal process is somewhat more than half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs has two bristles on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are longer than the two preceding; the carpus and metacarpus are serrated; the dactylus is long. The last three pairs are a little longer than the two preceding; the femur is broad; the carpus is longer than the tibia; the carpus and metacarpus are serrated. The lateral parts of the *pleonal* segments are obtusely rounded behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is a little longer than broad, and is shorter than the last ural segment; it is about as broad, but not half as long, as the peduncle of the last pair of *uropoda*.

**Colour.** White, with red spots.

**Length.** 5 to 6 mm.; («a fifth of an inch;» STEBBING).

**Hab.** The Southern temperate region of the Atlantic, at various localities between Lat. 32° and 45° S., and Long. 4° and 20° E. (D. M.; F. M.; S. M.; U. M.) »Off the Cape of Good Hope; Lat. 34° 41' S.; Long. 18° 36' E.; surface; surface temperature, 66°» (CH. E. STEBBING.)

Syn. 1888. *Hyperia promontorii*, TH. STEBBING.

— »Report on the Amphipoda». Voy.  
of H. M. S. Challenger. Zoology.  
Vol. 29, p. 1385, pl. 166, B.

Of *Hyperia promontorii* I have examined many specimens, and I think that it is a good species. It is distinguished from its nearest relatives by the following characteristics: from both *Hyperia Fabrei* and *H. luzoni* by the much dilated and tolerably produced carpus of the first pair of peræopoda; from *H. Fabrei* by the femur of the fifth pair not being broader than that of the seventh, and from *H. luzoni* by the telson being shorter than half the peduncle of the last pair of uropoda. As STEBBING does not give any figure of the whole animal, and no details of the female, I give some on plate XI.

#### The male.

The *body* is tolerably broad. The head and peræon together are scarcely longer than the pleon.

The *head* is quite as long as the first four peræonal segments and half the fifth. The antennal groove commences just at the middle of the front side, and is about as high as broad. The head is not fully twice as deep as long, and has the under side evenly rounded.

The *first pair of antennæ* reach a little farther back than to the hind margin of the second pleonal segment. The first joint of the peduncle is very broad, broader than long, and not fully twice as long as the two following joints together; the second joint is only a little longer than the third. The first joint of the flagellum is longer than the whole peduncle, showing a short cylindrical projection from the lower distal corner just as in *Hyperia Fabrei*; the second joint has two such projections, one in the middle of the under margin and the other at the distal corner, and is about as long as a fourth of the first joint; the third joint is as long as the second, but much narrower, and cylindrical; the following joints are slender, cylindrical, and slowly increasing in length to the fourteenth, which is more than twelve times as long as broad. The flagellar joints are in all eighteen in number.

The *second pair of antennæ* are a little longer than the first, and reach about to the hind margin of the last pleonal segment. The first free joint of the peduncle is somewhat broader than long; the glandular cone is very large, nearly as long as the first peduncular joint; the second joint is a little shorter than the first; the third is about twice as long as the second. The first joint of the flagellum is fully as long as the last peduncular joint, and much more slender; the following joints are about equal in length, slender, cylindrical, and about ten times as long as broad. The flagellar joints are in all twenty-two in number.

The *labrum* is longer than broad, and slightly bilobed.

The *mandibles* are stout, with the molar tubercle very broad. The three joints of the mandibular palp are almost equal in length.

The *first pair of maxillæ*. The apical portion of the principal lamina is not half as broad nor half as long as the secondary lamina, and is tipped with long bristles.

The *second pair of maxillæ*. The apical portion of the principal lamina is almost cylindrical, tipped with two hook-like spines, and densely set with long, slender bristles. The secondary lamina is broader than the principal, set with bristles, and provided with two short spines at the apex.

The *maxillipeds*. The basal portion is tolerably broad, broadest at the base, then abruptly constricted, with the apical part linear. The lateral laminae are half as long as the basal portion, elongate-ovate, with the inner margins notched and armed with a few short spines. The median lobe is feebly developed.

The *peræon*. The first two coalesced segments are as long as the third and fourth and half the fifth, and quite as long as the seventh.

The *epimerals* are deeper than long, and are almost as long as the under margins of the corresponding segments.

The *branchial sacks* are wide, and are somewhat shorter than the femora of the corresponding legs.

The *first pair of pereopoda* (Pl. XI, fig. 4 and 5). The femur is nearly as long as the four following joints together, broadest in the middle, and more than twice as long as broad. The genu is as long as broad, without bristles. The tibia is longer than the genu; the lower hind part is produced; the hind margin is strongly convex, and armed with three equidistant long bristles. The carpus is not fully as long as the two preceding joints together, dilated, and only a little longer than it is broad at the lower end; the front margin is feebly curved, almost straight, with a single bristle at the lower corner; the hind margin is twice notched, and each notch is provided with a long bristle; the carpal process is broad, spoon-shaped, with a long bristle at the apex and four bristles along each margin. The metacarpus is longer than the stem of the carpus, more than twice as long as it is broad at the base, and carries two long bristles on the front margin; the hind margin is serrated, with long simple teeth. The dactylus is strongly curved, much more than half as long as the metacarpus, and armed with some spine-like teeth on the hind margin. Glands are well developed in all the joints except in the dactylus.

The *second pair* (Pl. XI, fig. 6) are much longer than the first, and reach almost to the middle of the metacarpus of the third pair. The femur is narrow, somewhat broader below than at the base, more than three times as long as it is broad below, and fully as long as the four following joints together; the front margin is straight; the hind margin is feebly S-shaped. The genu is longer than broad, and smooth. The tibia is a little longer than the genu, with some bristles at the lower produced corner. The carpus is dilated and much produced; the stem of the carpus is shorter than the two preceding joints together; the front margin is nearly straight, with a single bristle at the lower corner; the carpal process is only a little shorter than the stem of the joint; the margins are fringed with a few very long bristles; the front side of the carpal process is more than half as long as the hind margin of the metacarpus. The metacarpus is broad at the base, tapering towards the apex, not fully three times as long as its greatest breadth, and much longer than the stem of the carpus; the front margin is convex, and provided

with two stout spines; the hind margin is slightly concave, and serrated with simple teeth. The dactylus is strongly curved, nearly half as long as the metacarpus, and is finely serrated on the hind margin. Glands are present in all the joints except the dactylus.

The *third and fourth pairs* are somewhat longer than the second. The femur is feebly bent at the apex, the front margin is slightly convex; the hind margin is almost straight; the femur is a little broader at the apex than at the base; it is much more than three times as long as it is broad at the apex, and quite as long as the four following joints together. The genu is longer than broad, with a minute spine at the lower hind corner. The tibia is a little longer than the genu, with the front margin more convex than the hind, which carries three or four minute spines. The carpus is quite as long as the preceding joints together, and fully as broad as the tibia; the hind margin is straight, serrated, and armed with a spine-like bristle at the lower corner and another above near the middle. The metacarpus is longer than the carpus but scarcely more than half as wide; it is more than half as long as the femur; the hind margin is slightly concave, and finely serrated. The dactylus is less curved than in the two preceding pairs, nearly half as long as the metacarpus, and provided with slender, spine-like teeth on the hind margin.

The *fifth, sixth, and seventh pairs* are a little longer than the two preceding. The femur is much broader than that in the third and fourth pairs, tolerably narrow at the base, broadening downwards, with convex margins, and almost truncated below; it is about twice as long as broad, and shorter than the three following joints together; the front margin is provided with four or six short bristles. The genu is somewhat longer than broad, and is smooth. The tibia is tolerably broad, about twice as long as the genu, and has the front margin faintly serrated. The carpus is somewhat longer, but a little narrower than the tibia; the front margin is serrated. The metacarpus is somewhat longer than that joint in the third and fourth pairs, longer than the carpus, and much more than half as long as the femur; the front margin is serrated. The dactylus is as long as a third of the metacarpus. In the joints of these pairs, as well as in those of the four preceding, there are to be seen at the side of the glands calcareous concretions forming balls or irregularly star-like bodies (Pl. XI, fig. 4, 6, 7, 9, 12 and 13). For further remarks on these concretions see the third section of this treatise.

The *pleon* is quite as long as the head and peræon together; the first segment is somewhat longer than the last two peræonal segments together. The lateral parts of the first and third segments are more evenly rounded behind than that of the second.

The *pleopoda* (Pl. XI, fig. 10 and 11). The coupling spines are stout, and provided with a hook-like projection at the middle of the stem. The cleft bristle is sparingly set with hairs on the basal portion. The outer ramus of the first pair has ten joints, the inner nine.

The *urus* is a little more than half as long as the last pleonal segment. The first segment is about twice as long as the last coalesced, which is broader than long.

The *uropoda*. The *first pair* reach a little below the middle of the outer ramus of the last pair; the peduncle is narrow, linear, fully four times as long as broad, and much

longer than the inner ramus; the rami are elongate, sharp-pointed, and provided with semi-circular incisions as in *Hyperia Fabrei*; the inner ramus is longer and somewhat narrower than the outer, with the outer margin finely serrated; the outer ramus has the inner margin serrated, and the outer smooth. The *second pair* reach nearly to the middle of the outer ramus of the last pair; the peduncle is broader than that in the first pair, but more than twice as long as broad, and longer than the inner ramus; the rami are broader than in the first pair, elongate-ovate, sharp-pointed, equal in length, and provided with semicircular incisions; they are serrated as in the first pair. The peduncle of the *third pair* is broader than that in the second, considerably more than twice as long as broad, and nearly twice as long as the inner ramus; the rami are somewhat narrower and shorter than in the preceding pair, but armed in the same way.

The *telson* is triangular with slightly curved margins, about as long as broad, and more than half as long, as the last ural segment; it is quite as broad, and less than half as long, as the peduncle of the last pair of uropoda.

#### The female.

Pl. XI, fig. 7, 9, 12 and 13.

The *body* is broader and wider than in the male. The head and peræon together are longer than the pleon, but somewhat shorter than the pleon and urus together.

The *first pair of antennæ* reach a little below the under margin of the head; the single flagellar joint is about twice as long as the whole peduncle.

The *second pair of antennæ* are scarcely more slender than the first.

The *peræon*. The first two coalesced segments are almost as long as the next three together.

The *first and second pairs of peræopoda* are exactly like those in the male.

The *third and fourth pairs* (Pl. XI, fig. 7) are somewhat more robust than in the male, with the tibia and carpus a trifle broader; the bristles on the hind margin of the carpus are shorter, but the serration is more distinct.

The *fifth, sixth, and seventh pairs* (Pl. XI, fig. 9) are like those in the male, but the femur is perhaps somewhat broader. The metacarpus is a little longer than two thirds of the femur. The dactylus is much longer than a third of the metacarpus.

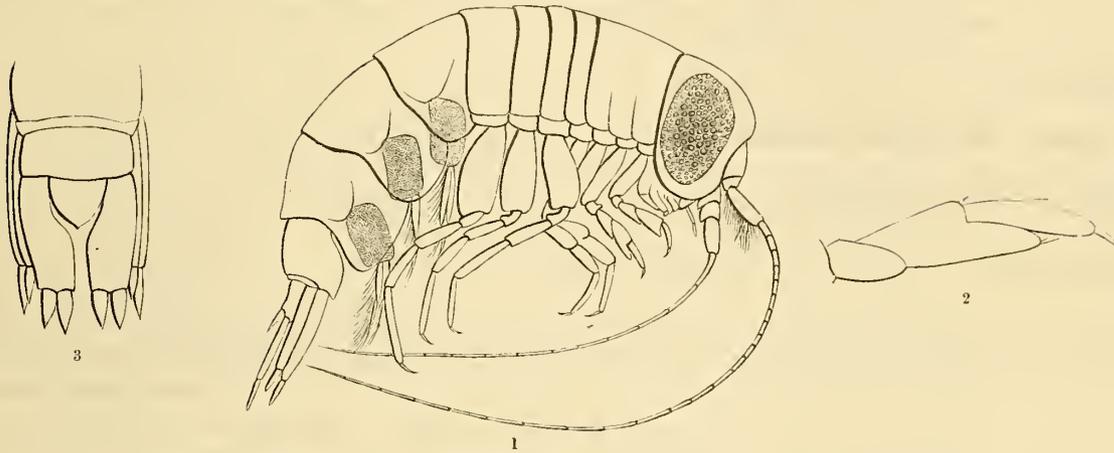
The *pleon* is only a little longer than the peræon; the first segment is as long as the last two peræonal segments together.

The *urus* is broader than in the male, and scarcely more than half as long as the last pleonal segment.

The *uropoda* (Pl. XI, fig. 12 and 13) are only a little broader and shorter than in the male.

16. **HYPERIA DANÆ**, n. n.

The name given in honour of Professor J. D. DANA.



*Hyperia Danae.*

Faesimile from DANA. U. S. Expl. Exp. Crust. II, pl. 67, fig. 10.

Fig. 1. The animal from the side. 2. The second pair of peraeopoda. 3. The urus.

**Diagn.** *Caput* permagnum, infra rotundatum, segmentis tribus primis peraei paullo longius. Segmenta tria prima *peraei* coalita, cetera libera. *Carpus pedum peraei* primi paris dilatatus ac productus, margo anterior processus carpalis dimidio marginis posterioris metacarpi brevior. *Carpus pedum secundi* paris productus, margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo longior. *Metacarpus pedum primi et secundi* parium spinam singulam margini anteriori affixam gerens; *dactylus* mediocris. *Pedes tertii ac quarti* parium pedibus parium duorum praecedentium paullo longiores; *carpus* non tumidus, spinis destitutus; *metacarpus* carpo vix angustior. *Pedes parium trium ultimorum* duobus praecedentibus longiores; *pedes septimi* paris pedibus quinti ac sexti parium longiores; *femur pedum septimi* paris latum; *carpus tibia* non brevior; *dactylus* longus. *Latera segmentorum plei* post rotundata. *Segmentum secundum uri* liberum(?). *Pedunculus pedum uri* ultimi paris plus quam duplo longior quam latior, ac ramo interno ter longior. *Telson* latius quam longius, segmento tertio uri paullo brevius, *pedunculo pedum uri* ultimi paris latius, ac dimidio pedunculi ejusdem brevius.

The *head* is very large, rounded below, and a little longer than the first three peraeonal segments. The first three segments of the *peraeon* are coalesced, the following are free. The *carpus* of the first pair of *peraeopoda* is dilated and produced; the front side of the carpal process is shorter than half the hind margin of the metacarpus. The *carpus* of the second pair is produced; the front side of the carpal process is a little more than half as long as the hind margin of the metacarpus. The *metacarpus* of the first and second pairs has a single bristle on the front margin; the *dactylus* is moderately long. The third and fourth pairs are a little longer than the first and second; the *carpus* is not tumid, and without bristles; the

metacarpus is scarcely narrower than the carpus. The last three pairs are longer than the two preceding. The seventh pair are longer than the fifth and sixth; the femur of the seventh pair is broad; the carpus is not shorter than the tibia; the dactylus is long. The lateral parts of the *pleonal* segments are rounded behind. The second segment of the *urus* is free(?). The peduncle of the last pair of *uropoda* is more than twice as long as broad, and three times as long as the inner ramus. The *telson* is broader than long, and a little shorter than the last ural segment; it is broader than, and less than half as long as, the peduncle of the last pair of *uropoda*.

**Colour.** (?)

**Length.** »One and a half lines» (DANA).

**Hab.** »Sooloo Sea» (DANA).

**Syn. 1852.** *Lestrigonus Fabreii?* (H. MILNE EDWARDS.) J. D. DANA.

United States Exploring Expedition. Crustacea. Vol. 2, p. 985, pl. 67, fig. 10.

” ” ” SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, pl. 48, fig. 6.

A comparison of the diagnoses and drawings given above of *Lestrigonus Fabrei*, H. MILNE EDWARDS, and *L. Fabrei*, DANA, proves clearly that they are two distinct species, and DANA himself did not place his species under the name *L. Fabrei* without hesitation, as shows the following passage from his description:

»The specimen here described has many of the characters of *L. Fabreii*; yet for want of a full description of that species, we cannot pronounce on an identity.»

And further:

»According to MILNE EDWARDS, the legs of the first pair in the *Fabreii* are cylindrical, and differ from those of the second pair; but we suspect that this form was observed in consequence of the leg being turned with the upper margin to the eye. This is the natural position both of the first and second pairs, in a side view of the animal, and when so situated, the projecting process (thumb-like) of the antepenultimate joint is not seen.»

SPENCE BATE in 1862 made matters worse by attaching a copy of the drawing of DANA's *Lestrigonus Fabreii* to a translation of the diagnosis of H. MILNE EDWARDS' *L. Fabrei*, without any explanation.<sup>1)</sup> Moreover the copy given by SPENCE BATE (l. c. pl. 48, fig. 6) is not very good, as for instance he delineates the peræon with seven free segments, but in the original drawing the first three segments are given as coalesced, and in his description DANA expressly states the same; further the carpus of the first two pairs of peræopoda in SPENCE BATE's copy is much broader than in the original, and has the process broadly rounded.

<sup>1)</sup> Above p. 140 I wrongly state that SPENCE BATE's description and drawing are copied from DANA, but the description is really translated from H. MILNE EDWARDS' *Histoire naturelle des Crustacés*, tome 3<sup>m<sup>e</sup></sup>, pag. 82.

The original description given by DANA runs:

»The facets cover a very large part of either side of the head. The front of the head in profile is somewhat concave near or below the base of the superior antennæ, but much less so than in EDWARDS' figure. The four posterior segments of the thorax are distinct, and the first three are coalesced along the back. Antennæ longer than the body; two fringes of hairs on under side of third basal joint of the superior antennæ, very delicate and close; apex of next joint not acute; flagella very slender, consisting of very long joints, excepting part of flagellum of superior pair, near the basal portion of the antennæ; twenty joints or more to the flagellum of this pair. First and second pairs of legs nearly equal, terminating in an imperfect hand, the lower apex of the antepenult joint being prolonged to about half the length of the next joint, which is subcylindrical. Third and fourth pairs equal; seventh pair longer than either of the preceding; these legs naked and without a longish seta on fourth joint, as in the *rubescens*; tarsus about one-third the length of the preceding joint. Basal joint in fifth, sixth, and seventh pairs narrow, rounded or obtuse at apex. Caudal segment of abdomen about half as wide as preceding, and nearly half as long as posterior caudal stylets, exclusive of the two terminal lamellæ. Posterior caudal stylets rather broad, the lamellæ equal, broad oval-lanceolate, about one-third as long as basal portion.»

As the species described by DANA is thus not identical with *Hyperia Fabrei*, H. MILNE EDWARDS, and seems to be a well defined species, I propose for it the new name *Hyperia Danae*.

As its specific characteristics may be pointed out:

The lower part of the *head* is rounded, not produced.

The first three *peraeonal* segments are coalesced. The carpus of the *first pair of peraeopoda* is produced into a process nearly half as long as the hind margin of the metacarpus.

The *seventh pair of peraeopoda* are longer than the others.

The inner ramus of the *third pair of uropoda* is not longer than the breadth of the peduncle.

The *telson* is a little broader than, but not half as long as, the peduncle of the last pair of uropoda.

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## 17. HYPERIA SCHIZOGENEIOS, TH. STEBBING, 1888.

**Diagn.** *Caput* maximum, infra acute productum, segmenta quinque prima perai longitudine æquans. Segmenta tria prima *perai* coalita, cetera libera. Carpus *pedum perai* primi paris dilatatus ac productus; margo anterior proeessus earpalis dimidio marginis posterioris metaearpi brevior. Carpus *pedum secundi* paris productus; margo anterior proeessus carpalis dimidio marginis posterioris metaearpi longior. Metacarpus *pedum primi et secundi* parium spinam singulam margini anteriori affixam gerens; margo posterior serratus, dentibus simplicibus; *daetylus* longus. *Pedes tertii ac quarti* parium *pedibus parium duorum* præcedentium paullo longiores; *earpus* non tumidus, spinis duobus margini posteriori affixis instructus; *metaearpus* carpo paullo angustior, serratus. *Pedes parium trium ultimorum* duobus præcedentibus non longiores; *earpus tibia* longior; *earpus metacarpusque* serrati; *daetylus* longus, simplex. *Latera segmentorum plei* post rotundata. *Pedunculus pedum*

*uri* ultimi paris quater longior quam latior, ramum internum tertia parte longitudine superans. *Telson* triangulatum, longius quam latius, segmentum ultimum uri longitudine æquans, pedunculo pedum uri ultimi paris duplo latius, ac dimidio pedunculi ejusdem paullo longius.

The *head* is very large, produced downwards into a sharp-pointed process, and as long as the first five pereopodal segments together. The first three segments of the *peræon* are coalesced, the four following are free. The carpus of the first pair of *peræopoda* is dilated and produced; the front side of the carpal process is not fully half as long as the hind margin of the metaearpus. The carpus of the second pair is produced; the front side of the carpal process is more than half as long as the hind margin of the metaearpus. The metaearpus of the first and second pairs has a single bristle on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are a little longer than the two preceding; the carpus is not tumid, and has two bristles on the hind margin; the metaearpus is only a little narrower than the carpus, and is serrated. The last three pairs are not longer than the two preceding; the carpus is longer than the tibia; the carpus and metaearpus are serrated; the dactylus is long and simple. The lateral parts of the *pleonal* segments are rounded behind. The peduncle of the last pair of *uropoda* is four times as long as broad, and only a third part longer than the inner ramus. The *telson* is triangular, longer than broad, and as long as the last uropodal segment; it is twice as broad, and more than half as long, as the peduncle of the last pair of *uropoda*.

**Colour.** Almost hyaline with small red spots.

**Length.** 2 to 4 mm.

**Hab.** The tropical region of the Atlantic: off Martinique; the Caribbean Sea. (F. M.; S. M.)  
»Off St. Vincent, Cape Verde Islands; Lat. 16° 49' N., Long. 25° 14' W.» (STEBBING.)

**Syn. 1888.** *Hyperia schizogeneios*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1391, pl. 168.

*Hyperia schizogeneios* is easily distinguished from all the preceding species by the lower portion of the head being produced downwards into a sharp process; from the next species *H. crucipes*, which also has the lower portion of the head produced, it may be distinguished by the shape of this process, and by the comparatively shorter carpal process of the first and second pairs of *peræopoda*. It is also remarkable for the great width of the forepart of the body, the *peræon* in the female being considerably broader than long. With this great dilatation of the *peræon* follows a considerable enlargement of the head, which is comparatively much larger than in any of the preceding species.

As the specimens I have collected in the West-Indies agree in all details with that described and figured by STEBBING, I give no new drawings, and only a few notices derived from the examination of an adult male.

### The male.

The *body* is only a little narrower than in the female, the head and peræon together being somewhat longer than the greatest breadth of the peræon, and nearly as long as the pleon and urus together.

The *eyes* occupy the whole surface of the head, and consist of an unusually large number of ocelli.

The *first pair of antennæ* reach to the hind margin of the second pleonal segment. The first joint of the flagellum is longer than the whole peduncle; the following flagellar joints are subequal in length, slender, cylindrical, and about five times as long as broad. The flagellar joints are twenty-four in number.

The *second pair of antennæ* are a little longer than the first; the flagellum has twenty-three joints, the first, the longest, being considerably longer than the last peduncular joint.

The *peræon*. The first three coalesced segments are nearly as long as the three following; the seventh segment is about as long as the two preceding together.

The *epimerals* are as long as the under margins of the corresponding segments.

The *branchial sacks* are very large, but shorter than the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda*. The femur is nearly as long as the four following joints together; it is broadest at the middle, and about three times as long as broad. The carpus is much dilated; the front side of the carpal process is not fully half as long as the hind margin of the metacarpus. The metacarpus is considerably longer than the stem of the carpus; the front margin is strongly convex; the hind margin is serrated, with spine-like, simple teeth. The dactylus is as long as two-thirds of the metacarpus, and is finely serrated on the hind margin.

The *second pair* are not longer than the first, and reach nearly to the apex of the tibia of the third pair. The femur is almost linear, more than three times as long as broad, and fully as long as the four following joints together. The carpal process is as long as the rest of the joint; its front side is as long as three-fourths of the hind margin of the metacarpus. The metacarpus is much longer than the stem of the carpus, and is armed as in the first pair. The dactylus is somewhat more than half as long as the metacarpus.

The *third and fourth pairs*. The femur is narrow, a little broader at the apex, fully four times as long as it is broad at the apex, and considerably longer than the three following joints together. The tibia is broad at the apex, quite as broad as the femur. The carpus is much longer than the tibia: the hind margin is indistinctly serrated, and carries two bristles. The metacarpus is about as long as the two preceding joints together, and is longer than two thirds of the femur; the hind margin is serrated. The dactylus is nearly half as long as the metacarpus.

The *fifth, sixth, and seventh pairs* are not longer than the two preceding pairs. The femur is broadest at the apex, not fully twice as broad as that of the third and

fourth pairs, and about as long as the three following joints together. The carpus is distinctly longer than the tibia, and has the front margin serrated. The metacarpus is only a little longer than the carpus, with the front margin serrated. The dactylus is half as long as the metacarpus.

The *pleon* is about as long as the peræon but scarcely more than half as broad. The lateral parts of the segments are rounded behind.

The *pleopoda*. The outer ramus has eight joints, the inner seven.

The *urus* is longer than the last pleonal segment. The first ural segment is a third longer than the last coalseed, which is nearly as long as broad.

The *uropoda*. The *first pair* reach to the apex of the last pair; the peduncle is about five times as long as broad, and is only a little longer than the inner ramus; the rami are narrowly elongated and sharp-pointed; the outer is somewhat shorter than the inner, and is serrated along the inner margin; the inner ramus is serrated along the outer margin. The *second pair* reach a little beyond the apex of the peduncle of the last pair; The peduncle is narrow, linear, about four times as long as broad, and is quite as long as the inner ramus; the rami are like those in the first pair. The peduncle of the *third pair* is four times as long as broad, and a third longer than the inner ramus; the rami are equal in length, and are armed as in the preceding pairs.

The *telson* is longer than broad, narrowed at the apex, and sharp-pointed; it is about as long as the last coalseed ural segment, twice as broad, and more than half as long, as the peduncle of the last pair of uropoda.

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STEBBING remarks (l. e. p. 1394) that he found in the »Challenger» collection a specimen labelled »Zebu Harbour, Philippines,» which closely resembles *Hyperia schizogeneios*, but differs by some minor characteristics; if it should need a specific name of its own, he proposes to call it *H. zebui*. He says:

»The features of difference which this specimen presents are that the head is less deep; the wrist of the first gnathopods has on the straight hind margin two spines, one on and three within the apex, and the straight hind margin of the hand is pretty strongly pectinate on the lower part; the third joint of the second gnathopods has four spines about the apex, the wrist has the produced part beset with eight spines, the hand has two on its front margin; in the first peræopods the fourth joint is rather conspicuously broad; the hinder corners of the first three pleon-segments are squared, but perhaps the actual angles a little more rounded than in the Atlantic specimen; the first two pairs of pleopods have seven joints to each ramus, the third pair has six; the telson is a little more elongate.»

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18. **HYPERIA CRUCIPES**, n. sp.

Pl. XI, fig. 14—25.

The name is chosen with regard to the peculiar form of the dactylus of the fifth and sixth pairs of peræopoda.

**Diagn.** *Caput* permagnum, infra late productum, segmenta tria prima peræi longitudine æquans. Segmenta tria prima peræi coalita, cetera libera. Carpus *pedum peræi* primi paris valde dilatatus ac productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi longior. Carpus *pedum secundi* paris valde productus; margo anterior processus carpalis marginem posteriorem metacarpi longitudine fere æquans. Metacarpus *pedum primi et secundi* parium spinis carens; margo posterior serratus, dentibus simplicibus, spinulis perpaucis intermixtis; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium longiores; carpus tumidus, spinis ternis, margini posteriori affixis, instructus; metacarpus carpo multo angustior, non serratus. Pedes parium trium ultimorum duobus præcedentibus non longiores; carpus metacarpusque non serrati; dactylus *pedum quinti ac sexti* parium crucifer. Latera segmentorum *plei* post rotundata. Pedunculus *pedum uri* ultimi paris latus. *Telson* longius quam latius, segmento ultimo uri paullo brevius, pedunculo *pedum uri* ultimi paris latius, ac dimidio pedunculi ejusdem longius.

The *head* is very large, broadly produced downwards, and is as long as the first three coalesced peræonal segments. The first three segments of the *peræon* are coalesced, the four following are free. The carpus of the first pair of *peræopoda* is much dilated and produced; the front side of the carpal process is more than half as long as the hind margin of the metacarpus. The carpus of the second pair is much produced; the front side of the carpal process is nearly as long as the whole hind margin of the metacarpus. The metacarpus of the first and second pairs wants bristles; the hind margin is serrated, with simple teeth and between them a few short spines. The third and fourth pairs are longer than the first and second pairs; the carpus is tumid, and provided with three bristles on the hind margin; the metacarpus is much narrower than the carpus, not serrated. The last three pairs are not longer than the two preceding; the carpus is longer than the tibia; the carpus and metacarpus are not serrated; the dactylus of the fifth and sixth pairs is armed with cross-shaped projections at the base. The lateral parts of the *pleonal* segments are rounded behind. The peduncle of the last pair of *uropoda* is broad, twice as long as broad. The *telson* is longer than broad, and a little shorter than the last ural segment; it is as broad, and more than half as long, as the peduncle of the last pair of *uropoda*.

**Colour.** Red, with small dark spots on the lower parts of the body.

**Length.** 4 mm.

**Hab.** The tropical region of the Atlantic: Off Barbadoes (F. M.; S. M.).

*Hyperia crucipes* is remarkable for the armature of the dactylus of the fifth and sixth pairs of peræopoda, which easily distinguishes it from all its congeners, and also for the deeply produced lower part of the head, which feature it has in common with *H. schizogeneios*. This process extends straight downwards in both species, but it is broad, almost truncated in *H. crucipes*, while it is acute in *H. schizogeneios*. Moreover the considerable elongation of the carpal process of the first and second pairs of peræopoda is a good characteristic for the distinction of this species from its nearest relative.

### The male.

Pl. XI, fig. 17—19, and 21—23.

The *body* is tolerably broad; the head and peræon together are longer than the pleon and urus together. The integument is very thin and almost hyaline, at least in the peræonal segments.

The *head* is fully as long as the coalesced portion of the peræon. The antennal groove commences a little below the middle of the front side, and is very deep.

The *first pair of antennæ* reach nearly to the hind margin of the first pleonal segment. The first joint of the peduncle is more than twice as long as the two following joints together. The first joint of the flagellum is shorter than the peduncle; the second and third joints are very short; the following are long, cylindrical, subequal in length, and about eight times as long as broad. The flagellar joints are fifteen in number.

The *second pair of antennæ* are about as long as the first. The first free joint of the peduncle is as long as broad, and only a little longer than the glandular cone; the third joint is as long as the two preceding together. The first joint of the flagellum is nearly as long as the last peduncular joint; the following are shorter, cylindrical, subequal in length, and about six times as long as broad. The flagellar joints are sixteen in number.

The *peræon*. The coalesced portion of the peræon is not fully as long as the following three segments together; the seventh segment is a third part longer than the sixth. The peræon is scarcely longer than the pleon and urus together.

The *first pair of peræopoda* (Pl. XI, fig. 17 and 18). The femur is nearly as long as the four following joints together; the hind margin is feebly convex; the front margin forms an obtuse angle in the middle. The tibia is produced at the lower hind corner, and armed with two bristles. The carpus is very broad, about as broad below as it is long; the carpal process is about a third part as long as the stem of the carpus, and its front side is fully half as long as the hind margin of the metacarpus, the margins being fringed with long bristles. The metacarpus is somewhat longer than the carpus, and is more than twice as long as broad at the base; the front margin is convex and smooth; the hind margin is sharply serrated, and armed with four tolerably long spines. The dactylus is feebly curved, and is not half as long as the metacarpus; the hind margin is serrated.

The *second pair* (Pl. XI, fig. 19). The femur is somewhat longer than all the following joints together. The tibia is produced as in the first pair. The carpal process is nearly as long as the stem of the joint, and its front side is only a trifle shorter than the hind margin of the metacarpus; the front margins are fringed with bristles. The metacarpus is a little longer than the stem of the carpus, and about twice as long as broad at the base; the front margin is almost straight; the hind margin is sharply serrated. The dactylus is not half as long as the metacarpus, and has the hind margin serrated.

The *third and fourth pairs* (Pl. XI, fig. 21). The femur is much longer than the three following joints together, almost linear, with the basal portion somewhat narrower, and bent backwards. The genu is broader than long. The tibia is considerably longer than the genu, and is very broad, nearly as broad below as the femur. The carpus is about as long as the two preceding joints together; it is very broad and tumid; the hind margin is armed with three short bristles; within the joint there is a very large gland. The metacarpus is a little longer than, but scarcely half as broad as, the carpus; the hind margin is fringed with a row of short spines. The dactylus is a third part as long as the metacarpus; at its base there is a circular opening for the glandular secretion.

The *fifth, sixth, and seventh pairs* (Pl. XI, fig. 22 and 23). The femur is tolerably broad, broader below than at the base, and nearly twice as broad as the femur of the two preceding pairs; in its middle there is a large gland. The genu is as long as broad. The tibia is much longer than the genu, and is tolerably broad. The carpus of the fifth and sixth pairs is fully as long as the two preceding joints together, linear, and much narrower than the tibia; the carpus of the seventh pair is shorter than the two preceding joints, but is considerably longer, and only a little narrower, than the tibia; the front margin is smooth. The metacarpus of the fifth and sixth pairs is as long as, that of the seventh is longer than, the carpus; the front margin is set with a few, equidistant short spines. The form of the dactylus of the fifth and sixth pairs is peculiar: at the base of the front side it is provided with a forked projection, which probably serves as a cover for an outlet from the glands; the slender, feebly curved, and sharp-pointed horns of the projection cross the dactylus on each side, thus making the dactylus itself appear cross-shaped; the dactylus of the seventh pair has no such forked projection, and shows a circular hole at the base as usual.

The *pleon* is longer than the last four peræonal segments together; the first pleonal segment is longer than the last peræonal. The lateral parts are obtusely rounded behind.

The *pleopoda*. The outer ramus has eight joints, the inner seven.

The *urus* is longer than the last pleonal segment. The first ural segment is scarcely longer than the last coalesced, but much broader; the last coalesced segment is considerably broader than long.

The *uropoda*. The *first pair* reach almost to the apex of the last pair; the peduncle is narrow, linear, and about as long as the inner ramus; the rami are narrowly elongate, sharp-pointed, without semicircular incisions at the base. The *second pair* reach a little beyond the apex of the peduncle of the last pair; the peduncle is shorter than the inner ramus. The peduncle of the *third pair* is narrow, linear, and much longer than

the rami, which are equal in length; the inner ramus is more than twice as long as the breadth of the peduncle.

The *telson* is half as long as, and much broader than, the peduncle of the last pair of uropoda.

### The female.

Pl. XI, fig. 14—16, 20, and 24—25.

The *body* is much broader than in the male; the pleon and urus together are much shorter than the peræon.

The *head* is a little shorter than the coalesced portion of the peræon.

The *first pair of antennæ* (Pl. XI, fig. 15) do not reach to the under margin of the head. The first joint of the peduncle is more than twice as long as the two following joints together; the second joint is more than three times as long, as the third. The single joint of the flagellum is evenly tapering towards the apex, and is fully twice as long as the whole peduncle; the under side is notched, and set with a few long olfactory hairs.

The *second pair of antennæ* (Pl. XI, fig. 16). The peduncle consists of only one free joint, which is about twice as long as the glandular cone. The single flagellar joint tapers evenly towards the apex, is smooth, and twice as long as the peduncle.

The *peræon*. The coalesced portion is quite as long as the next three segments together. The seventh segment is nearly twice as long as the sixth.

The *first and second pair of peræopoda* are similar to those pairs in the male.

The *third and fourth pairs* (Pl. XI, fig. 20) are somewhat stouter than in the male, and the carpus is more tumid. The metacarpus is as long, and not half as broad, as the carpus.

The *fifth, sixth, and seventh pairs* (Pl. XI, fig. 24 and 25) are considerably thicker than in the male. The dactylus of the fifth and sixth pairs is provided with such a forked projection as in the male; the dactylus of the seventh pair is transformed into a spout-like organ like that described from *Hyperia medusarum* and other species.

The *pleon* is as long as the last four peræonal segments together; the first pleonal segment is as long as the last peræonal.

The *urus*. The first segment is a little longer than, and nearly twice as broad as, the last coalesced, which is more than a third part broader than long.

The *uropoda* are like those in the male, but the peduncles are a trifle broader.

The *telson* is nearly twice as broad as the peduncle of the last pair of uropoda.

19. **HYPERIA LATISSIMA**, n. sp.

Pl. XI, fig. 26—36.

**Diagn.** *Caput* permagnum, segmentis quattuor primis peræi brevius. Segmenta quattuor prima *peræi* coalita, cetera libera. Carpus *pedum peræi* primi paris dilatatus, paullulo productus. Carpus pedum secundi paris productus; margo anterior processus carpalis dimidium marginis posterioris metacarpi longitudine æquans. Metacarpus pedum primi paris spinas duas lateri exteriori affixas gerens; metacarpus pedum secundi paris spinam unam gerens; margo posterior metacarpi serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium multo longiores; carpus spinis binis instructus; metacarpus serratus; dactylus curtus. Pedes parium trium ultimorum duobus præcedentibus paullo longiores; femur modice dilatatum; carpus pedum septimi paris tibia brevior; metacarpus serratus; dactylus longus. Latera segmentorum *plei* post rotundata. Pedunculus *pedum uri* ultimi paris plus quam ter longior quam latior. *Telson* triangulatum, longius quam latius, segmento ultimo uri paullo brevius, pedunculo pedum uri ultimi paris latius, ac dimidio pedunculi ejusdem multo longius.

The *head* is very large, but shorter than the first four peræonal segments together. The first four *peræonal* segments are coalesced, the following are free. The carpus of the first pair of *peræopoda* is dilated, and a little produced. The carpus of the second pair is produced; the front side of the carpal process is half as long as the hind margin of the metacarpus. The metacarpus of the first pair has two bristles on the outer side, that of the second pair has one; the hind margin of the joint is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are much longer than the first and second; the carpus is provided with two short bristles; the dactylus is short. The last three pairs are a little longer than the two preceding; the femur is moderately broad; the carpus of the seventh pair is shorter than the tibia; the metacarpus is serrated; the dactylus is long. The lateral parts of the *pleonal* segments are rounded behind. The peduncle of the last pair of *uropoda* is more than three times as long as broad. The *telson* is triangular, longer than broad, and a little shorter than the last ural segment; it is broader than, and more than half as long as, the peduncle of the last pair of *uropoda*.

**Colour.** Light red.

**Length.** 4 mm.

**Hab.** The Southern temperate region of the Atlantic (S. M.; U. M.).

In general form *Hyperia latissima* comes nearest to *H. schizogeneios*, but is at once distinguished by the broadly rounded under margin of the head, and by the coalition of the first four peræonal segments. STEBBING, describing *H. schizogeneios*, mentions incidentally (l. c. p. 1391) »the first three or sometimes four segments of the peræon dorsally coalesced»; as I never found more than the first three segments coalesced in the many specimens of *H. schizogeneios* that I have examined, and as I have specimens of *H. la-*

tissima taken in company with *H. schizogeneios* from two different localities, I suppose that this remark of STEBBING'S may be due to a similar circumstance, the more so as the two species resemble one another very much in general form of body, and the characteristic projection of the under margin of the head in *H. schizogeneios* is easily overlooked.

### The male.

The forepart of the *body* is much broader than the hind part, but not twice as broad, as it is in the female.

The *head* is only a little more than half as long as the coalesced portion of the peræon. The antennal groove is large and deep, commencing above the middle of the front side. The under margin of the head is semicircular.

The *first pair of antennæ* are shorter than the second, but reach fully to the hind margin of the first ural segment. The first joint of the peduncle is very large and tumid, and more than three times as long as the two following joints together. The first joint of the flagellum is not a third part as wide as the first peduncular joint, and a little shorter than the whole peduncle; the second and third joints are scarcely longer than broad; the next five increase slowly in length; the following are equal, slender, cylindrical, about seven times as long as broad, and each provided with three slender hairs on the under side. The flagellar joints are twenty-five in number.

The *second pair of antennæ* are longer than the whole animal. The first free joint of the peduncle is shorter than the second, the third is nearly as long as the two preceding together; the glandular cone is large, spherical, and almost as long as the first joint. The first flagellar joint is the longest, the following are equal in length, cylindrical, and about nine times as long as broad; they are twenty-two in number.

The *peræopoda* are like those of the female.

The *pleon* is fully as long as the whole peræon. The lateral parts of the segments are rounded behind.

The *urus* is nearly as long as the last pleonal segment. The first ural segment is longer than the last coalesced, which is nearly a third part broader than long.

The *uropoda* are like those of the female.

The *telson* is a little more than half as long as the peduncle of the last pair of uropoda.

### The female.

Pl. XI, fig. 26—36.

The forepart of the *body* is more than twice as wide as the hind part, and gives the animal the appearance of a ball, when the tail is folded up under the peræon.

The *head* is longer than in the male, and more than half as long as the coalesced portion of the peræon. The under margin is semicircular.

The *first pair of antennæ* (Pl. XI, fig. 27 and 28) reach a little beyond the under margin of the head. The first joint of the peduncle is large, almost three times as long as the two following together. The single flagellar joint is twice as long as the whole peduncle, slowly tapering towards the apex, and is provided with four pairs of long olfactory hairs along the inner side; the outer margin is fringed with short hairs which are curved at the apex.

The *second pair of antennæ* (Pl. XI, fig. 29) are very short, consisting of only one peduncular joint, and one representing the flagellum.

The *peræon*. The coalesced first four segments show distinct sutures at the lower parts of the side, and are provided with distinct epimerals as the last three segments. The coalesced part is about as long as the three following segments together. The seventh segment is strongly convex, and abruptly much wider than the first pleonal segment.

The *first pair of peræopoda* (Pl. XI, fig. 30 and 31). The femur is shorter than the four following joints together; the front margin is convex, the hind margin almost straight. The genu is broader than long, and without bristles. The tibia is longer than the genu, and is broadly produced at the lower hind corner, which carries three stout bristles. The carpus is only a little produced; the front margin is straight; the hind margin is feebly convex, and twice notched, each notch carrying a bristle; the under side is armed with three bristles on each margin, and a terminal one at the feebly protruding hind corner. The metacarpus is longer than the carpus, the front margin is convex, and without bristles; the hind margin is feebly concave, and finely serrated, with equal, simple teeth; on the outer side of the joint there are two long bristles. The dactylus is more than half as long as the metacarpus, curved, and armed with fine, spine-like teeth along the hind margin (Pl. XI, fig. 31).

The *second pair* are a little longer than the first, and reach to the middle of the carpus of the third pair. The femur is a little broader below than at the base; the front margin is straight, the hind margin is feebly convex at the lower end; the femur is fully as long as the four following joints together. The tibia is somewhat more produced than in the first pair, and armed at the lower hind corner with four or five bristles. The front side of the carpal process is quite half as long as the hind margin of the metacarpus; each margin is armed with four bristles. The metacarpus is longer than the stem of the carpus; the front margin is convex, without bristles; the hind margin is straight, and serrated as in the first pair; on the outer side of the joint there is a single bristle. The dactylus is more than half as long as the metacarpus, with the hind margin finely serrated.

The *third and fourth pairs* (Pl. XI, fig. 32 and 33). The femur is almost linear, and is three times as long as broad. The genu is longer than broad, and smooth. The tibia is longer than the genu, with the front margin convex; the hind margin is nearly straight, and armed with a single bristle near the apex. The carpus is somewhat longer, but narrower, than the tibia; the hind margin is straight, finely serrated, and provided with two short bristles at the lower end. The metacarpus is tolerably broad, and a little longer than the carpus; the hind margin is finely serrated; usually all the joints of these pairs as well as those of the other pairs are occupied by well deve-

loped glands; sometimes the dactylus is transformed into a spout-like organ, serving as an outlet for the glandular secretion (Pl. XI, fig. 33). In this case it shows a circular opening at the apex, surrounded by bristles. This transformation is perhaps periodical,<sup>1)</sup> and connected with the maternal functions, because it is to be found in those females which have nearly ripe eggs, but not in females of the same size which are without eggs. Normally the dactylus has the usual form, with a small opening at the base.

The *fifth, sixth, and seventh pairs* (Pl. XI, fig. 34 and 35). The femur is laminar, broader below than at the base, somewhat more than twice as long as it is broad at the apex, and fully as long as the three following joints together. The genu is longer than broad. The tibia is nearly twice as long as the genu, with smooth margins. The carpus is a little shorter than the tibia, and distinctly narrower; the front margin is fringed with minute spines along its lower half. The metacarpus is nearly twice as long as the carpus; the front margin is finely serrated. The dactylus is longer than a third part of the metacarpus.

The *pleon* is a little shorter than the peræon. The lateral parts of the segments are rounded behind.

The *pleopoda*. The outer ramus of the first pair has eight joints, the inner seven.

The *urus* is a little shorter than the last pleonal segment. The first ural segment is somewhat longer, and much broader, than the last coalesced, which is nearly twice as broad as long, and has a deep incision on each side for the articulation of the second pair of uropoda.

The *uropoda* (Pl. XI, fig. 36). The *first pair* reach to the middle of the outer ramus of the last pair; the peduncle is linear, nearly four times as long as broad; the rami are narrowly elongate, and sharp-pointed; the outer is shorter than the inner, which is about as long as the peduncle; the outer ramus is finely serrated along the inner margin, the inner ramus is serrated along the outer margin. The *second pair* reach beyond the apex of the peduncle of the last pair; the peduncle is narrower than that of the first pair, but reaches as far backwards; the rami as in the preceding pair. The peduncle of the *third pair* is linear, about three times as long as broad; the rami are equal in length, more than twice as long as the breadth of the peduncle, and serrated as in the first pair.

The *telson* is triangular, rounded at the apex, and a third shorter than the last ural segment; it is much broader than the peduncle of the last pair of uropoda, and much more than half as long.

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<sup>1)</sup> Compare: C. BOVALLIUS, »The Oxycephalids», p. 42. Nova Acta. Soc. Reg. Scientiarum Upsal. Ser. III. Vol. XV.

20. **HYPERIA THORACICA**, n. sp.

Pl. XI, fig. 37—41.

**Diagn.** *Caput* magnum, dimidio partis coalitæ peræi haud longius. Segmenta quinque prima *peræi* coalita, cetera libera, post acute producta. Carpus *pedum peræi* primi paris dilatatus et paullo productus. Carpus *pedum* secundi paris productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi paullo longior. Metacarpus *pedum* primi et secundi parium spinam singulam margini anteriori affixam gerens; margo posterior serratus, dentibus simplicibus; dactylus longus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores; carpus spinam singulam gerens; metacarpus serratus; dactylus longus. Pedes parium trium ultimorum duobus præcedentibus haud longiores; femur paullo dilatatum; carpus tibia non brevior; metacarpus non serratus; dactylus longus. Segmenta *plei* post acute producta; latera segmentorum post angulata. Pedunculus *pedum uri* ultimi paris quater longius quam latius. *Telson* lingulatum, longius quam latius, segmento ultimo uri brevius, pedunculo *pedum uri* ultimi paris latius, ac dimidio pedunculi ejusdem paullo brevius.

The *head* is large, about half as long as the coalesced part of the peræon. The first five *peræonal* segments are coalesced, the last two are free, and dorsally produced backwards, each into a sharp point. The carpus of the first pair of *peræopoda* is dilated, and a little produced. The carpus of the second pair is produced; the front side of the carpal process is somewhat more than half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs is provided with a single bristle on the front margin; the hind margin is serrated, with simple teeth; the dactylus is long. The third and fourth pairs are a little longer than the first and second; the carpus carries a single bristle; the metacarpus is serrated; the dactylus is long. The last three pairs are scarcely longer than the two preceding; the femur is a little dilated; the carpus is not shorter than the tibia; the metacarpus is not serrated; the dactylus is long. The segments of the *pleon* are dorsally produced backwards, each into a sharp point; the lateral parts of the segments are angulated behind. The peduncle of the last pair of *uropoda* is four times as long as broad. The *telson* is tongue-shaped, longer than broad, and shorter than the last ural segment; it is broader than, and not half as long as, the peduncle of the last pair of *uropoda*.

**Colour** Light red.

**Length.** 4—5 mm.

**Hab.** The tropical region of the Atlantic: Between Lat. 20°—13° N. and Long. 43°—50° W. (D. M.; F. M.; S. M.)

*Hyperia thoracica* is distinguished from its congeners, by the sharp-pointed, dorsal prolongations of the last two peræonal segments, and of all the pleonal, as well as by the coalition of the first five peræonal segments.

### The male.

Pl. XI, fig. 38, 39, and 41.

The *body* is broader and more tumid than that of the male of *Hyperia latissima*. The head and peræon together are fully as long as the pleon and urus together.

The *head* is more than half as long as the coalesced portion of the peræon. The antennal groove is large, and commences above the middle of the front side.

The *first pair of antennæ* in the adult male reach to the hind margin of the second pleonal segment. The first joint of the peduncle is twice as long as the two following together. The first joint of the flagellum is a little longer than the whole peduncle; the second, third, and fourth joints are small; the next six increase in length, the following are equal, slender, cylindrical, and about six times as long as broad. The flagellar joints are twenty in number.

The *second pair of antennæ* are somewhat longer than the first, and reach fully to the hind margin of the first ural segment. The first free joint of the peduncle is as long as the second, the third is not fully as long as the two preceding together. The flagellar joints are eighteen in number.

The *peræon* has the coalesced portion about twice as long as the two following segments together, and quite as long as the first two pleonal segments together. The sutures between the coalesced segments are visible only at the lowest parts of the sides; higher up there are no traces of sutures, but the integument is entirely even, hyaline, and homogeneous. In the dorsal line the hind parts of the last two segments are produced into sharp-pointed, narrowly triangular processes, which are directed backwards.

The *first pair of peræopoda* (Pl. XI, fig. 38). The femur is tolerably broad, and somewhat longer than the four following joints together; the front margin is strongly convex; the hind margin is concave above and convex below. The genu is much broader than long. The tibia is much produced at the lower hind corner, and armed with two bristles. The carpus has the front margin convex; the hind margin is straight, and provided with one notch, which carries a bristle; the front side of the carpal process is about as long as a third of the hind margin of the metacarpus, and is armed with a terminal bristle and another one on each margin. The metacarpus is fully as long as the stem of the carpus; the front margin is convex, and armed with a bristle; the hind margin is feebly concave, and finely serrated on its lower half. The dactylus is as long as two-thirds of the metacarpus.

The *second pair* (Pl. XI, fig. 39) are not longer, nor more slender, than the first; they reach beyond the middle of the carpus of the third pair. The femur is longer than the four following joints; the front margin is feebly convex; the hind margin is straight. The carpus is less dilated than in the first pair; the carpal process is shorter than the stem of the joint; its front side is a little more than half as long as the hind margin of the metacarpus; the margins are provided with five bristles. The metacarpus is much longer than the stem of the carpus; the front margin is feebly convex, and armed with

a bristle; the hind margin is straight, and serrated as in the first pair. The dactylus is more than half as long as the metacarpus, with the hind margin smooth.

The *third and fourth pairs*. The femur is bent at the base, and much broader at the apex than at the base. The tibia is much longer than the genu, broader below, and provided with one bristle on the front margin and one on the hind. The carpus is longer than the tibia, and is tolerably broad; the hind margin is straight, finely serrated, and armed with a bristle at the lower corner. The metacarpus is about as long as the two preceding joints together; the hind margin is finely serrated. The dactylus is feebly curved, and somewhat more than half as long as the metacarpus.

The *fifth, sixth, and seventh pairs* are about as long as the two preceding pairs. The femur is less dilated than in the preceding species, and fully twice as long as it is broad at the apex. The tibia is fully twice as long as the genu. The carpus is about as long as the tibia; the front margin is smooth. The metacarpus is much longer than the carpus, but considerably shorter than the tibia and carpus together. The dactylus is not fully a third part as long as the metacarpus.

The *pleon* is as long as the peræon. The segments are dorsally produced in the median line into sharp-pointed, narrow, spine-like, processes, directed backwards. The hind corner of the lateral parts are angular, and sharp-pointed.

The *pleopoda*. The outer ramus of the first pair has six joints, the inner five.

The *urus* is longer than the last pleonal segment. The first segment shows dorsally a median, sharp-pointed process, like those mentioned from the pleonal segments; the first segment is nearly twice as long as the last coalesced, which is a third part broader than long.

The *uropoda* (Pl. XI, fig. 41). The *first pair* reach beyond the middle of the outer ramus of the last pair; the peduncle is linear, four times as long as broad, and much longer than the inner ramus; the rami are elongated, sharp-pointed, and entirely smooth; the outer ramus is a trifle shorter than the inner. The *second pair* reach a little beyond the apex of the peduncle of the last pair; the peduncle is three times as long as broad, and much shorter than the peduncle of the first pair; the inner ramus is much shorter than the peduncle; the outer ramus is much shorter than the inner; both are smooth. The peduncle of the *third pair* is four times as long as broad, and twice as long as the rami, which are equal in length, and smooth.

The *telson* is tongue-shaped, longer than broad, and only a little shorter than the last ural segment; it is somewhat broader than, and half as long as, the peduncle of the last pair of uropoda.

### The young male.

Pl. XI, fig. 37.

The forepart of the *body* is comparatively wider than in the adult male, and the *head* is also a little larger.

The *first pair of antennæ* reach only a little beyond the under margin of the head the flagellum consists of one longer and ten very short joints.

The *second pair of antennæ* are longer than the first; the flagellum consists of nine subequal, very short joints.

The *peræopoda* are like those in the adult male, only a little thicker.

### The female.

Pl. XI, fig. 40.

The forepart of the *body* is much wider, and more tumid than in the adult male; the head and *peræon* together are considerably longer than the *pleon* and *urus* together.

The *first pair of antennæ* reach scarcely beyond the under margin of the head. The single flagellar joint is provided with about a dozen long olfactory hairs on the inner side.

The *second pair of antennæ* reach only a little farther down than the first pair; the first free joint of the peduncle is longer than the second, the third is not fully as long as the two preceding together; the glandular cone is about half as long as the first joint. The single flagellar joint is somewhat longer than the whole peduncle, and is fringed with short hairs along the under margin.

The *peræopoda* are like those in the male.

The *pleon* is shorter than the *peræon*. The segments are dorsally armed with spine-like projections as in the male.

The *urus* is somewhat broader than in the male, and the first segment is scarcely more than a third longer than the last coalesced.

## 21. HYPERIA GILESI, n. sp.

The name is given in honour of Dr. G. M. GILES.

**Diagn.** *Caput* permagnum, parte coalita *peræi* longius. Segmenta quinque prima *peræi* coalita, cetera libera. Carpus *pedum peræi* primi paris dilatatus, productus, processum formans dimidium marginis posterioris metacarpi longitudine superantem. Carpus *pedum secundi* paris valde productus; margo anterior processus carpalis dimidio marginis posterioris metacarpi multo longior. Metacarpus *pedum primi et secundi* parium spinis destitutus; margo posterior indistincte serratus. Pedes tertii ac quarti parium pedibus parium duorum præcedentium paullo longiores; carpus metacarpusque non serrati; dactylus longus. Pedes parium trium ultimorum duobus præcedentibus paullo longiores; femur latum; carpus tibiam longitudine æquans; tibia, carpus, metacarpusque non serrati. Segmenta *plei* non producta; latera segmentorum post rotundata. Pedunculus *pedum uri* ultimi paris plus quam duplo longior quam latior. *Telson* rotundatum, latius quam longius, segmento ultimo *uri* brevius, pedunculo *pedum uri* ultimi paris latius, et dimidio pedunculi ejusdem brevius.

The *head* is very large, and is longer than the coalesced part of the *peræon*. The first five *peræonal* segments are coalesced, the last two are free. The carpus of the first pair of *peræopoda* is dilated, and produced, forming a process which is more than half as long as

the hind margin of the metacarpus. The carpus of the second pair is much produced; the front margin of the carpal process is much more than half as long as the hind margin of the metacarpus. The metacarpus of the first and second pairs wants bristles; the hind margin is indistinctly serrated. The third and fourth pairs are a little longer than the first and second; the carpus and metacarpus are not serrated; the dactylus is long. The last three pairs are a little longer than the two preceding; the femur is broad; the carpus is as long as the tibia; the tibia, carpus, and metacarpus are not serrated. The *pleonal* segments are not produced; the lateral parts are rounded behind. The peduncle of the last pair of *uropoda* is more than twice as long as broad. The *telson* is rounded, broader than long, and shorter than the last ural segment; it is broader than, and not half as long as, the peduncle of the last pair of *uropoda*.

**Colour.** Hyaline, with red spots.

**Length.** 2—3 mm.

**Hab.** The Indian Ocean, Malacca Strait (S. M.).

This little species is easily distinguished from the preceding *Hyperia thoracica*, by the length of the carpal processes in the first two pairs of peræopoda, and by the want of dorsal spine-like processes on the hind margins of the last peræonal and the pleonal segments. I am much inclined to think that the *Hyperia* described by GILES as the young of *Lestrigonus bengalensis* belongs to this species, and for this reason I have chosen the name *Hyperia Gilesi* for the type of my description, but at present I cannot settle the question, as GILES expressly says that his specimens have the second and third ural segments free, and that the first and second pairs of *uropoda* are equal in length. The following description is taken from specimens preserved in the Royal Natural History Museum in Stockholm.

#### The male.

The *body* is thick and tumid, evenly tapering from the middle of the peræon to the urus. The head and peræon together are shorter than the pleon and urus together.

The *head* is fully as long as the coalesced portion of the peræon. The antennal groove commences at the middle of the front side.

The *first pair of antennæ* reach almost to the hind margin of the first pleonal segment. The first joint of the peduncle is more than twice as long as the two following joints together. The first flagellar joint is much longer than the whole peduncle; the second, third, and fourth joints are short, the following are subequal in length, cylindrical, more than four times as long as broad, and each provided with a few short hairs on the under margin. The flagellar joints are eighteen in number.

The *second pair of antennæ* are about as long as the first. The first free joint of the peduncle is longer than the second, the third is nearly as long as the first. The first joint of the flagellum is as long as the last peduncular joint; the following are shorter, equal in length, cylindrical, and about four times as long as broad. The flagellar joints are eighteen in number.

The *peræon*. The coalesced portion is scarcely longer than the last two segments together.

The *epimerals* of all the segments are distinct, and as long as the under margins of the corresponding segments.

The *first pair of peræopoda*. The femur is longer than all the following joints together, and almost linear. The lower hind corner of the tibia is only a little produced, and armed with a single bristle. The carpus is longer than the two preceding joints together; the front margin is feebly convex; the hind margin is straight, and provided with a single bristle; the front side of the carpal process is fully half as long as the hind margin of the metacarpus, the margins being set with a few short spines. The metacarpus is somewhat longer than the stem of the carpus; the hind margin is feebly serrated. The dactylus is half as long as the metacarpus.

The *second pair* are longer, and more robust, than the first pair. The femur is nearly as long as all the following joints together. The carpus is much dilated and produced; the hind margin carries a single bristle; the front side of the carpal process is longer than two-thirds of the hind margin of the metacarpus. The metacarpus is as long as the stem of the carpus; the hind margin is feebly serrated. The dactylus is about half as long as the metacarpus.

The *third and fourth pairs*. The femur is narrow, almost linear, with a single bristle at the lower hind corner. The genu is as long as broad, with a bristle at the lower hind corner. The tibia is longer, but not broader, than the genu, and is armed in the same way. The carpus is narrow, linear, and fully as long as the two preceding joints together; the hind margin is smooth. The metacarpus is only a little longer than the carpus, with the hind margin smooth. The dactylus is nearly half as long as the metacarpus.

The *fifth, sixth, and seventh pairs*. The femur is laminar, dilated, not twice as long as broad, and about as long as the three following joints together. The genu is as long as broad, and carries a single bristle at the lower front corner. The tibia is more than twice as long as the genu, and is armed in the same way. The carpus is a little longer than the tibia, and has the margins smooth. The metacarpus is longer than the carpus; the front margin is smooth. The dactylus is as long as a third part of the metacarpus.

The *pleon* is much longer than the *peræon*. The first segment is shorter than the last two *peræonal* segments together. The lateral parts of the segments are rounded behind.

The *pleopoda*. The outer ramus of the first pair has seven joints, the inner has six.

The *urus* is longer than the last *pleonal* segment. The first *ural* segment is a little longer than the last coalesced, which is broader than long.

The *uropoda*. The *first pair* reach almost to the apex of the last; the peduncle is linear, more than four times as long as broad, and nearly twice as long as the inner ramus; the rami are elongate-lanceolate, equal in length, and with serrated margins. The *second pair* reach to the middle of the outer ramus of the last pair; the peduncle is shorter than that in the first pair, three times as long as broad, and much longer than

the inner ramus; the outer ramus is shorter than the inner, both are serrated as in the first pair. The peduncle of the *third pair* is not fully three times as long as broad, and only a little longer than the rami, which are equal in length, and serrated as in the first pair.

The *telson* is triangular, rounded at the apex, and considerably shorter than the last ural segment; it is scarcely broader than, and not half as long as, the peduncle of the last pair of uropoda.

### The female.

The forepart of the *body* is wider and deeper than in the male; the head and peræon together are longer than the pleon and urus together.

The *head* is as long as the coalesced portion of the peræon.

The *first pair of antennæ* reach to the under margin of the head; the single flagellar joint is twice as long as the whole peduncle.

The *second pair of antennæ* are very short, and do not reach as far down as the first pair. The peduncle consists of only two free joints; the glandular cone is nearly as long as the first joint; the single flagellar joint is not longer than the peduncle.

The *peræopoda* are like those in the male.

The *pleon* is considerably shorter than the peræon; the first segment is much shorter than the last two peræonal segments together.

The *urus* is somewhat broader than in the male.

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Dr. K. BRANDT records in »Die Kolonie-bildenden Radiolarien des Golfes von Neapel»<sup>1)</sup> a small and probably not fullgrown Hyperia, which he found living as a true parasite in the colonies of *Myxosphaera coerulea* and of *Collozoum pelagicum*. I refer the reader to his interesting treatise (l. c. p. 139 and 140).

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<sup>1)</sup> Fauna und Flora des Golfes von Neapel, XIII.

## Doubtful species:

**Hyperia minuta**, TH. EDWARD, 1869.

- Syn. 1867.** *Hyperia minuta*, TH. EDWARD. »Stray Notes on some of the smaller Crustaceans. I, and II. On the habits &c. of the Hyperiidæ» Journ. Linn. of the Soc. of London. Zoology. Vol. 9, p. 144 and 167.

Of this species there exists no description, as far as I know, and, as the author himself did not mention it in a later publication, I think it best to drop the name.

**Hyperia mediterranea**, A. COSTA, 1865.

- Syn. 1865.** *Lestrigonus mediterraneus*, A. COSTA. — »Sopra una specie Mediterranea del genere *Lestrigonus*». Rendiconto dell' Accademia delle scienze fisiche e matematiche. Anno 4<sup>to</sup>, p. 34.
- Hyperia mediterranea*        »        J. V. CARUS. 1885. Prodomus Faunæ Mediterraneæ. Vol. 1, p. 422.
- ?    »        »        »        C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ», Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 17.

The diagnosis given by COSTA is too meagre to allow of any identification of his species. It runs:

»*Lestrigonus*) antennis superioribus paulum brevioribus; pedibus spurii quarti et quinti segmenti abdominalis stylis lanceolatis, externo parum longiore, in margine interno toto minute dentato-serrato; in margine externo integro; stylo interno margine utroque integerrimo: fusco-rufus, antennis, pedibus (articulo primo excepto) caudaque albidis. Longit. millim. 5».

He says further (l. c.):

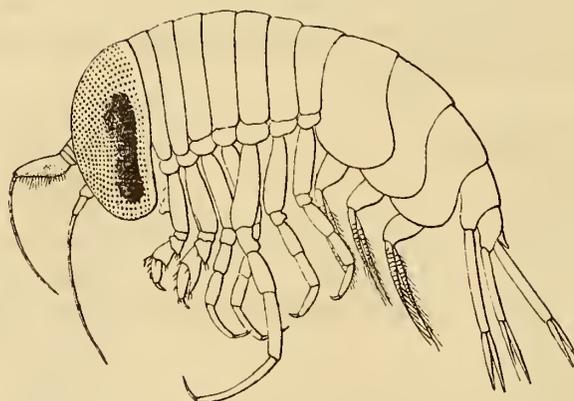
»Noi lo abbiamo ricevuto pochi giorni or sono vivente, pescato nel golfo de Napoli e trovato parassito sul corpo di una Medusa. Dallo studio accurato fattone risulta essere la specie molto affine a quella accenata della Gran Bretagna (*Lestrigonus Kinahani*, SPENCE BATE), differendone nondimeno per caratteri sufficienti per farla considerare quale specie distinta; caratteri dedotti principalmente dalla proporzione delle antenne superiori con le inferiori, e dalla forma delle fogliette terminali de' falsi piedi addominali.



- A. The lateral parts of the pleonal segments are rounded behind. The lower front corners of the femur, genu, and tibia of the last three pairs of peræopoda are reetangular, not produced. The inner ramus of the last pair of uropoda is ovate..... 1. *H. antarctica*.
- B. The lateral parts of the pleonal segments are acutely produced behind. The lower front eorners of the femur, genu, and tibia of the last three pairs of peræopoda are acutely produced downwards. The inner ramus of the last pair of uropoda is narrowly elongate and sharp-pointed..... 2. *H. dilatata*.

### 1. HYPERIELLA ANTARCTICA, C. BOVALLIUS, 1887.

Pl. XI, fig. 42—51.



*Hyperietta antarctica*, C. BOVALLIUS.

Drawn from the type specimen by A. M. WESTERGEN.

**Diagn.** *Caput* latum, segmentis tribus primis peræi longius. *Pedes peræi* quinti paris capite ac peræo conjunctis multo longiores. Anguli antero-inferiores femoris, genu et tibiæ pedum parium trium ultimorum non producti nec acuti. *Metaearpus* pedum sexti ac septimi parium earpo haud longior. *Latera* segmentorum *plei* post rotundata. *Pedunculus pedum uri* ultimi paris quam *telson* quater longior, ramus internus ovatus. *Telson* segmento ultimo uri brevius, ac *pedunculo* pedum uri ultimi paris angustius.

The *head* is broad, and longer than the first three peræonal segments together. The fifth pair of *peræopoda* are much longer than the head and peræon together. The lower front corners of the femur, genu, and tibia of the last three pairs are not produced, nor sharp-pointed. The *metaearpus* of the sixth and seventh pairs is not longer than the earpus. The lateral parts of the *pleonal* segments are rounded behind. The peduncle of the last pair of *uropoda* is four times as long as the *telson*; the inner ramus is ovate. The *telson* is shorter than the last ural segment and narrower than the peduncle of the last pair of uropoda.

**Colour.** Red, with spots of dark brown.

**Length.** 6—8 mm.

**Hab.** The American Antarctic region: Lat. 58° 43', Long. 76° W. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn.</b> 1887.	<i>Hyperietta antarctica</i> ,	C. BOVALLIUS.	—	»Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 20.
»	»	»	—	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttageser. Bd 4, p. 566, pl. 45, fig. 72—80.
»	»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1407.

*Hyperietta antarctica* is distinguished from *H. dilatata* by the greater length of the fifth pair of peræopoda, the unarmed lateral parts of the pleonal segments, and by the ovate or elongate-ovate form of the inner rami of the last two pairs of uropoda. The female has the forepart of the body wider, and the hind part comparatively shorter, than the male, but the peræon is not more than twice as broad as the pleon, as it is in *Hyperietta dilatata*.

#### The male.

Pl. XI, fig. 42—51.

The *body* is strongly built; the integument is tolerably thick and hard. The head and peræon together are a little longer than the pleon and urus together.

The *head* is very large, flat, almost truncated in front; the antennal groove commences a little above the middle. The head is considerably deeper than the peræon, and has the under side evenly rounded.

The *eyes* occupy almost the whole surface of the head.

The *first pair of antennæ* (Pl. XI, fig. 42) are shorter than in the genus *Hyperia*; they reach scarcely to the hind margin of the fourth peræonal segment. The first joint of the peduncle is broader than long, and about as long as the two following joints together; the second joint is only a little longer than the third. The first joint of the flagellum is twice as long as the whole peduncle, wider at the base, with bulging sides, tapering towards the apex, and densely set with long olfactory hairs on the inner and under sides; the second joint is shorter than broad; the third is longer, and about as long as broad; the third joint is longer than the two preceding together, the fourth and following

are still longer, equal in length, cylindrical, and about nine times as long as broad. The flagellar joints are in all ten in number.

The *second pair of antennæ* (Pl. XI, fig. 43) are a little longer than the first, but do not reach fully to the hind margin of the fifth peræonal segment. The first free joint of the peduncle is as long as the second; the glandular cone is small; the third joint is quite as long as the two preceding together. The first flagellar joint is longer than the last peduncular joint; the following are shorter, equal in length, cylindrical, and about ten times as long as broad. The flagellar joints are nine in number.

The *labrum* is nearly as long as broad, and feebly bilobed.

The *mandibles*. The edge of the incisive lamina is armed with eight equal teeth, the secondary lamina of the left mandible shows four teeth. The molar tubercle is large, the grinding surface being closely set with small, rounded tubercles, like pebbles, and surrounded by a marginal row of broad unequal teeth. The palp is slender; the first joint is about half as long as the second, the second and third are equal in length.

The *first pair of maxillæ*. The principal lamina is closely set with hairs and armed at the apex with four stout spines. The secondary lamina is tolerably broad; the lower margin is serrated, and armed with a tooth-like spine at the inner corner.

The *second pair of maxillæ*. Both laminae are hirsute; the secondary lamina is longer than the principal, and is armed at the apex with two stout spines.

The *maxillipeds*. The median lobe is comparatively shorter than in *Hyperia* and *Euthemisto*. The lateral laminae are serrated along the inner margins, and provided with some long bristles at the base.

The *peræon*. The segments are somewhat convex, the first is the shortest, and the seventh the longest. The first two segments are a little deeper than the following; the peræon is broadest at the anterior end, but not fully as broad as the hind part of the head.

The *epimerals* are fully as long as the under margins of the corresponding segments; they are rounded below.

The *branchial sacks* are attached to the second and four following pairs of peræopoda; they are somewhat shorter than the femora of the corresponding pairs.

The *first pair of peræopoda* (Pl. XI, fig. 44 and 45). The femur is almost linear, about three times as long as broad, and a little shorter than the four following joints together; it is provided with three bristles at the lower hind corner. The genu is as long as broad, with five or six bristles at the lower hind corner. The tibia is tolerably broad, and longer than the genu; the lower hind corner is produced, and the margins are fringed with ten or twelve long bristles. The carpus is a little produced and much dilated, fully as broad at the lower end as it is long; the front margin is almost straight, and provided with three long bristles at the apex; the hind margin is irregularly convex, and armed with four bristles; the under side is hollowed, but not as broadly as in *Hyperia*, showing a right and a left margin, fringed with long bristles, at the junction of the two margins, or the apex of the very short carpal process, there are three bristles. The metacarpus is longer than the carpus, and twice as long as broad; the front margin is convex, and set with four bristles; the hind margin is almost straight, and serrated, with three-pointed teeth; on the outer side of the joint there are some long bristles. The dactylus is

two-thirds as long as the metacarpus, and is serrated along the hind margin (Pl. XI, fig. 45). Glands are developed, especially in the femur.

The *second pair* (Pl. XI, fig. 46) are a little longer than the first, and reach to the apex of the carpus of the third pair. The femur is long, somewhat broader below the middle than at the base, and has the margins feebly convex; it is fully as long as the four following joints together; at the lower hind corner there are four or five bristles. The genu is broader than long, with three bristles at the lower hind corner. The lower hind part of the tibia is somewhat more produced than in the first pair, and has the under margins fringed with about twenty long bristles. The carpus is broad, and much produced, the carpal process being almost as long as the stem of the joint; the front margin of the carpus has four bristles at the lower corner; the hind margin is smooth; the front side of the carpal process is gouge-shaped, each margin set with four bristles, and the apex also armed with four long bristles; the carpal process is two-thirds as long as the hind margin of the metacarpus. The metacarpus is longer than the stem of the carpus, and more than twice as long as broad; the front margin is feebly convex, and carries seven bristles; the hind margin is straight, serrated, with three-pointed teeth, and provided with four bristles; the sides at the joint are also provided with long bristles. The dactylus is more than half as long as the metacarpus, and serrated along the hind margin.

The *third and fourth pairs* (Pl. XI, fig. 47). The femur is narrow, almost linear, three times as long as broad, and only a trifle longer than that in the second pair; the hind margin is set with some short, spine-like bristles. The genu is longer than broad, with one spine on the hind margin and another at the rounded hind corner. The tibia is only a little longer than the genu; the front margin is convex, the hind margin straight with some small spines and another longer one at the apex. The carpus is longer than the tibia; the front margin is convex, the hind margin straight, minutely serrated, and provided with some spine-like bristles. The metacarpus is much narrower than the carpus, feebly curved, and quite as long as the two preceding joints together; the hind margin is minutely serrated; on the sides of the joint there are some short, spine-like bristles. The dactylus is slender, half as long as the metacarpus, and provided with a few slender, very minute spines on the hind margin near the base.

The *fifth pair* (Pl. XI, fig. 48 and 49) are quite as long as the head, the whole peræon, and the first pleonal segment together. The femur is narrow, and a little more than twice as long as broad; the front margin is feebly concave, with the lower corner scarcely produced. The genu is longer than broad, with the lower front corner squared. The tibia is a third part longer than the genu, with the margins smooth, and the lower front corner squared. The carpus is twice as long as the tibia, but a little shorter than the femur; the joint is not dilated as in *Euthemisto*, but as broad as the tibia; the front margin is provided with very minute, spine-like hairs. The metacarpus is much narrower than the carpus, feebly curved, and considerably longer than the femur; the front margin is minutely pectinated, and provided with short bristles. The dactylus is more than a fourth part as long as the metacarpus, and has a few slender minute spines on the hind margin (Pl. XI, fig. 49).

The *sixth and seventh pairs* (Pl. XI, fig. 50) are scarcely two thirds as long as the fifth, and considerably shorter than the third and fourth pairs. The femur has the same form as in the fifth pair, with the lower front corner scarcely produced. The genu is about as long as broad, with the lower front corner squared. The tibia is nearly twice as long as the genu; the lower front corner is scarcely produced. The carpus is longer than the tibia; the front margin is smooth. The metacarpus is a little narrower, but scarcely longer, than the carpus, and much shorter than the femur; the front margin is smooth. The dactylus is not fully a third part as long as the metacarpus, and is smooth.

The *pleon* is as long as the last six pleonal segments together; the lateral parts are rounded below and behind, with a small tuberculous prominence at the middle of the under margin.

The *pleopoda*. The coupling spines are hook-shaped, with three sharp teeth between the apex and the base. The cleft bristle has the apically dilated arm shorter than the other. The outer ramus of the first pair of pleopoda has eleven joints, the inner nine.

The *urus* is as long as the last pleonal segment; the first segment is considerably longer than the last coalesced, which is fully twice as broad as long.

The *uropoda* (Pl. XI, fig. 51). The *first pair* reach beyond the middle of the third pair; the peduncle is about four times as long as broad, and a little longer than the inner ramus; the rami are elongate-lanceolate, the outer shorter and narrower than the inner; the outer ramus is serrated along the inner margin, with unequal teeth; the inner ramus shows a serration consisting of equal, sharp teeth along the outer margin. The *second pair* reach almost as far as the first; the peduncle is broader below than at the base, a little more than twice as long as broad at the apex, and quite as long as the inner ramus; the inner ramus is elongate-ovate, serrated on the lower parts of both margins; the outer ramus is elongate-lanceolate, shorter than the inner, and serrated along the inner margin. The peduncle of the *third pair* is about three times as long as broad, with the lower inner corner somewhat projecting; the inner ramus is ovate, serrated on both margins, and not fully half as long as the peduncle; the outer ramus is a little more than half as broad as, and somewhat shorter than, the inner; the inner margin is serrated.

The *telson* is triangular, with curved margins, and two thirds as long as the last ural segment; it is narrower than, and not a third part as long as, the peduncle of the last pair of uropoda.

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2. **HYPERIELLA DILATATA**, TH. STEBBING, 1888.

**Diagn.** *Caput* latum, segmentis tribus primis peræi brevius. *Pedes peræi* quinti paris capite ac peræo conjunctis breviores. Anguli antero-inferiores femoris, genu, et tibiæ pedum parium trium ultimorum producti et acuti. Metacarpus pedum septimi paris carpo longior. Latera segmentorum *plei* post acute producta. Pedunculus *pedum uri* ultimi paris plus quam quater longior quam lator; ramus internus anguste elongatus, acutus. *Telson* segmentum ultimum uri longitudine æquans, pedunculo pedum uri ultimi paris latius, ac dimidium pedunculi ejusdem longitudine fere æquans.

The *head* is broad, and shorter than the first three peræonal segments together. The fifth pair of *peræopoda* are shorter than the head and peræon together. The lower front corners of the femur, genu, and tibia of the last three pairs are produced and sharp-pointed. The metacarpus of the seventh pair is longer than the carpus. The lateral parts of the *pleonal* segments are produced behind, and sharp-pointed. The peduncle of the last pair of *uropoda* is more than four times as long as broad; the inner ramus is narrowly elongated, and sharp-pointed. The *telson* is as long as the last ural segment, is broader than, and nearly half as long as, the peduncle of the last pair of *uropoda*.

**Colour.** ?

**Length.** »A quarter of an inch.» (STEBBING.)

**Hab.** »Antarctic Ocean, Lat. 63° 30' S., Long. 88° 57' E.; surface; surface temperature 32°; and surface to 100 fathoms». (STEBBING.)

**Syn.** 1888. *Hyperietta dilatata*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1403, pl. 171.

In addition to the distinguishing characteristics given in the above diagnosis some other differences of minor importance will be found upon a comparison of the above description of *Hyperietta antarctica* with STEBBING's exhaustive description of *H. dilatata* (l. c. p. 1403—1407).

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Genus 6. **PARATHEMISTO**, A. BOECK, 1870.

**Diagn.** *Caput* mediocre, globosum. *Peraon* leve, epimeris distinctis instructum. *Pedes peræi* primi paris simplices, non subcheliformes. *Pedes secundi* paris cheliformes; *carpus* paullo dilatatus, valde productus, *processus carpi* anguste concavus, in formam cochlearis redactus. *Carpus pedum tertii ac quarti parium* dilatatus, simul cum *metacarpo*, instrumentum prensorium formans. *Pedes parium trium ultimorum* longitudine subæquales, duobus præcedentibus multo longiores; *carpus* non dilatatus; *metacarpus* valde elongatus. *Pedes uri* elongati.

The *head* is moderately large, globular. The *peraon* is smooth, provided with distinct epimerals. The first pair of *peræopoda* are simple, not subcheliform. The second pair are cheliform; the *carpus* is a little dilated, and much produced; the *carpal process* is narrowly concave, gouge-shaped. The *carpus* of the third and fourth pairs is dilated, forming together with the *metacarpus* a folding hand. The last three pairs are subequal in length, and much longer than the third and fourth pairs; the *carpus* is not dilated; the *metacarpus* is much elongated. The *wropoda* are elongated.

<b>Syn. 1870.</b>	<i>Parathemisto</i> , A. BOECK.	—	»Crustacea Amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 87 (7).
»	»	—	1872. De Skandinaviske og Arktiske Amphipoder, p. 84.
»	»	G. O. SARS.	1882. »Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter». Christiania Videnskabs Selskabs Forhandl. for 1882, N:o 18, p. 20.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 20.
»	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 566.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1419.

The genus *Parathemisto* was instituted in 1870 by A. BOECK who gave the following diagnosis:

»Corpus sat compressum; dorso carinato. Mandibulæ in apice perlatae, serratae, æque ut mala interna; tuberculo molari latissimo, in margine crenato; palpo longissimo. Maxillæ 1mi paris dentibus quatuor perlongis et firmis armatae. Pedes 2di paris (non pedes 1mi paris) carpo in angulo inferiore posteriore valde producto; manu cheliformi. Pedes 3tii 4tiqve paris articulo 4to subdilatato. Pedes trium parium ultimorum subæquales.»

He mentioned two species as belonging to the new genus, *Parathemisto compressa*, A. GOËS, and *P. abyssorum*, n. sp. Of the characteristics used in the diagnosis those relating to the mouth-organs, and to the first two pairs of peræopoda agree with *Euthemisto*, and the characteristic »dorso carinato» has only specific value.

In 1872 he repeated the Latin diagnosis, adding the following remarks, which I translate:

»This genus forms a transition between *Hyperia* and *Themisto*, but comes nearer to the latter, from which, however, it essentially differs by the last three pairs of legs being of the same shape and size, while in *Themisto* the fifth pair are dissimilar to the others and much elongated. To this genus may also belong the *Hyperia oblivia*, described by SPENCE BATE and WESTWOOD (Brit. Sessile-eyed Crust. II, p. 16), though they describe and figure the first (two) pairs of legs as if they were of the same shape and not provided with a scissors-like hand in the second pair, and do not mention that the dorsal side is carinated or angulated; it resembles however the following species in all the other points. *H. trigona*, DANA, too, belongs probably to this genus, the species of which thus seem to be distributed over a large area of sea.»

In 1882 G. O. SARS mentions the genus in his list of Norwegian Crustacea, attributing to it the same two species as did BOECK.

In 1887<sup>1)</sup> I placed the genus between *Hyperiella* and *Euthemisto*, enumerating the following species, *Parathemisto abyssorum*, BOECK, *P. oblivia*, KROEYER, *P. compressa*, A. GOËS, *P. longipes*, n. n. (= *P. gracilipes*, NORMAN), *P. trigona*, DANA, and *P. japonica*, n. sp.; and giving brief descriptions of all but *P. longipes*.

In 1888 TH. STEBBING mentioned the species belonging to the genus, and described a new species, *Parathemisto pacifica*.

The first species belonging to *Parathemisto* recorded in the literature was thus *Hyperia oblivia*, described in 1838<sup>2)</sup> by H. KROEYER. The next addition was made by J. D. DANA, who in 1852<sup>3)</sup> described *Lestrigonus rubescens* and *Hyperia trigona*; as to the former species I am a little doubtful whether it really belongs to *Parathemisto* or not; with respect to the latter I am fully convinced that it is a true *Parathemisto*. In 1862 SPENCE BATE<sup>4)</sup> described under the name *Hyperia trigona* (DANA) a *Parathemisto* which is specifically distinct from *Parathemisto trigona*, DANA, and which is recorded here as *Parathemisto Batei*, n. n. In 1868 SPENCE BATE and WESTWOOD<sup>5)</sup> described and figured under the name of *Hyperia oblivia*, (KROEYER), a *Parathemisto*, which A. MERLE NORMAN,<sup>6)</sup> in 1869, recognizing its non-identity with KROEYER's species, renamed *Hyperia gracilipes*. In 1870 A. BOECK instituted the new species *Parathemisto abyssorum*, which was the type for the genus *Parathemisto*, but which, in my opinion,

1) In »Systematical list» and »Arctic and Antaretic Hyperids».

2) H. KROEYER, »Grønlands Amfipoder», p. 70.

3) J. D. DANA, »United States Exploring Expedition. Crustacea.» Vol. 2, p. 984 and 987.

4) SPENCE BATE. Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 297, pl. 49, fig. 4.

5) SPENCE BATE and WESTWOOD, A History of the British Sessile-eyed Crustacea. Vol. 2, p. 16.

6) A. MERLE NORMAN, »Shetland Final Dredging Report». Part. 2. On the Crustacea» etc. Report of the 38<sup>th</sup> Meeting of the British Association for the Advancement of Science; held at Norwich, 1868, p. 287.

is the same species that KROEYER described as *Hyperia oblivia*, and for this reason it is recorded below under the name *Parathemisto oblivia*, KROEYER. In 1887 I gave a diagnosis of the new species *P. japonica*, and in 1888 STEBBING proposed the new species *P. pacifica*. Lastly I below describe *P. GOËSI*, n. sp. The *Parathemisto compressa*, GOËS, on the other hand, recorded by BOECK in 1872 and by me in 1887 is a true *Eutthemisto*, as suggested H. J. HANSEN in the same year.<sup>1)</sup>

Thus we have to mention here the following species:

<i>Parathemisto oblivia</i> , KROEYER.	<i>P. Batei</i> , n. n.
<i>P. gracilipes</i> , A. MERLE NORMAN.	<i>P. japonica</i> , C. BOVALLIUS.
<i>P. rubescens</i> , DANA.	<i>P. pacifica</i> , TH. STEBBING.
<i>P. trigona</i> , DANA.	<i>P. Goësi</i> , n. sp.

The sexual difference within the genus is expressed only in the form of the antennæ, and in the somewhat wider and longer peræon of the female.

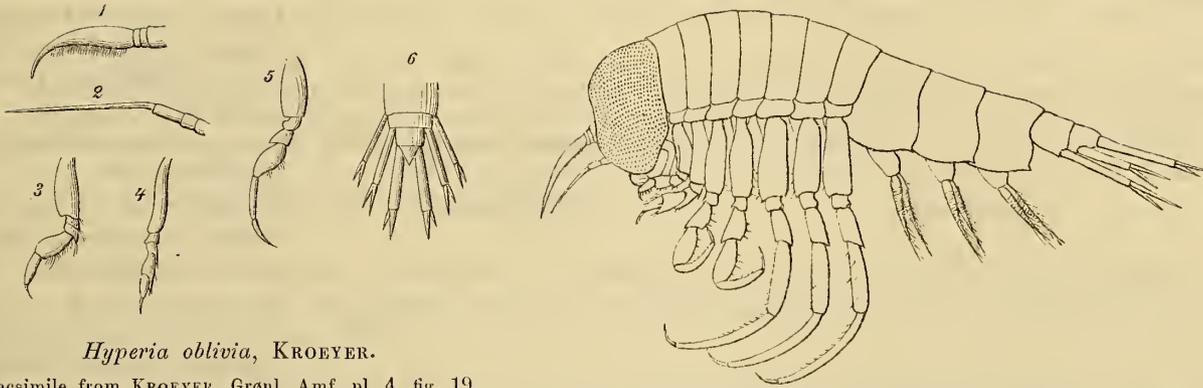
They eight species are to be distinguished according to the following synoptical table:

- A. The peræon is longer than the pleon.
- a 1. The front side of the earpal process of the second pair of peræopoda is more than half as long as the hind margin of the metacarpus.
- aa 1. The body is dorsally earinated.
- aaa 1. The earpal process of the second pair of peræopoda is provided with a terminal spine.
- aaaa 1. The earpus of the first pair of peræopoda is a little shorter than the metacarpus..... 1. *P. oblivia*.
- aaaa 2. The earpus of the first pair of peræopoda is longer than the metacarpus.
- aaaaa 1. The outer ramus of the last pair of uropoda is as long as the inner..... 2. *P. japonica*.
- aaaaa 2. The outer ramus of the last pair of uropoda is shorter than the inner..... 3. *P. pacifica*.
- aaa 2. The earpal process of the second pair of peræopoda wants a terminal spine..... 4. *P. trigona*.
- aa 2. The body is not earinated. The earpal process of the second pair of peræopoda is provided with a terminal spine. The outer ramus of the last pair of uropoda is shorter than the inner..... 5. *P. Batei*.
- a 2. The front side of the earpal process of the second pair of peræopoda is not half as long as the hind margin of the metacarpus.
- aa 3. The peduncle of the last pair of uropoda is three times as long as the telson..... 6. *P. gracilipes*.
- aa 4. The peduncle of the last pair of uropoda is not twice as long as the telson..... 7. *P. Goësi*.
- B. The peræon is shorter than the pleon..... 8. *P. rubescens*.

<sup>1)</sup> H. J. HANSEN. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenhavn. 1887, p. 59.

1. **PARATHEMISTO OBLIVIA**, H. KROEYER, 1838.

Pl. XII, fig. 11—16.

*Hyperia oblivia*, KROEYER.

Facsimile from KROEYER, Grøn. Amf. pl. 4, fig. 19.

Fig. 1. The first pair of antennæ. 2. The second pair of antennæ. 3. The first pair of pereopoda. 4. The second pair. 5. The third pair. 6. The urus.

*Parathemisto abyssorum*, A. BOECK.

Drawn from the type specimen by A. M. WESTERGRÉN.

**Diagn.** *Corpus* leviter earinatum. *Caput* segmentis duobus primis peræi longius. *Carpus pedum peræi* primi paris metacarpo paullo brevior; margo anterior levis, margo posterior spinis longis dense instructus; margo posterior metæarpi serratus et spinis longis instructus; dactylus metacarpo paullo brevior. Metacarpus pedum secundi paris carpum longitudine æquans; processus carpalis duas partes longitudinis metæarpi æquans, spina terminali instructus, dimidiam partem longitudinis processus ejusdem æquante; dactylus metacarpo paullo brevior. Metacarpus pedum tertii ac quarti parium carpo longior; metacarpus pedum parium trium ultimorum articulos duos præcedentes longitudine æquans. Peduneulus *pedum uræ* ultimi paris quam telson plus quam ter longior; ramus internus externo longior.

The *body* is feebly carinated. The head is longer than the first two peræonal segments together. The carpus of the first pair of *peræopoda* is a little shorter than the metacarpus, is smooth on the front margin, and is densely fringed with long bristles along the hind margin; the hind margin of the metacarpus is serrated, and armed with long bristles; the dactylus is a little shorter than the metacarpus. The second pair have the metacarpus as long as the stem of the carpus; the carpal process is two-thirds as long as the hind margin of the metacarpus, with an apical spine, which is fully half as long as the process; the dactylus is a little shorter than the metacarpus. The metacarpus of the third and fourth pairs is longer than the carpus; that of the last three pairs is as long as the two preceding joints together. The peduncle of the last pair of *uropoda* is more than three times as long as the telson; the inner ramus is longer than the outer.

**Colour.** Reddish brown.

**Length.** 5—8 mm.

**Hab.** The Arctic region; West and South coast of Greenland, off Spitzbergen, off the North and West coasts of Norway. The Northern temperate region; off the West coast of Sweden and Norway; off the East coast of Great Britain. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

- Syn. 1838.** *Hyperia oblivia*, H. KROEYER. — »Grønlands Amphipoder». Det Kongl. Danske Videnskabs-Selskabs Naturvidensk. og Matemat. Afhandlinger. Deel 7, p. 70, pl. IV, fig. 19.
- » » » MILNE EDWARDS. 1840. Histoire naturelle des Crustacés. Tom 3<sup>m</sup>e, p. 77.
- Parathemisto* » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 20.
- » » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 567.
- 1870.** *Parathemisto abyssorum*, A. BOECK. — »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 86 (7).
- » » » — 1872. De Skandinaviske og Arktiske Amphipoder, p. 85, pl. 3, fig. 1.
- » » » G. O. SARS. 1872. »Oversigt af Norges Crustacéer med foreløbige Bemærkninger over de nye eller mindre bekendte Arter». Christiania Videnskabs-Selskabs Forhandl. for 1882, N:o 18, p. 20 and 75.
- » » » » 1886. »Crustacea». The Norwegian North Atlantic Expedition. 1876—1878. Zoology. Crustacea. 2, p. 37.
- » » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 20.
- » » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 566, pl. 45, fig. 81—89.
- » » » H. J. HANSEN. 1887. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenhavn. 1887, p. 59.

The reasons why I here take *Parathemisto abyssorum*, A. BOECK, as a synonym for *Hyperia oblivia*, H. KROEYER, are that the few characteristics given by KROEYER exactly agree with those of *Parathemisto abyssorum*, and that BOECK never was aware of the fact that *Hyperia oblivia* belonged to the new genus *Parathemisto*, and so in 1872 he gave *Hyperia oblivia* as a synonym for *H. medusarum* and thus did nothing to clear up the question.

The diagnosis of the species given by KROEYER in 1838 runs:

»*Hyperia oblivia*: antennis superioribus brevioribus, validis, uncinatis, setosis; antennis inferioribus gracilibus, flagello scapum longitudine ter superante; pedibus secundi paris gracilibus, margine tertii et quarti articuli posteriore infra in stylum producto, ungue non inflexo; pedibus tertii quartique paris, ut duo paria priora longitudine superantibus, ita a paribus sequentibus, quæ invicem ejusdem fere sunt longitudinis, superatis. Qvinque paria ultima formam horum parium in *Metoeco Medusarum* prorsus imitantur.»

From his description I translate the passages respecting the first two pairs of peræopoda, the rest of the description being of but little importance for the identification of the species.

»The first pair of legs are small but robust: the first joint is the longest and is tolerably thick; the second and third joints are very short, and so closely united, that it is difficult to see the line of junction between them; the fourth joint is longer than the two preceding together, and is very thick; the fifth joint is about as long as the fourth, somewhat more slender, and a little narrowed at the apex; the sixth joint is a tolerably long and acute claw, which is not much curved. Some long, very slender and soft hairs are to be seen at the hind corner of the under margins of the first three joints, along the hind margin of the fourth joint, and on both the front and hind margins of the fifth joint.

The second pair of legs are longer than the first, but are more slender; the relation of length between the different joints is almost the same, but the third and fourth are produced downwards from the apex of the hind margin into a tolerably long process. The claw is very slender, and not curved; the covering of hairs is less rich than in the preceding pair.»

H. MILNE EDWARDS in 1840 gave the following short description probably taken principally from the drawing of KROEYER:

»Antennes inférieures plus longues que les supérieures; leur dernier article très-allongé et très-grêle. Pates de la troisième et de la quatrième paire allongées. Lame terminale de l'abdomen triangulaire et pointue au bout. Article basilaire des dernières fausses pates très-étroit et allongé.»

A. BOECK in 1870 instituted the new species *Parathemisto abyssorum* with the following diagnosis, which he repeated in 1872:

»Carina spinas retroversas non formans. Pedes 3ti et 4ti paris articulo 4to subangusto. Pedes 5ti paris articulo 3tio parum modo brevioris quam 4to.<sup>1)</sup>

From his very incomplete description of 1872 I translate what he says about the first and second pairs of peræopoda for a comparison with KROEYER'S description:

»The carpus of the first pair of legs is broad, provided on the hind margin with stout bristles, and is not produced into a heel; the hand (= metacarpus) is about as long as the carpus

<sup>1)</sup> This last statement is evidently an error as it is quite contrary to what he himself delineates on plate 3, fig. 1 n, and to what I have seen in his own type specimen, which lies before me.

and tapers towards the apex; the inner (= hind) margin is almost straight and serrated, and has a few stout, spine-like bristles, the outer (= front) margin is convex, and armed with slender bristles; the claw is a little curved, and somewhat shorter than the hand (= metacarpus).»

»The third joint of the second pair is produced at the lower hind corner, and has some bristles; the fourth joint, or carpus, is longer, and is strongly produced at the lower hind corner into a narrow heel, which at the apex and on the inner (= front) margin has almost spine-like bristles. The hand (= metacarpus) is about as long as the carpus, triangular, with the inner (= hind) margin serrated and provided with a few stout bristles; the outer (= front) margin is fringed with slender bristles.»

### The male.

Pl. XII, fig. 11—16.

The *body* is feebly carinated dorsally, but the hind corners in the median line of the peræonal and pleonal segments are not produced into angular processes as for instance they are in *Euthemisto compressa*.

The *head* is nearly twice as deep as long, and is much deeper than the peræon. The antennal groove commences at the middle of the front side, so that the first pair of antennæ are inserted a little below the middle of the head.

The *first pair of antennæ* (Pl. XII, fig. 11) are shorter than the second, and reach beyond the hind margin of the last peræonal segment. The first joint of the peduncle is quite as long as the two following together. The first joint of the flagellum is long, conical, with feebly bulging sides, and is nearly twice as long as the whole peduncle, the second and third flagellar joints are very short, the fourth is as long as the two preceding together, the fifth and following are long, slender, cylindrical, and increase slowly in length towards the last joint. The flagellar joints are fifteen in number.

The *second pair of antennæ* reach to the hind margin of the second pleonal segment. The first free joint of the peduncle is as long as broad, and somewhat shorter than the second; the third joint is considerably longer than the second, and is more slender. The first flagellar joint is longer than the last peduncular joint, the following are sub-equal in length, slender, cylindrical, and considerably shorter than the first. They are fifteen in number.

The *mouth-organs* closely resemble those in *Parathemisto japonica*, which are described below (p. 259 and 260).

The *peræon* has the first four peræonal segments about equal in length; the sixth is the longest of all.

The *epimerals* are somewhat longer than the under margins of the corresponding segments, overlapping each other with the broadly rounded anterior or posterior end.

The *branchial sacks* are attached to the second and four following pairs of peræopoda; they are shorter and thicker than those in the genus *Hyperia*.

The *first pair of peræopoda* (Pl. XII, fig. 12) are a little shorter and less robust than the second. The femur is narrow, almost linear, and a little curved, the front margin being feebly concave, with a long narrow groove or furrow for the reception of

the following joints, when they are folded up; in this furrow especially the carpus is concealed for more than half of its breadth, when thus bent upwards, the metacarpus standing out rectangularly with the long dactylus pointing downwards. The genu is as long as broad, the under hind corner is fringed with four or five long bristles. The tibia is somewhat longer than the genu; the under margin is rectangularly produced, and is provided with three or four long bristles. The carpus is a little shorter than the metacarpus, and somewhat broader, but does not form with it, neither a subcheli-form, nor a folding, hand,<sup>1)</sup> the articulation of the metacarpus not allowing it to be folded up along the hind margin of the carpus. The front margin of the carpus is nearly straight, without bristles; the hind margin is feebly convex, notched, and fringed with a row of five or six long, stout bristles. The metacarpus has the front margin strongly convex, and set with long bristles, the hind margin is straight, serrated, and bordered with some long bristles. The dactylus is very long, curved, and finely serrated at the base of the hind margin; it is about a fifth part shorter than the metacarpus. Glands are developed in the first four joints.

The *second pair* (Pl. XII, fig. 13) reach about to the middle of the carpus of the third pair. The femur is linear, smooth, and somewhat shorter than the four following joints together. The genu is as long as broad, with six or seven long bristles along the under margin. The hind portion of the tibia is produced to the middle of the stem of the carpus into a spoon-shaped process, the lower margin of which is fringed with six or eight long bristles. The front and hind margins of the carpus are straight and smooth; the carpal process, which is narrow and gouge-shaped, is a little more than half as long as the stem of the carpus, and two-thirds as long as the hind margin of the metacarpus; the terminal spine is long, more than half as long as the process itself, and reaches fully to the apex of the metacarpus; the margins of the carpal process are fringed with long bristles. The metacarpus is thick, conical, with bulging sides, and quite as long as the stem of the carpus; the front margin is feebly convex and fringed with eight or nine bristles; the hind margin is convex, and serrated. The dactylus is nearly straight, and scarcely more than a fourth part shorter than the metacarpus.

The *third and fourth pairs* (Pl. XII, fig. 14) are similar in shape, but the fourth are a little longer than the third; their last joints form a perfect folding hand. The femur is somewhat more than twice as long as broad; the front margin is almost straight, with a furrow for the reception of the following joints, and with the lower corner obtusely rectangular; the hind margin is convex, with two or three bristles below the middle, and one at the apex. The genu is fully as long as broad, with two bristles on the hind margin. The tibia is more than twice as long as the genu, with three long bristles on the hind margin, and the lower front corner a little produced downwards. The carpus is narrowly ovate, a little broader in the adult individuals than in the younger; the front margin is smooth, the hind margin is notched and provided with four or five very long bristles, the longest fully as long as the breadth of the joint; the carpus is a little longer than the two preceding joints together. The metacarpus is thick and stout,

<sup>1)</sup> Compare for the terminology: C. BOVALLIUS. »The Oxycephalids», p. 31. Nova Acta Soc. Reg. Scientiarum. Upsal. Ser. III. Vol. XIV.

and is considerably longer than the carpus; the front margin is strongly convex, and smooth; the hind margin is almost straight, finely serrated, and forming a thin edge which impinges against the hind margin of the carpus; at the base of this edge there is on the outer side of the joint a row of long slender bristles. The dactylus is about two-thirds as long as the metacarpus, nearly straight, slender, and sharp-pointed.

The *fifth, sixth, and seventh pairs* (Pl. XII, fig. 15) are similar in shape, and equal in length. The femur is quite as long as the femur of the fourth pair; the front margin is irregularly convex, with six or seven short bristles along its lower half, and with the lower corner a little produced; the hind margin is straight, with the lower corner squared; the femur is considerably shorter than the three following joints together. The genu is a little longer than broad, with a few short bristles on the front margin. The tibia is more than twice as long as the genu; the front margin is straight, and is provided with five or six minute spines; the hind margin is feebly convex, smooth, and has an apical spine at the lower, somewhat produced corner. The carpus is narrow, linear, and fully twice as long as the tibia; the front margin is straight, finely serrated, with minute, spine-like teeth, and four or five long, equidistant bristles; the hind margin is almost straight, with four bristles below the middle. The metacarpus is quite as long as the two preceding joints together, slender, and feebly curved; the somewhat concave front margin is finely serrated as in the preceding joint, and has eight or ten equidistant bristles; the convex hind margin has two or three short, spine-like bristles. The dactylus is long and slender, entirely smooth, and a third part as long as the metacarpus.

The *pleon* is a little shorter than the last six peræonal segments together. The dorsal keel is more distinct than in the peræon. The lateral parts of the segments have the hind corner outdrawn into a very short but sharp point.

The *pleopoda* are narrow and slender; the outer ramus of the first pair has thirteen joints, the inner twelve.

The *urus*, without the telson, is shorter than the last pleonal segment; the first segment is about as long as the last coalesced.

The *uropoda* (Pl. XII, fig. 16). The first pair reach a little beyond the middle of the inner ramus of the last pair. The peduncle is narrow, linear, about six times as long as broad, and is about a fourth part longer than the inner ramus; the rami are elongate, sharp-pointed; the inner is not twice as long as the outer, with the inner margin smooth and the outer finely serrated; the outer ramus has the inner margin finely serrated, and the outer smooth. The *second pair* reach scarcely beyond the apex of the peduncle of the last pair; the peduncle is narrower than in the first pair, longer than the inner ramus, and has the lower inner corner sharply produced downwards; the rami are serrated as in the first pair, the inner is longer than the outer. The *third pair* have the peduncle twice as long as the last coalesced ural segment, and somewhat more than three times as long as the telson; it is linear, somewhat broader than that in the first pair, and fully four times as long as broad; the lower inner corner is produced into a long, sharp-pointed process; the rami are elongate-lanceolate, and are serrated as in the first pair; the inner ramus is only a little longer than the outer.

The *telson* is spade-shaped, as long as broad, and broader than the peduncle of the last pair of uropoda.

### The female.

The *body* is less distinctly carinated than in the male.

The *head* is a little broader but not deeper than in the male.

The *first pair of antennæ* consist of a three-jointed peduncle and a very long single-jointed flagellum, which is curved a little downwards. The first joint of the peduncle is more than twice as long as the two following together. The flagellar joint is nearly three times as long as the whole peduncle, thick at the base, and gently tapering towards the middle, the rest is almost cylindrical, very slowly tapering towards the apex; the under concave margin of the flagellum is coarsely serrated from the base to the middle, the rest is smooth; on the inner side of the basal half of the joint there runs a feebly elevated ridge, which is thickly set with long and slender olfactory hairs; these hairs are usually geniculate near the apex.

The *second pair of antennæ* are longer than the first pair, and consist of a three-jointed peduncle and a single-jointed flagellum; the first joint of the peduncle is very short, the two following are longer and equal in length. The single flagellar joint is very slender, almost needle-shaped, and is more than twice as long as the whole peduncle.

The *peræon* is a little longer and wider than in the male.

The *ovitrices* are irregularly ovate, and considerably longer than the branchial sacks.

The *peræopoda* are exactly like those in the male.

The *pleon* is scarcely as long as the last five peræonal segments together.

The *urus* and its appendages are like those in the male.

2. **PARATHEMISTO JAPONICA**, C. BOVALLIUS, 1887.

Pl. XII, fig. 17—43.

**Diagn.** *Corpus* carinatum. *Caput* segmenta duo priora peræi longitudine æquans. *Carpus pedum peræi* primi paris metacarpum longitudine æquans; margo anterior ac posterior spinis armati; margo posterior metacarpi serratus, spinis carens; dactylus dimidio metacarpi paullo longior. Metacarpus pedum secundi paris carpo brevior; processus carpalis tres partes metacarpi longitudine æquans, spinam terminalem brevem gerens; dactylus dimidio metacarpi brevior. Metacarpus pedum tertii ac quarti parium carpo non longior. Metacarpus pedum parium trium ultimorum articulos duo præcedentes longitudine æquans. Pedunculus *pedum vri* ultimi paris quam telson haud ter longior; rami æquales.

The *body* is carinated. The *head* is as long as the first two peræonal segments together. The carpus of the first pair of *peræopoda* is as long as the metacarpus; the front and hind margins are provided with bristles; the hind margin of the metacarpus is serrated, and without bristles; the dactylus is a little more than half as long as the metacarpus. The metacarpus of the second pair is shorter than the stem of the carpus; the front side of the carpal process is three-fourths as long as the hind margin of the metacarpus, and has a short terminal spine; the dactylus is not half as long as the metacarpus. The metacarpus of the third and fourth pairs is not longer than the carpus; that of the last three pairs is as long as the two preceding joints together. The peduncle of the last pair of *uropoda* is not fully three times as long as the telson; the rami of the last pair are equal in length.

**Colour.** Yellowish red.

**Length.** 10.—16 mm.

**Hab.** The Northern temperate and subtropical region of the Pacific. (D. M.; F. M.; S. M.)

**Syn. 1887.** *Parathemisto japonica*, C. BOVALLIUS.

— »Systematical list of the Amphipoda Hyperiidæa». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11, N:o 16, p. 21.

» » » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1423.

*Parathemisto japonica* is a stout and strongly built animal and resembles a *Hyperia* rather than a *Parathemisto* in the general form of the body; from *Parathemisto pacifica* it is distinguished by the equal rami of the last pair of *uropoda* and by some other smaller differences. The difference between the genera *Parathemisto* and *Euthemisto* is so small that there is only one characteristic, namely the equality in length of the last three pairs of *peræopoda* that prevents the present species of being included in the genus *Euthemisto*. On the other hand the development of the carpus of the fifth pair is stronger than in any other species of *Parathemisto*; but this is compensated for by the fact that in the sixth and seventh pairs also of *Parathemisto japonica* the carpus is developed in almost the same degree.

### The male.

Pl. XII, fig. 22—38, and 41—45.

The *body* is robust with thin, shining, and pellucid integument.

The *head* is tolerably compressed, more than twice as deep as it is broad. The antennal groove commences at the middle of the front side, and is narrow.

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* (Pl. XII, fig. 44) are scarcely more than half as long as the second, and reach a little beyond the hind margin of the sixth peræonal segment. The first joint of the peduncle is very large, fully four times as long as the two following joints together, and is considerably longer than broad; the second and third joints are about equal in length. The first joint of the flagellum is a little shorter than the whole peduncle, conical, and fringed with long olfactory hairs along the inner side; the second and third joints are short, equal in length, and as long as broad; the following are slender, cylindrical, increasing in length, and fringed with fine hairs along the under margins; the last joint is more than five times as long as broad; the flagellar joints are fifteen in number.

The *second pair of antennæ* (Pl. XII, fig. 45) reach fully to the hind margin of the first ural segment. The first free joint of the peduncle is about as long as broad, and is a little shorter than the second; the third is about as long as the two preceding together, and is fringed with fine hairs along the under margin. The first joint of the flagellum is as long as the last peduncular joint; the following are rather decreasing in length, all fringed with very short hairs along the under margins; the flagellar joints are twenty-eight to thirty in number.

The *labrum* (Pl. XII, fig. 22) is deeply bilobed, with the lobes bluntly triangular.

The *mandibles* (Pl. XII, fig. 25—27) are very robust; the incisive lamina is broad, angularly bent inwards, and has at the inner corner two strongly projecting larger teeth, the following teeth bordering the lamina are equal in size, and are sharp-pointed; at the base of the lamina the inner margin is thickly set with long bristles. The accessory lamina of the left mandible is constricted at the base forming a neck, and is fixed on a disc-like prominence on the side of the mandible; the margin is bordered with strong teeth. The molar tubercle is very large, and narrow; it is fringed round the margins with long sharp teeth, and on the inside of these teeth there is a row of blunt conical tubercles, each tipped with a thick, obtuse, and strongly serrated spine, which possibly is a kind of taste-organ (Pl. XII, fig. 26); the middle of the molar tubercle consists of the grinding surface, which shows blunt teeth and pebble-like prominences. The mandibular palp is long, fixed on a tuberculous prominence on the outer side of the stem of the mandible; the first joint is slender and cylindrical; the second joint is more than half as long again as the first; the third is a little longer than the first, and tapers towards the apex.

The *labium* (Pl. XII, fig. 23 and 24) consists of two strongly convex lobes, densely set with short spines on the sides, and fringed along the under convex margins with a row of long, conical, tooth-like spines, each of which is strongly pectinated along the outer side (Pl. XII, fig. 24).

The *first pair of maxillæ* (Pl. XII, fig. 28) have the same form as in the genus *Hyperia*. The basal joint is very short and almost globular; the principal lamina is long, with the basal portion nearly rectangular; the apical portion forms a feebly curved and concave process, densely covered with long bristles, and provided at the apex with two long, and four somewhat shorter, stout spines. The secondary lamina is tolerably narrow, and fully as long as the stem of the principal lamina; the inner margin is serrated, and at the apex there is a row of short bristles and a single, curved, strong spine.

The *second pair of maxillæ* (Pl. XII, fig. 29). The principal lamina has the basal portion broad; the apical projecting portion is nearly cylindrical, with the apex rounded, and provided with a single stout spine and some tufts of long bristles. The secondary lamina is broader, with the apex rounded, and covered with long hair-like bristles.

The *maxillipeds* (Pl. XII, fig. 30) have the basal portion broad, with feebly concave margins; the lateral laminae are bean-shaped, the outer side being convex and the inner concave; the outer margin is strongly convex, and smooth, the inner is feebly concave or nearly straight, notched, and armed with long bristles. The median lobe is strongly projecting inwards, much longer than in the genus *Hyperia*; the broad apex is armed with two short spines, and is thickly covered with bristles.

The *peræon*. The median keel on the dorsal side is neatly defined, but does not project at the hind corners of the segments into processes. The first segment is longer than the second, and almost as long as the sixth or seventh.

The *epimerals* are somewhat longer than the under margins of the corresponding segments, longer than deep, and have the corners rounded.

The *branchial sacks* are ovate, and a little shorter than the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda* (Pl. XII, fig. 31 and 32) are considerably shorter than the second pair. The femur is about as long as the four following joints together, broader above than below, and has an unusually broad groove on the front margin for the reception of the next joints. The genu is broader than long, and is fringed on the hind part of the under margin with long bristles. The tibia is a little longer than the genu, with the under margin fringed with long bristles at the hind corner. The carpus is tolerably broad, scarcely more than one-third longer than broad; the front margin is feebly convex, and fringed with five or six long bristles; the hind margin is notched, and densely set with longer and shorter stout bristles; the free part of the under margin is obliquely truncate, and armed with bristles. The metacarpus is as long as the carpus, broad at the base, tapering towards the apex, with bulging sides; the strongly convex front margin is fringed with eight or ten long bristles; the hind margin is serrated with long, simple, spine-like teeth, and a few equidistant, short bristles. The dactylus is curved, quite half as long as the metacarpus, and somewhat rugose, but not serrated, on the hind margin (Pl. XII, fig. 32).

The *second pair* (Pl. XII, fig. 33 and 34) reach nearly to the apex of the carpus of the third pair. The femur is considerably longer than that in the first pair, and about as long as the four following joints together; the front margin is almost straight, the hind is feebly convex. The genu is broader than long, with half a dozen long bristles

at the lower hind corner. The tibia is more than twice as long as the genu; the hind portion is strongly produced to more than three-fourths of the length of the stem of the carpus, and is fringed with long bristles. The carpus is long, and comparatively broad at the lower end; the front margin is set with four or six bristles, the hind margin is entirely smooth; the carpal process is long and narrow, about a third part shorter than the stem of the joint, and three-fourths as long as the hind margin of the metacarpus; it is provided with a stout apical spine, which is not fully a third part as long as the carpal process; the front side of the process is narrowly gouge-shaped, the front margins are notched and serrated between the notches (Pl. XII, fig. 34); each notch carries a stout bristle. The metacarpus is a trifle shorter than the stem of the carpus; the front margin is convex, and set with six or seven long bristles; the hind margin is serrated as in the first pair. The dactylus is feebly curved, and not half as long as the metacarpus; the hind margin is smooth.

The *third and fourth pairs* (Pl. XII, fig. 35 and 36) are nearly similar in form; the fourth pair are longer than the third. The femur is scarcely longer than that of the second pair; the front side is almost straight, with the lower corner somewhat projecting and squared; the hind margin is convex, and set with short bristles. The genu is as long as broad; the hind margin is armed with two bristles. The tibia is longer and broader than the genu; the front margin is smooth, with the lower corner strongly produced and tipped with a bristle; the hind margin is convex, set with four or five equidistant bristles, and finely pectinated between the bristles. The carpus is elongate-ovate, considerably longer in the fourth pair than in the third; the front margin is smooth; the hind margin is notched and finely pectinated; each notch carries a stout bristle, and between these there are other more slender bristles, which are more numerous in the fourth pair than in the third; the carpus forms together with the metacarpus a perfect folding hand. The metacarpus is only a little shorter than the carpus in the third pair but much shorter in the fourth; the front margin is strongly convex, and smooth; the hind margin is feebly concave, finely pectinated, and bordered with equidistant, short bristles. The dactylus is curved, smooth on the hind margin, and is not half as long as the metacarpus.

The *fifth, sixth, and seventh pairs* (Pl. XII, fig. 37, 38, 41 and 42) are similar in shape, but unequal in length, the sixth being the longest, owing principally to the much elongated metacarpus, which is about a fourth part longer than in the fifth or seventh pair. The fifth pair (Pl. XII, fig. 37 and 38) are only a little longer than the fourth. The femur is considerably shorter than that in the fourth pair; the front margin is convex, and set with short bristles; the hind margin is straight, with the usual narrow groove for the reception of the next joints. The genu is somewhat longer than broad, and has the margins smooth. The tibia is much longer and broader than the genu, with the lower hind corner produced downwards and tipped with a bristle; the front margin is provided with four or five bristles, and is finely pectinated. The carpus is elongated, more than three times as long as broad, and more than twice as long as the tibia; that in the sixth pair is somewhat more elongated than in the fifth or seventh pair; the front margin is notched, set with bristles, and finely pectinated; the hind margin is feebly

notched, and provided with a few short bristles. The metacarpus is long, slender, quite as long as the two preceding joints together; in the sixth pair it is a little longer; the front margin is somewhat concave, it is finely pectinated, and provided with bristles; the hind margin is set with short bristles. The dactylus is long and slender; in the sixth pair it is nearly a third part as long as the metacarpus; in the fifth pair it is serrated at the base on the front margin, while it is smooth in the sixth and seventh pairs (Pl. XII, fig. 38 and 41).

The *pleon* is longer than the last five peræonal segments together. The lateral parts of the segments are obtusely rounded behind.

The *pleopoda* have the rami long and slender. In the first pair each ramus has fifteen joints. The coupling spines are hook-shaped, with two sharp teeth on the side of the stem; the cleft bristle has the apically dilated arm a little shorter than the other.

The *urus*. The first segment is about as long as the last coalesced, which is twice as broad as long.

The *uropoda* (Pl. XII, fig. 43). The *first pair* reach beyond the middle of the outer ramus of the last pair; the peduncle is linear, four times as long as broad, and quite as long as the inner ramus, which is a third part longer than the outer; both rami are elongated, and sharp-pointed; the inner is serrated on the outer margin; the outer ramus is serrated on the inner margin. The *second pair* reach a little beyond the apex of the peduncle of the last pair; the peduncle is narrower at the base than at the apex, with the lower inner corner strongly produced downwards; the inner ramus is a little shorter than the peduncle, and is longer than the outer ramus; it is irregularly lanceolate and serrated on both margins; the outer ramus is much narrower than the inner, is sharp-pointed, and serrated along the inner margin. The peduncle of the *third pair* is linear, three times as long as broad, and has the lower inner corner produced as in the second pair; the rami are equal in length, and as long as two-thirds of the peduncle; the inner is broader than the outer, and is serrated on both margins; the outer ramus is serrated on the inner margin.

The *telson* is as long as broad, fully as long as the last ural segment, and more than a third part as long as the peduncle of the last pair of uropoda.

### The female.

Pl. XII, fig. 17—21, 39 and 40.

The forepart of the *body* is wider than in the male; the pleon and urus together are shorter than the peræon.

The *first pair of antennæ* (Pl. XII, fig. 18 and 19) are somewhat longer than the head and the first peræonal segment together. The first joint of the peduncle is more than twice as long as the two following joints together. The single flagellar joint is considerably more than twice as long as the whole peduncle; the basal portion is conical, with somewhat bulging sides, the under margin is serrated, and provided with long olfactory hairs (Pl. XII, fig. 19); the flagellum is slender, cylindrical, and entirely smooth for the last two thirds of its length.

The *second pair of antennæ* (Pl. XII, fig. 20 and 21) are as long as the head and the first two peræonal segments together. The first free joint of the peduncle is half as long as the second, the third is much longer than the two preceding together. The single flagellar joint is longer than the whole peduncle, is slender, and tapers gently towards the apex; the under margin is fringed with fine hairs (Pl. XII, fig. 21).

The *peræopoda* are like those in the male, but the bristles on the carpus of the third and fourth pairs are less numerous. In some specimens the dactylus of the sixth pair is transformed into a spout-like organ, serving as an outlet for the secretion of the glands, which usually are more developed in the females than in the males; in these specimens the front margin of the metacarpus is entirely smooth without bristles nor pectination.

The *pleon* is scarcely longer than the last four peræonal segments together.

The *urus* and its appendages are like those in the male.

### 3. PARATHEMISTO PACIFICA, TH. STEBBING, 1888.

**Diagn.** Carpus *pedum peræi* primi paris metacarpo longior; margo anterior ac posterior spinis armati; margo posterior metacarpi pectinatus, spinis carens; dactylus dimidio metacarpi longior. Metacarpus *pedum secundi* paris carpo paullo brevior; processus carpalis tres partes metacarpi longitudine æquans, spinam terminalem longam(?) gerens. Metacarpus *pedum tertii* ac *quarti* parium carpo longior. Metacarpus *pedum parium trium ultimorum* articulis duobus præcedentibus brevior. Pedunculus *pedum vri* ultimi paris quam telson ter longior; ramus internus externo paullo longior.

The carpus of the first pair of *peræopoda* is longer than the metacarpus; the front and hind margins are provided with bristles; the hind margin of the metacarpus is pectinated, and without spines. The metacarpus of the second pair is a little shorter than the stem of the carpus; the front side of the carpal process is three-fourths as long as the hind margin of the metacarpus, and has a long(?) terminal spine. The metacarpus of the third and fourth pairs is longer than the carpus; that of the last three pairs is somewhat shorter than the two preceding joints together. The peduncle of the last pair of *uropoda* is three times as long as the telson; the inner ramus is a little longer than the outer.

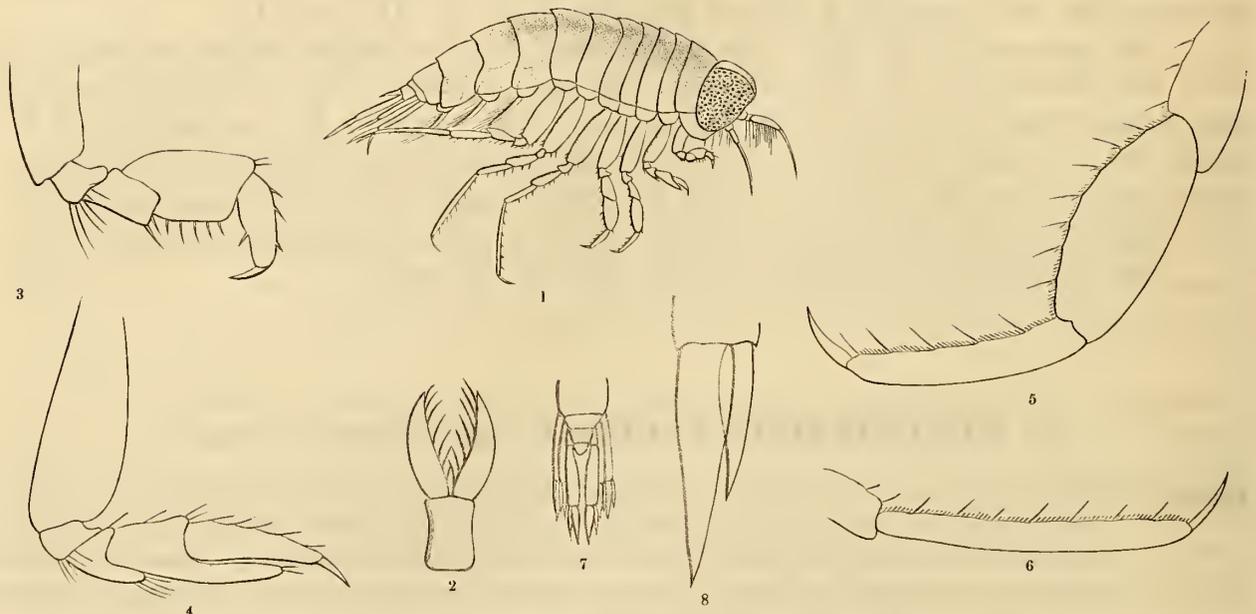
**Colour ?**

**Length.** »Three-tenths of an inch» (STEBBING).

**Hab.** The Pacific, between Japan and the Sandwich Islands. Lat. 35° 20' N., Long. 153° 39' E., surface (STEBBING).

**Syn. 1888.** *Parathemisto pacifica*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1420.

From the diagnosis it is clear that *Parathemisto pacifica* comes very near to *P. japonica*, and as STEBBING did not give any drawings I have not been able to ascertain the agreement or disagreement of the two species in some points. For further knowledge of the species I refer the reader to STEBBING'S description (l. c. p. 1420—1423).

4. **PARATHEMISTO TRIGONA**, J. D. DANA, 1852.*Parathemisto trigona*, J. D. DANA.

Facsimile from DANA. U. S. Expl. Exp. Crust. II, pl. 67, fig. 12.

Fig. 1. The animal from the side. 2. The maxillipeds. 3. The first pair of pereopoda. 4. The second pair. 5. The fourth pair. 6. The fifth pair. 7. The urus. 8. The last pair of uropoda.

**Diagn.** *Corpus* carinatum. *Caput* segmentis duobus primis peræi paullo longius. *Carpus pedum peræi* primi paris metacarpo multo longior; margo anterior levis, margo posterior spinis armatus; margo posterior metacarpi non serratus(?), spinam unam gerens; dactylus dimidio metacarpi brevior. *Metacarpus pedum secundi* paris carpo multo longior; processus carpalis tres partes metacarpi longitudine æquans, spina terminali carens; dactylus dimidio metacarpi brevior. *Metacarpus pedum tertii ac quarti* parium carpo non longior. *Metacarpus pedum parium trium ultimorum* articulis duobus præcedentibus longior. *Pedunculus pedum uri ultimi* paris quam telson quater longior; ramus internus externo longior.

The *body* is carinated. The *head* is a little longer than the first two pereopodal segments together. The *carpus* of the first pair of *peræopoda* is much longer than the metacarpus; the front margin is smooth, the hind margin is armed with bristles; the hind margin of the metacarpus is not serrated(?) and has a single bristle; the dactylus is not half as long as the metacarpus. The metacarpus of the second pair is much longer than the stem of the carpus; the carpal process, is three-fourths as long as the hind margin of the metacarpus, and wants a terminal spine; the dactylus is not half as long as the metacarpus. The metacarpus of the third and fourth pairs is not longer than the carpus. The metacarpus of the last three pairs is longer than the two preceding joints together. The peduncle of the last pair of *uropoda* is four times as long as the telson; the inner ramus is longer than the outer.

**Colour.** (?).

**Length.** »Six to eight lines» (DANA).

**Hab.** »Probably from Lagulhas Bank, near Cape Horn» (DANA).

**Syn. 1852.** *Hyperia trigona*, J. D. DANA. — United States Exploring Expedition.  
Crustacea. Vol. 2, p. 987, pl. 67,  
fig. 12.

*Parathemisto trigona.* » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda  
Hyperideæ». Bih. t. K. Sv. Vet. Ak.  
Handl. Bd. 11. N:o 16, p. 21.

» » » » 1887. »Arctic and Antarctic Hyperids». Vega-  
Exp. Vetensk. Iakttagelser. Bd. 4,  
p. 568.

*Parathemisto trigona* comes near to *P. pacifica* and *P. japonica*, and the distinctions between the three species are very small, as for instance the want of a terminal spine in the carpal process of the second pair of peræopoda in *Parathemisto trigona* and also the comparatively long peduncle of the last pair of uropoda.

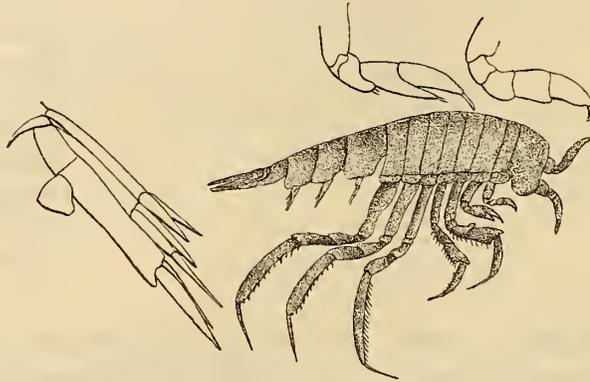
DANA's description follows here:

»Body very much compressed, the back rising to an edge. Antennæ longer than the head; superior pair subulate, inferior long (reaching nearly to fourth thoracic segment), very slender, flagellum indistinctly jointed. Feet very short, setulose; six<sup>1)</sup> posterior pairs long and subequal, the seventh pair a little the shortest; fourth joint of third or fourth pair rather broad. — — — The thin body, narrow triangular in its section, and sharp-backed, is unlike that of any *Hyperia* described. About fourteen indistinct joints may be counted in the flagellum of the inferior antennæ. The first pair of legs terminates in a small claw, and is not at all prehensile; the third joint is rectangular at lower apex. The second pair has a process to lower apex of fourth joint, nearly three-fourths as long as the finger (or fifth joint); along the back of the fifth joint, there are four or five short hairs, or pairs of hairs. The fourth joint of the fourth pair is more than twice the width of the fifth joint; and both joints, besides four to seven short hairs (not longer than diameter of fifth joint), have on the lower side exceedingly minute spinules, closely set, seen only with a high magnifier. The fifth joint of the legs of the fifth pair, has six or seven pairs of short hairs on lower margin, not longer than diameter of joint. The caudal stylets have the lamellæ of each unequal, the shorter nearly two-thirds as long as the longer, and both pointed.»

<sup>1)</sup> A typographical error instead of »three».

5. **PARATHEMISTO BATEI**, n. n.

The name is given in honour of the first describer of the species Mr C. SPENCE BATE.



*Parathemisto Batei*, n. n.

Facsimile from SPENCE BATE, Catal. Amph. Crust. Brit. Museum, pl. 49, fig. 4.

**Diagn.** *Corpus* non carinatum. *Caput* segmenta duo prima peræi longitudine æquans. *Carpus pedum peræi* primi paris metacarpo brevior; margo posterior metacarpi non serratus(?); *dactylus* dimidio metacarpi brevior. *Metacarpus pedum secundi* paris carpo multo longior; *processus carpalis* duas partes metacarpi longitudine æquans, ac spinam terminalem gerens; *dactylus* dimidio metacarpi brevior. *Metacarpus pedum tertii* ac *quarti* parium carpo multo longior. *Metacarpus pedum parium trium ultimorum* articulis duobus præcedentibus duplo fere longior. *Pedunculus pedum vri* ultimi paris quam *telson* ter quaterve longior; *ramus internus* externo longior.

The *body* is not carinated. The *head* is as long as the first two peræonal segments together. The *carpus* of the first pair of *peræopoda* is shorter than the *metacarpus*; the hind margin of the *metacarpus* is not serrated; the *dactylus* is not half as long as the *metacarpus*. The *metacarpus* of the second pair is much longer than the stem of the *carpus*; the front side of the *carpal* process is two-thirds as long as the hind margin of the *metacarpus*, and is provided with a terminal spine; the *dactylus* is not half as long as the *metacarpus*. The *metacarpus* of the third and fourth pairs is much longer than the *carpus*, that of the last three pairs is nearly twice as long as the two preceding joints together. The *peduncle* of the last pair of *uropoda* is three or four times as long as the *telson*; the inner *ramus* is longer than the outer.

**Colour.** ?

**Length.** 8 mm. ( $\frac{6}{20}$  of an inch, SPENCE BATE.)

**Hab.** The »Antarctic regions» (SPENCE BATE).

**Syn.** 1862. *Hyperia trigona*, (DANA). SPENCE BATE. Catal. Amph. Crust. Brit. Museum, p. 297, pl. 49, fig. 4.

This species comes perhaps nearer to *Euthemisto* than the other species assigned here to *Parathemisto*, to judge from the statement of SPENCE BATE that the armature of the metacarpus in the fifth pair of peræopoda is unlike that in the two following pairs. From its congeners the species seems to be well defined if the drawing is to be trusted.

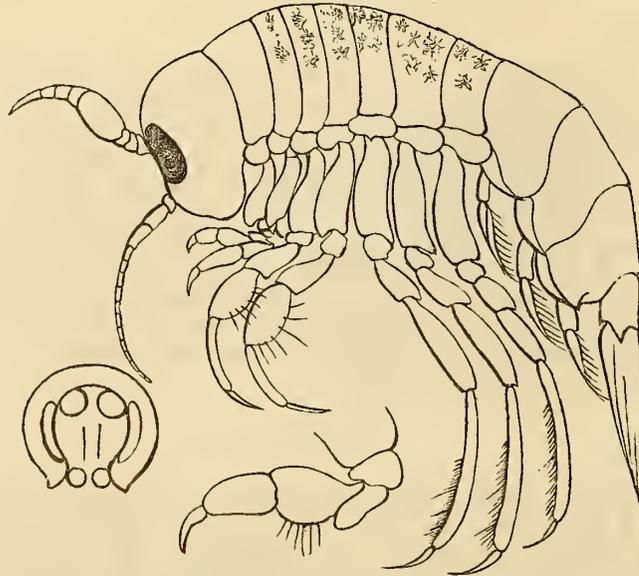
SPENCE BATE says:

»Cephalon ovate, not large. — — — — Gnathopoda very short: first pair having the carpus scarcely produced inferiorly; propodos tapering; dactylos short: second pair having the meros inferiorly produced; carpus infero-anteriorly produced to two-thirds the length of the propodos; dactylos short and straight. First two pairs of pereopoda subequal, slender, having the carpi broad and setose; three posterior pairs much longer than the two preceding, having the propoda very long, nearly half the length of the whole, anteriorly fringed with fine cilia, which in the third pair are long thickly packed, and comb-like, but sparsely existing on the fourth and fifth pairs. Peduncle of the antepenultimate and penultimate pairs of pleopoda reaching to half the length of that of the ultimate; rami of the penultimate pair unequal, and longer than those of the preceding pairs; ultimate pair having the peduncle three or four times as long as the telson; rami unequal, slender, smooth, nearly one half the length of the peduncle. Telson obtusely triangular, scarcely as long as broad.»

He remarks further:

»The peculiar form of the pereion (which DANA says is »very much compressed, the back rising to an edge») I attribute to accident, such as to pressure by the hand when first caught, since in every other respect the details of the specimens collected in the Antarctic expedition, and presented to the British Museum by the Admiralty, correspond exactly with DANA's description and figure. No species in any genus of this family, that I am aware of, has a dorsal carina.»

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6. **PARATHEMISTO GRACILIPES**, A. MERLE NORMAN, 1869.*Parathemisto gracilipes*, NORMAN.

Facsimile from SPENCE BATE and WESTWOOD, Brit. Sessile-eyed Crust., II, p. 16.

**Diagn.** *Corpus non carinatum. Caput segmenta tria prima peræi longitudine æquans. Carpus pedum perwi primi paris metacarpo longior; margo posterior metacarpi serratus; dactylus dimidio metacarpi brevior. Metacarpus pedum secundi paris carpum longitudine æquans; carpus non productus, spinis nonnullis, margini posteriori affixis, instructus; dactylus dimidium metacarpi longitudine æquans. Metacarpus pedum tertii ac quarti parium carpo longior. Metacarpus pedum parium trium ultimorum articulis duobus præcedentibus longior.*

The *body* is not carinated. The *head* is as long as the first three peræonal segments together. The carpus of the first pair of *peræopoda* is longer than the metacarpus; the hind margin of the metacarpus is serrated; the dactylus is not half as long as the metacarpus. The metacarpus of the second pair is as long as the stem of the carpus; the carpus is not produced, provided with a few long bristles on the hind margin; the dactylus is half as long as the metacarpus. The metacarpus of the third and fourth pairs is longer than the carpus; that of the last three pairs is longer than the two preceding joints together.

**Colour.** »Light straw, having the back starred with a few spots of black pigment (SP. BATE and WESTWOOD).

**Length.** 5 mm., ( $\frac{4}{20}$ ths of an inch, SPENCE BATE).

**Hab.** Moray Frith (SPENCE BATE).

- Syn. 1862.** *Hyperia oblivia*, (KROEYER.) SPENCE BATE. Catal. Amph. Crust. Brit. Museum, p. 298, pl. 49, fig. 5.
- » » » SPENCE BATE and WESTWOOD. 1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 16.
- 1869.** *Hyperia gracilipes*, A. MERLE NORMAN. — »Shetland Final Dredging Report. II, On the Crustacea etc. Report on the 38<sup>th</sup> Meeting of the British Association for the Advancement of Science; at Norwich, 1868, p. 287.
- 1887.** *Parathemisto longipes*, C. BOVALLIUS. — »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 21.

It is not impossible that this species is only a young form of *Parathemisto oblivia*, KROEYER, but after the detailed description of the second pair of peræopoda given by SPENCE BATE in 1862 we must at present consider it is a species of its own, and accept for it the name proposed by A. MERLE NORMAN.

SPENCE BATE's description runs:

»Cephalon transversely ovate; anterior margin flattened; pigment of the eyes occupying only part of the anterior portion of the cephalon. Superior antennæ as long as the cephalon, having the peduncle very short; flagellum broader at the base than the peduncle, tapering, subulate, sharp, unarticulate, but showing incipient signs of articulation. Inferior antennæ longer than the superior, slender; peduncle short (two joints only exposed); flagellum long, having the first articulus as long as the three others. Gnathopoda subequal, short; first pair the shorter, cylindrical, robust; carpus scarcely produced inferiorly; propodos not so long as the carpus, superior margin arcuate, inferior margin straight, serrated anteriorly with a row of small denticles; dactylos short, obtuse; second pair having the carpus slightly produced inferiorly, but not anteriorly, and fringed with a few hairs; propodos as long as the carpus, but not so stout; dactylos half the length of the propodos, arcuate, sharp. First two pairs of pereopoda long, much longer than the gnathopoda, having the carpi posteriorly dilated and fringed with a few hairs; propoda slightly arcuate, longer than the carpi, cylindrical; dactyla long and sharp. Third and fourth pairs of pereopoda subequal; third pair longest, having the basos not dilated; carpus long; propodos nearly twice as long as the carpus, slender, anteriorly fringed with a comb-like row of cilia; dactylos long, slightly curved, sharp; the fourth pair resembles, but is slightly shorter than, the third; and the fifth pair is still a little shorter than the fourth. Posterior pair of pleopoda longer than the preceding, and having the margins of the rami serrated. Telson lanceolate. The colour, as well as could be recognized from a dead specimen, is corneous, with some black stellate markings on the dorsal surface of the pereion.»

From the description given by SPENCE BATE and WESTWOOD in 1868 I reproduce only the »Specific character» and a few passages, the rest being essentially the same as in the description of 1862:

»*Specific character.* Superior antennæ as long as the depth of the cephalon. Inferior antennæ longer than the superior and terminating in a multi-articulate flagellum. Gnathopoda

subequal, carpi scarcely inferiorly produced. First and second pereopoda having the carpi considerably broader than the propoda. Three posterior pairs of pereopoda very long, subequal, and having the anterior margins fringed with fine comb-like cilia.»

»The hands can scarcely be described as subchelate, although they possess a tendency in the direction common to most animals in the division.»

»The caudal appendages are rather long and slender.»

»We have frequently doubted whether this species strictly belonged to the present genus (*Hyperia*). But finding that it agreed very closely with *H. trigona*, of DANA, from Cape Horn, we have considered it desirable that it should remain therein for the present. The form of the first two pairs of walking legs differ from the more typical species. The two succeeding pairs of legs in their length and armature suggest a relationship to the genus *Cyllopus*, which is also supported by the form of the inferior pair of antennæ, but from that genus this species is excluded by the length of the last pair of walking legs, which in *Cyllopus* are rudimentary.»

A. MERLE NORMAN in 1869 says:

»BATE and WESTWOODS »*H. oblivia*», which has not the propodos of the gnathopods at all produced, cannot be KRÖYER's species nor that here described (= the true *Parathemisto oblivia*, KRÖYER). I would propose for it the name *H. gracilipes*.»

## 7. PARATHEMISTO GOËSI, n. sp.

Pl. XII, fig. 1—10.

The name is given in honour of Dr AXEL GOËS of Kisa, Sweden.

**Diagn.** *Corpus* non carinatum. *Caput* segmentis duobus primis peræi longius. *Carpus pedum peræi* primi paris metacarpo multo brevior; margo anterior levis, margo posterior spinis paucis instructus; margo posterior metacarpi non serratus, spinam unam gerens; dactylus dimidium metacarpi longitudine æquans. *Metacarpus pedum secundi* paris carpo multo longior; processus carpalis dimidio metacarpi brevior, spina terminali carens; dactylus dimidio metacarpi longior. *Metacarpus pedum tertii ac quarti* parium carpo paullo longior. *Metacarpus pedum parium trium ultimorum* articulis duobus præcedentibus brevior. *Pedunculus pedum uri* ultimi paris quam telson duplo longior; ramus externus interno longior.

The *body* is not carinated. The *head* is longer than the first two peræonal segments together. The *carpus* of the first pair of *peræopoda* is much shorter than the metacarpus; the front margin is smooth, the hind margin is provided with a few bristles; the hind margin of the metacarpus is not serrated, and has a single bristle; the dactylus is half as long as the metacarpus. The metacarpus of the second pair is much longer than the stem of the carpus; the front side of the carpal process is not half as long as the hind margin of the metacarpus, and wants a terminal spine; the dactylus is more than half as long as the metacarpus. The metacarpus of the third and fourth pairs is a little longer than the carpus; that of the last three pairs is shorter than the two preceding joints together. The peduncle of the last pair of *uropoda* is twice as long as the telson; the inner ramus is longer than the outer.

**Colour.** Light red, with the ocular pigment dark red.

**Length.** 5—6 mm.

**Hab.** The Southern temperate region of the Atlantic, Lat. 41° S., Long. 57° W. (S. M.)

*Parathemisto* Goësi comes in general form of body nearer to the genus *Hyperia* than its congeners do. In fact the species is an intermediate form between *Parathemisto* and *Hyperia*, resembling the former in the shape of the antennæ and of the peræopoda, and the latter in the form of body and of the urus with its appendages.

### The female.

Pl. XII, fig. 1—10.

The *body* is *Hyperia*-like, only a little more compressed; the integument is very thin, and almost pellucid. The head and peræon together are quite as long as the pleon and urus together.

The *head* is fully as long as the first three peræonal segments together, and is more than a third part deeper than it is broad. The antennal groove commences above the middle of the front side, and is long and narrow.

The *first pair of antennæ* (Pl. XII, fig. 2) are not longer than the head; the first joint of the peduncle is only a little longer than the two following which are coalesced. The single flagellar joint is longer than the whole peduncle, is thick, and tapers slowly towards the apex, not showing such a long, cylindrical, terminal part, as does that joint in the females of the other species of *Parathemisto*; the under side of the flagellum is set with long olfactory hairs.

The *second pair of antennæ* (Pl. XII, fig. 3) are longer than the first, and nearly as long as the head and the first peræonal segment together. The first free joint of the peduncle is scarcely half as long as the coalesced second and third; the single flagellar joint is longer than the whole peduncle, gently tapering towards the apex, and is set with short fine hairs on the under margin.

The *first pair of peræopoda* (Pl. XII, fig. 4) are only a little shorter than the second. The femur is elongate-ovate, and it scarcely longer than the three following joints together. The genu is broader than long, and has a single bristle at the lower hind corner. The tibia is longer than the genu; the under truncated margin is fringed with a few bristles. The carpus is not very broad; the front margin is smooth, the hind fringed with four or five long bristles. The metacarpus is longer than the carpus; the convex front margin is smooth; the hind margin is straight, not serrated, and provided with a single bristle. The dactylus is quite half as long as the metacarpus; it is curved, and finely serrated on the hind margin.

The *second pair* (Pl. XII, fig. 5) reach to the apex of the carpus of the third pair. The femur is somewhat shorter than the four following joints together. The genu is

broader than long, and is armed as in the first pair. The tibia is more than twice as long as the genu; the lower hind part is produced to half the length of the stem of the carpus, and is fringed with four or six longer and shorter bristles. The carpus is tolerably broad; the front margin has a long bristle at the apex; the hind margin is smooth; the carpal process is short, and without terminal spine, but there are two long bristles at the apex; the front side is not half as long as the hind margin of the metacarpus, and has the margins smooth. The metacarpus is considerably longer than the stem of the carpus, the front margin is feebly convex, and is provided with two short, spine-like bristles; the hind margin is somewhat convex, is serrated on its lower half, and has a bristle near the apex. The dactylus is almost straight, and finely serrated on the hind margin; it is more than half as long as the metacarpus.

The *third and fourth pairs* (Pl. XII, fig. 6) are similar in form and equal in length. The femur is elongated, and is longer than that of the second pair. The genu is longer than broad, with a short bristle near the lower hind corner. The tibia is not longer, but much broader, than the genu, and has two short bristles on the hind margin. The carpus is nearly ovate, the hind margin is armed with three or four long bristles, but is not serrated. The metacarpus is comparatively thick, feebly curved, and finely serrated on the hind margin; it is a little longer than the carpus. The dactylus is feebly curved, smooth, and about half as long as the metacarpus.

The *fifth, sixth, and seventh pairs* (Pl. XII, fig. 7—9) are similar in shape and equal in length. The femur is quite as long as the three following joints together; that in the fifth pair is a little broader than those in the sixth and seventh. The genu is about as long as broad, with the lower hind corner somewhat produced. The tibia is not fully twice as long as the genu, with the margins smooth. The carpus is as long as the two preceding joints together, is linear, and has the margins smooth. The metacarpus is shorter than the two preceding joints together; the front margin is straight, provided with five or six short bristles, and is finely pectinated; the hind margin is smooth. The dactylus (Pl. XII, fig. 8) is feebly curved, smooth, and is about half as long as the metacarpus; in the sixth and seventh pairs it is sometimes transformed into a spout-like organ (Pl. XII, fig. 9).

The *pleon* is only a little shorter than the whole peræon. The lateral parts of the segments are almost straight below, and obtusely rounded behind.

The *pleopoda* have the rami long and slender; the outer ramus of the first pair has eight joints, the inner seven. The coupling spines are slender, hook-shaped, and have two sharp teeth on the middle of the stem. The cleft bristle has the apically dilated arm much shorter than the other.

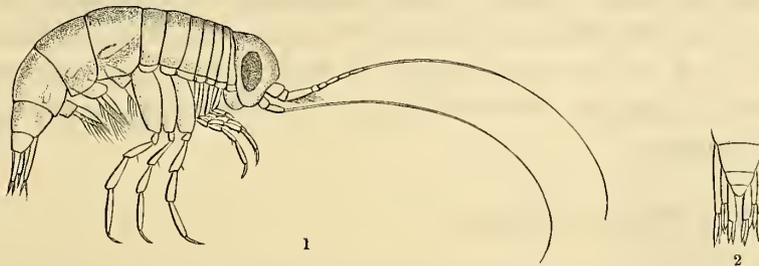
The *urus* is quite as long as the last pleonal segment. The first ural segment is about as long as the last coalesced, which is quite as long as it is broad at the base.

The *wropoda* (Pl. XII, fig. 10). The *first pair* reach below the middle of the outer ramus of the last pair; the peduncle is linear, five times as long as broad, and considerably longer than the inner ramus, which is about a third part longer than the outer; both rami are elongate and sharp-pointed; the inner ramus is serrated on the outer margin, the outer ramus is serrated on the inner margin. The *second pair* reach a little below

the apex of the peduncle of the last pair; the peduncle is narrower than that in the first pair, five times as long as broad, and considerably longer than the inner ramus, which is nearly twice as long as the outer; the rami are serrated as in the first pair. The peduncle of the *third pair* is shorter than the last coalesced ural segment, not fully three times as long as broad, and only a little longer than the inner ramus, which is somewhat longer than the outer; both rami are serrated as in the first pair. In some specimens of this species I have observed peculiar features in the form of the uropoda, which features I suppose to be connected with the moulting process, and which will be accounted for in the morphological part of this treatise.

The *telson* is obtusely triangular, and scarcely as long as broad; it is half as long as, and much broader than, the peduncle of the last pair of uropoda.

### 8. PARATHEMISTO RUBESCENS, J. D. DANA, 1852.



*Parathemisto rubescens*, J. D. DANA.

Facsimile from DANA. U. S. Expl. Exp. Crust. II, pl. 67, fig. 9.

Fig. 1. The animal from the side. Fig. 2. The urus.

**Diagn.** *Corpus* non carinatum. *Caput* segmentis quinque primis peræi longius. *Carpus pedum peræi* primi paris metacarpo longior(?). *Carpus pedum quarti* paris metacarpo multo brevior, ac duas spinas margini posteriori affixas gerens. *Metacarpus pedum parium trium ultimorum* articulis duobus præcedentibus brevior. *Pedunculus pedum uri* ultimi paris quam *telson* ter longior; *ramus externus* parium trium omnium *ramum internum* longitudine æquans.

The *body* is not carinated. The *head* is longer than the first five peræonal segments together. The *carpus* of the first pair of *peræopoda* is longer than the *metacarpus*(?). The *carpus* of the fourth pair is much shorter than the *metacarpus*, and has two bristles on the hind margin. The *metacarpus* of the last three pairs is shorter than the two preceding joints together. The *peduncle* of the last pair of *uropoda* is three times as long as the *telson*; the *outer ramus* of all the three pairs is as long as the inner.

**Colour.** »A little reddish in some parts. Coxæ of six posterior legs reddish» (DANA).

**Length.** »One-eighth of an inch», (DANA.)

**Hab.** The Pacific, Lat. 18° S., Long. 124 W. (DANA.)

**Syn. 1852.** *Lestrigonus rubescens*, J. D. DANA. —

United States Exploring Expedition.  
Crustacea. Vol. 2, p. 984, pl. 67,  
fig. 9.

*Hyperia rubescens*,

»

C. BOVALLIUS. 1887.

»Systematical list of the Amphipoda  
Hyperiiidea». Bih. t. K. Sv. Vet. Ak.  
Handl. Bd. 11. N:o 16, p. 16.

As I have said above it is not quite certain that the present species is a true *Parathemisto*, nothing being known about the shape of the first two pairs of peræopoda nor of the carpus in the third and fourth pairs. On the other hand nothing in the short description goes against the supposition that it is a *Parathemisto*, so it is provisionally placed here to await the rediscovery of the species and its further investigation. From the other species of the genus it is distinguished by the unusually short peræon, which has the dorsal part of the first segment almost concealed, by the carpus of the fourth pair of peræopoda being armed with only two bristles, by the fifth and sixth ural segments not being coalesced, and by the outer ramus of all the three pairs of uropoda being quite as long as the inner, if this last characteristic, derived from the examination of the drawing, is to be relied upon.

I reproduce here DANA's description:

»Thorax a little longer than in the preceding,<sup>1)</sup> first segment nearly concealed. Head flattened in front. Seventh abdominal segment separated by a suture from the sixth, sparingly narrower. Antennæ four, very nearly equal, a little longer than the body, base of the superior antennæ not acute at lower apex, flagellum about 14-jointed, first joint short, the others oblong. Coxa of six posterior feet nearly rectangular and acute at posterior apex, and fourth joint bearing a seta (these feet elsewhere naked); claw half as long as tarsus. — — First joint of flagellum of superior antennæ not longer than last of base, other joints of flagellum slender, cylindrical. Last (seventh) abdominal segment triangular, obtuse. Two setæ on inferior side of fourth joint of fourth pair of legs. Fifth, sixth, and seventh pairs of legs very nearly equal.»

<sup>1)</sup> *Lestrigonus fuscus* = *Themistella fusca*.

Genus 7. **EUTHEMISTO**, F. E. GUÉRIN, 1825.

**Diagn.** *Caput* mediocre, globosum. *Peraeon* leve, epimeris distinctis instructum. *Pedes pervei* primi paris simplices, non subcheliformes. *Pedes secundi* paris cheliformes; *carpus paullo dilatatus*, valde productus; *processus carpalis* anguste concavus, in formam cochlearis redactus. *Carpus pedum tertii ac quarti parium dilatatus*, simul cum *metacarpo instrumentum prensorium formans*. *Pedes quinti* paris ceteris longiores, *carpus valde dilatatus ac elongatus*; *metacarpus valde elongatus*; *carpus simul cum metacarpo instrumentum prensorium formans*. *Pedes parium duorum ultimorum pedibus tertii ac quarti parium longiores*. *Pedes uri elongati*.

The *head* is moderately large, globular. The *peraon* is smooth, and provided with distinct epimerals. The first pair of *peræopoda* are simple, not subcheliform. The second pair are cheliform; the *carpus* is a little dilated and much produced; the *carpal process* is narrowly concave, gouge-shaped. The *carpus* of the third and fourth pairs is dilated, forming together with the *metacarpus* a folding hand. The fifth pair are longer than the others; the *carpus* is much dilated and elongated; the *metacarpus* is much elongated; the *carpus* together with the *metacarpus* forms a folding hand. The last two pairs are longer than the third and fourth pairs. The *uropoda* are elongated.

<b>Syn. 1825.</b>	<i>Themisto</i> , F. E. GUÉRIN.	—	»Uroptère.» Encyclopédie Méthodique. Histoire naturelle. Tome 10 <sup>me</sup> , p. 772.
»	»	—	1828. »Mémoire sur le nouveau genre <i>Themisto</i> , de la classe de Crustacés». Mémoires de la Soc. d'Hist. nat. de Paris. Tome 4 <sup>me</sup> , p. 380.
»	»	H. MILNE EDWARDS.	1830. Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences naturelles. Tome 20 <sup>me</sup> , p. 393.
»	»	H. LATREILLE.	1830. »Themisto». Dictionnaire classique d'Histoire naturelle. Tome 16 <sup>me</sup> , p. 222.
»	»	»	1831. Cours d'Entomologie, p. 399.
»	»	F. E. GUÉRIN-MÉNEVILLE.	1836. Iconographie du Règne Animal de G. Cuvier. Crustacés, p. 22.
»	»	P. A. LATREILLE.	1836. Le Règne Animal — — —, par G. Cuvier. 3 <sup>me</sup> éd. Tome 2 <sup>me</sup> , p. 204.
»	»	F. S. VOIGT.	1836. Das Thierreich — — — vom Baron von Cuvier. 4 <sup>ter</sup> Band, p. 202.
»	»	H. BURMEISTER.	1837. Handbuch der Naturgeschichte, 2 <sup>te</sup> Abth. Zoologie, p. 569.
»	»	H. KROEYER.	1838. »Grønlands Amphipoder». Det K. Danske Videnskabs-Selskabs Naturvidensk. og Mathemat. Afhandling. Bd. 5, p. 294 (66).

- Themisto*, F. E. GUÉRIN. H. MILNE EDWARDS. 1838. Histoire naturelle des animaux sans vertèbres par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 305.
- » » » 1839. » » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 369.
- » » H. LUCAS. 1839. »Thémisto». Dictionnaire pittoresque d'Histoire naturelle. Tome 9<sup>me</sup>, p. 397.
- » » H. MILNE EDWARDS. 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 84.
- » » » 1849. Le Règne Animal — — —, par G. Cuvier. Ed. acc. des pl. Crustacés, p. 172.
- » » H. LUCAS. 1849. »Themisto». Dictionnaire universel d'Histoire naturelle — — —, par Ch. d'Orbigny. Tome 12<sup>me</sup>, p. 552.
- » » » 1851. Histoire naturelle des Crustacés, Arachnides et des Myriapodes, p. 235.
- » » J. D. DANA. 1852. »On the Classification of the Crustacea Choristopoda or Tetradecapoda». The American Journal of Science and Arts. Second Series. Vol. 14, p. 316.
- » » » 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000 and 1442.
- » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 311.
- » » A. GERSTAECKER. 1863. Handbuch der Zoologie von W. Ch. E. Peters, J. V. Carus und A. Gerstaecker. 2<sup>ter</sup> Band, p. 383.
- » » A. S. PACKARD JR. 1863. A list of Animals dredged near Caribou Island, Southern Labrador. The Canadian Naturalist. Vol. 8, p. 425.
- » » A. GOËS. 1865. »Crustacea amphipoda maris Spetsbergiam alluentis cum speciebus aliis arcticis». Öfversigt af K. Vet. Ak. Förhandl. 1865. N:o 8, p. 533 (17).
- » » SPENCE BATE and WESTWOOD. 1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 522.
- » » A. BOECK. 1870. »Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandling for 1870, p. 87 (7).
- » » » 1872. De Skandinaviske og Arktiske Amphipoder, p. 86.
- » » C. CLAUS. 1872. Grundzüge der Zoologie. 2<sup>te</sup> Aufl., p. 467.
- » » R. BUCHHOLTZ. 1874. Die zweite Deutsche Nordpolarfahrt. 2<sup>ter</sup> Bd. 2<sup>te</sup> Abth. Zoologie, p. 385.
- » » C. CLAUS. 1875. Grundzüge der Zoologie. 3<sup>tte</sup> Aufl., p. 517.
- » » J. C. SCHIØDTE. 1875. »Krebsdyrenes sugemund». Naturhist. Tidskr. 3:die Række. 10:de Bd, p. 229.

<i>Themisto</i> , F. E. GUÉRIN.	G. M. THOMSON.	1879.	»New Zealand Crustacea». Trans. and Proc. of the New Zealand Institute. Vol. 11, p. 242.
»	»	C. CLAUS.	1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 602 (2).
»	»	»	1880. Grundzüge der Zoologie. 4:te Aufl., 1:ster Band, p. 587.
»	»	A. GERSTAECKER.	1886. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Bd. 5. Abth. 2, p. 491.
<i>Euthemisto</i> ,	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 21.
»	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 568.
»	»	H. J. HANSEN.	1887. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenhavn. 1887, p. 59.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1407.

This genus, one of the oldest and best known of all the Hyperiid genera, has never been confounded with any other genus, at least with regard to its fully adult forms; the young of the species belonging to this genus, on the other hand, have been described as species of *Hyperia*. The difference between *Euthemisto* and *Parathemisto* is so small, that it is somewhat doubtful, as I have said before,<sup>1)</sup> whether they really ought to be recorded as two independent genera or not.

The first generic diagnosis, given in 1825 by F. E. GUÉRIN-MÉNEVILLE, the founder of the genus, was repeated in a memoir in 1828. It runs:

»Corps oblong, composé de douze segmens; tête occupée entièrement par deux yeux à réseau, arrondie, non prolongée inférieurement en rostre. Quatre antennes: les supérieures plus courtes que la tête, courbées au bout; les inférieures beaucoup plus longues. Quatorze pieds: le quatre premiers courts, dirigés en avant, couchés sur la bouche, et représentant les deux dernières paires de pieds-mâchoires des Crustacés supérieurs; les quatre suivans beaucoup plus grands, terminés par un crochet dirigé vers la queue; la cinquième paire très-longue dirigée vers la bouche, ayant l'avant-dernier article grêle, fort long, garni d'épines en dedans et terminé par un crochet; les quatre derniers, de moitié plus courts, dirigés et conformés de même, mais sans dents à l'avant-dernier article. Queue terminée par six appendices natatoires longs, aplatis, bifides à l'extrémité; trois paires des filets également natatoires sous les trois premiers segmens de la queue.»

Only two of the many characteristics given here by the founder of the genus have generic value, namely, that respecting the elongation of the fifth pair of peræopoda, and that respecting the long uropoda. He gave also a description of the mouth-organs.

<sup>1)</sup> In »Arctic and Antarctic Hyperids», p. 566 and 588.

In 1830 H. MILNE EDWARDS gave a somewhat improved diagnosis. It runs:

»Tête grosse et renflée; antennes simples; thorax divisé en sept segmens, dont le premier et bien distinct; pattes de la seconde paire terminées par une petite main imparfaitement didactyle.»

In the same year LATREILLE gave a generic description, taken probably from that of GUÉRIN, but more adequate in form. I quote the following passage:

»— — — quatorze pieds, les quatre antérieures beaucoup plus petits que les suivans, les seconds terminés par une pince didactyle, ceux de la cinquième paire beaucoup plus longs que les autres, avec le quatrième article armé en dedans d'un rang de petites dents en forme de peigne.»

In 1838 H. MILNE EDWARDS gave a short description of the genus, which description is important because here for the first time it is pointed out that the form of the carpus of the third and fourth pairs of peræopoda is a characteristic for this genus. I quote only the passage in question:

»— — — mais les pattes de la troisième et quatrième paires, au lieu d'être grêles et cylindriques, portent une espèce de main triangulaire formée par l'antépénultième article, sur le bord duquel s'infléchit une griffe formée par les deux derniers articles.»

In 1839 LUCAS repeated the description given by LATREILLE.

In 1840 H. MILNE EDWARDS gave a good description, from which the following may be cited:

»Les pates de la première paire sont complètement dépourvues de main ehéiforme; — — — Enfin les fausses pates qui garnissent l'extrémité de l'abdomen sont plus longues et plus grêles que chez les Hypéries, mais présentent, du reste, la même disposition.»

It may be noticed that he expressly points out the close relationship between *Hyperia* and *Themisto*.

In 1852 DANA placed the genus *Themisto* in the second subfamily, *Phrosiniinæ*, of his second Hyperiidæan family, *Phronimidæ*, thus removing it from its due place next to *Hyperia*. He gave the following short diagnosis:

»Pedes 3tii 4tique prehensiles, manibus latis. Manus pedis 5ti elongate lineares, digito reeto, longissimo, tenui.»

In 1862 SPENCE BATE, reintroducing the genus in the family *Hyperidæ*, gave the following diagnosis:

»Cephalon transversely ovate. Pereion not largely distended. Pleon slender. Eyes occupying the entire cephalon, dorsally separated. Antennæ subequal, as long as the cephalon is deep; superior pair having the flagellum not articulated; inferior pair having the flagellum more or less articulated. Mandible having an appendage. First pair of gnathopoda short, tolerably robust; carpus not having the anterior margin inferiorly produced; second pair having the carpus on the inferior angle anteriorly produced. First pair of pereopoda having the carpus dilated; propodos narrow, and capable of being inflected against the carpus; second pair like the first; third pair twice the length of the second; carpus very long; propodos longer than the carpus, fringed along the anterior margin with a comb-like series of teeth, and capable of impinging

against the anterior margin of the carpus: fourth and fifth pairs subequal, of the same form as the third, but not more than half the length. Three posterior pairs of pleopoda subequal, the last being the longest; rami double, lanceolate. Telson small, squamose.»

In 1868 SPENCE BATE and WESTWOOD repeated essentially the same diagnosis.

In 1870 A. BOECK gave the following diagnosis, which he repeated in 1872:

»Instrumenta cibaria et pedes 1mi et 2di paris æque ut apud genus antecedens (*Parathemisto*). Pedes 3tii et 4ti paris articulo 3tio brevissimo; articulo 4to per dilatato, in margine posteriore spinoso et manu quodammodo formanti; articulo 5to et 6to junctis ungvem longum 2-articulatum efficientibus. Pedes 5ti paris pedibus 6ti et 7mi paris multo longiores; articulo 1mo dilatato, 3tio brevi, 4to et 5to prælongato.»

In 1872 CLAUS characterizes the genus as follows:

»Fünftes Fusspaar sehr stark verlängert, die beiden vorhergehenden viel kürzern Fusspaare mit zusammengesetzter triangulärer Greifhand. Sechstes und siebtes Fusspaar gleichgestaltet. Caudalgriffel sehr lang und stabförmig.»

In 1875 SCHJØDTE gave an account of the mouth-organs of *Euthemisto*.

In 1887 I corrected the name *Themisto* into *Euthemisto*, because the former was found to be preoccupied for a genus of Mollusca.

The first species belonging to this genus was minutely described in 1822 by M. W. MANDT<sup>1)</sup> under the name *Gammarus Libellula*. The second species was the type for the generic name *Themisto*, *Th. Gaudichaudii*, founded in 1825 by F. E. GUÉRIN. In 1838 KROEYER described two new species *Themisto arctica* and *Th. crassicornis*, which BOECK justly placed as synonyms of *Th. libellula*, MANDT. The next new specific name was DANA's *Themisto antarctica*, proposed in 1852. Thereafter follows *Th. Guerini*, instituted in 1862 by SPENCE BATE, it is, however, nothing but a young female of *Euthemisto antarctica*.

In 1865 GOËS instituted the new species *Themisto compressa*, and in 1870 BOECK gave the diagnosis of *Th. bispinosa*, n. sp., which is identical with GOËS' species.

In 1879 G. M. THOMSON described an *Euthemisto* which he justly supposed to be *E. antarctica*, DANA. In 1887 I gave a short description and figures of *E. Nordenskiöldi*, n. sp., which however, as HANSEN suggested in the same year, is only a young form of *E. libellula*. In 1888 STEBBING described the new species *E. australis*, and *E. Thomsoni*, which latter in my opinion is identical with *E. Gaudichaudii*.

After a close examination of the very rich material at my disposal I am convinced that all these specific names really form only four tolerably good species viz:

<i>Gammarus Libellula</i> , MANDT,	} = <i>Euthemisto libellula</i> MANDT.
<i>Themisto arctica</i> , KROEYER,	
<i>Themisto crassicornis</i> , KROEYER,	
<i>Euthemisto Nordenskiöldi</i> , C. BOVALLIUS,	

<sup>1)</sup> M. W. MANDT. Observaciones in historiam naturalem et anatomiam comparatam in itinere Groenlandico factæ. Dissertatio. (Berlin, 1822), p. 32—34.

<i>Themisto Gaudichaudii</i> , F. E. GUÉRIN,	}	= <i>Euthemisto Gaudichaudii</i> , F. E. GUÉRIN.
<i>Euthemisto Thomsoni</i> , STEBBING,		
<i>Themisto antarctica</i> , DANA,	}	= <i>Euthemisto antarctica</i> , DANA.
<i>Themisto Guerinii</i> , SPENCE BATE,		
<i>Themisto compressa</i> , A. GOËS,	}	= <i>Euthemisto compressa</i> , A. GOËS.
<i>Themisto bispinosa</i> , A. BOECK,		

And lastly *Euthemisto australis*, STEBBING, which is a little doubtful, seemingly very closely allied to, if not identical with, *Euthemisto antarctica*.

*Euthemisto Gaudichaudii*, in the sense it is taken here, and *E. compressa* are closely related, and agree in many characteristics as well as in general form of body.

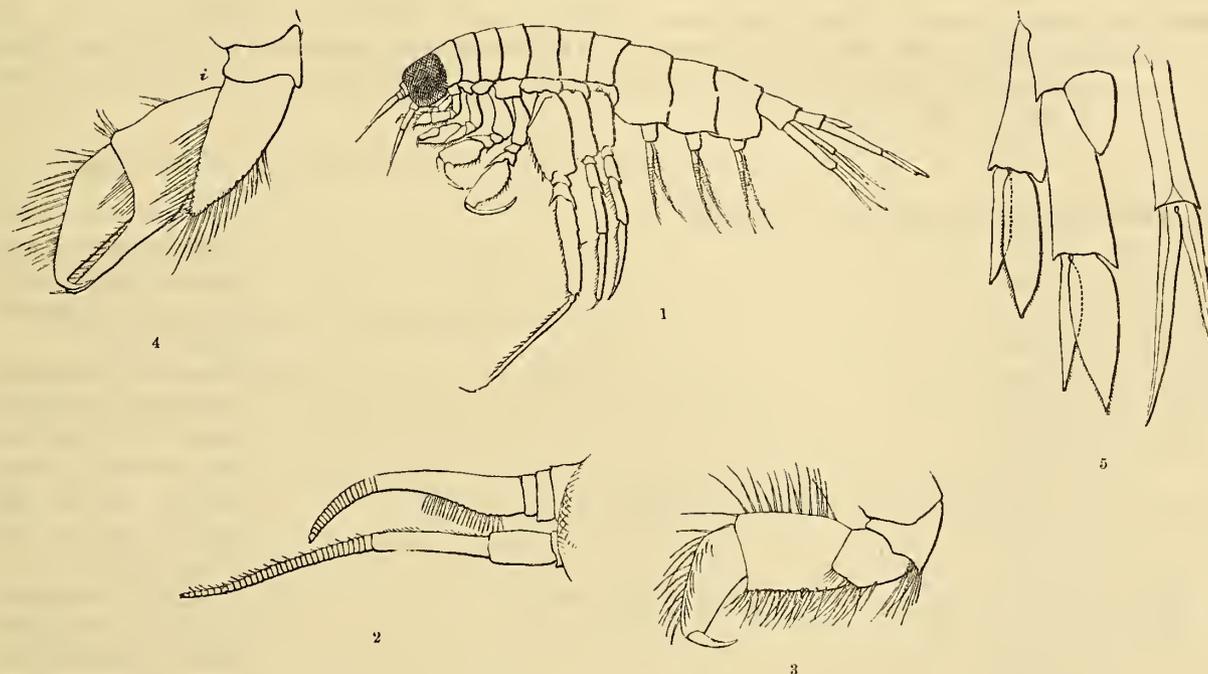
The reasons for the synonymy adopted here will be given under the heads of the corresponding species.

The characteristics which have been found of value for distinguishing the species in the genus are not many, they are:

1. The femur of the last three pairs of peræopoda being broad — or comparatively narrow.
  2. The lower hind corner of the tibia in the fifth pair of peræopoda being more or less produced downwards.
  3. The dactylus of the fifth pair of peræopoda being provided with spine-like teeth on the front margin — or not.
  4. The first pair of uropoda reaching beyond the apex of the second — or not.
  5. The relation between the telson and the peduncle of the last pair of uropoda.
- A.** The femur of the last two pairs of peræopoda is dilated, being about twice as long as broad. The first pair of uropoda reach beyond the apex of the second pair. The telson is fully a third part as long as the peduncle of the last pair of uropoda ..... **1. *E. libellula.***
- B.** The femur of the last two pairs of peræopoda is comparatively narrow, being about three times as long as broad.
- b 1.** The first pair of uropoda reach beyond the apex of the second pair.
    - bb 1.** The inner margin of the inner ramus in the third pair of uropoda is smooth ..... **2. *E. antarctica.***
    - bb 2.** The inner margin of the inner ramus in the third pair of uropoda is pectinated ..... **3. *E. australis.***
  - b. 2.** The first pair of uropoda do not attain the apex of the second pair.
    - bb 3.** The telson is broader than, and more than a fifth part as long as, the peduncle of the last pair of peræopoda ..... **4. *E. Gaudichaudii.***
    - bb 4.** The telson is narrower than, and less than a fifth part as long as, the peduncle of the last pair of uropoda ..... **5. *E. compressa.***
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1. **EUTHEMISTO LIBELLULA**, M. W. MANDT, 1822.

Pl. XII, fig. 1—31.

*Euthemisto libellula*, GOËS.

Facsimile from GOËS. Crust. Amph., pl. 41, fig. 33.

Fig. 1. The animal from the side. 2. The antennæ of a young male. 3. The first pair of pereopoda. 4. The second pair. 5. The urus.

**Diagn.** *Corpus* carinatum. Femur *pedum peræi* parium trium ultimorum dilatatum, duplo longius quam latius. Tibia *pedum quinti* paris post producta, processum formans dimidio stipitis articuli multo longiorem; dactylus spinis margini anteriori affixis instructus. *Pedes uri* primi paris *pedes secundi* paris longe superantes, pedunculus ramo interno brevior; ramus externus *pedum secundi* ac *tertii* parium ramo interno paullo brevior. *Telson* segmento ultimo *uri* paullo brevius, pedunculo *pedum uri* ultimi paris latius, ac tertiam partem longitudinis pedunculi ejusdem superans.

The *body* is carinated. The femur of the last three pairs of *peræopoda* is dilated, being about twice as long as broad. The tibia of the fifth pair is produced at the lower hind corner into a process, which is much more than half as long as the rest of the joint; the dactylus is provided with spine-like teeth on the front margin. The first pair of *uropoda* reach far beyond the apex of the second pair; the outer ramus of the second and third pairs is only a little shorter than the inner. The *telson* is a little shorter than the last

ural segment; it is broader than, and more than a third part as long as, the peduncle of the last pair of uropoda.

**Colour.** Light red to yellowish brown.

**Length.** 20—60 mm.

**Hab.** The Arctic region, off the West coast of Greenland, off Iceland, off Spitzbergen, off the West coast of Novaja Semlja. The Northern temperate region, off the West coasts of Sweden and Norway, off the East coast of England. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1822.** *Gammarus libellula*, M. W. MANDT.

			—	Observationes in Historiam Naturalem et Anatomicam Comparatam in itinere Groenlandico factæ, p. 32.
<i>Themisto</i>	»	»	A. GOËS.	1865. »Crustacea Amphipoda maris Spetsbergiam alluentis, cum speciebus aliis arcticis». Öfvers. af K. Sv. Vet. Ak. Förhandl. f. 1865, p. 533, pl. 41, fig. 33.
»	»	»	A. BOECK.	1870. »Crustacea Amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 87 (7).
»	»	»	»	1872. De Skandinaviske og Arktiske Amphipoder, p. 88, pl. 1, fig. 5.
»	»	»	G. O. SARS.	1882. »Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter». Christiania Vidensk. Selskabs Forhandl. for 1882, N:o 18, p. 20.
»	»	»	»	1886. The Norwegian North Atlantic Expedition, 1876—78. Zoology. Crustacea, 2, p. 37 and 88.
<i>Ethemisto</i>	»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 22.

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| <i>Euthemisto libellula</i> , M. W. MANDT.           | C. BOVALLIUS.     | 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 569, pl. 46, fig. 90—96.   |
| » » »  | H. J. HANSEN.     | 1887. »Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenh., 1887, p. 60.<br>Appendix to the narrative of a second voyage of search of a North West Passage, etc. by Sir John Ross, p. 90. |
| 1835. <i>Themisto Gaudichaudii</i> , (F. E. GUÉRIN). | R. OWEN.          | »Grønlands Amfipoder». Det Kongl. Danske Vidensk.-Selskabs naturhist. og math. Afhandl. Deel 7, p. 291 (63), pl. 4, fig. 16.   |
| 1838. <i>Themisto arctica</i> , H. KROEYER.          | —                 | 1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 85.  |
| » » »  | H. MILNE EDWARDS. | 1862. Catal. Amph. Crust. Brit. Museum, p. 315, pl. 50, fig. 11.   |
| » » »  | SPENCE BATE.      | 1863. »Synopsis of the Marine Invertebrata collected by the late Arctic Expedition, under Dr J. J. Hayes». Proc. of the Acad. of Nat. Sciences of Philadelphia, 1863, p. 139.  |
| » » »  | W. STIMPSON.      | »Grønlands Amfipoder». Det Kongl. Danske Vidensk. Selsk. naturhist. og math. Afhandl. Deel 7, p. 295 (67), pl. 4, fig. 17.   |
| 1838. <i>Themisto crassicornis</i> , H. KROEYER.     | —                 | 1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 85.  |
| » » »  | H. MILNE EDWARDS. | 1862. Catal. Amph. Crust. Brit. Museum, p. 315, pl. 50, fig. 12.   |
| » » »  | SPENCE BATE.      |  |



»Affinis hæc species 1) *Onisco Cicadæ Oth. Fabricii*, a quo tamen differt capitis pedumque forma, colore et magnitudine;

2) *Onisco Medusarum O. Fabricii*, cuius tamen oculi lineares, arcuati, coerulei, lateribus frontis innati, nimis discrepant. Cum hac utraque *Gammarus Libellula* peculiare genus constituat, in familiæ huius descriptione monographica arctius definiendum.

Unicum huius animalculi specimen die vicesimo nono mensis Iunii anni præterlapsi accepi vivum e mari prope Insulam Ian Meyen protractum, plura autem mense insequente mortua in stomacho *Procellariæ glacialis* reperi, integra quidem et digestionem vix læsa, nisi quod pedum subtilissima pubes detrita esset.

Inter hæc iuvenilia quoque, dimidiæ reliquorum magnitudinis, cæterum simillima illis.»

The new species of MANDT and LICHTENSTEIN was however forgotten for many years by carcinologists until A. GOËS in 1865 restituted it as *Themisto libellula*, MANDT. During the interval the species had received new names, as in 1838, *Themisto arctica*, KROEYER, and *Th. crassicornis*, KROEYER, and as early as in 1835 it had been identified with GUÉRIN's *Themisto Gaudichaudii*, thereby being for the first time placed in the genus to which it really belonged. In 1887 I proposed the name *Euthemisto Nordenskiöldi* for animals which I after further researches have found to be only younger and less developed specimens of *Euthemisto libellula*; the characteristics on which the supposed new species was founded have proved to be of no specific value, as they change with the growth of the animal; thus for instance the head is much larger in the young than in the adult animal, the carpal process of the second pair of peræopoda is shorter, and not only the length, but also the shape of the fifth pair, changes with the age.

Owing to its size the adult animal is one of the giants of the group, being inferior only to some species of *Thaumatops*, and, if length be considered, also to *Xiphocephalus armatus*. Some of the species of *Lanceola* approach the extreme length of *Euthemisto libellula*. The females seem to attain a greater size than the males. The largest male I have examined measured 35 mm. in length from the front margin of the head to the apex of the last pair of uropoda. The development of the fifth pair of peræopoda is liable to great individual variation, and this not always in strict relation to the size of the animal, so that we may find large individuals, females as well as males, with this pair comparatively short, and only a little longer than the next; but on the other hand the characteristic features of the fifth pair are at once recognizable, namely the breadth of the femur, the elongated tibial process, the strongly developed carpus, and the bundle of spine-like teeth on the front margin of the dactylus; these features are so constant that we find them even in young ones, a few days or even one day old. This is the reason also why I have maintained the generic distinction between *Euthemisto* and *Parathemisto*. The carpal process of the second pair is somewhat shorter in young specimens than in the adult, but even in the very young it is always more than half as long as the hind margin of the metacarpus.

**The male.**

Pl. XIII, fig. 6—21, and 23—31.

The *body* is less compressed than in the following species, but the peræon is scarcely broader than the first pleonal segment. A distinct median carina runs dorsally from the front margin of the first peræonal segment to the hind margin of the first ural segment, but does never project into angular processes. The integument is thin and homogenous, of an almost vitreous appearance. The head and peræon together are scarcely as long as the pleon and urus together.

The *head* is comparatively smaller than in *Euthemisto compressa*; it is tolerably compressed, but somewhat broader than the first peræonal segment. The upper side is evenly rounded. The antennal groove commences just above the middle of the front side. The under side of the head is feebly rounded.

The *eyes* occupy the whole surface of the head.

The *first pair of antennæ* reach to the hind margin of the first pleonal segment. The first joint of the peduncle is thick, cylindrical, and more than three times as long as the two following joints together; the second joint is fully twice as long as the third. The first joint of the flagellum is elongated, tumid, and tapers evenly from the middle towards the apex; it is not fully twice as long as the whole peduncle, and has the inner side fringed with long olfactory hairs; the second flagellar joint is nearly as long as broad, the third a little longer, the fourth is more than twice as long as broad; the following are much longer, subequal, about seven or eight times as long as broad, and each is provided with three bundles of short, geniculate hairs, three or four in each bundle. The flagellar joints are twenty-eight or thirty in number.

The *second pair of antennæ* are longer than the first, and reach beyond the hind margin of the last pleonal segment. The first free joint of the peduncle is as long as broad; the second is half as long again as the first, and is fringed with hairs along the under margin; the third is quite as long as the two preceding joints together, and has the under margin fringed with hairs. The first joint of the flagellum is shorter than the last peduncular joint, bulbous at the base, whence it gently tapers towards the apex; the second joint is half as long as the first; the third is as long as the second; the following joints are longer, subequal in length, and four or five times as long as broad; the terminal joints are somewhat more slender than those near the base; each joint carries on the under margin some short hairs. The flagellar joints are forty-five or forty-seven in number.

The *labrum* (Pl. XIII, fig. 6) is thick and deeply, but symmetrically, bilobed; the lobes are smooth.

The *mandibles* (Pl. XIII, fig. 7—12) are comparatively longer than those in *Parathemisto*. The incisive lamina is bent inwards, with the margin curved; the two uppermost teeth are very large, the following are much smaller, broad, rounded, but sharp-edged; at the base of the lamina there are tufts of long, hair-like bristles. The accessory

lamina of the left mandible has the apical margin broad and sharply serrated; it is fixed on a disc-like prominence as in *Parathemisto japonica*. The molar tubercle (Pl. XIII, fig. 9) is very broad and thin; the margins are fringed with sharp, broad teeth, and a inner row of broad tubercles, each of which is tipped with a stout, smooth spine (Pl. XIII, fig. 10 and 11). The mandibular palp is long and slender; the first joint is tolerably thick, and cylindrical; the second is more slender, and nearly twice as long as the first; the third joint is more than half as long as the second, and tapers gently towards the apex; the outer margin is densely fringed with minute hairs (Pl. XIII, fig. 12).

The *labium* has the lateral lobes larger, and more irregularly convex, than in *Parathemisto japonica*.

The *first pair of maxillæ* (Pl. XIII, fig. 13 and 14) are very similar to that pair in *P. japonica*. The apical portion of the principal lamina has three curved, strong spines, and is sparingly provided with hair-like bristles. The apical margin of the secondary lamina is fringed with spine-like bristles, and has a strongly projecting tooth at the upper corner (Pl. XIII, fig. 14).

The *second pair of maxillæ* (Pl. XIII, fig. 15 and 16) are thick, and almost tumid. The apical portion of the principal lamina is short, and covered with hair-like bristles. The secondary lamina has two stout spines at the apex, surrounded by long bristles, (Pl. XIII, fig. 16).

The *maxillipeds* (Pl. XIII, fig. 17—21) are very robust. The apex of the basal portion, between the lateral laminae, is thickly covered with long, slender bristles. The lateral laminae are broad at the base, and narrowly angular at the apex; the outer side is strongly convex, and is set with slender bristles; the inner side is concave, and is sparingly provided with bristles; the outer margin is curved, and fringed with four long bristles, the inner margin is straight, and complicately serrated (Pl. XIII, fig. 17). The median lobe projects strongly inwards, rectangularly to the basal portion; it is armed at the apex with two curved spines, and is thickly set with long hairs.

The *peræon*. The suture between the first and second segments is quite distinct, even in the youngest specimens, but the articulation seems to be less perfect than between the other segments, at least at the dorsal side. The first segment is longer than the second, and nearly as long as the third.

The *epimerals* are a little longer than the under margins of the corresponding segments; they are longer than deep, and have the corners rounded.

The *branchial sacks* are broad below, and are considerably shorter than the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda* (Pl. XIII, fig. 23) are considerably shorter than the second. The femur is as long as the three following joints together; it is narrow, and without hairs or bristles. The genu is as long as broad, and has the hind corner thickly set with long, slender bristles. The tibia is scarcely longer than the genu; the hind corner is only a little produced; the hind and under margins are densely set with long, slender bristles. The carpus is long, and only a little dilated; it is longer than the two preceding joints together; the front margin is almost straight, and is fringed with long, slender bristles; the hind margin is feebly curved, notched, and thickly set with bristles.

The metacarpus is a little shorter than the carpus; the front margin is convex, and fringed with bristles; the hind margin is almost straight, finely pectinated, with long, spine-like teeth, and is bordered with bristles. The dactylus is strongly curved, and is finely serrated at the base on the hind margin; it is not half as long as the metacarpus. Glands are developed in all the joints, except the dactylus.

The *second pair* reach fully to the apex of the third. The femur is nearly linear, longer than the three following joints, and has the margins smooth. The genu is broader than long, with long bristles at the lower hind corner. The tibia has the hind part strongly produced, forming a tongue-shaped process, feebly angular at the apex, and reaching almost as far as to the base of the metacarpus; the margins of the process are densely fringed with long, slender bristles. The carpus is only a little dilated; the front margin is feebly curved, and is set with long bristles, the hind margin is smooth; the carpal process is very long and narrow, and is nearly as long as the stem of the joint; the front side is narrowly gouge-shaped, with the margins set with equidistant, spine-like bristles; the apical spine is stout but short, and scarcely a sixth part as long as the process itself. The metacarpus is as long as the stem of the carpus, and a little longer than the front-side of the carpal process; the front margin is convex, and fringed with long bristles; the hind margin is straight, and pectinated, with long, spine-like teeth. The dactylus is like that in the first pair, the glandular opening at the base is unusually large; the dactylus is not fully half as long as the metacarpus.

The *third and fourth pairs* (Pl. XIII, fig. 24) are tolerably similar in form but unequal in length, the fourth being much the longer. The femur is broad, about twice as long as broad, with the hind margin strongly convex and the front margin irregularly concave, each provided with four or six spines near the apex. The genu is longer than broad, and has two or three short bristles on the hind margin. The tibia is longer than the genu; the lower front corner is produced, and armed with three or four spines; the hind margin is armed with four or five spines, and shows between the spines a fringe of soft hairs, which often are curved at the apex. The carpus is ovate, with a deep incision on the hind margin just at the apex; the joint is longer and broader in the adult animals than in the young; the front margin is convex, with three or four short spines and two longer ones at the apex; the hind margin is convex, set with eight or nine equidistant spines, the uppermost being slender and bristle-like, and the margin between them fringed with soft hairs; the four undermost spines are very stout, and between them there is a strong pectination, consisting of long, spine-like teeth. The metacarpus is a trifle shorter than the carpus in the adult males, but fully as long in the younger animals; the hind margin is pectinated; the front margin is convex. The dactylus is stout and curved; it is not half as long as the metacarpus.

The *fifth pair* (Pl. XIII, fig. 25—28) vary a little in length from one individual to another, but are in the adult male usually fully as long as the head, peræon, pleon, and urus together. The femur is considerably broader than that in the sixth pair, and a little broader than that in the seventh; the front margin is concave near the base, with the lower half straight and armed with seven or nine spines; the hind portion of the femur is dilated and laminar in order to protect a part of the leg when folded up, and

thus substituting the usual narrow groove at the hind margin; the hind margin is straight, and without spines; the joint is about twice as long as broad. In the young male the front margin is more regularly convex. The genu is about as long as broad, and has the lower hind corner a little produced. The tibia is somewhat longer than the genu; the front margin is feebly convex, and set with three or four short spines; the lower hind corner is strongly produced downwards, forming a process which in the adult male is fully as long as, or even longer than, the rest of the joint, in the very young animal this process is about two-thirds as long as the stem of the joint. The carpus is enormously developed, being even in the young animal longer than the femur, and in the adult more than half as long again; it is broadest near the base, and is more than five times as long as broad in the adult male, being only three times as long as broad in the very young male; the front margin is armed with a row of twelve to fifteen stout, spine-like bristles, and has between them a fine pectination; the hind margin is feebly notched, and set with some very short spines. The metacarpus is very long and slender, almost rod-like, and fully as long as the three preceding joints together in the adult male; the metacarpus impinges against the front margin of the carpus, forming with it a perfect folding hand; the lower half of the front margin is strongly pectinated, and set with a row of equidistant, spine-like bristles; the long, spine-like teeth forming the pectination, are directed somewhat downwards, and are thus not rectangular to the joint; the hind margin of the metacarpus is entirely smooth. In some specimens I have seen a very short metacarpus, but otherwise like that just described, probably its size depended upon that the joint had been broken and reproduced. In the young the metacarpus is much thicker and shorter, scarcely longer than the carpus, but armed as in the adult animal. The dactylus is feebly curved, stout, and about an eighth part as long as the metacarpus; on the front margin it has a comb-like set of long spines. In the very young animal the entire length of the fifth pair scarcely surpasses the length of the sixth pair with a sixth or seventh part, but even there the femur and the carpus show their characteristic form.

The *sixth, and seventh pairs* (Pl. XIII, fig. 29) are nearly similar in shape, and equal in length; in the adult male they are nearly two-thirds as long as the fifth pair. The femur is scarcely a fifth part shorter than in the fifth pair; that of the sixth pair is less dilated than in the seventh, but is still much broader than in the following species, and only a little more than twice as long as broad; that of the seventh pair is quite twice as long as broad; the front margin is straight, and has three or four spines near the apex; the hind margin is straight, with the upper and lower corners rounded; it is feebly notched, and provided with short spines. The genu is broader than long. The tibia is about three times as long as the genu, and has the lower hind corner strongly produced and tipped with a long bristle; the front margin is straight, and set with long bristles in the seventh pair, in the sixth it has three equidistant spines. The carpus is much longer than the tibia, but scarcely more than half as long as the femur; it is a little broader below than above; the front margin is minutely pectinated, and armed with spines in the sixth pair; in the seventh the front margin is set with long bristles. The metacarpus is feebly curved, and is about as long as the carpus in the young

male, in the adult it is a little longer; the front margin is minutely pectinated, and set with bristles; the hind margin is armed with a few short spines. The dactylus is about a fifth part as long as the metacarpus in the adult male, in the young it is comparatively much longer, being nearly half as long as the metacarpus; it is minutely pectinated at the base of the front margin.

The *pleon* is much longer than the whole peræon, and only a little shorter than the head and peræon together. The under margin of the segments is feebly notched; the hind corner is not produced, but sharp-pointed.

The *pleopoda* (Pl. XIII, fig. 30) are long and slender, the rami are longer than the peduncle; the outer ramus of the first pair has twenty-two joints, the inner twenty; in the very young the number of joints is only the half. The coupling spines are robust with a large head and three sharp, hook-like projections on the stem. The apically dilated arm of the cleft bristle is a little shorter than the other; the basal part is thickly set with long hairs.

The *urus* is quite as long as the last pleonal segment; the first ural segment is considerably longer than the last coalesced, which is a little broader than long, and shows a deep incision on either side for the insertion of the second pair of uropoda.

The *uropoda* (Pl. XIII, fig. 31). The *first pair* reach considerably beyond the apex of the second pair, and nearly to the apex of the third. The peduncle is narrow, linear, nearly seven times as long as broad, and only a trifle longer than the inner ramus; the rami are narrowly elongated, sharp-pointed, and provided with semicircular incisions near the base; the inner ramus is a little broader, and a third part longer, than the outer, it is serrated along the outer margin and smooth on the inner; the outer ramus is serrated along the inner margin and smooth on the outer. In the young the first pair reach beyond the middle of the outer ramus of the third pair. The *second pair* reach beyond the apex of the peduncle of the last pair; the peduncle is broader below than above, about four times as long as it is broad at the apex, and has the lower inner corner produced downwards into a sharp-pointed angle; the peduncle is a trifle longer than the inner ramus, which is lanceolate, sharp-pointed, serrated on both margins, and is twice as broad as, and a about a fourth part longer than, the outer ramus; the outer ramus is serrated along the inner margin and smooth on the outer. In the young the inner ramus is much narrower than in the adult. The peduncle of the *third pair* is broad, linear, three and a half times as long as broad, and has the lower inner corner produced downwards into a sharp angle; it is about a third part longer than the inner ramus, which is lanceolate, serrated on both margins, and is twice as broad as, and a little longer than, the outer ramus; the outer ramus is serrated as in the second pair. In the young the peduncle is almost four times as long as broad, and the rami are narrower than in the adult.

The *telson* is tongue-shaped, considerably longer than broad, and longer than the last ural segment; it is as broad, and not fully half as long, as the peduncle of the last pair of uropoda.

## The female.

Pl. XIII, fig. 1—5, and 22.

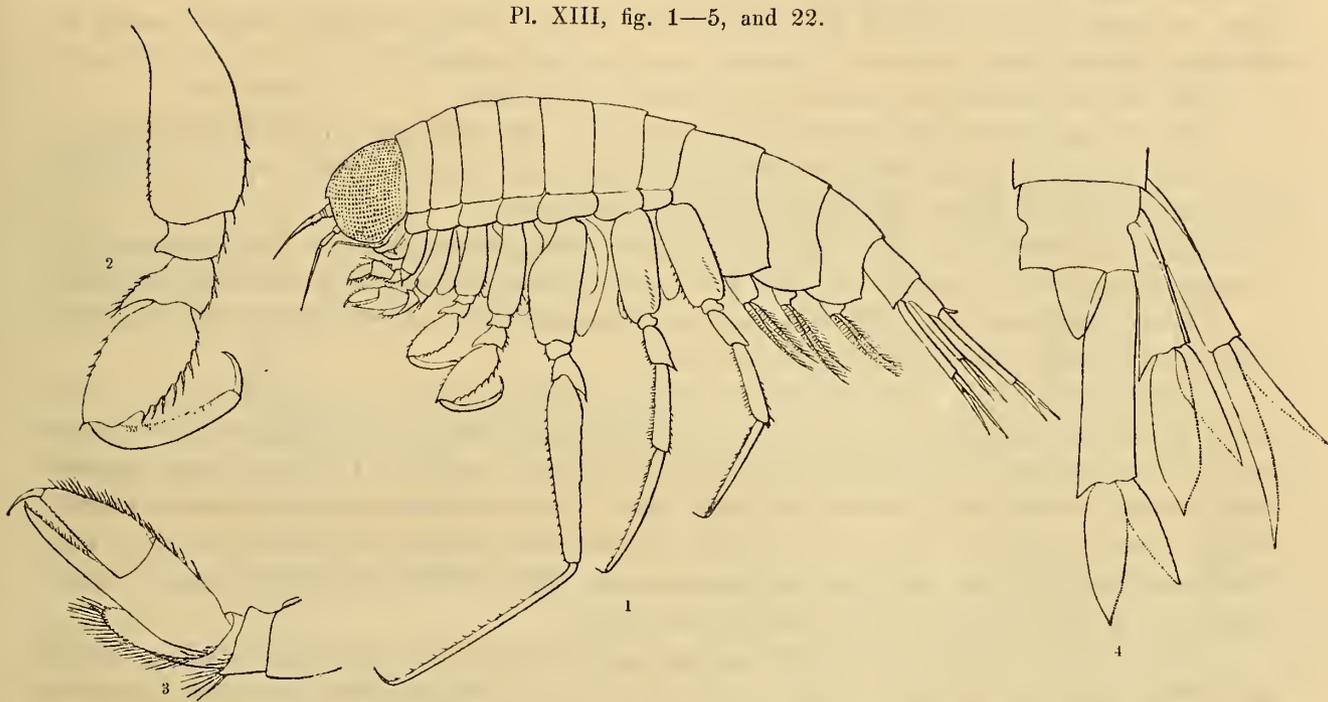
*Ethemisto libellula*, MANDT. Adult female.Copy from C. BOVALLIUS, *Arct. and Antarct. Hyper.*, pl. 46, fig. 90, 93, 94 and 96.

Fig. 1. The female from the side. 2. The second pair of peræopoda. 3. The third pair. 4. The urus.

The *body* is somewhat broader than in the male, the peræon being a little broader than the head, and nearly twice as broad as the pleon. The head and peræon together are considerably longer than the pleon and urus together. The body is distinctly carinated dorsally.

The *head* is quite as long as deep, and somewhat broader than long; it is not fully as long as the first three peræonal segments together. The young female has the head comparatively larger, and considerably deeper, than the peræon, but still it is shorter than the first three peræonal segments together.

The *first pair of antennæ* (Pl. XIII, fig. 1—4) in the adult female are quite as long as the head, and consist of a three-jointed peduncle and a single flagellar joint. The first joint of the peduncle is longer than the two following together. The single flagellar joint is nearly four times as long as the whole peduncle; it is evenly curved, and coarsely serrated along the under margin; the inner side is densely set with long hairs (Pl. XIII, fig. 1). In the young female the first pair of antennæ are much shorter than the head, and the single flagellar joint is short, irregularly conical, and scarcely longer than the peduncle (Pl. XIII, fig. 4).

The *second pair of antennæ* (Pl. XIII, fig. 5) are longer than the first pair; the third peduncular joint is fully as long as the two preceding together. The single flagellar joint is straight, slender, and tapers feebly towards the apex; it is twice as long as the whole peduncle, and is fringed with short hairs on the under margin. In the young female the flagellar joint is scarcely longer than the peduncle.

The *mouth-organs* are exactly like those in the male.

The dorsal line of the *peræon* is very convex; the fifth segment is the longest.

The *epimeral* of the fifth pair of peræopoda is the longest, while the preceding decrease anteriorly in length and the following posteriorly.

The *branchial sacks* (Pl. XIII fig. 22) are about half as long as the femora of the corresponding pairs of peræopoda, and are broad, almost truncated at the apex.

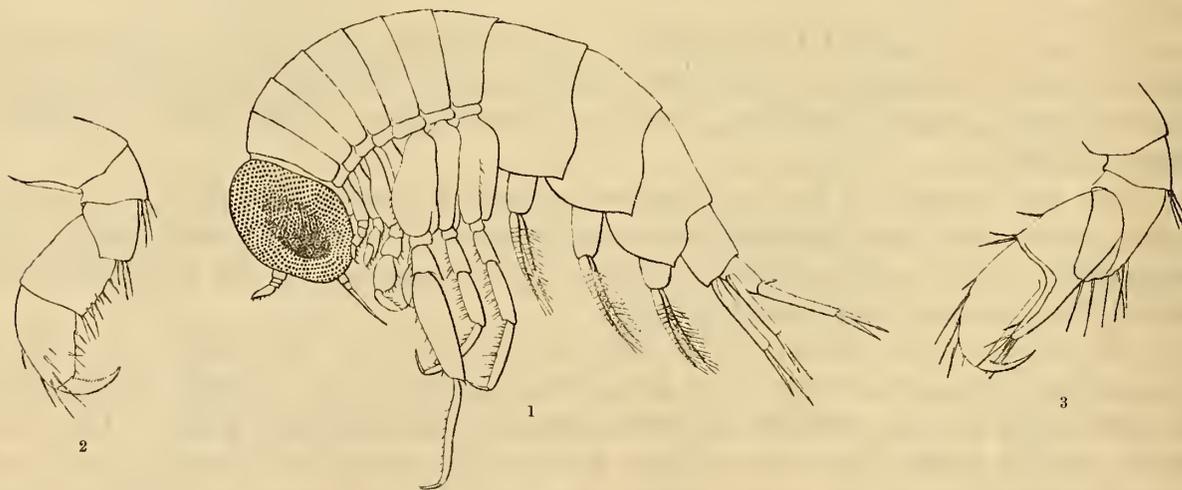
The *ovitetrices* (Pl. XIII fig. 22) are elongate-ovate, narrow at the apex, and are considerably longer than the branchial sacks.

The *peræopoda* (p. 291, fig. 2 and 3) are closely similar to those in the male; in the young female the carpal process of the second pair does not reach to the apex of the metacarpus, but is still much more than half as long as the hind margin of the metacarpus; also the tibial process in this pair, and in the fifth pair, is less produced than in the adult animal, though more produced than, for instance, in the adult animal of *Ethemisto compressa*. Sometimes the dactylus, and even the metacarpus, of the sixth and seventh pairs is transformed for giving outlet to the glandular secretion.

The *pleon* is not fully as long as the last five peræonal segments together, and is distinctly carinated; the hind corner of the segments is sharp-pointed, but not produced.

The *urus* is a little longer than the last pleonal segment in the adult female, in the young it is somewhat shorter.

The *uropoda* (p. 291, fig. 4) are like those in the male.



*Ethemisto libellula*, MANDT. Young female.

Copy from C. BOVALLIUS, Arct. and Antarct. Hyper., pl. 47, fig. 104, 107, and 108.

Fig. 1. The animal from the side. 2. The first pair of peræopoda. 3. The second pair.

## Measurements

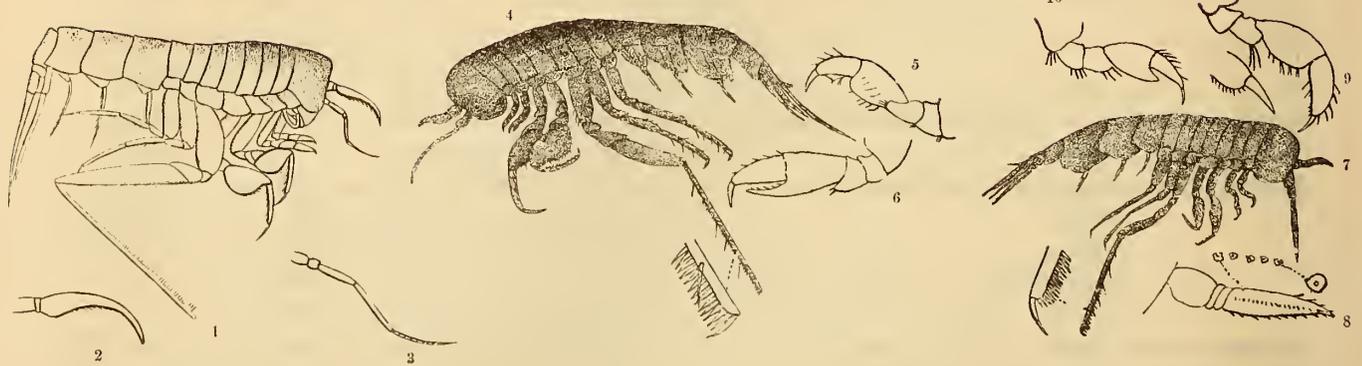
of A, an adult female, 50 mm. long, and of B, a young female, 10 mm. long.

	A.	B.
Length of the first pair of antennæ.....	5 mm.	0,6 mm.
» » the second » » .....	6,2 »	1 »
Length of the head.....	5 »	1,3 »
Depth » » .....	5 »	1,8 »
Breadth » » .....	6 »	1,3 »
Length of the peræon .....	16 »	4 »
Height » » » (at the fifth segment).....	8 »	1,9 »
Breadth » » » .....	8 »	1,8 »
Length of the second pair of peræopoda.....	7,5 »	1,3 »
» » » third » » .....	12,5 »	2,3 »
» » » fifth » » .....	35 »	4,6 »
» » » seventh » » .....	22,5 »	3,8 »
» » » pleon.....	12 »	3,4 »
Breadth of the pleon.....	4,5 »	1,1 »
Length of the first pair of pleopoda.....	9,2 »	2,3 »
» » » urus.....	6 »	1,3 »
» » » first pair of uropoda.....	11,5 »	2,2 »
» » » second » » .....	8,5 »	1,7 »
» » » third » » .....	10 »	1,9 »
» » » telson.....	3 »	0,5 »

Length of the femur of the fifth pair of peræopoda.....	7,5 »
Breadth » » .....	3,5 »
Length » » genu » » .....	1 »
» » » tibia <sup>1)</sup> » » .....	1,5 »
» » » carpus » » .....	10,5 »
» » » metacarpus » » .....	13 »
» » » dactylus » » .....	1,5 »
» » » femur » » seventh » » .....	6,2 »
Breadth » » .....	3,1 »
Length » » genu » » .....	1 »
» » » tibia » » .....	2,7 »
» » » carpus » » .....	5 »
» » » metacarpus » » .....	7 »
» » » dactylus » » .....	1 »
» » » peduncle » » first pair of pleopoda.....	4 »
» » » ramus » » .....	5 »
» » » peduncle » » .....	6 »
» » » .....	4,2 »
» » » .....	6 »

<sup>1)</sup> Without the process.

## 2. EUTHEMISTO ANTARCTICA, J. D. DANA, 1852.

*Themisto antarctica*, DANA.*Themisto antarctica*, DANA.*Themisto Guerinii*, SPENCE BATE.

Facsimile from DANA. U. S. Expl. Exp. Crust., pl. 69, fig. 1.

Facsimile from SPENCE BATE. Cat. Amph. Crust. Brit. Museum, pl. 50, fig. 8.

Facsimile from SPENCE BATE. Cat. Amph. Crust. Brit. Museum, pl. 50, fig. 9.

Fig. 1. The animal from the side.  
2. The first pair of antennæ.  
3. The second pair.

Fig. 4. The animal from the side. 5. The first pair of peræopoda. 6. The second pair.

Fig. 7. The animal from the side. 8. The first pair of antennæ. 9. The first pair of peræopoda. 10. The second pair.

**Diagn.** *Corpus* carinatum. Femur pedum peræi parium trium ultimorum modice dilatatum, plus quam duplo longius quam latius. Tibia pedum quinti paris quam genu duplo longior, post producta, processum formans dimidio stipitis articuli multo brevior; dactylus levis. Pedes uri primi paris pedes secundi paris superantes; pedunculus ramo interno longior; ramus externus pedum secundi ac tertii parium ramo interno paullo brevior. Telson dimidio segmenti ultimi uri paullo longius, pedunculam pedum uri ultimi paris latitudine æquans, ac quarta parte longitudinis pedunculi ejusdem brevior.

The *body* is carinated. The femur of the last three pairs of *peræopoda* is moderately dilated, being more than twice as long as broad. The tibia of the fifth pair is twice as long as the genu; the lower hind corner is produced into a process, which is much shorter than half the rest of the joint; the dactylus is smooth. The first pair of *uropoda* reach beyond the apex of the second pair; the peduncle is longer than the inner ramus; the outer ramus of the second and third pairs is a little shorter than the inner. The *telson* is a little more than half as long as the last ural segment; it is as broad, and less than a fourth part as long, as the peduncle of the last pair of *uropoda*.

**Colour.** Brownish red.

**Length.** 15—25 mm.

**Hab.** The Antarctic region; the Southern temperate regions of the Atlantic, of the Indian Ocean, and of the Pacific. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn. 1852.</b>	<i>Themisto antarctica</i> ,	J. D. DANA.	—	United States Exploring Expedition. Crustacea. Vol. 2, p. 1005, pl. 69, fig. 1.
»	»	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 312, pl. 50, fig. 8.
»	»	»	G. M. THOMSON.	1879. »New Zealand Crustacea». Trans. and Proc. of the New Zealand Institute. Vol. 11, p. 243, pl. 10 D, fig. 2—3.
	<i>Euthemisto antarctica</i> ,	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 22.
	»	»	»	1887. »Arctic and Antarectic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 570.
<b>1862.</b>	<i>Themisto Guérinii</i> ,	SPENCE BATE.	—	Catal. Amph. Crust. Brit. Museum, p. 313, pl. 50, fig. 9.
<b>1888.</b>	<i>Euthemisto Gaudichaudii</i> ,	(F. E. GUÉRIN.)	TH. STEBBING.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1410, pl. 172 and 173.

*Euthemisto antarctica*, DANA, and *E. Gaudichaudii*, GUÉRIN, are closely allied, and are less easily distinguished from one another than the two Northern forms; the best distinguishing mark is however the relation between the length of the first and second pairs of uropoda.

The original description given by DANA in 1852 runs:

»Superior antennæ longer than the head, nearly naked, three-jointed, two basal joints small, the third long and acuminate; inferior pair longer and very slender, base four-jointed, third and fourth joints slender, fourth longer, flagellum a little longer than fourth joint. Third and fourth pairs of feet prehensile, hand broad, triangulato-subovate, finger slender, longer than hand, claw nearly straight. Fifth pair rather stout, coxa large, next two joints short, fourth long, stout, fifth longer than three preceding together. Sixth and seventh subequal and slender. Caudal stylets very long. — — — Thoracic segments seven, subequal. Fifth abdominal segment very short. Last segment quite small, triangular. Terminal caudal stylets longest, nearly as long as abdomen, first pair longer than second, but not extending as far back as third pair. Antennary area rather small, broader above, occupies more than half the height of the head, and less than half its width. Two anterior pairs of legs are cylindrical towards apex and pointed, fifth joint longer than fourth, and fourth longer than third; at apex a few long setæ. The hand in third and fourth pairs has a few very short setæ on the palm, and the finger one or two minute setæ on the inner side. The long tarsus or finger of fifth pair appeared to have a minute claw at apex. The sixth and seventh pairs are rather long and nearly equal; there are several short spines on inner margin of fourth joint, besides a few on the other joints. The third pair of abdominal legs is smaller than the preceding.»

The description of *Themisto antarctica* given by SPENCE BATE in 1862 agrees tolerably well with that of DANA, and as the characteristics respecting the uropoda positively agree I think that SPENCE BATE was right in his determination. I quote only the last passages of his description:

»— — Ultimate pair of pleopoda having the peduncle more than four times the length of the telson, and the rami half as long as the peduncle, with the margins scarcely serrated; penultimate pair reaching a little beyond the extremity of the peduncle of the ultimate; antepenultimate reaching a little further than the extremity of the penultimate. Telson lanceolate.»

In the same publication SPENCE BATE briefly described a supposed new species *Themisto Guerinii*, saying that the uniarticulate flagellum of the second pair of antennæ »is one of the chief distinctions» from *Th. antarctica*. After giving some further distinctions, which easily are explained from the difference in age of the two specimens, he says:

»The rest of the animal corresponds with the description given of *T. antarctica*. In fact, the species so much resemble each other, that, had not their respective size and locality been very distinct, they probably would have been passed over as varieties of the same.»

I have examined specimens in the collection of the »Musée d'Histoire naturelle» in Paris labelled: »*Themisto — Latitude de la Plata — L'Astrolabe. (63)*», without doubt the very type specimens of the British author; they were in a bade state, but proved clearly to be females and young males of *Ethemisto antarctica*, after my diagnosis above; and of this reason I have put *Th. Guerinii* as a synonym for *Ethemisto antarctica*, DANA.

In 1879 GEO. M. THOMSON described *Themisto antarctica* from the sea off New Zealand, and nothing in his description goes against his view that the animal in question is identical with DANA's species. His description closely agrees with that given by SPENCE BATE.

In 1888 STEBBING identified one of the species represented in the »Challenger» collection with that described by THOMSON, and gave to it the new name *Ethemisto Thomsoni*. In my opinion STEBBING was not right in this identification, and overlooked that his *E. Gaudichaudii* was the same species as the *Themisto antarctica*, described by THOMSON, and thus, according to my opinion, the true *Ethemisto antarctica*, DANA. STEBBING'S *E. Thomsoni*, on the other hand is considered here to be identical with the true *Ethemisto Gaudichaudii*, GUÉRIN. The chief characteristic which induced STEBBING to deny the identity of THOMSON'S species with DANA'S was the statement of the former author that the body is dorsally carinated in the adult animals, which characteristic DANA does not mention, but in all the older specimens of all the species which I have examined, namely *Ethemisto libellula*, *E. antarctica*, *E. Gaudichaudii*, and *E. compressa*, the body is dorsally carinated. The development of this carina is however very varying from one individual to another within *each* species, and is usually less distinct in an ovigerous female than in a male of the same size. This feature has thus in my opinion no value at all for specific distinction. A comparison of the diagnoses, given in this treatise for *Ethemisto antarctica* and *E. Gaudichaudii*, with the descriptions and drawings given by STEBBING for *E. Gaudichaudii* and *E. Thomsoni* will support, I hope, my views as to the synonymy adopted here.

As the drawings given by STEBBING l. c. pl. 172 of an elder, but not fully adult, male, and pl. 173 of a younger one, are very good, I find it unnecessary to publish my

own, and as his description is detailed I can restrict myself to give only a few complementary notices.

The *head* and *peræon* together are a little longer than the *pleon* and *urus* together.

The *head* is deeper than long, and about as broad as long.

The *first pair of peræopoda* have a strong bristle at the middle of the hind margin of the metacarpus.

The *second pair* are much longer than the first. The tibial process is about half as long as the stem of the carpus. The carpal process is more than half as long as the hind margin of the metacarpus, and wants a terminal spine.

The *third and fourth pairs* have the femur considerably narrower than in *Euthemisto libellula*, being about two and a half times as long as broad. The tibia is scarcely longer than the genu, and is only a little produced at the lower front corner. The carpus in the adult animal is irregularly triangular; the front margin is smooth; the hind margin is set with long bristles, and is pectinated. The metacarpus is about as long as the carpus.

The *fifth pair* have the femur moderately broad, being only a little more than twice as long as broad; the front margin is strongly convex, and set with bristles. The tibia is twice as long as the genu, and has the lower hind corner only a little produced, the process being scarcely a third part as long as the rest of the joint. The carpus is nearly twice as long as the femur, and is about five times as long as broad; the front margin is set with equidistant, spine-like bristles, and irregularly pectinated between them; the hind margin has a few spine-like bristles on its lower half. The metacarpus in the adult animal is very long and slender, only a little shorter than all the preceding joints together; the long, spine-like teeth forming the pectination on its lower half are almost rectangular to the joint, in the young animal they are directed a little downwards. The dactylus is smooth, and is about a twelfth part as long as the metacarpus.

The *sixth and seventh pairs*. The femur is moderately dilated, being about two and a half times as long as broad; it is considerably shorter than that in the fifth pair. The tibia is nearly three times as long as the genu. The carpus is about twice as long as the tibia, and only a little shorter than the femur; the front margin is finely pectinated, and set with equidistant, long bristles; the hind margin is armed with long bristles. The metacarpus is much longer than the carpus, and is a little longer in the seventh pair than in the sixth; the front margin is finely pectinated, and carries a row of long bristles on the side. The dactylus is nearly a fourth part as long as the metacarpus in the adult animal.

The *pleon* is longer than the last six *peræonal* segments in the male, in the female it is considerably shorter. The hind corner of the *pleonal* segments is sharp-pointed but not produced.

The *urus* is nearly as long as the last *pleonal* segment.

The *uropoda*. The *first pair* reach considerably beyond the apex of the second pair, but do not reach fully to the middle of the outer ramus of the third; the peduncle

is narrow, linear, and is considerably longer than the inner ramus, which is about a fourth part longer than the outer. The *second pair* reach only a little beyond the apex of the peduncle of the third pair; the peduncle is broad, about three times as long as it is broad at the apex; the lower inner corner is scarcely produced; the inner ramus is shorter than the peduncle, and about a third part longer than the outer ramus. The peduncle of the *third pair* is broad, linear, with the lower inner corner not produced; it is more than four times as long as broad, and about a third part longer than the inner ramus, which is a little longer than the outer, and has the inner margin smooth.

The *telson* is triangular, with curved margins, as long as broad, and considerably shorter than the last ural segment; it is nearly as broad, and scarcely a fourth part as long, as the peduncle of the last pair of uropoda.

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### 3. EUTHEMISTO AUSTRALIS, TH. STEBBING, 1888.

**Diagn.** Tibia *pedum perai* quinti paris quam genu plus quam duplo longior, post producta, processum formans dimidio stipitis articuli multo brevior; dactylus longus, levis. *Pedes uri* primi paris pedes secundi paris superantes(?); pedunculus ramo interno paullulo longior; ramus externus pedum secundi ac tertii parium ramo interno multo brevior. *Telson* tertia parte longitudinis pedunculi pedum uri ultimi paris brevior.

The tibia of the fifth pair of *peruopoda* is more than twice as long as the genu; the lower hind corner is produced, forming a process which is much shorter than half the rest of the joint; the dactylus is long and smooth. The first pair of *uropoda* reach beyond the apex of the second pair(?); the peduncle is only a little longer than the inner ramus; the outer ramus of the second and third pairs is much shorter than the inner. The *telson* is shorter than a third part of the peduncle of the last pair of uropoda.

**Colour.** ?

**Length.** »About a quarter of an inch.» (STEBBING.)

**Hab.** »South-west of Melbourne, Lat. 39° 45' S., Long. 140° 40' E.; surface.» (STEBBING.)

**Syn.** 1888. *Ethemisto australis*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1417.

As STEBBING in his description does not record some features, important for the specific distinction, and as he does not give any drawings, it is impossible to say anything at present of the value of the species. For further knowledge on the matter I refer the reader to STEBBING'S work quoted above.

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4. **EUTHEMISTO GAUDICHAUDII**, F. E. GUÉRIN, 1825.

Pl. XIII, fig. 44—46.

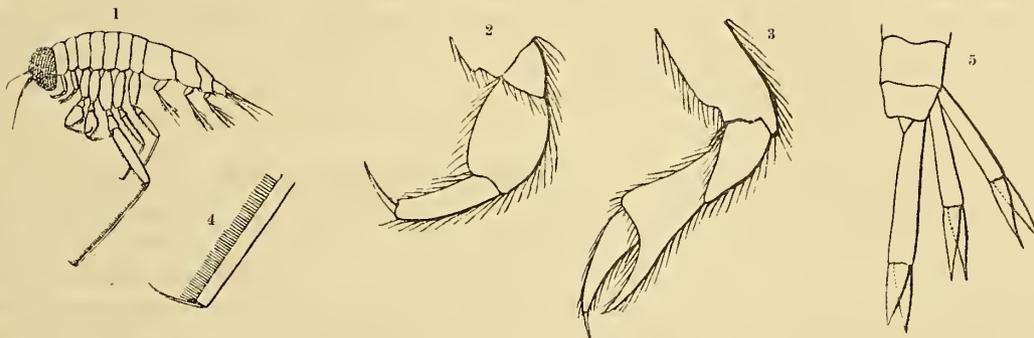
*Ethemisto Gaudichaudii*, GUÉRIN.Facsimile from GUÉRIN, Mém. Soc. Hist. nat. Tome 4<sup>me</sup>, pl. 25, C, fig. 1.

Fig. 1. The animal from the side. 2. The first pair of pereopoda. 3. The second pair. 4. The fifth pair. 5. The urus.

**Diagn.** *Corpus* carinatum, interdum serratum. Femur *pedum perævi* parium trium ultimorum angustum, ter longius quam latius. Tibia pedum quinti paris quam genu plus quam duplo longior, post paullulo producta; dactylus levis. *Pedes uri* primi paris pedes secundi paris non superantes; pedunculus ramo interno longior; ramus externus pedum secundi ac tertii parium dimidio rami interni paullo longior. *Telson* segmento ultimo uri paullo brevius, pedunculo pedum uri ultimi paris latius ac quartam partem longitudinis pedunculi ejusdem fere æquans.

The *body* is carinated, and sometimes serrated. The femur of the last three pairs of *peræopoda* is narrow, three times as long as broad. The tibia of the fifth pair is more than twice as long as the genu; the lower hind corner is only a little produced; the dactylus is smooth. The first pair of *uropoda* do not attain the apex of the second pair; the peduncle is longer than the inner ramus; the outer ramus of the second and third pairs is a little more than half as long as the inner. The *telson* is a little shorter than the last coalesced ural segment; it is broader than, and not fully a fourth part as long as, the peduncle of the last pair of *uropoda*.

**Colour.** Red, or light red, with the rami of the *uropoda* deep red.

**Length.** 15—33 mm.

**Hab.** The Antarctic regions; the Southern temperate regions (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1825.** *Themisto Gaudichaudii*, F. E. GUÉRIN.

— «Uroptère». Encyclopédie Méthodique. Histoire naturelle. Tom 10<sup>me</sup>, p. 774.

- Themisto Gaudichaudii*, F. E. GUÉRIN. — 1828. »Mémoire sur le nouveau genre *Thémisto*, de la classe de Crustacés». Mémoires de la Soc. d'Hist. nat. de Paris. Tome 4<sup>me</sup>, p. 384, pl. 25, C, fig. 1—17.
- » » » H. MILNE EDWARDS. 1830. »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés Amphipodes». Ann. des Sciences nat. Tome 20<sup>me</sup>, p. 393.
- » » » F. E. GUÉRIN-MÈNEVILLE. 1836. Iconographie du Règne Animal de G. Cuvier. Crustacés, p. 25, fig. 7.
- » » » H. LUCAS. 1839. »*Thémisto*». Dictionnaire pittoresque d'Histoire naturelle. Tome 9<sup>me</sup>, p. 397, pl. 688, fig. 2.
- » » » H. MILNE EDWARDS. 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 84.
- » » » H. LUCAS. 1851. Histoire naturelle des Crustacés, des Arachnides et des Myriapodes, p. 235, pl. 18, fig. 5.
- » » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 314, pl. 50, fig. 10.
- Euthemisto Gauchaudii*, » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 21.
- » » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vet. Iakktagelser. Bd. 4, p. 568.
1888. *Euthemisto Thomsoni*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1414, pl. 174 and 175.

*Euthemisto Gaudichaudii* was very incompletely described by GUÉRIN, with regard to the specific distinction. The short diagnosis runs:

»Th. corpore elongato, luteo; capite globoso; antennis inferioribus longioribus; pedibus inæqualibus, quinto pari longissimo; caudæ appendicibus planis, ciliatis».

From his generic description only meagre notices are to be had for the distinction of this species from its congeners. The following may be quoted:

»Sa tête est aussi longue que large, arrondie. — — — La troisième pair (= the fifth pair of peræopoda) est la plus extraordinaire; elle est au moins trois fois plus longue que les pre-

mières: son premier article est aussi long que les trois premières des pattes précédentes; il a à peu près la même forme. Le second est très-court, plus large à son extrémité; il donne insertion au troisième (= carpus) qui est de la longueur des deux premières réunies, presque aussi large dans toute sa longueur. Le quatrième (= metacarpus) est beaucoup plus étroit, presque aussi long que les précédens réunis, aplati, de la même grosseur dans toute sa longueur; il est armé en dedans, ou du côté qui regarde la tête, d'un range d'épines d'égale largeur, perpendiculaires, et qui lui donnent l'aspect d'un long peigne; le dernier article ou le tarse est très-petit et en forme d'ongle ou de crochet. — — — L'abdomen est composé de cinq segmens; les trois premiers sont grands, dilatés sur les côtés, repliés en dessous, et terminés postérieurement et de chaque côté par une petite épine. — — — Le quatrième article donne insertion postérieurement à deux appendices aplatis, composés d'un article basilaire ayant le double de sa longueur et portant à son extrémité deux lames aiguës.»

In 1839 H. LUCAS gave an extract of GUÉRIN'S description.

In 1840 H. MILNE EDWARDS gave a fresh description of the species. The following passages are to be recorded:

»Les pates des deux premières paires sont petites. Les premières se terminent par un ongle styloforme, et les secondes par une petite main didactyle très-imparfaite. Le bord postérieur et inférieur de l'antépénultième article de celles des deux paires suivantes, est armé d'une rangée d'épines assez fortes. L'avant-dernier article des pates de la cinquième paire est beaucoup plus long que les précédens, grêle, cylindrique et garni sur le bord antérieur d'un grand nombre de petites pointes, fines, allongées et placées perpendiculairement les unes a côté des autres comme les dents d'un peigne.»

In the precious collection of Hyperids from the »Musée d'Histoire naturelle» in Paris so generously intrusted to me for examination by Professor ALPHONSE MILNE EDWARDS there is a glass marked simply: »*Thémisto, Les Malouines*», and containing a male and three female specimens, which are the types for the description I am going to give below. Of course I am not able to ascertain that one of them is the type specimen of GUÉRIN, but it seems very likely that they are taken at the same occasion as his specimen, and that they are the types for the independent description given by H. MILNE EDWARDS in 1840, as there are no other specimens from this locality in the collection. Moreover the few specific characteristics which are to be picked out from GUÉRIN'S description agree with these specimens. There is also in the same collection another glass containing many individuals of the present species taken by Mr. REVEILLÈRE some twenty degrees West of the Falkland Islands. Of the other Southern species *Euthemisto antarctica* this collection contains no specimens from the Southern Atlantic, except the above (p. 296) recorded specimens of »*Themisto Guerinii*», taken at the latitude of La Plata. Thus I think that I have good reasons for supposing the present species to be the true *Euthemisto Gaudichaudii*, GUÉRIN.

#### The male.

Pl. XIII, fig. 44—46.

The *body* is dorsally carinated, often showing projecting, sharp-pointed angles at the hind margin of the last three peræonal segments and of all the pleonal. The head and peræon together are nearly as long as the pleon and urus together.

The *head* is less rounded than in *Euthemisto libellula* and *E. antarctica*, with the front margin almost obliquely truncated, and the under margin thus being very short. The antennal groove is broader above than below.

The *first pair of antennæ* are very short, and reach a little beyond the hind margin of the fourth peræonal segment. The first joint of the peduncle is half as long again as the two following joints together. The first joint of the flagellum is tumid, with the upper margin strongly convex; it is more than twice as long as the whole peduncle; the second joint is very short, broader than long; the third is somewhat longer than broad; the fourth is as long as the two preceding together; the fifth, sixth, and seventh joints increase in length; the following are longer, and are subequal in length; the last joint is ten times as long as broad. The flagellar joints are thirteen in number.

The *second pair of antennæ* are longer than the first, and reach beyond the hind margin of the last peræonal segment. The second peduncular joint is longer than the first; the third is as long as the two preceding together. The first joint of the flagellum is somewhat shorter than the last peduncular joint; the second and third are short; the following are longer, subequal in length; the last four decrease slowly in length; the last joint is eight times as long as broad. The flagellar joints are twenty in number.

The *mouth-organs* are like those in *Euthemisto libellula*.

The *peræon*. The first segment is much longer than the second; the seventh is the longest of all. The dorsal carina is very distinct, and in adult males it is usually projecting in a small angle on the fifth segment and in a larger on the sixth and seventh.

The *epimerals* are not deep; that of the fifth pair is about four times as long as deep.

The *branchial sacks* are comparatively larger than in *Euthemisto libellula*; they are broadest at the middle.

The *first pair of peræopoda*. The femur is almost linear, and is considerably longer than the three following joints together. The produced lower part of the tibia is emarginate, showing a small projection, and is fringed with long bristles. The carpus is longer than the two preceding joints together, and has the front margin set with long hairs, and the hind margin notched and armed with long bristles. The metacarpus is fully as long as the carpus; the convex front margin is fringed with long, hair-like bristles; the hind margin is serrated, and has a single stout bristle a little below the middle. The dactylus is curved, and more than half as long as the metacarpus.

The *second pair* ((Pl. XIII, fig. 44) are only a trifle longer than the first. The femur is a little shorter than the four following joints together. The tibial process is emarginate at the apex, and is more than half as long as the stem of the carpus in the adult male, a little shorter in the young, and is thickly set with long bristles. The carpal process in the adult male is nearly as long as the hind margin of the metacarpus, and is provided with a terminal spine; in the young it is shorter, but still more than half as long as the metacarpus. The metacarpus is as long as the stem of the carpus, and has the front margin densely set with long, hair-like bristles; the hind margin is finely pectinated. The dactylus is almost straight, and is half as long as the metacarpus.

The *third and fourth pairs* (Pl. XIII, fig. 45). The femur is narrow, about three times as long as broad, and nearly as long as the three following joints together. The genu is as long as broad. The tibia is twice as long as the genu, and has the lower front corner only a little produced. The carpus is about half as long again as it is broad, a little narrower in the young, and has the hind margin faintly pectinated and armed with long bristles. The metacarpus is thick and stout, and fully as long as the carpus; the hind margin is pectinated; along the side runs a row of long, hair-like bristles. The dactylus is long and stout, about half as long as the metacarpus.

The *fifth pair* (Pl. XIII, fig. 46) are very long in the adult male, longer than the head, peræon, pleon, and urus together. The femur is almost linear, with the front margin only feebly convex, and notched; it is about three times as long as broad. The genu is a little longer than broad. The tibia is twice as long as the genu, and has the lower hind corner only faintly produced; the front margin is finely pectinated, and set with short spines. The carpus is only slowly tapering towards the apex; it is longer than the femur, and nearly five times as long as broad at the middle; the front margin is pectinated, and set with equidistant spines; the hind margin is feebly notched, and armed with a few very short spines. The metacarpus in the adult male is perfectly straight, rod-like, and much longer than the three preceding joints together; the lower half of the front margin is pectinated, the long, slender, spine-like teeth forming the pectination are set rectangularly to the joint; in the young the metacarpus is much shorter, curved, and having the teeth of the pectination directed somewhat downwards; along the front margin there is a row of bristles, like those in the preceding species. The dactylus is smooth, curved, and about a fifteenth part as long as the metacarpus in the adult male, and comparatively much longer in the young.

The *sixth and seventh pairs*. The femur is narrow, linear, and more than three times as long as broad. The genu is as long as broad. The tibia is three times as long as the genu; the front margin is armed with short spines; the hind margin is almost smooth; the lower hind corner is only faintly produced. The carpus is much longer than the tibia, but not twice as long; the front margin is set with longer and shorter spines; the hind margin has a few minute spines. The metacarpus is stout, strongly curved, longer than the femur, and nearly as long as the three preceding joints together; the front margin in the sixth pair is minutely pectinated, and armed with spines; in the seventh pair there are only spines; the hind margin carries some spines. The dactylus is smooth, and about a sixth part as long as the metacarpus.

The *pleon* is longer than the peræon; the under margin of the segments is serrated, and the hind corner is produced into a short spine-like process.

The *pleopoda*. The outer ramus of the first pair has eighteen joints, the inner sixteen.

The *urus* is longer than the last pleonal segment; the first ural segment is only a little longer than the last coalesced, which is a little broader than long.

The *uropoda*. The *first pair* do not attain the apex of the second pair, and reach a trifle beyond the apex of the peduncle in the last pair; the peduncle is narrow, linear, more than seven times as long as broad, and is considerably longer than the inner ramus,

which is more than a third part longer than the outer; the inner ramus is serrated on the inner margin. The *second pair* reach nearly to the apex of the outer ramus in the last pair; the peduncle is broad, somewhat broader below than at the base, with the lower inner corner a little projecting and sharp-pointed; it is about three and a half times as long as it is broad at the apex, and is a little longer than the inner ramus, which is much broader, and somewhat more than a third part longer, than the outer ramus; the rami are serrated as in the first pair. The peduncle of the *third pair* is broad, linear, about five times as long as broad, and has the lower inner corner a little projecting and sharp-pointed; it is a little more than a third part longer than the inner ramus, which is a third part longer than the outer; both rami are serrated as in the first pair.

The *telson* is triangular, with feebly curved margins, and is somewhat more than half as long as the last coalesced ural segment; it is about as broad, and nearly a fourth part as long, as the peduncle of the last pair of uropoda.

### The female.

The *body*, especially the peræon, is a little broader than in the male. The dorsal carina is always distinct, but the projecting angles of the last peræonal, and of the pleonal, segments are often less conspicuous, at least in young, and also in ovigerous females. The head and peræon together are much longer than the pleon and urus together.

The *first pair of antennæ* are about as long as the head. The first peduncular joint is half as long again as the two following together; the single flagellar joint is robust, more than three times as long as the whole peduncle in the adult female, which has the terminal part of the flagellum somewhat curved, but not as much as in the young male where it is bent downwards as a hook; the first half of the inner margin is coarsely serrated.

The *second pair of antennæ* are only a little longer than the first. The single flagellar joint is half as long again as the whole peduncle.

The *peræon* has the last four segments subequal in length.

The *ovitetrices* are much larger than in *Ethemisto libellula*, irregularly triangular, and broad below.

The *peræopoda* are quite like those in the male, and in young females as well as in young males the fifth pair are short, only a little longer, or not longer, than the sixth; also the carpus in the third and fourth pairs, and the metacarpus in the sixth and seventh, are shorter than in the adult. Often the dactylus, and even the metacarpus of the last pair, or of the two last pairs, is transformed for giving an easy outlet to the glandular secretion.

The *pleon* is not as long as the last five peræonal segments together.

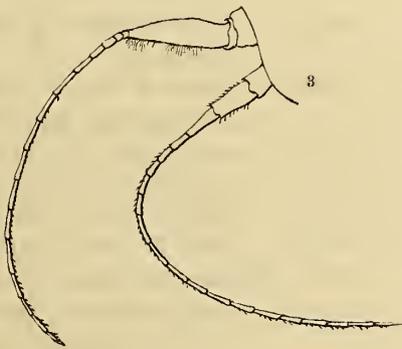
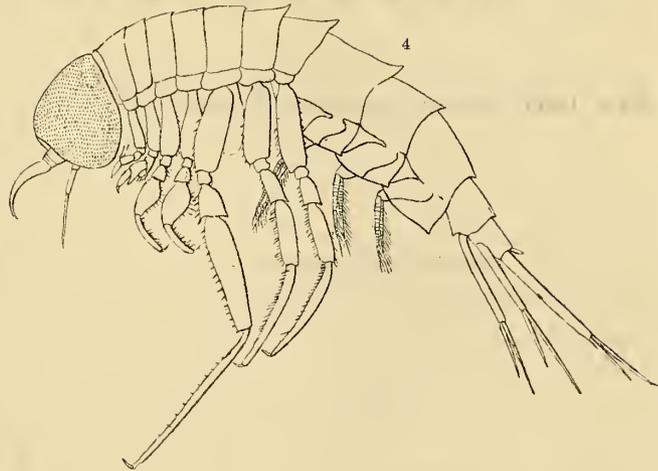
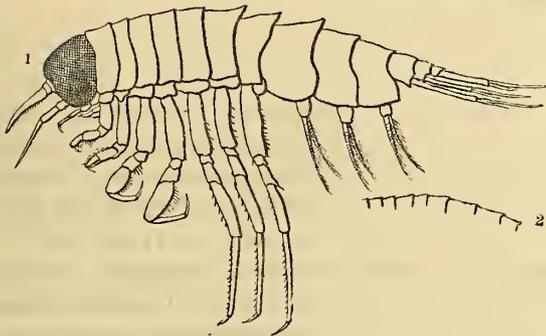
The *urus* is longer than the last pleonal segment; the first ural segment is about a fourth part longer than the last coalesced, which is considerably broader than long.

The *uropoda* are like those in the male.

The *telson* is fully two-thirds as long as the last coalesced ural segment.

5. **EUTHEMISTO COMPRESSA**, A. GOËS, 1865.

Pl. XII, fig. 46—57; Pl. XIII, fig. 32—43.

*Euthemisto compressa*, GOËS.

Facsimile from GOËS. Crust. Amph., pl. 41, fig. 34.

*Euthemisto compressa*, GOËS.

Copy from C. BOVALLIUS, Arct. and Antarct. Hyper., pl. 46, fig. 97, and 101.

Fig. 1. The female from the side. 2. A piece of the dorsal side. 3. The antennæ of the male.

Fig. 4. The young male from the side. 5. The third pair of pereopoda.

**Diagn.** *Corpus* carinatum, sæpe serratum. Femur *pedum peræi* parium trium ultimorum angustum, plus quam ter longius quam latius. Tibia *pedum* quinti paris post paullo producta; dactylus levis. *Pedes uri* primi paris *pedes* secundi paris non superantes; *pedunculus* ramo interno paullo longior; ramus externus *pedum* secundi ac tertii parium dimidio interno paullulo longior. *Telson* dimidio segmenti ultimi uri paullo brevius, *pedunculo* *pedum* uri ultimi paris angustius, ac quintam partem longitudinis *pedunculi* ejusdem haud æquans.

The *body* is carinated, and often serrated. The femur of the last three pairs of *peræopoda* is narrow, more than three times as long as broad. The lower hind corner of the tibia of the fifth pair is somewhat produced; the dactylus is smooth. The first pair of *uropoda* do not attain the apex of the second pair; the peduncle is a little longer than the inner ramus; the outer ramus of the second and third pairs is a little more than half as long as the inner. The *telson* is not fully half as long as the last coalesced ural segment; it is narrower than, and scarcely a fifth part as long as, the peduncle of the last pair of *uropoda*.

**Colour.** Light red.

**Length.** 16—30 mm.

**Hab.** The Arctic region: West coast of Greenland, Spetsbergen, West coast of Norway.  
(D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1865.** *Themisto compressa*, A. GOËS.

		—	»Crustacea amphipoda maris Spetsbergiam alluentis cum speciebus aliis arcticis». Öfversigt af K. Vet. Ak. Förhandl. 1865, p. 533, pl. 41, fig. 34.
<i>Parathemisto compressa</i> , »	A. BOECK.	1870.	»Crustacea amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandling for 1870, p. 87 (7).
» » »	»	1872.	De Skandinaviske og Arktiske Amphipoder, p. 86.
» » »	G. O. SARS.	1882.	»Oversigt af Norges Crustaceer med foreløbige Bemærkninger over de nye eller mindre bekjendte Arter». Christiania Vidensk.-Selskabs Forhandl. for 1882, N:o 18, p. 20 and 76.
» » »	C. BOVALLIUS.	1887.	»Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 21.
» » »	»	1887.	»Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 567.
<i>Euthemisto compressa</i> , »	H. J. HANSEN.	1887.	»Oversigt over det vestlige Grønlands Fauna af malakostrake Havkrebsdyr». Vidensk. Meddel. fra den Naturhist. Forening i Kjøbenhavn. 1887, p. 59.
<i>Parathemisto compressa</i> »	TH. STEBBING.	1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1409.
<b>1870.</b> <i>Themisto bispinosa</i> , A. BOECK.	—		»Crustacea Amphipoda borealia et arctica». Christiania Videnskabs-Selskabs Forhandl. for 1870, p. 88 (8).
» » »	—	1872.	De Skandinaviske og Arktiske Amphipoder, p. 87, pl. 1, fig. 4.
» » »	G. O. SARS.	1886.	The Norwegian North Atlantic Expedition, 1876—1878. Zoology. Crustacea. Vol. 2, p. 37.

<i>Euthemisto bispinosa</i> , A. BOECK.	C. BOVALLIUS.	1887.	»Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 22.
»	»	1887.	»Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 569, pl. 46, fig. 97—103.
»	»	1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1408.
1878. <i>Lestrigonus spinidorsalis</i> , SPENCE BATE.	—	—	»Two new Crustacea from the coast of Aberdeen». Ann. and Mag. of Nat. Hist. 5 <sup>th</sup> Ser., Vol. 3, p. 411, fig. 2.
<i>Hyperia spinidorsalis</i> ,	»	1878.	»On the Willemoesia Group of Crustacea». Ann. and Mag. of Nat. Hist. 5 <sup>th</sup> Ser. Vol. 3, p. 489.

After having compared many individuals of both sexes and different ages of the two supposed species *Themisto compressa* and *Th. bispinosa*, I am convinced that they are one and the same species, as HANSEN also suggested in 1888. The species must therefore have the older name given by GOËS in 1865, and it is here recorded as *Euthemisto compressa*, GOËS.

The original diagnosis runs:

T. compressa n., carinata segmentum septimum saepe etiam sextum et octavum margine postico in spinulam productum dorsalem in juvenibus exiguam, in adulto facile conspicuam; antennæ ♂ flagello multiarticulato, tenuissimo, valde elongato ut in Hyperii omnino.»

The drawings which accompany his description are however somewhat erroneous, and suggest the idea that the fifth pair of peræopoda are built exactly as the sixth pair, and are quite as long, the animal thus being a *Parathemisto* and not an *Euthemisto*; but after examining his type-specimens, now preserved in the Natural History Museum at Stockholm, I find that this is only due to a misconception of the draughtsman, as in all the specimens labelled by Goës's hand, the carpus of the fifth pair is distinctly longer and broader than in the sixth pair, and that in only one single specimen the fifth pair do not reach distinctly beyond the apex of the sixth.

A. BOECK in 1870 gave the following diagnosis of *Parathemisto compressa*:

»Segmentum trunci ultimum et segmenta postabdominis duo anteriora carina spinas retro-versas formanti. Pedes 3<sup>tii</sup> et 4<sup>ti</sup> paris articulo 4<sup>to</sup> magno, elongato-ovali. Pedes 5<sup>ti</sup> paris articulo 4<sup>to</sup> duplo longiore quam articulo 3<sup>tio</sup>.»

And of *Themisto bispinosa* he gave the following diagnosis:

»Corpus compressum, segmentum trunci 6<sup>tum</sup> et 7<sup>mum</sup> in medio margine posteriore in spinas producta. Pedes 3<sup>tii</sup> et 4<sup>ti</sup> paris articulo 4<sup>to</sup> oblongo. Pedes trium parium ultimum

articulo Imo perangusto, non dilatato; articulo tertio magis elongato quam apud speciem antecedentem.»

In 1872 he repeated the two diagnoses, and gave a closer description of *Themisto bispinosa*, from which I translate the following passage:

»The fifth pair of legs are a little longer than the following; its first joint is only feebly dilated, with the front margin convex and the hind straight; its third joint is very short; the fourth is narrow, scarcely more than four times as long as broad, and is provided with bristles on the front margin; the fifth joint is much longer, and is finely serrated along the front margin. The last two pairs are shorter; their third joint is narrower and somewhat longer; the fourth and fifth joints are shorter and narrower than the corresponding joints in the fifth pair. This species is very similar to the preceding (= *Parathemisto compressa*) in the form of the urus and of the uropoda.»

In 1878 SPENCE BATE described and delineated under the name *Lestrigonus spinidorsalis* an animal which certainly belongs to the present species. In the same year he changed the name into *Hyperia spinidorsalis*.

In 1887 HANSEN, as I have said above, rightly united *Parathemisto compressa*, GOËS, and *Euthemisto bispinosa*, BOECK, under the name *Euthemisto compressa*, GOËS.

#### The male.

Pl. XIII, fig. 32—43.

The *body* is compressed, the peræon scarcely being broader than the pleon. A strongly developed median carina runs on the dorsal side from the front margin of the first peræonal segment to the hind margin of the first ural segment, often, but not always, projecting into sharp angular processes in the last two peræonal segments and in the first pleonal. The integument is thin and nearly pellucid. The head and peræon together are about as long as the pleon and urus together.

The *head* is much more compressed than in the species of *Hyperia* and *Hyperiella*, nearly twice as deep as it is broad. The upper and front sides form a semi-circle. The antennal groove commences considerably below the middle of the front margin, and is comparatively short. The under side of the head is short, and evenly rounded.

The *eyes* occupy the whole surface of the head, and are separated at the crown by a very narrow stripe.

The *first pair of antennæ* (p. 305 fig. 3) reach to the hind margin of the fourth peræonal segment. The first joint of the peduncle is almost globular, and is nearly twice as long as the two following joints together; the second and third joints are about equal in length. The first joint of the flagellum is elongate-conical, and only a little tumid; it is more than twice as long as the whole peduncle, and is fringed with long olfactory hairs along the inner side; the second and third flagellar joints are very short, being scarcely as long as broad; the fourth, fifth, sixth, and seventh increase in length, the nine following are equal in length, very long and slender, and about twenty times

as long as broad, the last is a little shorter; all are sparingly provided with short hairs. The flagellum consists of seventeen joints.

The *second pair of antennæ* (Pl. XIII, fig. 32, and p. 305, fig. 3) are scarcely longer than the first pair; the third peduncular joint is somewhat shorter than the two preceding together. The first joint of the flagellum is as long as the last peduncular joint, but more slender, and tapers towards the apex; the following are shorter but increasing in length; the last four joints decrease in length towards the apex. The flagellar joints are eighteen in number.

The *mouth-organs* are like those in *Euthemisto libellula*.

The *peræon*. The first segment is considerably longer than the second, the last three are subequal in length. Sometimes the four last segments show a sharp-pointed angular projection in the median line, those of the two last segments being the largest, but more often the three last, or only the two last segments are provided with such a projection, and in very young animals often all the segments want projections, but as a rule they are distinct even there, though very feebly developed.

The *epimerals* are comparatively deeper than in *Euthemisto Gaudichaudii*, but not as deep as in *E. libellula*. That of the fifth pair of peræopoda is more than twice as broad as deep.

The *branchial sacks* are comparatively larger than in *Euthemisto libellula*, and are rounded below.

The *first pair of peræopoda* (Pl. XIII, fig. 33) are a little shorter than the second. The femur is narrow, linear, and nearly as long as the four following joints together. The genu is broader than long, and is fringed with long, hair-like bristles on the under margin. The tibia is a little longer than the genu, a little produced below, and fringed with long bristles. The carpus is longer than the two preceding joints together; the front margin is feebly convex and sparingly set with long bristles; the hind margin and the inner side are thickly covered with long, slender bristles. The metacarpus is as long as the carpus, tapering towards the apex, and has the front margin convex and fringed with long bristles; the hind margin is straight, serrated, and provided with a single bristle at the middle, as in *Euthemisto Gaudichaudii*. The dactylus is smooth, and not fully half as long as the metacarpus.

The *second pair* (Pl. XIII, fig. 34) do not reach quite to the apex of the carpus in the third pair. The femur is narrow, linear, and as long as the four following joints together. The tibial process is a trifle shorter than half the stem of the carpus, and is fringed with long bristles. The carpal process is shorter than the rest of the joint, and is in the adult male three-fourths as long as the hind margin of the metacarpus, and provided with a terminal spine (Pl. XIII, fig. 34); in the young the carpal process is much shorter, but always about half as long as the metacarpus. The metacarpus is somewhat shorter than the stem of the carpus, and tapers towards the apex; the front margin is fringed with long bristles; the hind margin is finely serrated. The dactylus is feebly curved, and more than half as long as the metacarpus.

The *third and fourth pairs* (Pl. XIII, fig. 35 and 36, and p. 305, fig. 5). The femur is scarcely more than twice as long as broad; the front margin is feebly convex

and indistinctly notched; the hind margin is convex, notched, and set with spines. The tibia is a little longer than the genu, and has the lower front corner somewhat produced. The carpus in the adult male is irregularly triangular, with the upper part of the hind margin strongly convex, pectinated, and armed with long bristles (Pl. XIII, fig. 35); the front margin is feebly convex; in the young the carpus is narrower and more ovate. The metacarpus is stout, longer than the carpus, and has the hind margin finely pectinated; along the side of the joint there runs a row of tufts of long hairs (Pl. XIII, fig. 36). The dactylus is almost half as long as the metacarpus.

The *fifth pair* (Pl. XIII, fig. 37—39) in the adult male are fully as long as the head, peræon, and pleon together. The femur is comparatively narrow, fully three times as long as broad; the front margin is only feebly convex, and fringed with spines; the hind margin is straight, and notched, or coarsely serrated. The genu is broader than long. The tibia is quite twice as long as the genu, with the lower hind corner produced into a short process, which scarcely is half as long as the rest of the joint; the front margin is fringed with spines. The carpus is longer than the femur and genu together, and is about four times as long as broad; the front margin is almost straight, finely pectinated (Pl. XIII, fig. 38), and set with equidistant, spine-like bristles; the hind margin is feebly convex, notched, and provided with a few short spines. The metacarpus in the adult male is straight, slender, and as long as the three preceding joints and half the femur together; the front margin is pectinated (Pl. XIII, fig. 39), the spine-like teeth forming the pectination being directed a little downwards; the hind margin is smooth. The dactylus is smooth, feebly curved, and about a twelfth part as long as the metacarpus.

The *sixth and seventh pairs* (Pl. XIII, fig. 40—42) are equal in length, and reach in the adult animal scarcely beyond the apex of the carpus in the fifth pair. The femur is narrow, three times as long as broad, and has the front margin a little convex and armed with spine-like bristles; the hind margin is straight and notched. The tibia is more than twice as long as the genu, with the lower hind corner produced into a triangular, sharp-pointed process. The carpus is fully twice as long as the tibia, and is a little broader in the sixth pair than in the seventh, with the front and hind margins very feebly convex and armed with bristles; in the seventh pair (Pl. XIII, fig. 41) the front margin is feebly concave, notched, and set with long bristles, and the hind margin is feebly convex, carrying two or three short, spine-like bristles. The metacarpus is long and curved, in the adult male it is a little longer than the three preceding joints together; the front margin is indistinctly pectinated, and set with long bristles (Pl. XIII, fig. 42). The dactylus is smooth and long, more than a fifth part as long as the metacarpus.

The *pleon* is almost as long as the whole peræon, and strongly carinated; each segment shows an angular projection in the median line, which projection is largest in the first segment; the lower hind corner of the segments is a little produced and sharp-pointed; the under margin of the segments is feebly notched.

The *pleopoda* are comparatively shorter than in *Euthemisto libellula*; the outer ramus of the first pair has sixteen joints, the inner fifteen.

The *urus* is about as long as the last pleonal segment; the first ural segment is longer than the last coalesced, which is quite as long as broad.

The *uropoda* (Pl. XIII, fig. 43). The *first pair* do not reach to the apex of the second, and attain the middle of the outer ramus in the last pair; the peduncle is very narrow, linear, and more than six times as long as broad; it is a trifle longer than the inner ramus, which is very narrow and sharp-pointed, and not fully twice as long as the outer; the inner ramus is serrated on the outer margin; the outer ramus is serrated on the inner margin. The *second pair* reach nearly to the apex of the outer ramus in the last pair; the peduncle is four times as long as broad, and has the lower inner corner projecting and sharp-pointed; it is as long as the inner ramus, which is broader than, and nearly twice as long as, the inner; the rami are serrated as in the first pair. The peduncle of the *third pair* is broader than the preceding, four times as long as broad, with the lower inner corner projecting and sharp-pointed; the inner ramus is about three-fourths as long as the peduncle, and nearly twice as long as the outer ramus; both rami are serrated as in the first pair.

The *telson* is small, rounded, as long as broad, and not half as long as the last coalesced ural segment; it is narrower than, and scarcely more than a sixth part as long as, the peduncle of the last pair of uropoda.

### The female.

Pl. XII, fig. 46—57.

The *body* is considerably broader than in the male, but still compressed and strongly carinated. The head and the peræon are much longer than the pleou and *urus* together.

The *first and second pairs of antennæ* (Pl. XII, fig. 47—50)<sup>1)</sup> closely resemble those pairs in the female of *Euthemisto Gaudichaudii*.

The *peræon*. The first segment is longer than the second, the four following are equal in length, the seventh is a little shorter.

The *peræopoda* (Pl. XII, fig. 51—56) are similar to those in the male.

The *pleon* is about as long as the last four peræonal segments together; the angular projections in the median line of the segments are often less developed than in the male.

The last coalesced *ural* segment is a little broader than long.

The last two pairs of *uropoda* (Pl. XII, fig. 57) are somewhat less elongated than in the male.

<sup>1)</sup> Through a change of figures the details of the antennæ have got wrong numbers on the plate and in the explanation, fig. 50 really is the end of the flagellum in the first pair, and fig. 48 that in the second.

Genus 8. **THEMISTELLA**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* mediocre, altius quam longius. *Peræon* leve; epimera cum segmentis coalita. *Pedes perævi* primi et secundi parium cheliformes; carpus paullo dilatatus; processus carpalis anguste concavus in formam cochlearis redactus. Carpus pedum tertii ac quarti parium paullo dilatatus, sed cum metacarpo instrumentum prensorium non formans. *Pedes* parium trium ultimorum duobus præcedentibus multo longiores, longitudine inæquales, pedes quinti paris longissimi, sequentes longitudine sensim decrescentes; carpus pedum quinti paris non dilatatus; metacarpus modice elongatus. *Pedes uri* elongati.

The *head* is moderately large, and is deeper than long. The *peræon* is smooth; the epimerals are coalesced with the segments. The first two pairs of *peræopoda* are cheliform; the carpus is a little dilated; the carpal process is narrowly concave, gouge-shaped. The carpus of the third and fourth pairs is a little dilated, but does not form a folding hand together with the metacarpus. The last three pairs are much longer than the third and fourth, unequal in length, the fifth pair being the longest, and the following evenly decreasing in length; the carpus of the fifth pair is not dilated; the metacarpus is moderately elongate. The *uropoda* are elongated.

**Syn. 1887.** *Themistella*, C. BOVALLIUS.

— »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11, N:o 16, p. 22.

The genus *Themistella* was instituted in order to receive a Hyperid which could not properly be placed in any of the other genera. On the whole it is more closely allied to *Hyperia* and *Hyperielli* than to *Euthemisto*, but differs decidedly in the chelate character of the first pair of *peræopoda*, and in the great length of the last three pairs. From *Euthemisto* it is distinguished at once by the form of all the pairs of *peræopoda* except the second. From *Parathemisto* it differs in the same characteristics, in addition to which comes the elongation of the fifth pair of *peræopoda*.

The type species was *Themistella Steenstrupi*, but I think that DANA's *Le-strigonus fuscus* may also be conveniently placed in this genus, at least till it is better known than at present. *Hyperia pupa*, A. COSTA, which in 1887<sup>1)</sup> I placed with a sign of interrogation in the genus *Hyperielli*, in mistake for *Themistella*, because I did not know it from the original description but only from SPENCE BATE's »Catalogue» and CARUS' »Prodromus Faunæ Mediterraneæ», does certainly not belong to the family Hyperiidæ but ought probably to be placed in the family *Lycæidæ* as STEBBING suggested in 1888.<sup>2)</sup>

- A. The second and third ural segments are coalesced as usual. The inner ramus of the first two pairs of *uropoda* is about half as long as the peduncle..... 1. **Th. Steenstrupi.**  
 B. The second and third ural segments are free not coalesced. The inner ramus of the *uropoda* is a third part as long as the peduncle ..... 2. **Th. fusca.**

<sup>1)</sup> In my »Systematical list of the Amphipoda Hyperiidæ», p. 20.

<sup>2)</sup> TH. STEBBING, »Report on the Amphipoda», Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 299.

1. **THEMISTELLA STEENSTRUPI**, C. BOVALLIUS, 1887.

Pl. XIII, fig. 47—60.

The name is given in honour of Professor JAPETUS STEENSTRUP of Copenhagen.

**Diagn.** *Caput* non duplo altius quam longius, segmenta quattuor prima peræi longitudine æquans. Segmenta duo priora *peræi* coalita, cetera libera. Metacarpus *pedum peræi* primi paris carpo longior. Pedes secundi paris duas partes pedum tertii paris longitudine æquantes; processus carpi dimidio marginis posterioris metacarpi paullo longior. Pedes sexti paris pedibus septimi paris multo longiores. Latera segmentorum *plei* post rotundata. Segmentum secundum et tertium *uri* coalita. Ramus internus *pedum uri* primi et secundi parium dimidium pedunculi longitudine æquans. *Telson* rotundatum, pedunculo pedum uri ultimi paris angustius, ac quinta parte longitudinis pedunculi ejusdem brevius.

The *head* is not twice as deep as long, and is as long as the first four peræonal segments together. The first two *peræonal* segments are coalesced, the following are free. The metacarpus of the first pair of peræopoda is longer than the carpus. The second pair are two-thirds as long as the third pair; the carpal process is somewhat more than half as long as the hind margin of the metacarpus. The sixth pair are much longer than the seventh. The lateral parts of the *pleonal* segments are rounded behind. The second and third *ural* segments are coalesced. The inner ramus of the first two pairs of *uropoda* is about half as long as the peduncle. The *telson* is rounded, narrower than, and not a fifth part as long as, the peduncle of the last pair of uropoda.

**Colour.** Yellowish brown.

**Length.** 4 mm.

**Hab.** The tropical region of the Atlantic, Lat. 3° N., Long. 25° W. (S. M.)

**Syn. 1887.** *Themistella Steenstrupi*, C. BOVALLIUS. — »Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 23.

**The male.**

The fore-part of the *body* is unusually short, the head and peræon together being shorter than the pleon. The integument is very thin and pellucid.

The *head* is about a third part deeper than long. The antennal groove commences above the middle of the front side, and is tolerably broad. The under side of the head is rounded.

The *eyes* occupy the whole surface of the head. The eye-cones are very short, and are unusually wide at the apex.

The *first pair of antennæ* (Pl. XIII, fig. 48—50) reach to the hind margin of the first ural segment. The first joint of the peduncle is very thick and stout, and nearly

twice as long as the two following joints together; the second joint is longer than the third. The first joint of the flagellum is about as long as the whole peduncle; it is unusually tumid, with the under portion bulging out, and thickly covered with long olfactory hairs; the second flagellar joint (Pl. XIII, fig. 50) is about as long as broad, and has the lower front corner projecting into a tumid process, which reaches to the middle of the third joint, and carries three pairs of long olfactory hairs, fixed on large, ovate discs; the last of these pairs of hairs are club-shaped, the two preceding pairs are slender. The third flagellar joint is longer than broad, and has the under portion projecting into a tumid, bulging process, which lies pressed against the inside of the joint; this process is armed with three pairs of long, club-shaped hairs (Pl. XIII, fig. 49). The fourth joint is longer than the two preceding together, slender and cylindrical, the following are subequal in length, but slowly tapering towards the apex. The flagellar joints are twenty-four in number.

The *second pair of antennæ* (Pl. XIII, fig. 51 and 52) are longer than the first, and a little longer than the whole animal. The first free joint is about as long as broad, and a little longer than the second; the third joint is nearly as long as the two preceding joints together, but is much more slender; the following joints are shorter than the first, subequal in length, and each carries a short hair on the under side. The last joint is tipped with two long hairs, and is more than twenty times as long as broad. The flagellar joints are twenty-one in number.

The *peræon* is scarcely more than twice as long as the head, and is quite as long as the first two pleonal segments together. The first and second segments are coalesced. The seventh segment is the longest of all.

The *epimerals* are not separated from the peræonal segments, but coalesced with them.

The *branchial sacks* are egg-shaped, and are shorter than the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda* (Pl. XIII, fig. 53) are scarcely shorter than the second. The femur is almost as long as all the following joints together; the front margin is strongly curved, the hind margin is nearly straight. The genu is broader than long, and has a stout bristle at the lower hind corner. The tibia is longer than the genu, and carries two or three bristles on the under margin. The carpus is shorter than the two preceding joints together, the front margin is smooth, the hind margin is armed with a stout bristle; the carpal process is narrowly spoon-shaped, provided with three bristles, and is scarcely more than half as long as the stem of the carpus; the front side of the process is more than a third part as long as the hind margin of the carpus. The metacarpus is much longer than the stem of the carpus; the front margin is convex, and armed with two bristles below the middle; the hind margin is straight, and indistinctly serrated. The dactylus is curved, and is half as long as the metacarpus.

The *second pair* (Pl. XIII, fig. 54) reach to the apex of the carpus in the third pair. The femur is narrower than in the first pair, and is broader below than above; it is nearly as long as all the following joints together. The genu is considerably broader than long. The tibia is a little produced at the lower hind corner, which is fringed with short, spine-like bristles. The carpus, without the process, is about as long as the two preceding joints together; the front and hind margins are smooth; the carpal process is

fully three-fourths as long as the stem of the joint, and its front side is three-fourths as long as the hind margin of the metacarpus; the front margins of the process are fringed with three spine-like bristles each. The metacarpus is a little longer than the stem of the carpus; the front margin is feebly convex, and is armed with two bristles as in the first pair; the hind margin is straight and smooth. The dactylus is feebly curved, and has an obtuse tooth on the hind margin near the apex; it is half as long as the metacarpus.

The *third and fourth pairs* (Pl. XIII, fig. 55 and 56) are similar in form, but the fourth pair are considerably longer than the third. The femur is elongated, narrow, and is broader below than above, with a spine at the lower hind corner. The genu is a little longer than broad, and is smooth. The tibia is longer than the genu. The carpus is a little dilated, with the front margin convex, and the hind margin straight and armed with a spine at the lower corner and a shorter one at the middle; in the third pair the carpus is shorter than, in the fourth pair it is as long as, the two preceding joints together. The metacarpus is feebly bent, slender, and armed on the hind margin with a few equidistant short spines; in the third pair it is longer than, in the fourth nearly as long as, the two preceding joints together. The dactylus is feebly curved, smooth, and a third part as long as the metacarpus.

The *fifth pair* (Pl. XIII, fig. 57) are half as long again as the fourth. The femur is somewhat more than twice as long as broad at the apex where it is broader than at the base; the front margin is feebly notched, with the lower corner sharp-pointed; the hind margin is straight. The genu is longer than broad, and is smooth. The tibia is not fully twice as long as the genu; the front margin is set with a few equidistant short hairs. The carpus is longer than the two preceding joints together, and nearly twice as long as the tibia; the front margin is sparingly set with very short hairs as in the preceding joint. The metacarpus is much elongated, about as long as the two preceding joints together, and has the front margin armed with short hairs as in those joints. The dactylus is scarcely a sixth part as long as the metacarpus.

The *sixth and seventh pairs* (Pl. XIII, fig. 58 and 59) are similar in form, but unequal in length, the sixth being much the longest. The femur, genu, and tibia are like those joints in the fifth pair. The carpus is nearly as long as the two preceding joints together. The metacarpus is shorter than the carpus and tibia together. The dactylus is about a fourth part as long as the metacarpus.

The *pleon* is unusually large; the first segment is longer than the last two peraeonal segments together. The lateral parts of the first two segments are broadly rounded behind; that of the third is somewhat produced backwards, and obtusely rounded.

The *pleopoda* (Pl. XIII, fig. 60 and 61) are tolerably large. The coupling spines (Pl. XIII, fig. 60) are slender, with a small heed, and three hooks on the stem. The cleft bristle (Pl. XIII, fig. 61) is very thick at the base, and has short arms. Both rami of the first pair are eight-jointed.

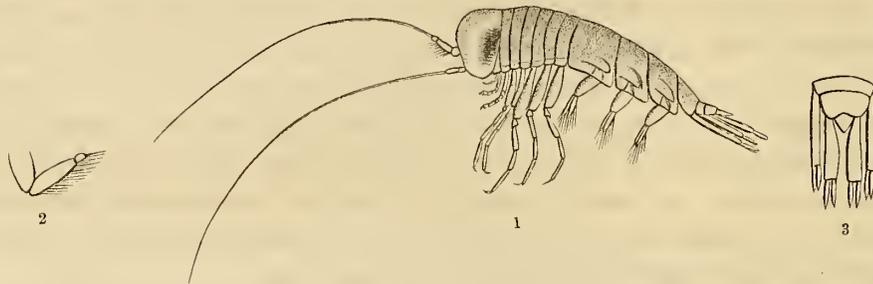
The *urus* is quite as long as the last pleonal segment; the first ural segment is somewhat longer than the last coalesced, which is a third part broader than long.

The *uropoda* (Pl. XIII, fig. 62). The *first pair* reach nearly to the apex of the last. The peduncle is linear, and about five times as long as broad; it is finely serrated

on the lower part of the outer margin; the rami are elongate, nearly equal in length, and provided with semicircular incisions near the base; the inner ramus is half as long as the peduncle, with the inner margin smooth, and the outer serrated. The *second pair* reach nearly to the middle of the outer ramus of the last pair. The peduncle is more than four times as long as broad, and fully twice as long as the inner ramus, which is longer than the outer; the rami are armed as in the first pair. The peduncle of the *third pair* is broader than in the preceding pairs, not fully four times as long as broad, and quite three times as long as the inner ramus, which is rather shorter than the outer; both are serrated as in the first pair.

The *telson* is rounded, as long as broad, and more than half as long as the last coalesced ural segment; it is narrower than, and scarcely a fifth part as long as, the peduncle of the last pair of uropoda.

## 2. THEMISTELLA FUSCA, J. D. DANA, 1852.



*Themistella fusca*, DANA.

Facsimile from DANA, U. S. Expl. Exp. Crust. pl. 67, fig. 8.

Fig. 1. The animal from the side. 2. The flagellum of the first pair of antennæ. 3. The urus.

**Diagn.** *Caput* duplo altius quam longius, segmentis quattuor primis peræi longius. Segmenta omnia *peræi* libera, segmentum primum brevissimum. *Metae*carpus *pedum peræi* primi paris carpo haud longior(?). *Pedes* secundi paris dimidio *pedum* tertii paris breviores. *Pedes* sexti paris *pedibus* septimi paris paullo longiores. *Latera* segmentorum *plei* post angulata. Segmentum secundum et tertium *uri* libera. *Ramus* internus *pedum uri* tertiam partem *pedunculi* longitudine æquans; *ramus* externus *internum* longitudine æquans. *Telson* triangulatum, *pedunculo* *pedum uri* ultimi paris latius, et quarta parte longitudinis *pedunculi* ejusdem longius.

The *head* is twice as deep as long, and is longer than the first four *peræonal* segments together. All the *peræonal* segments are free; the first segment is very short. The *metae*carpus of the first pair of *peræopoda* is not longer than the *carpus*(?). The second pair are not half as long as the third pair. The sixth pair are only a little longer than the seventh. The lateral parts of the *pleonal* segments are angular behind. The second and

third *ural* segments are free. The inner ramus of the *uropoda* is a third part as long as the peduncle; the outer ramus is as long as the inner. The *telson* is triangular, broader than, and more than a fourth part as long as, the peduncle of the last pair of *uropoda*.

**Colour.** »Dark reddish brown, pervading whole animal, verging in some parts towards pale reddish.» (DANA.)

**Length.** »Two lines.» (DANA.)

**Hab.** The tropical region of the Atlantic, Lat. 1° S, Long. 17° to 18° W. (DANA.)

**Syn. 1852.** *Lestrigonus fuscus*, J. D. DANA. — United States Exploring Expedition. Crustacea. Vol. 2, p. 983, pl. 67, fig. 8.

          "          "          "          SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 291, pl. 48, fig. 8.

*Hyperietta fusca*, "          C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperietidae«. Bih. t. K. Sv. Vet. Akad. Handl. Bd. 11. N:o 16, p. 20.

*Themistella fusca* shows a great agreement with *Th. Steenstrupi* in many characteristics and in general form of body, but differs decidedly in the relative length of the third, fourth, sixth, and seventh pairs of *peraeopoda*, in the angular hind corners of the pleonal segments, and in the characteristics of the *urus* and its appendages.

DANA's original diagnosis runs:

»Thorax seven-jointed, first segment nearly concealed. Seventh segment (= *telson*) of abdomen separated by a suture from preceding, half narrower than the sixth. Superior antennæ as long as the body, inferior one-fourth longer, inferior apex of basal portion acute. Coxa of six posterior feet obtuse at apex, and claw less than half the tarsus (= *metaeopus*) in length. Feet of fifth pair longer than sixth or seventh».

The characteristic »inferior apex of basal portion» refers probably only to the first pair of antennæ, and is most likely the same feature as is described above in the second and third flagellar joints of *Themistella Steenstrupi*. The characteristic »coxa of six posterior feet obtuse at apex» is valid also for the preceding species.

DANA gave further the following description of the species:

»Greatest height of head about twice its length, rounded in front, but profile slightly flattened about the antennary area. Segments of thorax all very narrow, first hardly apparent. Base of inferior antennæ having the last joint longest. Claw of six posterior legs *not* half as long as preceding joint: coxa about as long as width of thorax; fifth joint rather longer than either of the preceding. Ciliæ of natatories about twice as long as the lamellæ. Lamellæ of stylets about one-third their whole length, subultriform, acute. Second pair of stylets extend about as far backward as middle of lamellæ of last pair».

Genus 9. **PHRONIMOPSIS**, C. CLAUS, 1879.

**Diagn.** *Caput* magnum, altius quam longius. *Peræon* leve, epimera cum segmentis coalita. *Pedes peræi* primi paris simplices, non subcheliformes; carpus angustus. *Pedes secundi* paris dactylo-cheliformes<sup>1)</sup>; carpus minimus, valde productus; processus carpi styloformis; metacarpus maximus, valde productus; processus metacarpi robustus, tuberculatus, ante anguste excavatus. Carpus pedum tertii ac quarti parium non dilatatus. *Pedes parium trium ultimorum* cheliformes, longitudine subæquales, præcedentibus multo longiores; metacarpus non elongatus. *Pedes uri* elongati.

The *head* is large, and deeper than long. The *peræon* is smooth; the epimerals are coalesced with the corresponding segments. The first pair of *peræopoda* are simple, not subcheliform; the carpus is narrow. The second pair are dactylo-cheliform; the carpus is very short and much produced; the carpal process is styloform; the metacarpus is very large, and much produced; the metacarpal process is robust, tuberculated, with the front side very narrowly excavated. The carpus of the third and fourth pairs is not dilated. The last three pairs are cheliform, subequal in length, and much longer than the two preceding pairs; the metacarpus is not elongated. The *uropoda* are elongated.

<b>Syn. 1879.</b>	<i>Phronimopsis.</i>	C. CLAUS.	—	»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 63 (5).
»	»	—	1882.	Grundzüge der Zoologie. Vierte Aufl. 2 <sup>ter</sup> Bd. p.
»	»	J. V. CARUS.	1885.	Prodromus Faunæ Mediterraneæ. Vol. 1, p. 424.
»	»	A. GERSTÆCKER.	1886.	Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Bd. 2 <sup>te</sup> Abth. Arthropoda, p. 489.
»	»	C. BOVALLIUS.	1887.	»Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 23.
»	»	TH. STEBBING.	1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1373.

The genus *Phronimopsis* is remarkable chiefly by the peculiar prehensile organ of the second pair of *peræopoda*, formed by the strongly produced *metacarpus* and the *dactylus*, and not as usually by the carpus and the metacarpus.

CLAUS in 1879 placed the genus in the family *Phronimidæ*, and gave the following diagnosis:

»Körper zoëa-ähnlich, mit gedrungenem, fast kugligem Vorderleib, schmalem, langgestrecktem Adomen und 3 Paar langer stiftförmiger Uropoden. Kopf kurz und hoch. Die beiden vordern Brust-

<sup>1)</sup> This peculiar form of prehensile organ, which I propose to call a »dactylo-cheliform hand» will be closely described below under *Phronimopsis Sarsi* (p. 322).

segmente ohne Grenzen verschmolzen. Vorderantennen des Weibchens zweigliedrig, relativ lang, hintere Antennen mit Stachel. Das Männchen mit dreigliedrigem Mandibeltaster. Zweites Gnatopodenpaar dick und stark, mit vollkommener Scheere bewaffnet. Die fünf nachfolgenden Beinpaare des Thorax dünn und langgestreckt, sämtlich mit schwacher langgezogener Greifhand endigend. Die Uropodenäste schmal und griffelförmig, fast so lang als das stiftförmig gestreckte Basalglied».

Of these characteristics only that which refers to the cheliform hand in the last five pairs of peræopoda, and, with some alteration, that which refers to the second pair, are useful for generic distinction. He does not mention the peculiar structure of the second pair. The type species was *Phronimopsis spinifera*.

CARUS in 1885 gave CLAUS' diagnosis translated in Latin.

GERSTAECKER in 1886 gave a somewhat altered diagnosis. The following passage may be quoted:

»— — — Erstes Beinpaar kurz, mit gepinseltem Endklaue, zweites kräftiger, mit zweifingriger Scheere, die fünf folgenden lang und dünn, in eine schwache Greifhand endigend. Hinterleib schmal, so lang wie der Vorderkörper».

In 1887 I transferred the genus from *Phronimidæ* to the family Hyperiidæ, in which *Phronimopsis* has its nearest relatives, while it has nothing, except the coalesced epimerals, in common with the Phronimids. With the Hyperiidæ genera it agrees in the general form of body, in both pairs of antennæ, in the mouth-organs, and in the form of the urus and its appendages. At the same time I briefly described a new species *Phronimopsis Sarsi*.

In 1888 STEBBING accepted my views as to the systematical position of the genus, placing it in the family Hyperiidæ. He described from the »CHALLENGER» collection a new species *Phronimopsis tenella*, which is very closely allied to *Ph. Sarsi*.

He gave a new generic diagnosis, which runs:

»*Antennæ* of both pairs having multiarticulate flagella in the male, but not in the female. *Mandibles* with dentate cutting edge, a secondary plate on the left mandible, a molar tubercle, and, in the male, a three-jointed palp. The *First Gnathopods* simple, with hairy finger; the *Second Gnathopods* chelate. The *Peræopods* slender, all narrowly subchelate. *Uropods* with long narrow peduncles and narrowly lanceolate rami. *Telson* small. The *Head* short and deep; *branchial vesicles* attached to the second, third, and fourth pairs of peræopods».

Of these characteristics the first two<sup>1)</sup> are valid for all the Hyperiidæ genera; and are thus, according to my views as to the systematization, *family* characteristics and not *generic*. The following four are on the other hand good generic characteristics. The last three seem to be of only specific value.

For the specific distinction the following characteristics are here used:

1. The peræon being globularly inflated — or normal in form.
2. The last three peræonal segments, and all the pleonal, produced dorsally in the median line into a short spine-like process, — or not produced.

<sup>1)</sup> With the addition that the three-jointed mandibular palp is present also in the female.

3. The femur of the fifth pair of peræopoda being longer, — or shorter, than the carpus.  
4. The uropoda being fringed with hairs, — or smooth.

One would easily be inclined to suspect that the inflated peræon is only a sexual feature, but as CLAUS expressly gives it as characterizing the male as well as the female of his species it must be considered a specific characteristic in this genus.

The question of the morphological homologies of the joints in the second pair of peræopoda is difficult to clear up; I have called the leg dactylo-chelate, thereby suggesting that the metacarpus has assumed the form and function usually appertaining to the carpus, and the dactylus that of the metacarpus. Perhaps it might be more proper to say that the tibia is divided into two joints, but it must be noticed that independent muscles are developed in both.

The species are to be distinguished as the following table shows.

- A.** The margins of the uropoda are fringed with hairs. The peræon is not inflated.  
**a 1.** The telson is shorter than a sixth part of the peduncle of the last pair of uropoda. The outer ramus is about as long as the inner ..... **1. Ph. Sarsi.**  
**a 2.** The telson is a fourth part as long as the peduncle of the last pair of uropoda. The outer ramus of the second pair is much shorter than the inner ..... **2. Ph. tenella.**  
**B.** The margins of the uropoda are smooth. The peræon is globularly inflated..... **3. Ph. spinifera.**

## 1. PHRONIMOPSIS SARSI, C. BOVALLIUS, 1887.

Pl. XIV, fig. 1—29.

The name is given in honour of Professor G. O. SARS of Christiania.

**Diagn.** *Caput* segmentis quattuor primis peræi longius, paullo altius quam longius. *Peræon* non inflatum; segmenta duo ultima in dorso leviter producta. *Pedes peræi* secundi paris pedibus primi paris paullo longiores, apicem earpi pedum tertii paris haud attingentes. Femur pedum quinti paris earpo non longius. Rami *pedum uri* marginibus fimbriatis; ramus externus internum longitudine fere æquans. *Telson* sexta parte pedunculi pedum uri ultimi paris brevior.

The *head* is longer than the first four peræonal segments together, and is a little deeper than long. The *peræon* is not inflated; the last two segments are dorsally feebly produced in the median line. The second pair of *peræopoda* are only a little longer than the first, and do not reach to the apex of the carpus in the third pair. The femur of the fifth pair is not longer than the carpus. The rami of the *uropoda* have the margins fringed with fine hairs; the outer ramus is about as long as the inner. The *telson* is not a sixth part as long as the peduncle of the last pair of uropoda.

**Colour.** Reddish white, almost hyaline.

**Length.** 5—6 mm.

**Hab.** The tropical regions of the Atlantic. (D. M.; F. M.; P. M.; K. M.; S. M.; U. M.)

**Syn.** 1887. *Phronimopsis Sarsi*, C. BOVALLIUS. — »Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 23.

Of the hitherto known species of the genus *Phronimopsis* the present comes nearest to the other forms of the family Hyperiidæ in general habitus as well as in the shape of the peræon. From its congeners it is distinguished by the form of the urus and its appendages. *Phronimopsis tenella* comes, however, extremely near to it in many characteristics.

I have examined only male specimens.

### The male.

The *body* is slender; the integument is very thin and pellucid. The head and peræon together are scarcely longer than the pleon.

The *head* is broader than the peræon, and about a fourth part deeper than long. The antennal groove is very large, commencing above the middle of the front side. The under side of the head is evenly rounded, with the epistoma a little protruding.

The *first pair of antennæ* (Pl. XIV, fig. 2 and 3) are about as long as the second. The first joint of the peduncle is very thick and robust, and is about three times as long as the two following joints together. The first joint of the flagellum is as long as the whole peduncle, tapering towards the apex, with bulging sides, and is densely set with long olfactory hairs; the second joint is tolerably thick, and almost a third part as long as the first; the lower front corner is produced into a cylindrical process, which is tipped with two club-shaped hairs (Pl. XIV, fig. 3): the third joint is longer, but narrower, than the second; the following joints are much longer, slender, cylindrical, and set with a few short hairs on the under margin. The flagellar joints are sixteen or seventeen in number.

The *second pair of antennæ* (Pl. XIV, fig. 4—6) reach beyond the telson. The first free joint is as long as the second, the third is almost as long as the two preceding together. The first joint of the flagellum is longer than the whole peduncle; the following are shorter, subequal in length, and each provided with a short hair at the middle. The flagellar joints are sixteen or seventeen in number.

The *epistoma* is obtusely conical, and unusually large.

The *labrum* is symmetrically bilobed, with a shallow incision at the middle.

The *mandibles* (Pl. XIV, fig. 7). The stem is slender, and somewhat constricted at the middle; the incisive lamina is rounded, with five or six sharp teeth and two tufts of short hairs at the base; the secondary lamina of the left mandible has five teeth; the molar tubercle is very broad, like that in *Euthemisto*. The mandibular palp is slender with the joints equal in length.

The *labium* has the lateral processes rounded, and covered with short hairs.

The *first pair of maxillæ* (Pl. XIV, fig. 8) have the principal lamina shorter than the stem, thickly covered with short hairs, and armed at the apex and on the inner side with stout spines. The secondary lamina is much longer than the principal, with the apex broadly rounded, serrated, and armed with a single short spine.

The *second pair of maxillæ* (Pl. XIV, fig. 9 and 10). The principal lamina is irregularly conical, sparingly set with short hairs, and armed with a single, two-pointed spine at the apex; the secondary lamina is longer than the principal, curved, thickly covered with hairs, and provided with two spines at the apex.

The *maxillipeds* (Pl. XIV, fig. 11—13) are long and slender. The stem is long and narrow; the lateral laminae are narrow, almost linear, deeply incised at the apex, where each carries two short obtuse spines, which are tipped with four or five fine hairs (Pl. XIV, fig. 13); the median lobe is stout and well developed, but shorter than in the genus *Euthemisto*; the apex and the front margin are fringed with short hairs.

The *peræon* is not twice as long as the head, and quite as long as the first two pleonal segments together; the first two segments are dorsally coalesced, the third is much shorter, the following increase slowly in length, the seventh being the longest. The epimerals are fused with the segments without traces of a suture. The peræon is not broader than the pleon.

The *branchial sacks* are attached to the second, third, fourth, fifth, and sixth pairs of peræopoda. That of the sixth pair is the longest, but still not half as long as the corresponding femur.

The *first pair of peræopoda* (Pl. XIV, fig. 14 and 15). The femur is narrow, with the hind margin feebly convex; it is much longer than the three following joints together. The lower hind part of the tibia is produced, and armed with two spine-like bristles. The carpus is not dilated, fully as long as the two preceding joints together, and armed with a stout bristle at the middle of the hind margin. The metacarpus is long, slender, tapering towards the apex, and as long as the two preceding joints together; the lower half of the hind margin is feebly notched, and set with four or five short spines. The dactylus is scarcely half as long as the metacarpus; is curved, and densely set with hairs; at the base there is on the hind margin a large opening for the outlet of the glandular secretion. Glands are developed in all the joints.

The *second pair* (Pl. XIV, fig. 16 and 17) do not fully reach to the apex of the carpus in the third pair. The femur is narrow, almost linear, and is quite as long as the three following joints together, the carpal process included. The genu is somewhat broader than long, and is smooth. The tibia is very small, almost reduced, but is provided with a distinct adductor-muscle and a retractor; the margins of the joint are smooth. The carpus may also be considered as reduced in form and size; the stem of the joint is somewhat shorter than the tibia, but is provided with distinct muscles; the lower hind corner is produced into a long narrow, rod-like process, which is more than three times as long as the rest of the joint; it is subapically armed with a stout spine, the apex of the process being sharp-pointed and projecting behind this spine for about half its length (Pl. XIV, fig. 17). Such a terminal spine occurs in the carpal process of *Euthemisto libellula*, and in some way supports the opinion that the fourth joint in the second pair of *Phronimopsis* may

be the homologue of the fourth joint in that pair of *Euthemisto*, and thus the true carpus. The metacarpus is enormously developed, forming together with the dactylus a perfect »dactylocheliform hand»; the stem of the joint is thick, and broadly dilated, not fully twice as long as broad, and only a little shorter than the femur; the margins are feebly convex; the metacarpal process is thick and stout, half as long as the stem of the joint; it has the front margin uneven, and very narrowly channeled, especially at the apex, where the apex of the dactylus is received; in the joint there is an unusually large adductor-muscle divided into two portions, occupying almost the whole of the interior of the joint; in front of this muscle runs the narrow retractor. The dactylus is thick, elongate-triangular, and reaches almost to the apex of the metacarpal process. Glands are present in all the joints, especially in the femur and in the dactylus, which latter joint shows a very small fissure-like opening for the outlet of the glandular secretion at the obtuse apex; this opening is bordered in front by a minute semicircular wall or ridge.

The *third and fourth pairs* (Pl. XIV, fig. 18—20) are similar in shape, and equal in length. The femur is narrow, a little broader below than above, and is shorter than the three following joints together; the genu is somewhat longer than broad. The tibia is fully twice as long as the genu, with three equidistant spines on the hind margin, the lowest the longest. The carpus is longer than the two preceding joints together, and is armed with three equidistant, spine-like bristles on the hind margin; the joint is not dilated, not being broader than the tibia. The metacarpus is as long as the carpus, feebly curved, and finely serrated or pectinated along the hind margin; the lower hind corner is produced into a sharp-pointed, triangular process which, together with the dactylus, forms an imperfect prehensile organ (Pl. XIV, fig. 20); the front side of this metacarpal process is armed with three or four strong teeth. The dactylus is long and slender, feebly curved, and a trifle more than half as long as the metacarpus; it has a circular glandular opening at the hind side of the heel-like base.

The *fifth, sixth, and seventh pairs* (Pl. XIV, fig. 21—24) are subequal in length; the fifth pair are longer than the head and peræon together. The femur is very narrow, a little broader below than above, and fully six times as long as it is broad below; the front margin is fringed with minute hairs, and has the lower corner produced into a sharp-pointed process, which is almost half as long as the genu. The genu is longer than broad, with the front margin fringed with minute hairs, and the lower corner produced and sharp-pointed. The tibia is twice as long as the genu in the fifth and sixth pairs, in the seventh it is a little shorter; the front margin is fringed as in the preceding joint, and has the lower corner produced. The metacarpus is much longer than the two preceding joints together, and is almost as long as the femur in the fifth and sixth pairs, in the seventh on the other hand the carpus is quite as long as the two preceding joints together, and is much shorter than the femur; the front margin is fringed with minute hairs and a few short spines; the lower corner is truncated, not produced; the hind margin has a few minute spines. The metacarpus in the fifth pair is shorter than, in the sixth as long as, and in the seventh much longer than, the carpus; the front margin is armed as in the preceding joint, and has the lower corner produced into a sharp-pointed process as in the third and fourth pairs; the hind margins of the narrowly ex-

cavated, gouge-shaped process are serrated. (Pl. XIV, fig. 23). The dactylus is curved, a fifth or sixth part as long as the metacarpus, and has a circular opening at the base.

The *pleon* is much longer than the peræon, almost as long as the head and peræon together. The segments are much deeper than the peræon, with the hind corner rounded, and a very short, spine-like, dorsal projection in the median line. The first segment is as long as the last three peræonal segments together.

The *pleopoda* (Pl. XIV, fig. 25—27) have the peduncle egg-shaped, and longer than the rami. The two coupling spines (Pl. XIV, fig. 26) are thick and stout, with two hook-like teeth on each side of the stem. The cleft bristle (Pl. XIV, fig. 27) is densely fringed with cilia, and has the apically dilated arm usually quite as long as the other; above the cleft bristle there is a tuft of long simple hairs on the side of the first joint of the ramus. The rami of the first pair have six joints each.

The *wrus* is considerably shorter than the last pleonal segment. The first ural segment is fully twice as long as, and much broader than, the last coalesced, which is more than a third part broader than long.

The *uropoda* (Pl. XIV, fig. 28 and 29). The *first pair* reach almost to the apex of the last pair; the peduncle is almost linear, five times as long as broad, and has the inner margin fringed with minute hairs; the rami are narrowly elongated and sharp-pointed, equal in length, and have both margins fringed with minute hairs (Pl. XIV, fig. 29); they are about four-fifths as long as the peduncle. The *second pair* reach beyond the middle of the outer ramus in the third pair; the peduncle and rami are like those in the first pair. The peduncle of the *third pair* is linear, more than six times as long as broad; the inner margin is fringed with minute hairs; the rami are like those in the preceding pairs but shorter; the inner ramus is a trifle longer than the outer, and is scarcely more than half as long as the peduncle.

The *telson* is broadly rounded, and about a third part as long as the last coalesced ural segment; it is broader than, and about a sixth part as long as, the peduncle of the last pair of uropoda.

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## 2. PHRONIMOPSIS TENELLA, TH. STEBBING, 1888.

**Diagn.** *Caput* segmentis tribus primis peræi brevius, multo altius quam longius. *Peræon* non inflatum; segmenta duo ultima non producta(?). *Pedes peræi* secundi paris pedibus primi paris paullo longiores, apicem carpi pedum tertii paris fere attingentes. Femur pedum quinti paris carpo paullo longius. Rami *pedum uri* marginibus fimbriatis; ramus externus pedum primi paris internum longitudine æquans; ramus externus pedum secundi paris interno brevior. *Telson* quartam partem pedunculi pedum uri ultimi paris longitudine æquans.

The *head* is shorter than the first three peræonal segments together, and is much deeper than long. The *peræon* is not inflated; the last two segments are not produced dorsally(?). The second pair of *peræopoda* are a little longer than the first, and reach almost to the apex of the carpus in the third pair. The femur of the fifth pair is a little longer than the carpus. The rami of the *uropoda* have the margins fringed with minute hairs; the outer ramus of the first pair is as long as the inner; the outer ramus of the second pair is shorter than the inner. The *telson* is a fourth part as long as the peduncle of the last pair of uropoda.

**Colour.** ?

**Length.** »About three-tenths of an inch.» (STEBBING.)

**Hab.** The Pacific, »Lat. 35° N., Japan to Honolulu.» (STEBBING.)

**Syn. 1888.** *Phronimopsis tenella*, TH. STEBBING.

— »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1374, pl. 164.

As I have said above this species comes very near to *Phronimopsis Sarsi*, and the distinguishing characteristics are few, and of small importance, but as the characteristics of the urus and its appendages suggest a distinction I have not united the species.

I refer the reader to the description and drawings given by STEBBING.

3. **PHRONIMOPSIS SPINIFERA**, C. CLAUS, 1879.

Pl. XIV, fig. 30—35.

**Diagn.** *Caput* segmentis tribus primis peræi brevius, duplo altius quam longius. *Peræon* inflatum; segmenta duo ultima in dorso leviter producta. *Pedes peræi* secundi paris pedibus primi paris duplo fere longiores, pedes tertii paris longitudine æquantes. Femur pedum quinti paris earpo longius. Rami *pedum uri* leves; ramus externus interno multo brevior. *Telson* obtuse triangulatum, decimam partem pedunculi pedum uri ultimi paris longitudine æquans.

The *head* is shorter than the first three peræonal segments together, and is twice as deep as long. The *peræon* is globularly inflated; the last two segments are dorsally feebly produced in the median line. The second pair of *peræopoda* are almost twice as long as the first, and about as long as the third. The femur of the fifth pair is longer than the carpus. The rami of the *uropoda* have the margins smooth; the outer ramus is much shorter than the inner. The *telson* is obtusely triangular, and about a tenth part as long as the peduncle of the last pair of uropoda.

**Colour.** Red.

**Length.** 4 mm.

**Hab.** The Northern temperate and tropical region of the Atlantic, Lat. 32° N., Long. 77° 45' W., taken by Captain G. C. ECKMAN; Lat. 17° 22' N., Long. 37° 23' W., taken by the author; the Mediterranean, Messina (CLAUS). (D. M.; F. M.; S. M.; U. M.)

<b>Syn.</b> 1879.	<i>Phronimopsis spinifer</i> , C. CLAUS.	—	»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 64 (6), pl. 1, fig. 1—3.
»	»	J. V. CARUS. 1885.	Prodromus Faunæ Mediterraneæ. Vol. 1, p. 424.
»	»	C. BOVALLIUS. 1887.	»Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 23.
»	»	TH. STEBBING. 1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1377.

*Phronimopsis spinifera* is easily distinguished from its hitherto known congeners by the deep head, the globularly inflated peræon, the great length of the second pair of peræopoda, and by the narrow and not hirsute uropoda.

CLAUS did not give any separate specific diagnosis, but pointed out the following distinctions as being of specific value: the spine-like processes of the peduncles in both pairs of antennæ, and in the labrum, the angularly bent femora of the first two pairs of

peræopoda, and the numerous, red-brown, star-like pigment-spots on the sides of the peræonal segments.

In 1885 CARUS gave the following diagnosis in Latin:

»Articulis basalis antennæ utriusque, labiumque superius aculeis instructa; latera segmentorum maculis stellatis fusco-rubris; femora I et II angulatim curvata.»

From my own examination of fresh specimens I give the following details:

#### The female.

The forepart of the *body* is thick, and inflated, the hind part is very narrow and slender. The head and peræon together are longer than the pleon and urus together.

The *head* is broader above than below; the antennal groove commences above the middle of the front side, and is long and narrow. The head is only a little longer than the first two peræonal segments together, and is considerably broader than the peræon.

The *first pair of antennæ* (Pl. XIV, fig. 31) are longer than the head, but shorter than the head and the first two peræonal segments together. The peduncle consists of a single joint; the inner lower corner is produced into a long, spine-like process, which is considerably longer than the rest of the peduncle. The single flagellar joint is much longer than the peduncle with the process; it is broad at the base, thereafter more slender, nearly cylindrical, and broadly rounded at the apex; on the sides there are a few short projections tipped with hairs.

The *second pair of antennæ* (Pl. XIV, fig. 32) are scarcely longer than the stem of the peduncle in the first pair. The first free joint of the peduncle is twice as broad as long; the second joint is more than three times as long as the first, tapering towards the apex, and perfectly smooth; the single flagellar joint is elongate-conical, nearly as long as the whole peduncle, and is tipped with a few short hairs.

The *mouth-organs* are like those in *Phronimopsis Sarsi*; a tree-jointed mandibular palp is present.

The *peræon* is about three times as long as the head, and is as long the whole pleon. The first two segments are dorsally coalesced, the second being more than twice as long as the first; the third and fourth are equal in length; the following increase in length, and show a very short spine-like projection dorsally in the median line. The epimerals are fused with the segments. The peræon is, at the middle, more than four times as broad as the pleon.

The *branchial sacks* are considerably shorter than half the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda*. The femur is narrow, angularly bent, and as long as the three following joints together. The carpus is longer than the two preceding joints together, and has the hind margin smooth. The metacarpus is scarcely longer than the carpus, with a few short spines on the hind margin. The dactylus is hirsute, and like that in *Phronimopsis Sarsi*.

The *second pair* are in shape exactly like that pair in *Ph. Sarsi*, but have the metacarpus much larger; hanging straight down the second pair reach fully to the apex of

the third. The femur is angularly bent, and is considerably shorter than the three following joints with the carpal process. The carpus is very broad and short, the carpal process is more than three times as long as the rest of the joint, and reaches to the middle of the stem of the metacarpus. The stem of the metacarpus is only a little longer than broad, and is much longer than the femur; the metacarpal process is half as long as the rest of the joint, and is somewhat longer than the stout dactylus.

The *third and fourth pairs* (Pl. XIV, fig. 33) are similar in form, and equal in length. The femur is a trifle broader above than below, and is considerably longer than the three following joints together. The carpus is somewhat shorter than the two preceding joints together, and has three long bristles on the hind margin. The metacarpus is considerably longer than the carpus, with the front margin feebly pectinated, and the lower corner produced into a triangular process, which is armed with one or two low teeth on the front margin. The dactylus is scarcely more than a third part as long as the metacarpus.

The *fifth, sixth, and seventh pairs* (Pl. XIV, fig. 34) are equal in length; the fifth pair are a little shorter than the head and pereon together. The femur is very narrow, more than nine times as long as broad at the apex; the front margin is smooth, and has the lower corner produced and sharp-pointed. The carpus is considerably shorter than the femur, that of the seventh pair is the shortest, being scarcely more than half as long as the femur; it has a single bristle at the middle of the front margin. The metacarpus in the fifth pair is not half as long, that in the sixth more than half as long, and that in the seventh pair fully as long, as the carpus; the front margin is smooth, and the lower corner is produced as in the preceding species. The dactylus is feebly curved.

The *pleon* is shorter than the pereon. The segments are scarcely deeper than the pereon, and have the hind corner obtusely rounded, and a tolerably long dorsal projection in the median line.

The *pleopoda*. The rami of the first pair have four joints each.

The *urus* is scarcely half as long as the last pleonal segment.

The *uropoda* (Pl. XIV, fig. 35). The *first pair* reach to the apex of the third; the peduncle is very narrow linear, more than ten times as long as broad, and scarcely longer than the inner ramus, which is considerably longer than the outer; both rami are smooth. The *second pair* reach to the apex of the peduncle of the last pair; the peduncle is as long as the inner ramus; the outer ramus is much shorter than the inner; both are smooth. The peduncle of the *third pair* is linear, more than ten times as long as broad, and a little longer than the inner ramus, which is considerably longer than the outer; the rami are smooth.

The *telson* is minute, obtusely triangular, and not a fifth part as long as the last coalesced ural segment; it is as broad, and about a tenth part as long, as the peduncle of the last pair of uropoda.

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The ninth family **PHRONIMIDÆ**, J. D. DANA, 1852.

**Diagn.** *Caput* magnum, tumidum, globosum vel conicum. *Oculi* grandes. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ; articulus primus flagelli crassus, elongatus; ceteri in mare plus minusve numerosi, filiformes; in femina nulli. *Antennæ* secundi paris in mare longi, filiformes, parti anteriori capitis affixæ; in femina obsoletæ. *Instrumenta oris* masticatoria, mandibulæ palpo earentes. *Pedes perævi* parium quinque ultimorum ambulatorii, vel pedes quinti paris in instrumenta prensoria transformati. *Pedes uvi* ramis instructi.

The *head* is large, tumid, globular or conical. The *eyes* are large. The first pair of *antennæ* are straight, fixed on the front side of the head; the first joint of the flagellum is thick, and elongate; the following are more or less numerous in the male, and filiform, in the female they are wanting. The second pair of *antennæ* are long and filiform in the male, and are fixed on the front side of the head; in the female they are obsolete. The mouth-organs are adapted for mastication; the mandibles want a palp. The last five pairs of *peræopoda* are walking legs, or the fifth pair are transformed into a prehensile organ. The *uropoda* are provided with rami.

<b>Syn. 1852.</b>	<i>Phronimida</i> ,	J. D. DANA.	—	»On the Classification of the Crustacea Choristopoda or Tetradeceapoda». The American Journal of Science and Arts. 2 <sup>nd</sup> Ser. Vol. 14, p. 315.
	»	»	—	1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 979, 999 and 1442.
	»	»	SPENCE BATE.	1856. »On the British Edriophthalma. Part 1. The Amphipoda». Report of the 25 <sup>th</sup> Meeting of the British Association for the Advancement of Science, at Glasgow, 1855, p. 59.
	<i>Phronimada</i> ,	»	A. WHITE.	1857. A popular History of the British Crustacea, p. 205.
	<i>Phronimida</i> ,	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 316.
	»	»	SPENCE BATE and WESTWOOD.	1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 20.
	»	»	C. CLAUS.	1872. Grundzüge der Zoologie. 2 <sup>te</sup> Aufl., p. 467.
	»	»	»	1875. » 3 <sup>tte</sup> Aufl, p. 518.
	»	»	E. J. MIERS.	1876. Catalogue of the Stalk- and Sessile-eyed Crustacea of New Zealand, p. 129.

<i>Phronimidæ</i> , J. D. DANA.	TH. STREETS.	1877.	»Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. 1877. N:o 7, p. 128.
»	»	C. CLAUS.	1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität. Wien. Tom. 2, p. 60 (2).
»	»	TH. STREETS.	1882. »A Study of the Phronimidæ of the North Pacific Surveying Expedition». Proc. of the U. S. National Museum. Vol. 5, p. 4.
»	»	C. CLAUS.	1884. Grundzüge der Zoologie. 4 <sup>te</sup> Aufl., 1 <sup>ster</sup> Bd, p. 586.
»	»	J. V. CARUS.	1885. Prodrömus Faunæ Mediterrancæ. Vol. 1, p. 422.
»	»	A. GERSTAECKER.	1886. Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Bd. 5. Abth. 2, p. 487.
»	»	G. M. THOMSON and A. CHILTON.	1886. »Critical list of the Crustacea Malacostraca of New Zealand». Trans. and Proc. of the New Zealand Institute. Vol. 18, p. 150.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ.» Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 23.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1342.

When DANA in 1852 for the first time made the Phronimidæ a separate family he divided it into three subfamilies, 1. *Phroniminæ*, with the genera *Phronima*, LATREILLE, and *Primno*, GUÉRIN, 2. *Phrosininæ*, with *Anchylomera*, H. MILNE EDWARDS, *Phrosina*, RISSO, and *Themisto*, GUÉRIN, and 3. *Phorcinæ* with the single genus *Phorcus*, H. MILNE EDWARDS.

SPENCE BATE in 1862 retained the first two subfamilies as composing the family Phronimidæ, only transferring *Primno* to the second subfamily which he called *Phrosinides*, and removing *Themisto* to the *Hyperidæ*. The third subfamily of DANA he considered as an independent family under the name *Phorcidæ*.

CLAUS in 1872 and in 1875 recorded the family Phronimidæ with the genera *Phronima*, *Phronimella*, CLAUS, *Dactylocera*, LATREILLE (= *Phrosina*) and *Primno*. In 1879 he added two new genera *Paraphronima* (see above p. 24) and *Phronimopsis* (see above p. 318), and retained the two subfamilies *Phrosininæ* and *Phroniminæ*.

In 1877 STREETS described a new genus *Anchylonyx*, which he himself in 1882 considered to be a synonym for *Phronimella*; he also pointed out the family characteristics of Phronimidæ.

In 1886 GERSTAECKER recorded the family Phronimidæ with the two subfamilies 1. *Phrosininæ*, comprising the genera *Anchylomera*, *Phrosina*, and *Primno*, and 2. *Phroniminæ* with the genera *Phronima*, *Phronimella*, *Phronimopsis* and *Paraphronima*.

In 1887 I removed *Phrosininæ* from the family Phronimidæ instituting for their reception a new family *Anchylomeridæ*; the Phronimidæ I gave with two subfamilies, 1. *Dairellinæ*, based upon the new genus *Dairella*, and 2. *Phroniminæ* with two genera *Phronima* and *Phronimella*.

In 1888 STEBBING recorded the Phronimidæ, describing new species of *Dairella*, *Phronima*, and *Phronimella*; with regard to the *Phrosininæ* as a family by itself he accepted my views but proposed the name *Phrosinidæ* instead of *Anchylomeridæ* (see below).

The two subfamilies differ from one another in many characteristics, but agree in the building of the eyes, the building of the first pair of antennæ, and the absence of the second pair in the female, the form of the mouth-organs, the fusion of the epimerals with the peræonal segments, and in the form of the seventh pair of peræopoda.

- A.** The head is irregularly globular. All the peræopoda are simple, walking legs.... **1. Dairellinæ.**  
**B.** The head is conical. The first two pairs of peræopoda are more or less subcheliform; the fifth pair form a subcheliform, or a folding hand..... **2. Phroniminæ.**

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The first subfamily **DAIRELLINÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* permagnum, tumidum, inæquabiliter globosum. *Epimera* indicata sed non a segmentis peræi sejuncta. *Pedes peræi* omnes simplices, ambulatorii.

The *head* is very large, tumid, and irregularly globular. The *epimerals* are marked but not separated from the peræonal segments. All the *peræopoda* are simple, walking legs.

It is possible that further anatomical studies of *Dairella* and *Phronima* will make it desirable to place the *Dairellinæ* as an independent family, instead of a subfamily at the side of the *Phroniminæ*, but at present I find it more convenient on ground of the agreement in the above recorded characteristics, to retain the *Dairellinæ* as a subfamily of Phronimidæ.

Hitherto only a single genus *Dairella* is known.

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Genus 1. **DAIRELLA**, C. BOVALLIUS, 1887.

**Diagn.** Caput magnum, plus minusve globosum. *Peræon* latum, post non angustatum. *Pedes peræi* primi et secundi parium simplices, non subcheliformes, sequentibus simillimi ac paullulo solum breviores. Pedunculus *pedum uri* ultimi paris valde dilatatus.

The *head* is large, and more or less globular. The *peræon* is broad, not narrowed behind. The first and second pairs of *peræopoda* are simple, not subcheliform, very similar to the following, and only a little shorter. The peduncle of the last pair of *uropoda* is much dilated.

**Syn.** 1887. *Dairella*, C. BOVALLIUS.

— »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 24.

» » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1342.

The genus *Dairella* is one of the most remarkable among the Hyperiidæan genera because it is »isopodous», i. e., all the pairs of *peræopoda* are subsimilar in shape, none of them forming a prehensile organ of any kind.

The type for the genus was *Paraphronima californica*, proposed by me in 1885;<sup>1)</sup> at the same time as the new genus *Dairella* was instituted I gave a short description of a new species from the Atlantic, *Dairella latissima*.

STEBBING in 1888 proposed the new specific name *Dairella Bovallii* for a species which however is no doubt identical with *D. latissima*. He says that *D. Bovallii* is distinguished from *D. latissima* »by the wrist of the first gnathopods not being twice as long as the hand, and by having the peduncles of the first pair of uropods much longer, instead of shorter, than those of the second pair». The first difference is due to a misunderstanding of the wording in my diagnosis, caused by the omission of two commas; the passage runs, »Carpus of first pair of pereopoda twice broader and longer than metacarpus», instead of »Carpus of first pair of pereopoda twice broader, and longer, than metacarpus». The other difference exists but is only sexual, so that in the male specimens the peduncle of the first pair of uropoda reaches fully to the apex of the peduncle of the second pair, but in the females it does not reach as far down. At the time when I wrote the original diagnosis I did not know any male specimens.

The characteristics used for the specific distinction are:

1. The size of the head.
2. The length of the fifth pair of *peræopoda*.
3. The relation between the length of the femur and of the carpus in the fifth pair.
4. The breadth of the femur in the last three pairs of *peræopoda*.
5. The form of the rami in the last pair of uropoda.

<sup>1)</sup> C. BOVALLIUS. »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 10. N:o 14, p. 11.

The two species are easily distinguished from one another:

- A.** The head is fully as long as the first three peræonal segments together. The fifth pair of peræopoda are scarcely longer than the fourth; the femur is not longer than the carpus. The rami of the uropoda are narrowly ovate ..... **1. D. californica.**
- B.** The head is much shorter than the first three peræonal segments together. The fifth pair of peræopoda are considerably longer than the fourth; the femur is longer than the carpus. The rami of the last pair of uropoda are broadly ovate **2. D. latissima.**

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1. **DAIRELLA CALIFORNICA**, C. BOVALLIUS, 1885.

Pl. XV, fig. 21—33.

**Diagn.** *Caput* segmenta tria prima peræi longitudine æquans. Segmenta duo priora *peræi* coalita, cetera libera. *Pedes peræi* quinti paris pedibus quarti paris haud longiores, ac quam peræon multo breviores; femur carpo multo longius. Femur pedum parium trium ultimorum angustum, plus quam quinquies longius quam latius. *Pedes uri* primi paris apicem pedum ultimi paris superantes; rami pedum ultimi paris anguste ovati.

The *head* is as long as the first three peræonal segments together. The first two *peræonal* segments are coalesced, the following are free. The fifth pair of *peræopoda* are not longer than the fourth, and are shorter than the peræon; the femur is much longer than the carpus. The femur of the last three pairs is narrow, more than five times as long as broad. The first pair of *uropoda* reach beyond the apex of the last pair; the rami of the last pair are narrowly ovate.

**Colour.** Whitish red, with numerous spots of dark red.

**Length.** 9 mm.

**Hab.** The Northern temperate and tropical regions of the Pacific, off the West coast of California. (S. M.).

**Syn. 1885.** *Paraphronima californica*, C. BOVALLIUS. — »On some forgotten genera among the Amphipodous Crustacea». Bih. t. K. Vet. Ak. Handl. Bd. 10. N:o 14, p. 11.

*Dairella* » » — 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 24.

*Dairella californica* is at once distinguished from *D. latissima* by the large, inflated head, the shortness of the fifth pair of peræopoda, and by the narrow femur in the last three pairs.

Hitherto I know only the female form.

## The female.

Fig. 21—33.

The *body* is tolerably broad, not at all compressed, but is scarcely more than twice as long as the pleon. The surface of the segments is uneven, forming irregular tubercles and furrows. The head and peræon together are much longer than the pleon, the urus and the last pair of uropoda together.

The *head* is irregularly globular, inflated, and rises considerably above the dorsal line of the peræon; it is nearly as broad as long, and is only a little deeper than long. There exists no proper antennal groove but the antennæ are fixed directly on the smooth surface of the front side of the head.

The *eyes* are divided into four portions, a top-portion and an inferior portion on either side just as in *Phronima*<sup>1)</sup>; the top-portion is much larger than the inferior and is separated from that in the other half of the head by a tolerably broad strip on the crown of the head.

The *first pair of antennæ* (Pl. XV, fig. 22) are considerably more than half as long as the head. The first joint of the peduncle is somewhat longer than the two following joints together; the third joint is longer than the second. The single flagellar joint is finger-like, twice as long as the whole peduncle, and is fringed with comparatively short olfactory hairs on the inner side.

Of a second pair of antennæ there is not the slightest trace.

The *mouth-organs* are closely like those in *Dairella latissima*, and will be described under this latter species.

The *peræon* is broad, rather depressed than compressed, resembling more the common form in Isopoda than that usually occurring in the Amphipoda; the form of the peræon approaches that in *Euthamneus* and also that in *Scina* (= *Tyro*), but is not carinated as in this latter genus. The first and second segments are completely coalesced, only the lowest parts, the epimerals, being free. Along the front margin of the first segment there is a duplicature of the integument, probably serving for the articulation of the head. The third segment is shorter than the first two together, and equal to the fourth; the fifth and sixth are a little longer; the seventh is as long as the third.

The *epimerals* are firmly coalesced with the corresponding segments, but their upper limit is marked by a ridge which runs along the under margin of the peræon.

The *branchial vesicles* are bottle-shaped, and are attached to the second and four following pairs of peræopoda; those of the second, third, and sixth pairs are not half as long as the corresponding femora; those of the fourth and fifth pairs are somewhat more than half as long as the femora.

The *ovitetrices* are much broader and longer than the branchial vesicles, broad, and feebly rounded at the apex.

<sup>1)</sup> Compare C. CLAUS, »Der Organismus der Phronimiden», Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 124—133 (66—75). The »Top-portion» of the eye corresponds with »das Scheitelauge», in CLAUS's treatise.

The *first pair of peræopoda* (Pl. XV, fig. 23) are only a little shorter than the second. The femur is linear, about five times as long as broad, and quite as long as the three following joints together; the under margin is fringed with short, spine-like teeth. The genu is broader than long, and has the under margin armed as in the femur. The tibia is considerably longer than the genu, and is armed in the same way. The carpus is narrow, almost linear, and a little more than half as long as the femur; the hind margin is feebly concave, and is fringed with equidistant, short spines. The metacarpus is somewhat narrower than, and a little more than half as long as, the carpus; it tapers slowly towards the apex, and has the hind margin set with short spines. The dactylus is almost straight, and is about a fifth part as long as the metacarpus. Glands, forming long bands, are developed in all the joints, except dactylus.

The *second pair* (Pl. XV, fig. 24 and 25) closely resemble the first, but are a little longer, and have the carpus fully two-thirds as long as the femur, and the front and under margins of the metacarpus fringed with short, slender bristles. The second pair reach beyond the apex of the carpus in the third pair.

The *third and fourth pairs* (Pl. XV, fig. 26 and 27) are similar to the two preceding pairs but want the armature of spines. The femur is not fully five times as long as broad. The carpus is as long as the femur, and is twice as long as the metacarpus. The dactylus is feebly curved, and almost a fourth part as long as the metacarpus. Glands are developed as in the preceding pairs.

The *fifth, sixth, and seventh pairs* (Pl. XV, fig. 28—31) are similar to the preceding pairs in form, but the fifth pair is a little longer than the sixth and seventh; these last pairs are equal in length, and shorter than the third and fourth pairs. The femur is about five times as long as broad, and is, in the fifth pair, as long as, in the sixth and seventh, much longer than, the three following joints together. The metacarpus is not half as long as the carpus, in the fifth pair; in the sixth and seventh pairs it is a trifle more than half as long as the carpus. The dactylus is about a third part as long as the metacarpus, and has an ovate opening for the glandular secretion at the base.

The *pleon* is not deeper than the peræon, and is a little shorter than the last four peræonal segments together; the hind corner of the pleonal segments is obtusely rounded.

The *pleopoda* (Pl. XV, fig. 32). The peduncle is considerably longer than the rami. The coupling spines are *six* in number planted in a straight row; the stem is perfectly smooth (Pl. XV, fig. 32). I could not detect any cleft bristle. The rami of the first pair have nine joints each.

The *urus* is longer than the last pleonal segment. The first ural segment is a little broader, and a trifle longer, than the last coalesced segment, which is nearly twice as broad at the base as it is long.

The *uropoda* (Pl. XV, fig. 33). The *first pair* reach beyond the apex of the last pair; the peduncle is dilated, laminar, twice as broad at the apex as at the base, nearly three times as long as broad at the apex, and not fully twice as long as the inner ramus; the inner margin is fringed with spine-like teeth; the rami are lanceolate, equal in length, and sharply serrated on both margins; they are inserted near the corners of the peduncle, so that there is a wide space left between them. The *second pair* reach about to the middle

of the outer ramus in the third pair; the peduncle is much narrower than in the first pair, and is narrower at the base than at the apex; it is four times as long as broad at the apex, and is twice as long as the inner ramus; it has the inner margin armed as in the first pair; the rami are elongate-lanceolate, and are subequal in length, the outer rather somewhat longer; the rami are serrated on both margins. The peduncle of the *third pair* is broad, laminar, constricted at the base, and more than twice as long as it is broad at the base, and more than twice as long as the inner ramus; the inner margin is fringed with minute spines; the rami are narrowly ovate, equal in length, and much distant from one another; the inner ramus is serrated on the both margins; the outer ramus is serrated on the inner margin and smooth on the outer.

The *telson* is broader than long, obtusely rounded, and less than a third part as long as the last coalesced ural segment; it is a little more than half as broad, and a seventh part as long, as the peduncle of the last pair of uropoda.

## 2. DAIRELLA LATISSIMA, C. BOVALLIUS, 1887.

Pl. XV, fig. 1—20.

**Diagn.** *Caput* segmentis tribus primis peræi multo brevius. Segmenta duo priora *peræi* coalita, cetera libera. *Pedes peræi* quinti paris pedibus quarti paris multo longiores, ac quam *peræon* longiores; femur carpo haud longius. Femur pedum parium trium ultimorum modice dilatatum, ter quaterve longius quam latius. *Pedes uri* primi paris apicem pedum ultimi paris non attingentes; rami pedum ultimi paris late ovati.

The *head* is much shorter than the first three *peræonal* segments together. The first two *peræonal* segments are coalesced, the following are free. The fifth pair of *peræopoda* are much longer than the fourth, and are longer than the *peræon*; the femur is not longer than the carpus. The femur of the last three pairs is moderately dilated, three or four times as long as broad. The first pair of *uropoda* do not reach to the apex of the last pair; the rami of the last pair are broadly ovate.

**Colour.** Red, with spots and bands of very deep red, especially on the legs.

**Length.** 6—8 mm.

**Hab.** The temperate and tropical regions of the Atlantic. (D. M.; F. M.; S. M.; U. M.).

- Syn. 1887.** *Dairella latissima*, C. BOVALLIUS. — »Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 1. N:o 16, p. 24.
- 1888.** *Dairella Bovallii*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, 1343, pl. 158.

The reasons why I have given *Dairella Bovallii* as a synonym for *D. latissima* will be easily appreciated, I think, on a comparison of my description given here with that of the former species by STEBBING.

Of this species I have examined several specimens, males as well as females.

### The male.

Pl. XV, fig. 1—15.

The *body* is almost as broad as in the female of the preceding species. The head and peræon together are a little shorter than the pleon, the urus, and the last pair of uropoda together.

The *head* is almost globular, but not inflated, and does not rise above the dorsal line of the peræon; it is a little broader and deeper than long, and is not fully as long as the first two peræonal segments and half the third together.

The *eyes* are distributed as in the preceding species.

The *first pair of antennæ* (Pl. XV, fig. 2) reach beyond the hind margin of the last peræonal segment. The peduncle is thick and robust; the first joint is longer than the two following together; the third is longer than the second. The first joint of the flagellum is thick and tumid, about as long as the whole peduncle, and is densely set with long, olfactory hairs on the inner and under sides; the second joint is short, the third is twice longer; the fourth and following are still longer, and subequal in length. The flagellar joints are sixteen or eighteen in number.

The *second pair of antennæ* (Pl. XV, fig. 3) are not fully as long as the first, and reach nearly to the hind margin of the last peræonal segment. The first free joint of the peduncle is very short; the second is as long and broad as the third; the first flagellar joint is considerably longer than the last peduncular joint; the following are shorter, subequal in length, and are fringed on the under margin with very short hairs. The flagellar joints are about twenty in number.

The *labrum* (Pl. XV, fig. 4) is unsymmetrically bilobed, the lobes are set with minute hairs.

The *mandibles* (Pl. XV, fig. 5) are tolerably long. The incisive lamina is feebly bent, sharply serrated on the edge, with numerous small teeth; the secondary lamina of the left mandible is somewhat smaller than the principal, and is armed with only half a dozen small teeth. The molar tubercle is large, thick, and strongly denticulated. The outer side of the mandibles is evenly convex and smooth.

The *labium* is broad; the lateral lobes are feebly projecting and irregularly rounded.

The *first pair of maxillæ* (Pl. XV, fig. 6) have the apical part of the principal lamina tongue-like, armed with four spine-like teeth, and fringed with slender, short hairs. The secondary lamina is broad at the apex, armed with a single tooth, and fringed with short hairs.

The *second pair of maxillæ* (Pl. XV, fig. 7) are comparatively small. The apical part of the principal lamina is narrow, linear rounded at the apex, and fringed with min-

ute hairs; the secondary lamina is long, and is provided at the apex with two short spines and a few minute hairs.

The *maxillipeds* (Pl. XV, fig. 8) have the stem long, and only a little narrower at the apex than at the base. The median lobe is small, only a little projecting, and obtusely rounded at the apex. The lateral laminae are narrow at the apex, and sparingly fringed with short hairs.

The *peræon* is like that in the preceding species, the first two segments being coalesced, and the fifth and sixth being the longest.

The *epimerals* are coalesced with the segments, and their upper limit marked by a ridge.

The *branchial vesicles* are more than half as long as the femora of the corresponding pairs of peræopoda.

The *first pair of peræopoda* (Pl. XV, fig. 9 and 10) are about as long as the second. The femur is about four times as long as broad, and is considerably longer than the three following joints together, and has the under margin fringed with minute spines. The carpus is more than half as long as the femur, the hind margin is set with minute spines. The metacarpus is more slender than the carpus, being scarcely more than half as broad; it is two-thirds as long as the carpus. The dactylus is feebly curved (Pl. XV, fig. 10), and is a fourth part as long as the metacarpus.

The *second pair* are closely similar to the first, and reach to the middle of the metacarpus in the third pair. The femur is somewhat more dilated than in the first pair, three and a half times as long as broad. The carpus is only a little shorter than the femur.

The *third and fourth pairs* (Pl. XV, fig. 11 and 12) are similar in shape and equal in length. The femur is nearly four times as long as broad. The carpus is much shorter than the femur, and is about a third longer than the metacarpus. The dactylus is sometimes reduced in length, thick, rounded at the apex, and provided with a very large glandular opening.

The *fifth pair* are the longest of all, much longer than the fourth pair, and somewhat longer than the peræon. The femur is three times as long as broad, and is about as long as the two following joints and half the carpus together. The carpus is a little longer than the femur, and is not twice as long as the metacarpus. The dactylus is about a fourth part as long as the metacarpus.

The *sixth and seventh pairs* (Pl. XV, fig. 13) are equal in length, nearly four-fifths as long as the fifth pair, and a little shorter than the third and fourth pairs. The femur is somewhat dilated, and only a little more than three times as long as broad; in the sixth pair it is nearly as long as, in the seventh longer than, the three following joints together. The metacarpus is fully two-thirds as long as the carpus. The dactylus is scarcely a third part as long as the metacarpus.

The *pleon* is a little deeper than the peræon, and is quite as long as the last five peræonal segments together. The hind corner of the pleonal segments is broadly rounded.

The *pleopoda* (Pl. XV, fig. 14). The peduncle is longer than the rami. The coupling spines are ten or twelve in number, and are placed in a semicircular row; the stem is smooth. The outer ramus of the first pair has nine joints, the inner eight.

The *urus* is about as long as the last pleonal segment. The first ural segment is much broader, and a little longer, than the last coalesced, which is about a third part broader than long.

The *uropoda*. The *first pair* do not reach to the apex of the third pair; the peduncle is very broad and laminar, a little broader above than below, and a trifle more than twice as long as broad at the apex; it is finely pectinated on the inner margin, and is not fully twice as long as the inner ramus; the rami are lanceolate, and serrated on both margins; the outer ramus is a trifle longer than the inner. The *second pair* reach beyond the apex of the peduncle in the third pair, but do not reach to the middle of the outer ramus; the peduncle does not reach beyond the apex of the peduncle in the first pair; it is comparatively narrow, and more than four times as long as broad at the apex; it is serrated on the inner margin, and is a little more than twice as long as the inner ramus; the rami are lanceolate, serrated on both margins, and about equal in length, the outer rather the longer. The peduncle of the *third pair* is broader than that of the first, about twice as long as broad, and is finely pectinated along the inner margin; it is nearly three times as long as the inner ramus; the rami are not as widely separated as in the preceding species, are broadly ovate, equal in length, serrated on both margins, and are considerably shorter than the breadth of the peduncle.

The *telson* is broader than long, broadly rounded, and nearly a third part as long as the last coalesced ural segment; it is scarcely more than a third part as broad, and about a fifth part as long, as the peduncle of the last pair of uropoda.

#### The female.

Pl. XV, fig. 16—20.

The forepart of the *body* (Pl. XV, fig. 16) is very dilated, the peræon being at the middle about three times as broad as the pleon, and more than twice as broad as the head.

The *head* is twice as broad as long, only a fourth part deeper than long, and is only a trifle longer than the first two coalesced peræonal segments. It is more flattened anteriorly than in the male, but without antennal groove.

The *first pair of antennæ* (Pl. XV, fig. 17) are like that pair in the female of *Dairella californica*, but the single flagellar joint is three times as long as the whole peduncle.

The *mouth-organs* are exactly like those in the male.

The *peræon* seen from above is nearly as broad as it is long. The last five segments are subequal in length.

The *branchial vesicles* (Pl. XV, fig. 19) are comparatively somewhat shorter than in the male.

The *ovitetrices* (Pl. XV, fig. 19) are large, almost rectangular, and feebly rounded at the apex. They are fully as long as the femora of the corresponding pairs of peræopoda.

The *peræopoda* (Pl. XV, fig. 18) closely agree with those in the male, and the glands are even more developed.

The *pleon* is a little deeper than the *peræon*, and is nearly as long as the last four *peræonal* segments together.

The *urus* is much longer than the last *pleonal* segment. The first *ural* segment is as long as, and scarcely broader than, the last *coalesced* segment, which is somewhat broader than long.

The *uropoda* (Pl. XV, fig. 20. The *first pair* reach a little beyond the middle of the outer *ramus* of the last pair; the *peduncle* does not reach to the apex of the *peduncle* in the second pair. In other respects the *uropoda* are like those in the male.

### The second subfamily PHRONIMINÆ.

**Diagn.** *Caput* magnum, altum, conicum. *Epimera* cum *segmentis peræi* coalita. *Pedes peræi* quinti *paris instrumenta prensoria* formantes.

The *head* is large, deep, and conical. The *epimerals* are *coalesced* with the *peræonal* segments. The fifth pair of *peræopoda* form a *prehensile organ*.

<b>Syn. 1852.</b>	<i>Phroniminae</i> , J. D. DANA.	—	»On the Classification of the Crustacea Choristopoda or Tetradecepoda». The American Journal of Science and Arts. Second Series. Vol. 14, p. 315.
	»	—	1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000, 1001 and 1442.
	<i>Phronimides</i> , SPENCE BATE.	—	1862. Catal. Amph. Crust. Brit. Museum, p. 316.
	»	SPENCE BATE and WESTWOOD.	1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 20.
	<i>Phroniminae</i> , J. D. DANA.	TH. STREETS.	1877. »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum, 1877, p. 128.
	»	C. CLAUS.	1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 61 (3).
	»	J. V. CARUS.	1885. Prodrömus Faunæ Mediterraneæ. Vol. 1, p. 423.
	»	A. GERSTAECKER.	1886. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Bd. 2 <sup>te</sup> Abth., p. 488.

*Phroniminæ*, J. D. DANA. C. BOVALLIUS.

1887. »Systematical list of the Amphipoda Hyperiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 24.

The name *Phroniminæ* for a *subfamily* including *Phronima* and *Primno*, was used as early as in 1852 by DANA, who placed it by the side of the subfamilies *Phrosininæ* and *Phorcinae*, in the family *Phronimidae*.

He gave the following diagnosis of *Phroniminæ*:

»Abdomen versus basin sat gracile. Pedes 5ti magna manu didactyla vel monodactyla confecti, 3tii, 4ti extremitate graciles, non prehensiles.»

SPENCE BATE in 1862 retained the first two subfamilies as constituting the family *Phronimidae*, but changed the names to *Phronimides* and *Phrosinides*, without giving any reasons for the change. He rightly transferred *Primno* from the former to the latter subfamily.

In 1868 SPENCE BATE and WESTWOOD retained the same division of the family.

In 1877 STREETS recorded the family with the two subfamilies *Phroniminæ* and *Phrosininæ*.

In 1879 CLAUS gave the *Phronimidae* with the same two subfamilies, *Phroniminæ* containing the four genera *Phronima*, *Phronimella*, *Paraphronima* and *Phronimopsis*.

In 1885 CARUS and in 1886 GERSTAECKER recorded the same two subfamilies as CLAUS had given, with exactly the same limitation.

In 1887 I removed *Phrosininæ* from *Phronimidae*, instead adding the new subfamily *Dairellinæ* (see above p. 331).

The two genera *Phronima*, LATREILLE, and *Phronimella*, CLAUS, thus constituting the subfamily *Phroniminæ*, are easily distinguished from one another by the form of the fifth pair of peræopoda and of the second pair of uropoda.

- A. The carpus of the fifth pair of peræopoda is thick and broadly dilated, with the lower front corner strongly produced; the carpus forms together with the metacarpus a perfect subcheliform hand. The second pair of uropoda are well developed..... 1. *Phronima*.
- B. The carpus of the fifth pair of peræopoda is thin, long, and narrow, and is only feebly dilated at the apex, with the lower hind corner not produced; the carpus forms together with the metacarpus an imperfect folding hand. The second pair of uropoda are more or less rudimentary in the male and entirely wanting in the female..... 2. *Phronimella*.

Genus 1. **PHRONIMA**, P. A. LATREILLE, 1802.

**Diagn.** *Caput* altum, conicum. *Peræon* compressum, post anguste elongatum. *Pedes peræi* primi et secundi parium subcheliformes, sequentibus dissimiles et multo breviores. Metacarpus pedum tertii ac quarti parium non elongatus. *Pedes* quinti paris subcheliformes. *Pedes uri* secundi paris completi. *Telson* subterminale.

The *head* is deep and conical. The *peræon* is compressed, the hind part narrowly elongated. The first two pairs of *peræopoda* are subcheliform, dissimilar to the following, and much shorter. The metacarpus of the third and fourth pairs is not elongated. The fifth pair are subcheliform. The second pair of *uropoda* are complete. The *telson* is fixed subterminally.

<b>Syn. 1802.</b>	<i>Phronima</i> , P. A. LATREILLE.	—	Histoire naturelle générale et particulière des Crustacés et des Insectes. Tome 3 <sup>me</sup> , p. 38.
"	"	—	1803. " Tome 6 <sup>me</sup> , p. 289.
"	"	L. A. G. BOSCH.	1803. »Phronime». Nouveau Dictionnaire d'Histoire naturelle. Tome 17 <sup>me</sup> , p. 422.
"	"	A. M. C. DUMÉNIL.	1806. Zoologie analytique ou Méthode naturelle de Classification des Animaux, p. 184.
"	"	P. A. LATREILLE.	1806. Genera Crustaceorum et Insectorum. Tom. 1 <sup>mus</sup> , p. 56.
"	"	"	1810. Considérations générales sur l'ordre naturel des Animaux composant les classes des Crustacés, des Arachnides, et des Insectes, p. 103.
"	"	W. E. LEACH.	1813. »Crustaceology». The Edinburgh Encyclopædia. Vol. 7, p. 433.
"	"	"	1815. »A tabular View of the external Characters of Four Classes of Animals, which Linné arranged under Insecta, etc.» The 'Trans. of the Linn. Soc. of London. Vol. 11. Part. 2, p. 355.
"	"	C. S. RAFINESQUE-SCHMALTZ.	1815. Analyse de la Nature etc., p. ?
"	"	A. RISSO.	1816. Histoire naturelle des Crustacés des environs de Nice. p. 119.
"	"	P. A. LATREILLE.	1816. »Amphipoda». Nouveau Dictionnaire d'Histoire naturelle. Tome 1 <sup>er</sup> , p. 467.
"	"	"	1817. Le Règne Animal, par G. Cuvier. Tome 3 <sup>me</sup> , p. 46.

<i>Phronima</i> , P. A. LATREILLE.	J. B. P. A. DE LAMARCK.	1818. Histoire naturelle des Animaux sans vertèbres. Tome 5 <sup>me</sup> , p. 178.
»	A. G. DESMAREST.	1823. »Malacostracés». Dictionnaire des Sciences naturelles. Tome 28 <sup>me</sup> , p. 346.
»	P. A. LATREILLE.	1825. Familles naturelles du Règne Animal, p. 289.
»	»	1825. »Phronime». Encyclopédie Méthodique. Histoire naturelle. Tome 10 <sup>me</sup> , p. 113.
»	A. G. DESMAREST.	1825. Considérations générales sur la classe des Crustacés, p. 257.
»	A. RISSO.	1826. Histoire naturelle des principales productions de l'Europe méridionale. Tome 5 <sup>me</sup> , p. 90.
»	H. E. STRAUS-DURCKHEIM.	1828. Considérations générales sur l'Anatomie comparée des Animaux articulés etc., p. 22 bis.
»	J. C. ZENKER.	1828. Das thierische Leben und seine Formen, p. 349.
»	A. G. DESMAREST.	1828. Histoire naturelle des Crustacés --- par L. A. G. BOSE. 2 <sup>de</sup> éd. Tome 2 <sup>nd</sup> , p. 116.
»	F. E. GUÉRIN.	1828. »Phronime». Dictionnaire classique d'Histoire naturelle. Tome 13 <sup>me</sup> , p. 437.
»	P. A. LATREILLE.	1829. Le Règne Animal -- par Cuvier. Nouvelle éd. Tome 4 <sup>me</sup> , p. 116.
»	H. MILNE EDWARDS.	1830. »Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences nat. Tome 20 <sup>me</sup> , p. 394.
»	P. A. LATREILLE.	1831. Cours d'Entomologie, p. 399.
»	J. C. ZENKER.	1832. De Gammari Pulicis, Fabr. historia naturali, p. 1.
»	H. MILNE EDWARDS.	1835. »Observations sur les changemens de forme que divers Crustacés éprouvent dans le jeune âge». Ann. des Sciences nat. 2 <sup>nde</sup> Sér. Tome 3 <sup>me</sup> , p. 329.
»	P. A. LATREILLE.	1836. Le Règne Animal --- par Cuvier. 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 203.
»	F. S. VOIGT.	1836. Das Thierreich --- vom Baron von Cuvier. 4 <sup>ter</sup> Bd., p. 200.
»	H. BURMEISTER.	1837. Handbuch der Naturgeschichte. 2 <sup>te</sup> Abth. Zoologie, p. 569.
»	H. LUCAS.	1838. »Phronime». Dictionnaire pittoresque d'Histoire naturelle. Tome 7 <sup>me</sup> , p. 426.

- Phronima*, P. A. LATREILLE. H. MILNE EDWARDS. 1838. Histoire naturelle des Animaux sans vertèbres, par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 301.
- » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 368.
- » » » 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 91.
- » » A. WHITE. 1847. List of the Specimens of Crustacea in the Collection of the British Museum, p. 91.
- » » H. MILNE EDWARDS. 1849. Le Règne Animal, --- par G. Cuvier. Ed. acc. des planches, p. 171.
- » » H. LUCAS. 1849. »Phronima». Dictionnaire universel d'Histoire naturelle --- ---, par Ch. d'Orbigny. Tome 10<sup>me</sup>, p. 8.
- » » J. VAN DER HOEVEN. 1849. Handboek der Dierkunde. 2<sup>de</sup> Uitg. 1<sup>ste</sup> Deel, p. 758.
- » » H. LUCAS. 1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238.
- » » J. D. DANA. 1852. »On the Classification of the Crustacea Choristopoda or Tetradecapoda». The American Journal of Science and Arts. 2<sup>nd</sup> Ser. Vol. 14, p. 315.
- » » » 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000 and 1442.
- » » A. COSTA. 1853. »Fronima», p. 1. Fauna del Regno di Napoli.
- » » A. WHITE. 1857. A popular History of the British Crustacea, p. 208.
- » » SPENCE BATE. 1858. »On the Nidification of Crustacea». Ann. and Mag. of Nat. Hist. 3<sup>rd</sup> Ser. Vol. 1, p. 168.
- » » P. GERVAIS and P. J. VAN BENEDEEN. 1859. Zoologie médicale. Tome 1<sup>er</sup>, p. 488.
- » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 316.
- » » A. GERSTAECKER. 1863. Handbnch der Zoologie von W. Ch. E. Peters, J. V. Carus and C. E. A. Gerstaecker. 2<sup>ter</sup> Band, p. 383.
- » » SPENCE BATE and WESTWOOD. 1868. A History of the British Sessile-eyed Crustacea. Vol. 2, p. 21.
- » » C. CLAUS. 1872. Grundzüge der Zoologie. 2<sup>te</sup> Aufl., p. 467.

- Phronima*, P. A. LATREILLE. J. D. MACDONALD. 1874. »On the Anatomy and Habits of the genus *Phronima*«. Proe. Roy. Soc. of London. Vol. 22, p. 154—158, pl. 1.
- » » A. E. VERRIL and S. I. SMITH. 1874. »Report upon the Invertebrate Animals of Vineyard Sound» etc. Report of the Commission of Fish and Fisheries 1871—72, p. 567.
- » » C. CLAUS. 1875. Grundzüge der Zoologie. 3<sup>te</sup> Aufl., p. 518.
- » » E. J. MIERS. 1876. Catalogue of the Stalk- and Sessile-eyed Crustacea of New Zealand, p. 129.
- » » C. CLAUS. 1878. »Ueber Herz und Gefässsystem der Hyperiden«. Zoologischer Anzeiger. Vol. 1, p. 269.
- » » P. MAYER. 1878. »Careinologische Mittheilungen«. Mittheilungen aus der Zool. Station zu Neapel. Bd. 1, p. 40—48, pl. 1, fig. 2—5, 7—9, and 11—15.
- » » C. CLAUS. 1879. »Der Organismus der Phronimiden«. Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 62 (4).
- » » H. GRENACHER. 1879. Untersuchungen über das Sehorgan der Arthropoden, p. 111—114.
- » » A. WRZESNIEWSKI. 1879. »Vorläufige Mittheilungen über einige Amphipoden. Beiträge zur Anatomie der Amphipoden«. Zoologischer Anzeiger. Vol. 2, p. 568.
- » » C. CLAUS. 1880. Grundzüge der Zoologie. 4<sup>te</sup> Aufl. 1<sup>ster</sup> Bd, p. 587.
- » » Y. DELAGE. 1881. Contribution à l'étude de l'appareil circulatoire des Crustacés édriophthalmes marins». Archives de la Zoologie expérimentale et générale. Vol. 9, p. 87—120.
- » » TH. STREETS. 1882. »A Study of the Phronimidæ of the North Pacific Surveying Expedition«. Proe. of the U. S. National Museum. Vol. 5, p. 4.
- » » J. CARRIÈRE. 1885. Die Sehorgane der Thiere vergleichend anatomisch dargestellt, p. 160—166.

<i>Phronima</i> , P. A. LATREILLE.	J. V. CARUS.	1885. Prodomus Faunæ Mediterraneæ. Vol. 1 <sup>mus</sup> , p. 423.
»	» A. GERSTÆCKER.	1886. Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Band. 2 <sup>ter</sup> Abth., p. 488.
»	» C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ», Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 25.
»	» G. M. GILES.	1887. »On Six new Amphipoda from the Bay of Bengal». Journ. of the Asiatic Soc. of Bengal. Vol. 56. Part 2, N:o 2, p. 212.
»	» R. KOEHLER.	1887. »Recherches sur la structure des fibres musculaires chez les Edriophthalmes». Journ. de l'Anatomie et de la Physiologie normales et pathologiques. Tome 23 <sup>me</sup> , p. 118.
»	» TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1346.
1832. <i>Bivonia</i> , A. COCCO.	—	»Su di alcuni nuovi crustacei de'mare di Messina». Effemeridi scientifiche per la Sicilia. Tomo 2 <sup>do</sup> , p. 208.

*Phronima* is as a genus by itself the oldest in the whole tribe being instituted by LATREILLE as early as in 1802 in his »Histoire naturelle générale et particulière des Crustacés et Insectes», third volume. He gave the following diagnosis:

»Antennes apparentes au nombre de deux, presque sétacées, des trois articles. Des palpes saillans, setacés. Dix pattes; les quatre antérieures et les quatre postérieures terminées par une pièce conique, un peu arquée; celles de la troisième pair les plus longues, et terminées par une main ayant deux pinces. Derniers anneaux étroits: plusieurs stylets alongés, articulés et bifides, à l'extrémité du corps.

Corps mou. Tête fort grande. Animal vivant dans un corps ovulaire, transparent, presque gélatineux (Cadavre d'un Beroë?)»

In the sixth volume of the same work he gave a close description of the type species *Phronima sedentaria*, FORSKÅL.

In 1806 he characterized the genus with the following words:

»Pedes decem; tertio pari longiore manibus didactylis.»

In the same year DUMÉRIL gave an extract of LATREILLE's description.

In 1815 LEACH gave the following diagnosis:

»*Caput* magnum, nutans; *antennæ* biarticulatæ, articulo primo parvo. *Thorax* 7-articulatus, segmentis omnibus pedigeris. *Pedes* compressi; paria duo articulo antepenultimo ad apicem processu foliaceo instructa; articulo penultimo apice bifido, ungue minuto terminato: paria

3 et 4 simplicia longiora, suberassiora ungue arcuato terminata: par quintum magnum, longissimum, crassius, didactylum, articulo primo ad apicem gradatim subincrassato; secundo subtrigono; tertio ovato, ad basin subabrupte angustato; ultimo ad basin angustato digitis curvatis interne unidentatis; paria 6 et 7 simplicia, ungue subrecto terminata. *Abdomen* triarticulatum, segmento singulo utrinque appendice duplici pedunculo insistente instructo. *Cauda* biarticulata; articulo primo infra utrinque processu biarticulato stylis duobus terminato; articulo secundo processibus quatuor, stylis duobus instructis, processu inferiore biarticulato, superiore triarticulato.»

In 1816 Bosc repeated the diagnosis given by LATREILLE.

In the same year Risso recorded the genus as follows:

»Le nom donné à la première espèce de phronime, a rapport à l'habitude qu'elle a de s'emparer des divers radiaires molasses pour fixer son domicile dans leur corps. Semblables aux argonautes et aux carinaires, ces crustacés viennent pendant le calme des eaux, dans la belle saison voyager dans ces nacelles vivantes, sans se donner le soin de nager. Néanmoins lorsqu'ils veulent plonger, ils rentrent dans leur gîte et se laissent tomber par le seul effet de la pesanteur.

Ces animaux qui se nourrissent d'animalcules, ne se montrent à la surface des eaux qu'à la fin du printemps, et restent dans les profondeurs un peu vaseuses pendant tout le reste de l'année.»

In 1817 LATREILLE gave a somewhat altered diagnosis. It runs:

»Les Phronimes. N'ont que deux antennes distinctes et fort courtes. Leur tête est grosse, les pieds de la cinquième paire sont fort longs et terminés seuls par une serre à deux doigts. La queue, beaucoup plus étroite que le corcelet, est composée de cinq articles, dont le dernier a, au bout, plusieurs appendices allongés en forme de stiletts. Le corps est très-mou.»

In 1818 LAMARCK gave the following diagnosis:

»Deux antennes courtes, de trois articles. Deux yeux sessiles. Tête grosse, sessile, ayant antérieurement une saillie conique, en forme de bec, inclinée en bas. Corps mou, allongé; le tronc demicylindrique, divisé en six anneaux; la queue étroite, partagée en cinq segments: le dernier terminé par quelques appendices styliformes. Dix pattes; la troisième paire fort longue, à mains didactyles.»

In 1823 DESMAREST gave a more complete description of the genus, than those given by his predecessors. It runs:

»Deux antennes sctacées, très-courtes, composées d'un petit nombre d'articles. Les quatre premiers pieds (*mâchoires extérieures*, LATR.) en forme de petits bras comprimés, finissant en pointe, dentés en dessous; les deux antérieurs étant plus petits et annexés à la tête. Pieds de la cinquième paire les plus grands des tous, terminés par une pince didactyle. Six sacs vésiculeux divisés en trois paires, et placés à la base interne des six derniers pieds. Tête très-grande, cordiforme, verticale. Corps très-mou, étroit et long. Queue plus mince que le corps, terminée par six stylets allongés et fourchus au bout, pourvue en dessous de quatre ou six pattes natatoires disposées par paires, sous les troisième, quatrième et cinquième anneaux; ces pattes étant formées d'un petit article pour leur articulation avec la queue, d'un grand article ovale aplati, et de deux filets terminaux.»

In 1825 he repeated the same description.

In the same year LATREILLE gave the following description:

»— — tête fort grosse, presque en forme de coeur. — Deux antennes très-courtes et bi-articulées. — Quatorze pieds, y compris les quatre derniers pieds-mâchoires, et dont la cinquième, paire, ou la troisième des pieds proprement dits, terminée en un pince didactyle et précédée de

deux articles arrondis, les autres simples; six sacs vésiculeux disposés sur deux rangées longitudinales entre les derniers. — *Corps* allongé, mou, de douze articles, non compris la tête, terminé postérieurement par six appendices en forme de stylets, fourchus au bout; six autres appendices, mais natatoires, sur le dessous de post-abdomen, et disposés sur deux lignes longitudinales.»

In 1826 RISSO gave a short extract of LATREILLE's description.

In 1828 DESMAREST recorded the genus with the same characteristics as in 1823.

In the same year GUÉRIN gave a description, from which the following passages may be quoted:

»Les caractères de ce genre sont: deux antennes; tête très-grosse; la cinquième paire des pieds, en comptant les quatre pieds-mâchoires postérieurs, beaucoup plus grande que les autres, et terminée par une main didaetyle; six sacs vésiculeux entre les derniers pates. Ces Crustacés sont distingués de tous les autres genres de la tribu des Crevettines, parce qu'ils n'ont que deux antennes, tandis que ces derniers en ont quatre.»

In 1829 LATREILLE repeated his former description.

In 1830 H. MILNE EDWARDS gave the following diagnosis:

»Tête très-grosse; une seule pair d'antennes styliformes, très-courtes; pattes de quatre premières paires non préhensiles; celles de la cinquième paire terminées par une grosse main didaetyle bien formée; pattes de deux dernières paires adactyles.»

In 1831 LATREILLE gave a somewhat enlarged description. It runs:

»Leur tête est pareillement grosse (come celle des Typhis), et n'offre que deux antennes, qui sont très-courtes, de deux articles, dont le dernier beaucoup plus long; leur mandibules n'ont point de palpe; leur quatorze pieds sont allongés et grêles; ceux de la cinquième paire sont terminés par une main ovale, renflée et didaetyle; ceux de la dernière sont faibles, subulés et repliés. Ces crustacés vivent, ainsi que les suivans (les Themisto, Hyperia et Phrosine), dans l'intérieur du corps de divers acaléphes.»

In 1835 H. MILNE EDWARDS gave some notes on the development of *Phronima*, remarking that the fifth pair of peræopoda in the young are not cheliform but only feebly subcheliform and of the same length as the two following pairs.

The quotations of LATREILLE in 1836 and of VOIGT in the same year offer nothing new.

In 1837 BURMEISTER recorded *Phronima* with the following characteristics:

»— — hat am 5ten eine Scheere, keine unteren Fühler und keine schildförmigen Grundglieder.»

In 1838 LUCAS repeated the description given by GUÉRIN in 1828.

In the same year H. MILNE EDWARDS, describing the genus, made the following remark:

»C'est à tort qu'on a attribué aux *Phronimes* seulement six anneaux thoraciques, cinq anneaux abdominaux et cinq paires des pattes; ils ont sept paires des pattes insérées chacune à un anneau thoracique distinct, et ce sont les pattes de la cinquième paire qui sont terminées par une main didaetyle; l'abdomen se compose de sept anneaux dont le cinquième et le sixième sont plus ou moins confondus en un seul tronçon, et dont le dernier est lamelleux.»

In 1840 he gave a much enlarged and very good generic description. It runs:

»Sous beaucoup de rapports, les Phronimes ressemblent au genre Anehylomère, mais leur corps est mou, semi-transparent et beaucoup plus allongé. La tête est très-grosse, verticale, et ne porte que deux petites antennes insérées très-loin de la ligne médiane. Les mandibules n'ont point de grand palpe articulé comme chez les Hypéries, mais les autres appendices de la bouche sont essentiellement les mêmes que chez ces animaux. Le thorax est très-large antérieurement, et se termine presque en pointe; on y compte sept anneaux, dont le premier est très-étroit. Les pattes sont toutes longues, grêles et faibles; celles de deux premières paires ont, en général, l'antépénultième article aplati et élargi antérieurement; celles des deux paires suivantes sont grêles et cylindriques dans toute leur longueur. Les pattes de la cinquième paire sont les plus longues; elles sont dirigées en arrière et terminées par une main forte, renflée et didactyle. Les pattes de deux dernières paires sont faibles, subulées et reployées sur elles-mêmes. Enfin, entre les deux rangées formées par ces organes, on trouve comme chez les autres Amphipodes une série d'appendices membraneux, très-longs, vésiculeux et de forme ovulaire, disposés par paires sur chaque des segments thoraciques, excepté le premier et le septième; le nombre total de ces appendices est par conséquent de dix, et non de six comme on le croit communément, et s'ils remplissent les fonctions d'organes respiratoires ils servent aussi à retenir sous le corps les œufs et les jeunes qui viennent d'éclore. L'abdomen est presque aussi long que le thorax: les trois premiers anneaux sont étroits et allongés; les fausses pattes qui y correspondent sont remarquables par la grandeur de leur pédoncule, lequel est plus long que les deux lames natatoires qui les terminent. Le quatrième segment de l'abdomen est beaucoup plus court que les précédents; le sixième est confondu avec le cinquième, et se continue postérieurement avec une petite lame horizontale; enfin les fausses pattes des trois dernières paires sont formées par un pédoncule long, grêle et cylindrique, portant à son extrémité deux petites lames pointues.

Ces Crustacés singuliers habitent l'intérieur d'une espèce de coque cylindrique, ouverte aux deux bouts, d'une texture gélatineuse absolument semblable à celle de Méduses les plus simples, et formée probablement par le corps de quelque Beroë.»

In 1849 LUCAS repeated this last description of H. MILNE EDWARDS.

In the same year VAN DER HOEVEN gave the following diagnosis:

»Antennæ duæ breves. Pedes quinti paris elongati, manu lata, didactyla terminati. Cauda elongata, segmentis quinque distinctis, sexto segmento eum quinto coalito.»

In 1852 DANA characterized the genus as follows:

»Antennæ 2dæ exsertæ — — breves. Abdomen in ventrem se non flectens, — — versus basin sat gracile. Pedes 5ti — — magna manu didactyla; 3tii 4ti extremitate graciles, non prehensiles. Segmentum thoracis 1mum oblongum.»

In the same year A. COSTA recorded the genus with the same characteristics, which LATREILLE had given in 1831.

In 1857 WHITE gave the following description:

»Head large, vertical; two antennæ inserted, one on each side of the front; tail ending in styliform threads. Body very soft, half transparent. Legs all long, slender, and feeble; the fifth pair the longest, directed backwards, and ending in a strong, swollen, two-fingered claw.»

In 1861 PAGENstecher gave a historical account of Phronima and a detailed anatomical description, thereby correcting some erroneous statements given by previous authors.

In 1862 SPENCE BATE gave a new generic diagnosis. It runs:

»Cephalon large, broad at the top, tapering inferiorly to the oral apparatus. Pereion broad and flat. Pleon narrow. Eyes on the dorsal surface of the cephalon. Superior antennæ short, two-jointed; inferior antennæ obsolete. Mandibles without an appendage. Gnathopoda more or

less complexly subchelate. Pereiopoda consisting of but six joints: first two pairs of pereiopoda simple: third having the daetylos fused with the propodos; the propodos and carpus developed into a perfectly-formed chela: fourth and fifth pairs uniform, shorter than the third. Three posterior pairs of pleopoda biramous, lanceolate. Telson single.»

In the same year CLAUS published some anatomical remarks on *Phronima sedentaria* and *Phronimella elongata*.

In 1863 GERSTAECKER gave the following diagnosis:

»Kopf dick, vertical, nur mit einem Paare stummelförmiger Fühler; Körper sich nach hinten stark verschmälernd. Beine mit sehr langen, griffelförmigen Hüften, die beiden ersten Paare mit dreieckig erweitertem vorletzten Gliede, das fünfte in eine grosse, zweifingrige Scheere endigend. Die drei vorderen Beinpaare des Postabdomen mit sehr dickem, birnförmigem Basalgliede.»

In 1872 CLAUS described for the first time the male form of *Phronima* and discussed the nature of the hyaline, barril-like dwelling of the female *Phronima*, which had been characterized as early as in 1802 by LATREILLE as the rest of a *Beroë*.

In the same year he gave the following diagnosis of the genus:

»Antennen 2gliedrig. Die beiden vordern Beinpaare schwächlich. Das fünfte Beinpaar endet mit einer mächtigen Scheerenhand. Drei Paar langer stiftförmiger Caudalgriffel, jeder mit ganz kurzen lanzetförmigen Acsten.»

In 1876 MIERS recorded the genus with essentially the same characteristics that SPENCE BATE in 1862.

In 1878 P. MAYER described the glands in the peræopoda of *Phronima*, and recorded some experiments made to prove the nature of the dwelling used by the animal.

In 1879 CLAUS gave the following enlarged diagnosis:

»Körper gestreckt, mit stark verjüngtem und langgezogenem Endsegment der Brust, mit drei Paar wohlentwickelter stiftförmiger Uropoden. Kopf kurz, aber hoch mit sehr verlängerter Scheitelmundachse. Vorderantennen des Weibchens zweigliedrig. Basalglied des hintern Antennenpaares im weiblichen Geschlecht kuglich gewölbt und mit kurzer Borste besetzt. Die Mandibeltaster fehlen auch dem Männchen. Unterlippe (Maxillarfusspaar) stark comprimirt, mit lanzetförmig zugespitzten Laden und conischer Zunge. Die beiden Gnathopodenpaare schwächlich, mit schwacher zusammengesetzter Greifhand, fünftes Beinpaar mit mächtiger (zusammengesetzter) Scheerenhand bewaffnet. Drei Paare von Kiemenschläuchen am 4., 5., u. 6. Thoracalsegment.»

He remarked further:

»Die als *Ph. sedentaria*, FORSK., *custos*, RISSO, *Atlantica*, GUÉR. und *WHITE* (*Borneensis*) unterschiedenen Arten scheinen nur nach Oertlichkeit, Alter und Grösse abweichende Zustände derselben Art zu sein. Das Weibchen lebt mit seiner Brut in glashellen Tönnehen (ausgefressenen Pyrosomen). Das Männchen wurde bislang nur freischwimmend (Mittelmeer) angetroffen.»

In 1882 STREETS published the following generic description:

»Head, thorax, and abdomen as described under *Phronimida*. The first and second pairs of thoracic feet short and slender, with the fourth, or earpal joint *broadly produced*; the third and fourth pairs long, simple, and subequal. The fifth pair stoutly developed, and provided

with a *strong prehensile organ, resembling the claw of some of the Cancride*. The last two pairs of legs shorter than the preceding, and subequal. The three pairs of caudal appendages long and slender, each furnished with two lanceolate branches. Telson short.

*Sexual differences.* — Males smaller than the females. In the female the inferior antennæ are absent. In the position of these organs — beneath the lateral eye — is a broad, rounded prominence, slightly projecting beyond the anterior margin of the head. The apex of this prominence usually bears a single short hair. The superior antennæ are short and three-jointed, the last joint being beset with a few auditory hairs. In the male both pairs of antennæ are present, and are provided with long, flexible flagella; the last joint of the peduncle of the superior pair long, as in the female, but much more robust, and densely furnished with hairs; the peduncle of the inferior pair three-jointed. The abdomen of the male is stouter, and the bases of the swimming feet more nearly rounded; in the female the basal portion of these feet are oblong-ovate, and the last segment of the thorax is longer and narrower than the corresponding part in the male.»

In 1885 CARUS translated in Latin the diagnosis of CLAUS (from 1879) in a somewhat condensed form.

In 1886 GERSTAECKER gave a diagnosis, which contains some new characteristics. It runs:

»Kopf kurz, nach unten long ausgezogen. Beide Fühlerpaare des Männchens verlängert, die oberen mit langem, dicht buschigem Endglied des Schaftes; beim Weibchen die oberen kurz, zweigliedrig, die unteren nur als Höcker angedeutet. Kiefertaster beiden Geschlechtern fehlend. Die beiden ersten Mittelleibssegmente stark verkürzt, aber frei, das verlängerte siebente nach hinten stark verjüngt. Die beiden vorderen Beinpaare verkürzt, in eine schwache Greifhand endigend, das armförmig verlängerte fünfte mit mächtig entwickelter Scheerenhand. Drei Paare von Kiemenschläuchen am vierten bis sechsten Mittelleibsringe. Die Spaltbeine der drei grossen vorderen Hinterleibsringe mit sehr breitem lamellösem Schaftgliede; auch die griffelförmigen Spaltbeine zu drei Paaren ausgebildet.»

The first described species was as mentioned above *Cancer sedentarius*, FORSKÅL. The next new specific name was *Phronima custos*, proposed in 1816 by RISSO, it is however only a synonym for *Ph. sedentaria*. In 1832 A. COCCO described *Bivonia Zan-zara*, n. sp., which probably is identical with *Phronima sedentaria*. In 1836 GUÉRIN proposed the two new species *Phronima atlantica* and *Ph. solitaria*. In 1862 SPENCE BATE briefly described *Ph. Borneensis*, n. sp., which must be considered as identical with *Ph. sedentaria*. In 1875 POWELL proposed the new species *Ph. Novæ Zealandiæ*, which also is identical with *Ph. sedentaria*. In 1886 THOMSON and CHILTON changed the name to *Ph. neozelanica*. In 1877 STREETS described the new species *Ph. pacifica*. In 1887 I gave short diagnoses of two new species *Ph. spinosa* and *Ph. Colletti*. In the same year GILES described and delineated *Ph. bucephala*, which in my opinion is synonymous with *Ph. Colletti*. In 1888 STEBBING described *Ph. megalodus*, n. sp., which I consider to be identical with *Ph. solitaria*, and *Ph. tenella*, n. sp., which shows a transition to the genus *Phronimella*. In 1889 A. CHUN<sup>1)</sup> described *Ph. Diogenes*, n. sp., which certainly is identical with *Ph. Colletti*.

The following list shows the synonyms of the hitherto named species, according to my views as to the nomenclature; but it must be remarked here that almost all these

<sup>1)</sup> A. CHUN. »Bericht über eine nach den Canarischen Inseln im Winter 1887—88 ausgeführte Reise. II». Sitzungsberichte der K. Preussischen Akademie der Wissenschaften zu Berlin. 1889, p. 527, pl. 3, fig. 5—6.

so called species are closely related to each other and show transitions, so that I think they ought to be regarded as varieties rather than species. But as I have found small but constant differences even in the young of, for instance, *Phronima sedentaria* as compared with *Ph. atlantica*, I at present retain the following seven species in the hope that I may soon have access to living specimens and be able to study the question thoroughly.

<i>Phronima sedentaria</i> , FORSKÅL.	}	= <i>Ph. sedentaria</i> , FORSKÅL.
» <i>custos</i> , RISSO.		
<i>Bivonia zanzara</i> , COCCO.		
<i>Phronima Borneensis</i> , SPENCE BATE.		
» <i>novazealandiæ</i> , POWELL.		
» <i>neozelanica</i> , THOMSON and CHILTON.	}	= <i>Ph. solitaria</i> , GUÉRIN.
» <i>atlantica</i> , GUÉRIN.		
» <i>solitaria</i> , GUÉRIN.	}	= <i>Ph. Colletti</i> , C. BOVALLIUS.
» <i>megalodus</i> , STEBBING.		
» <i>pacifica</i> , STREETS.	}	= <i>Ph. Colletti</i> , C. BOVALLIUS.
» <i>spinosa</i> , C. BOVALLIUS.		
» <i>Colletti</i> , C. BOVALLIUS.		
» <i>bucephala</i> , GILES.		
» <i>Diogenes</i> , A. CHUN.	}	= <i>Ph. Colletti</i> , C. BOVALLIUS.
» <i>tenella</i> , STEBBING.		

Characteristics used for distinguishing the species in the genus *Phronima*.

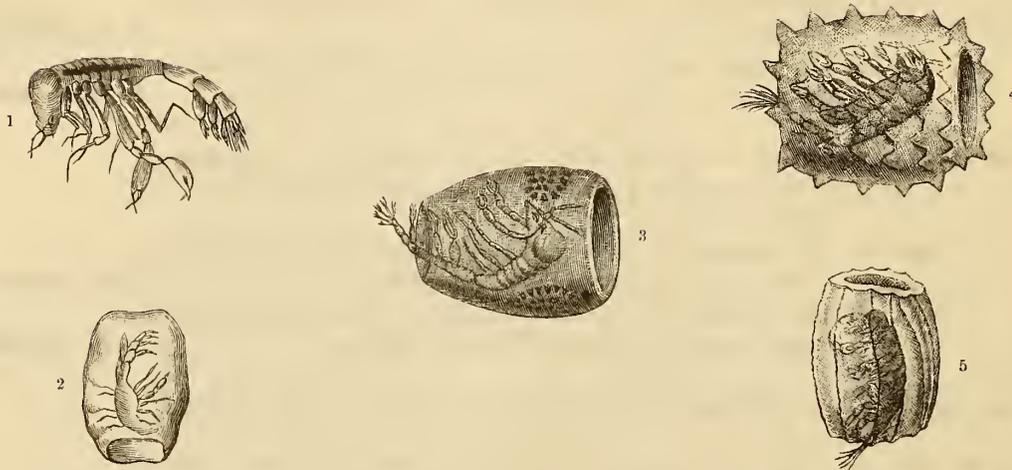
1. The length of the head.
2. The fifth pair of pereopoda being longer — or shorter than the fourth.
3. The length of the carpal process in the fifth pair in relation to the tubercle on the under margin of the carpus, and in relation to the metacarpus.
4. The tubercle on the under margin of the carpus being undivided — or divided into two or more points or teeth.
5. The relation of the length and breadth of the carpus in the fifth pair.
6. The femur in the seventh pair being about as long as, or longer than, that in the sixth.
7. The hind corners of the pleonal segments being rounded, — sharp-pointed, — or produced into long processes.
8. The inner ramus of the second pair of uropoda being shorter — or longer than the outer.

These seven species are to be distinguished as shows the following synoptical table:

- A.** The lower front corner of the carpus of the fifth pair of peræopoda is produced downwards beyond the under margin of the joint.
- a 1.** The carpus of the fifth pair of peræopoda is longer than broad.
- aa 1.** The carpal process of the fifth pair of peræopoda is more than twice as long as the tubercle on the under margin of the joint.
- aaa 1.** The fifth pair of peræopoda are much longer than the fourth..... **1. Ph. sedentaria.**
- aaa 2.** The fifth pair of peræopoda are not longer than the fourth..... **2. Ph. spinosa.**
- aa 2.** The carpal process of the fifth pair of peræopoda is not twice as long as the tubercle on the under margin of the joint.
- aaa 3.** The tubercle on the under margin of the carpus of the fifth pair of peræopoda is undivided..... **3. Ph. solitaria.**
- aaa 4.** The tubercle on the under margin of the carpus of the fifth pair of peræopoda is two-pointed..... **4. Ph. atlantica.**
- a 2.** The carpus of the fifth pair of peræopoda is about as broad as long.
- aa 3.** The fifth pair of peræopoda are shorter than the fourth. The inner ramus of the second pair of uropoda is longer than the outer..... **5. Ph. Colletti.**
- aa 4.** The fifth pair of peræopoda are about as long as the fourth. The inner ramus of the second pair of uropoda is scarcely half as long as the outer..... **6. Ph. pacifica.**
- B.** The lower front corner of the carpus of the fifth pair of peræopoda does not project beyond the under margin of the joint..... **7. Ph. tenella.**

## 1. PHRONIMA SEDENTARIA, P. FORSKÅL, 1775.

Pl. XVI, fig. 1—3.

Fig. 1 and 2. *Phronima sedentaria*, FORSKÅL.Facsimile from FORSKÅL. *Icones rerum naturalium etc.*, pl. 41, fig. D and d.Fig. 3. »*Doliolum mediterraneum*», DELLE CHIAJE.» 4. »*Doliolum papillosum*», DELLE CHIAJE.» 5. »*Doliolum sulcatum*», DELLE CHIAJE.Facsimile from DELLE CHIAJE. *Animali Invertebrati della Sicilia citeriore*. (Vol. 6—7.) Tavola 33, fig. 5—7.

**Diagn.** *Caput* segmentis tribus primis peræi brevius. Segmenta duo priora peræi segmento tertio paullo altiora. *Pedes peræi* quinti paris pedibus quarti paris longiores; carpus longior quam lator; processus carpalis tuberculo marginis inferioris plus quam duplo longior; tuberculus integer, crenulatus; metacarpus tuberculo magno crenulato instructus. Femur pedum septimi paris angustum, femore pedum sexti paris quarta parte longius. Latera segmentorum plei post producta, acuta. Ramus internus pedum uræi secundi paris ramo externo paululo longior.

The *head* is shorter than the first three peræonal segments together. The first two peræonal segments are a little deeper than the third. The fifth pair of peræopoda are longer than the fourth; the carpus is longer than broad; the carpal process is more than twice as long as the tubercle on the under margin of the joint; the tubercle is undivided, and crenulated; the metacarpus is provided with a large, crenulated tubercle on the front margin. The femur of the seventh pair is narrow, and is a fourth part longer than that of the sixth. The lateral parts of the pleonal segments are produced behind, and sharp-pointed. The inner ramus of the second pair of uropoda is a trifle longer than the outer.

**Colour.** Hyaline, sparingly spotted with red.

**Length.** 10—36 mm.

**Hab.** The Mediterranean; the temperate, subtropical, and tropical regions of the Atlantic, of the Indian Ocean, and of the Pacific. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn. 1775.</b>	<i>Cancer sedentarius</i> ,	P. FORSKÅL.	—	Descriptiones Animalium Avium, Amphibiorum, Piscinum, Insectorum, Vermium, quæ in itinere orientali observavit P. Forskål. Ed. C. Niebuhr, p. XXI and 95.
	»	»	—	1776. Icones rerum naturalium, quas in itinere orientali depingi curavit P. Forskål. Ed. C. Niebuhr, p. 14, pl. 41, fig. D and d.
	»	»	J. F. W. HERBST.	1796. Versuch einer Naturgeschichte der Krabben und Krebse. 2 <sup>ter</sup> Bd, p. 136, pl. 36, fig. 8.
	<i>Gammarus</i>	»	P. K. A. SCHOUSBOE.	1802. »Iakttagelser over tvende sieldne og lidt bekjendte Krebsarter». Skrifter af Naturhistorie Selskabet. 5 <sup>te</sup> Bind, 2 <sup>det</sup> Hefte, p. 11, pl. 1. fig. 1—6.
	<i>Phronima sedentaria</i> ,	»	P. A. LATREILLE.	1803. Histoire naturelle, générale et particulière, des Crustacés et des Insectes. Tome 6 <sup>me</sup> , p. 291.
	»	»	L. A. G. BOSCH.	1803. »Phronime». Nouveau Dictionnaire d'Histoire naturelle. Tome 17 <sup>me</sup> , p. 422.
	»	»	P. A. LATREILLE.	1806. Genera Crustaceorum et Insectorum. Tom. 1 <sup>mus</sup> , p. 56.
	»	»	W. E. LEACH.	1813. »Crustaceology». The Edinburgh Encyclopædia. Vol. 7, p. 403.
	»	»	»	1815. »A tabular View of the external Characters of Four Classes of Animals, which Linné arranged under Insecta», etc. The Trans. of the Linn. Soc. of London. Vol. 11, Part 2, p. 355.
	»	»	A. RISSO.	1816. Histoire naturelle des Crustacés des environs de Nice, p. 120.
	»	»	P. A. LATREILLE.	1816. »Amphipoda». Nouveau Dictionnaire d'Histoire naturelle. Tome 1 <sup>er</sup> , p. ?

- Phronima sedentaria*, P. FORSKÅL. P. A. LATREILLE. 1817. Le Règne Animal --- par G. Cuvier. Tome 3<sup>me</sup>, p. 46.
- » » » J. B. P. A. DE LAMARCK. 1818. Histoire naturelle des Animaux, sans vertèbres. Tome 4<sup>me</sup>, p. 179.
- Phronima sedentarius*, » P. A. LATREILLE. 1818. Tableau encyclopédique et méthodique des trois règnes de la nature. 24<sup>me</sup> partie, pl. 336, fig. 18--22.
- Phronima sedentaria*, » A. G. DESMAREST. 1823. »Malacostracés». Dictionnaire des Sciences naturelles. Tome 28<sup>me</sup>, p. 347.
- » » » » 1825. Considérations générales sur la classe des Crustacés, p. 257.
- » » » P. A. LATREILLE. 1825. »Phronime». Encyclopédie Méthodique. Histoire naturelle. Tome 10<sup>me</sup>, p. 113.
- » » » A. RISSO. 1826. Histoire naturelle des principales productions de l'Europe méridionale. Tome 5<sup>me</sup>, p. 90.
- » » » A. G. DESMAREST. 1828. Histoire naturelle des Crustacés --- par L. A. G. Bosc. 2<sup>de</sup> éd. Tome 2<sup>nd</sup>, p. 117, pl. 75 bis, fig. 4.
- » » » F. E. GUÉRIN. 1828. »Phronime». Dictionnaire classique d'Histoire naturelle. Tome 13<sup>me</sup>, p. 437.
- » » » P. A. LATREILLE. 1829. Le Règne Animal--- par Cuvier. Nouvelle éd. Tome 4<sup>me</sup>, p. 116.
- (*Phronima*) *sedentarius*, » L. V. OKEN. 1835. Allgemeine Naturgeschichte. 5<sup>ter</sup> Bd. 2<sup>te</sup> Abth. (Thierreich 2<sup>ten</sup> Bandes 2<sup>te</sup> Abth.) p. 612.
- Phronima sedentaria*, » P. A. LATREILLE. 1836. Le Règne Animal--- par Cuvier. 3<sup>me</sup> éd. Tome 2<sup>nd</sup>, p. 203.
- » » » F. S. VOIGT. 1836. Das Thierreich --- vom Baron von Cuvier. 4<sup>ter</sup> Bd, p. 201.
- » » » H. LUCAS. 1838. »Phronime». Dictionnaire pittoresque d'Histoire naturelle. Tome 7<sup>me</sup>, p. 426.
- » » » H. MILNE EDWARDS. 1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamark. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 303.
- » » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>me</sup>, p. 368.
- » » » O. G. and A. COSTA. 1840. Catalogo de Crostacei del Regno di Napoli, p. ?
- » » » H. MILNE EDWARDS. 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 93.
- » » » DELLE CHIAJE. 1841. Descrizione e notomia degli animali invertebrati della Sicilia citeriore, pl. 33, fig. 5--7.

- Phronima sedentaria*, P. FORSKÅL. A. WHITE. 1847. List of the Specimens of Crustacea in the Collection of the British Museum, p. 91.
- » » » H. MILNE EDWARDS. 1849. Le Règne Animal --- par G. Cuvier. Ed. acc. des planches, p. 171, pl. 58, fig. 3.
- » » » H. LUCAS. 1849. »Phronima». Dictionnaire universel d'Histoire naturelle --- par Ch. d'Orbigny. Tome 10<sup>me</sup>, p. 8.
- » » » J. VAN DER HOEVEN. 1849. Handboek der Dierkunde. 2<sup>de</sup> Utg. 1<sup>ste</sup> Deel, p. 758.
- » » » H. LUCAS. 1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238, pl. 18, fig. 6.
- » » » F. G. HOPE. 1851. Catalogo dei Crostacei Italiani, etc., p. 21.
- » » » A. COSTA. 1853. »Fronima, Anfipodi», p. 2. Fauna del Regno di Napoli.
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- » » » A. WHITE. 1857. A popular History of British Crustacea, p. 208, pl. 11, fig. 4.
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The original description given in 1775 by FORSKÅL runs:

*Cancer sedentarius*; *macrourus*; *articularis*; *manibus adactylis*.

Descr. *Color* vitreus, flavescens. *Caput* fere conicum, perpendicularare, ante paululum planatum, juxta verticem emarginatum. Ori utrinque spherula oculiformis adjacet; supra quamque harum, cylinder perpendicularis erigitur, *oculum* referens; sintne ergo huic animali duo oculorum paria, affirmare non sustineo. *Antennæ* setaceæ longitudine cylindrorum, lateri eorum anteriori affixæ. Thorax ovato-lanceolatus, septem-articulatus. *Cauda* lineari-attenuata, compressa, antice articulis 3 rotundatis, pone truncatis, utrinque unispinis. Articuli duo angustiores apicem caudæ constituunt, cui insistent spini sex, vel setæ lineares, apice bifidæ, acutæ. *Pedes* utrinque decem: paria enim septem, thoracis septem articulis adhærent; omnia adactyla, præter *quinti* ordinis par, cæteris multo crassius, longius, *femoribus* compressis, apice uni-spinosis, carpis clavatis, chelis obovatis, ventricosis; digitis adeo curvatis, forficatis, introrsum dente instructis. Priora 4 paria *plantis* gaudent setaceis, curvatis & longitudine superantibus plantas *posteriorum* pedum thoracicorum, quorum paria retrorsum majora majoraque: & *membrana* subtus acuta utrinque triplici, ovata, natatoria.<sup>1)</sup> Articulis Caudæ tribus, totidem pedum paria, versus apicem caudæ gradatim minora affiguntur, brevia, femoribus obovatis, membranaceis; tibiis recurvatis, concavis.

In *Mari mediterraneo*. Mirum in suo genere Animal Oculorum forma, & Pedom numero. Singularis architecturæ inhabitat domum, cubico-ventricosam, rugosam, gelatinosam, rigidam, utroque extremo patulam. Hic residet incurvum, sæpe situm mutans: his cunis ova deponit pullosque excludit.»

In 1796 HERBST translated in German the diagnosis given by FORSKÅL thereby committing some mistakes as PAGENSTECKER pointed out in 1861.

<sup>1)</sup> PAGENSTECKER considers (in 1861) this passage to be corrupted and proposes the following emendation: — — majora majoraque. Et adest *membrana* subtus acuta utrinque triplex, ovata natatoria.»

In 1802 SCHUSBOE gave a fresh description of the animal from specimens examined by himself. The description as well as the accompanying drawings are remarkably good for the time. The description runs:

»G(amarus) capite verticali, obtusissimo, pedibus viginti, quinto pari cheliformi, cauda stylis sex, bifurcatis.» — — —

»Animal habitus *Astaci squilla*, sesquipollicare, quo latius quatuor lineas aequat, recens colore vitreo, subdiaphanum, in spiritu vini diutius asservatum colorem induit sordide flavescens, residens curvatum liberum in *Domo* figura eadi, cylindrico-oblonga, ventricosa, transverse striata, quandoque punctis rigidis exasperata, tumque striae sunt obsoletae, substantia cartilaginea, firma, vitrei coloris, subdiaphana, diametro longitudinali sesquipollicari et ultra, transversali pollicem fere aequante, utraque extremitate patula, altera vero ampliore, extus angulis tribus quatuorve notata.

*Caput* obconicum, verticale, propendens (more locustarum), corpore amplius. *Vertex* dilatatus, in medio linea impressa notatus, angulis paullulum productis, rotundatis, obtusissimis. Intus per membranam pellucidam, corpus undique crustae loco obvestientem, perspiciuntur punctuli rufescentes. *Oculi* laterales, cylindrici, propendentes, immobiles, fusci, punctis & lineis transversalibus notati, ante os innati, apice liberi. Antice inter apices oculorum utrinque globulus albus, stemmata referens, fronti innatus. Superne intus ad basin oculorum litura fusca. *Antennae* setaceae, capite breviores, supra & inter oculos insertae.

*Thorax* elongatus, convexiusculus, superne latior, abdomen versus angustatus, articulis *septem* compositus, quorum *quinque* superiores latitudine aequales, *sexto* & *septimi* sensim angustioribus: quoad longitudinem *duo* supremi angustiores, insequentes *tres* aequales, *sextus* contractior & magis convexus, *septimus* omnium longior atque angustior. *Sub pectore* interne juxta basin pedum trium posteriorum *sacculi* utrinque tres, oblongi, tenuis, subdiaphani, humore repleti. *Abdomen* articulis tribus, oblongis, antice angustioribus rotundatis, postice sublunulatis, angulo postico infra spinula terminato. *Cauda* biarticulata, stylis terminata: articulus primus major, lineari-oblongus; alter subrotundatus, vel triplo brevior. *Styli* sex bifurcati, acuti, inaequales: *duo breviores* a basi articuli ultimi caudae orti: *quatuor longiores*, quorum duo subtus ex angulo postico articuli primi, duo ex apice articuli ultimi exeunt.

*Pedes* viginti. *Septem paria* articulis thoracis affixa, inaequalia: quatuor priora retrorsum sensim majora; *duo antica* chelata, chela crassitie tantum tibiae, compressa, unguibus inaequalibus: *duo* insequentia duplo longiora, simpliciter unguiculata. Par *quintum* omnium majus & longius: *femur* compressum, ad tibiae articulationem inferne spinula brevi notatum: *tibia* brevis margine anteriori spinula supra infraque instructa: *tarsus* clauatus: *Chela* oblongiuscula, subteres, ventricosa, terminata unguibus duobus, parum inaequalibus, incurvatis, forficatis, anteriori breviori juxta basin, posteriori intus in medio denticulo notatis. Par *sextum* & *septimum* structura tertii & quarti paris, sed paullulum breviora. *Pedes spurii* sex, subaequales, articulis tribus abdominis affixi. *Femur* oblongum, crassum, terminatum *membranis* duobus, lanceolatis, tenuibus, concavis, recurvatis, acutis, marginibus ciliatis.»

In 1803 LATREILLE gave a detailed description of *Phronima sedentaria*, but this description is less correct than SCHUSBOE's. The following passages may be quoted:

»— — la tête est grande, comme pyramidale et perpendiculaire, assez semblable à celle d'une sauterelle, plane sur le front, arrondie, et un peu dilatée au sommet. Le devant de la tête présente une espèce de museau servant d'attache à différentes parties; on aperçoit, à chacun de ses côtés, une saillie qui semble renfermer quelque chose que je n'ai pu distinguer, n'ayant pas voulu examiner minutieusement l'animal, de peur de le mutiler ou de le déformer. On remarque distinctement quatre palpes longs, sétacés, comprimés, de plusieurs articles distincts, dont le dernier conique, arqué, et ayant deux petits avancemens ou dents, en dessous, vers le bas.<sup>1)</sup> Au dessus des saillies ou de protubérances latérales, dont nous avons parlé plus haut, sont placées deux antennes, plus courtes que la tête, cylindrico-coniques, de trois pièces, dont la première ou celle de la base plus courte, la seconde la plus longue, et la terminale presque conique, comprimée, et velue sur les côtés.

<sup>1)</sup> These palps are no doubt the first two pairs of peræopoda.

Le corselet semble être formé d'un ou des deux segmens antérieurs, courts, cambrés sur les côtés, et de quatre autres plus longs, dont le côtés courbés en dessous forment un avancement ou un lobe arrondi. Les deux premières paires de pattes sont attachées aux deux segmens antérieurs; elles sont cylindriques, assez menues, de cinq articles, dont le dernier égalant presque en longueur les trois précédens, sétacé, menu et arqué. Du troisième segment part une troisième paire de pattes d'un tiers plus longue que les précédentes; l'article qui répond à la cuisse est grand; celui qui vient ensuite est en forme de genou; le suivant est ovalaire, est le dernier est figuré en main très-renflée, ovalaire, anguleuse, ayant deux doigts arqués, presque égaux, se croisant, unidentés au côté interne. Le quatrième segment porte une paire de pattes qui ne diffère des premières que par la petitesse de l'article de l'extrémité.

La queue offre quatre anneaux; le premier est plus étroit, allongé, et vers sa base, en dessous, naissent deux pattes (ou la cinquième paire) semblable aux deux dernières. Les trois autres anneaux ont chacun en dessous deux pièces renflées, presque ovalaires, qui donnent naissance à deux lames foliacées, frangées ou barbues sur leurs bords. La queue est terminée par une pièce servant de support à cinq ou six styles longs, articulés, cylindriques, bifides au bout, et dont les latéraux plus petits.»<sup>1)</sup>

LEACH in 1813 did not give any specific description.

In 1816 RISSO gave the following description of *Phronima sedentaria*:

»Le corps de cette espèce est mou, transparent, naéré et ponctué de rougeâtre. Le corselet est lisse, formé de plusieurs segmens. La tête est grosse, probosciforme, plane sur le devant, arrondie au sommet et pointillée de rouge sur les côtés. Les yeux sont noirs, sessiles. Les pattes sont tachetées de rouge de laque; la troisième paire est fort longue à articles épais, terminés par des pinces arquées et inégales. Les deux dernières paires sont courtes et dentelées sur leur second article. L'abdomen est convexe et composé de quatre segmens terminés en pointe. La pièce de l'extrémité de la queue sert de support aux appendices bifides qui la terminent.»

At the same time he gave a description of *Phronima Custos*, n. sp. It runs:

»Cette phronime a le corps linéaire, cylindrique et blanchâtre. Son corselet est formé de très-petits segmens. Sa tête est conique, plane sur le devant. Ses yeux sont noirs et sessiles. Ses pattes sont filiformes; la troisième paire est un peu plus longue que les autres et armée de pinces égales, les postérieures sont courtes et grêles. L'abdomen est composé de quatre longs segmens. La queue se termine par une petite plaque qui sert de support à des appendices bifurqués.»

A comparison of these two descriptions shows that the supposed new species differs from the older only in the colour, and in having the carpal process of the fifth pair of peræopoda as long as the metacarpus, but these characteristics vary from one individual to another, so I do not find any reason whatever to retain the specific name proposed by RISSO.

The following descriptions meeting in the literature are, without exception, reproductions from LATREILLE or RISSO until H. MILNE EDWARDS in 1840 gave a fresh description. It runs:

»Corps presque transparent. Les antennes courtes et formées de deux articles dont le premier est fort petit. Les pates des deux premières paires comprimées; leur antépénultième article se prolongeant au-dessous de la griffe, qui est cylindrique et paraît bifide à cause de la petitesse de l'ongle terminal et de l'existence d'une épine à l'extrémité du dernier article. Les pates de la quatrième paire plus longues que les précédentes; les deux doigts qui terminent

<sup>1)</sup> LATREILLE cited (l. c. p. 289) a drawing of the animal on plate 56, but there is none to be found. His figure given in 1818 is a bad copy of FORSKÅL's drawing.

celles de la cinquième sont gros, courbés, et armés d'une dent sur le bord interne. Enfin les dernières pates sont plus petites et plus faibles que celles de la sixième paire.»

On *Phronima custos* he made the following remark:

»M. Risso a décrit et figuré sous le nom de Phronime sentinelle une espèce qui probablement ne diffère guère de la précédente; les caractères que cet auteur y assigne ne suffisent même pas pour motiver sa distinction.»

Some years earlier Cocco, in 1832, described *Bivonia zanzara*, n. g. et sp., (or *B. culicina*) which most probably is a synonym for *Phronima sedentaria*; it must be observed that this is the first time that a male form belonging to the genus *Phronima* was described. The *Phronima Coccoi*, n. sp., proposed in 1850 by DE NATALE<sup>1)</sup> is probably also a young male of *Ph. sedentaria*, from his description it is, however, impossible to identify it.

In 1853 COSTA gave the next new description of *Phronima sedentaria*, expressly stating that *Ph. Custos* was only a synonym for it. His description runs:

»Capite maximo, corpore gracile in caudam attenuatam transeunte: margaritaceo, hyalino, marginibus omnibus rubro-punctatis.»

»Il Fronima sedentario si distingue ben tosto al suo corpo lungo e sottile, sormontato da un capo grosso e lungo, alle sue gambe mediane molto lunghe, ed alla tenera e trasparentissima crosta dalla quale è rivestito all' esterno. Il capo cordiforme è superiormente assai grosso, e come diviso in due lobi, quasi da rassomigliare le due gobbe frontali d'un uomo. La lucidissima erosta da cui vien formato è fatta a reticolo come gli occhi d'una mosea, ed a traverso de essa si osserva tutta la massa cerebrale, quasi simile a poeo e liquido mucoso. Gli organi della masticazione, che fin dentro prolungansi, lasciano vedere i loro movimenti a traverso di questa massa trasparentissima, e sembra come se due battenti, od ali di porta, si aprissero e si chiudessero successivamente. Verso l'inferior parte sono situati gli occhi sessili, ovali, la di cui pupilla nero-violacea vien riflessa sul grugno, e sembra ciascun oocchio come composto di due macchie lunghette. L'inferior parte del capo si prolunga alla guisa d'un grugno, e la bocca è munita di due paja di mandibole vere. Superiormente agli occhi sono inserite le antenne delicate, brevi, composte di tre articoli filiformi, l'ultimo de'quali è più lungo e più delicato.

Il corpo è composto di 7 semmenti; i primi più stretti, e gli altri mano mano allargandosi in ogni senso lo rendono abbastanza ampio, ma depresso, l'ultimo essendo conico e molto allungato. A ciascuno di tali artieoli è attaccato un pajo di gambe. Il primo e secondo pajo anteriore ha un dito artieolato, il quale, colla spina assai sensibile dell'articolo sottoposto, che verso innanzi si avvanza, ne rende l'estremità quasi didattila, od a chele. Le due seguenti paja, sempre erescendo in lunghezza, vengono terminate da unghia lunga, gracile, e curva anteriormente. Il quinto pajo è lunghissimo, coll'ultimo articolo assai largo, quasi ovale, e didattilo. Le due ultime paja posteriori sono mediocri, munite di unghia corta ed ottusa. Tutti hanno l'estremità articolari dell'anca e della tibia sormontata da valida spina. L'addomine è composto di tre anelli quasi cilindrici, terminati da una piccola punta in ciascuno degli angoli posteriori. Sotto ciascuno di questi anelli addominali evvi un pajo di piedi remigatori, composti da un picciolissimo articolo, per mezzo del quale si congiungono coll'anello rispettivo, da un secondo articolo largo ovale, e laminare, e da due filetti terminali pelacciuti. Coda formata da 3 articoli deerescenti, avente ciascuno alla sua estremità due fili, od appendici biforcate ed appuntate nell'opiee.

Tutto formato da una crosta diafana delicatissima, d'un bianco perlaceo, macchiato di puntini e linee rosse sul contorno di tutti i semmenti, e lungo gli articoli di tutte le gambe.»

In 1857 WHITE recorded the species with the following words:

»Body nearly transparent; two first pairs of legs compressed and prolonged at the end.

Found by the Rev. Dr FLEMING at Burray, among the Shetland Isles.

This curious creature lives inside a cylindrical eocoon, open at both ends; the latter is of a gelatinous texture, and is probably formed of the body of some *Beroe*.»

<sup>1)</sup> G. DE NATALE. Su pochi Crostacei del porto di Messina. Napoli 1850.

In 1861 PAGENSTECHEER gave a detailed morphological description of the animal, and good drawings of the young. He also pointed out the nature of the »house» of *Phronima*, and corrected some erroneous statements given by previous authors.

In 1862 SPENCE BATE gave the following specific description of *Phronima sedentaria*:

»Antennæ not so long as the cephalon; first joint short, second four times as long. First pair of gnathopoda having the meros inferiorly produced, with the margin serrated; carpus infero-anteriorly produced to nearly half the length of the propodos; propodos cylindrical, arcuate, slightly tapering, serrated on the inferior margin with small teeth that gradually increase anteriorly to every fourth or fifth denticle; dactylos short, terminating in a double point, and flanked at the posterior extremity with *dactyloptera* (this name is suggested for the two wing-like plates on each pair of gnathopoda, and which have not hitherto been described by authors), having the inferior margin of the outer finely pectinated, and of the inner finely serrated: second pair resembling the first, but longer, and having the carpus not so prominently produced. First pair of pereopoda as long again as the gnathopoda, cylindrical, tapering; dactylos minute: second pair like the first, but longer and more robust: third pair having the carpus antero-distally produced to nearly the length of the propodos, cylindrical, robust, tapering, curved, inner margin subcentrally furnished with a projecting tubercle that is tuberculated on the apex and posterior margin, and on the concave margin behind it; propodos long, slender, tapering to a point, arcuate, the inner margin being furnished with a tubercle that impinges against that on the carpal process on the distal surface, and tuberculated on the top and on the distal margin as well as the concave surface beyond the tubercle; dactylos obsolete. Two posterior pairs of pereopoda subequal, having the base long, remaining joints short. Penultimate pair of pleopoda shorter than the other two. Telson rudimentary.»

On *Phronima custos* he said:

»Third pair of pereopoda broader than in *P. sedentaria*, and having the tubercle on the carpal process more tooth-like in form, and that upon the propodos less prominent and smooth. — — —

The descriptions given by authors of this and the preceding species (= *Phronima sedentaria*) appear adapted for either. Without having examined the typical specimens, I can only assume them to be as here named — if, indeed, they are not varieties of the same species only.»

*Phronima Borneensis*, n. sp., which must be considered as a synonym to *Ph. sedentaria*, he characterized as follows:

»This species resembles *P. custos* in the size of the chelate development of the third pair of pereopoda and in the form of the tubercle on the fixed ramus, and *P. sedentaria* in the form of the erenulated tubercle on the moveable ramus.

I can detect no other variation of form in these species from very distant localities: and the union of the specific characters of both the Western species in that from the Eastern Seas suggests the idea, in spite of their distant habitats, that the three forms may be but varieties of one species.»

In the same year CLAUS gave the following diagnosis of *Phronima sedentaria*:

»Körperform kräftiger und massiger (als in *Phronima elongata*). Kopf stärker aufgetrieben und Thorax gedrungener. Das Abdomen kürzer, minder gestreckt mit 3 Schwimmpaaren und 3 Paaren von Springfüßen. Thoracalfüsse kräftig, die dritten und vierten mit langen, hakenförmigen Endgliedern. Die fünften Scherenfüße, ihre untern Glieder angeschwollen.»

This diagnosis has thus generic value for the distinction from *Phronimella*, rather than value for the distinction of the species.

In 1868 SPENCE BATE and WESTWOOD gave the following »specific character»:

»Cheliform organ on the third pair of pereopoda slender. The inner margins of each ramus of the chela furnished with one tubercle, both tubercles finely tuberculated.»

In 1872 CLAUS gave the first drawings of a male form of *Phronima*, and in 1879 he, as mentioned above, published most valuable anatomical details of *Phronima sedentaria* and its allies.

In 1875 POWELL proposed the new specific name *Phronima novæ-zealandiæ*, which however must be considered a synonym for *Ph. sedentaria*, as there are no important differences in the Australian specimens, which I have examined, from the Mediterranean specimens of the true *Ph. sedentaria*. The diagnostic points which he mentions, viz; »The long sharp process on the mero of the second pair of gnathopoda, the processes on the basa and ischia of the third pair of pereopoda», as well as the characteristics given in his description, agree with *Phronima sedentaria*.

In 1888 STEBBING with some hesitation identified with *Phronima novæ-zealandiæ* a specimen, which, in my opinion, is a true *Ph. sedentaria*.

*Phronima sedentaria* is closely allied to *Ph. atlantica*, *Ph. solitaria*, and *Ph. spinosa*; it differs from them all in the more elongated form of the carpus and the carpal process of the fifth pair of peræopoda, and in the long, sharp projection from the hind corner of the last pleonal segment. From *Ph. atlantica* especially it is distinguished in the female by the undivided tubercle on the under margin of the carpus of the fifth pair, and in the male by the carpus of the same pair being much longer than broad; from *Ph. solitaria* again by the well developed tubercle on the front margin of the metacarpus of the fifth pair; and from *Ph. spinosa* by the form of the femur of the same pair.

The newly-hatched young have all the seven pairs of peræopoda developed and of nearly the same length; the carpus of the fifth pair is distinctly dilated but still longer than broad. The lower front corner of the carpus is at first broadly rounded, then grows angular, and lastly projects into a sharp-pointed process; this process is much longer in the young female than in the young male.

The females seem to grow much larger than the males; the largest female I have examined measured 36 mm. from the front margin of the head to the apex of the last pair of uropoda, while the largest male attained only 16 mm.

The question of the nature of the »house» of *Phronima* has been ventilated almost from the description of the first specimen of *Phronima sedentaria*, and thoroughly examined by PAGENSTECHEER, CLAUS and MAYER. It seems beyond doubt that it in most cases consists of the rests of *Tunicata* and *Siphonophora*, which have been attacked, and adapted for its purpose, by the *Phronima* itself.

### The female.

Pl. XVI, fig. 1—3.

The *body* is slender; the head and peræon together are longer than the pleon and urus together. The integument is pellucid, but tolerably thick.

The *head* is bluntly conical, with the upper part the widest and rounded; it is more than twice as deep as long. The front side is flat, but without antennal groove.

The *eyes* have been minutely described by CLAUS, to whose treatise I refer the reader.

The *first pair of antennæ* are fixed below the middle of the front side of the head, and consist of a single-jointed peduncle, which is somewhat longer than broad, and a single flagellar joint. The flagellum is slender, cylindrical, with the apex rounded and set with long olfactory hairs; it is about four times as long as the peduncle, and is comparatively larger in the young female than in the adult.

The *second pair of antennæ* are reduced to a tubercular prominence near the lower end of the front side of the head.

The *mouth-organs* are exactly like those in *Phronima Coletti*, and will be described under that species.

The *peræon*. The forepart is broad and scarcely compressed, gently narrowing to the hind margin of the sixth segment. The seventh is very long and compressed, equalling in length the three preceding segments together.

The *epimerals* are entirely fused with the peræonal segments without the slightest trace of a suture in the adult animal, in the young on the other hand the epimerals are indicated as small tubercles above the base of the femora.

The *branchial vesicles* are strongly developed at the fourth, fifth and sixth pairs of peræopoda, and attain nearly the length of the corresponding femora. They are attached to the peræonal segments a little behind the insertion of the femora, and are elongate-ovate in form. The vesicles of the second and third pairs are small and thin but distinct in the adult as well as in the young animals.

The *ovitetrices* are very thin, laminar, irregularly triangular, and are, when the eggs are deposited in the dwelling of the female, closely pressed against the underside of the peræon. They are attached to the second, third, fourth and fifth pairs of peræopoda, inserted close to the bases of the femora.

The *first pair of peræopoda* (Pl. XVI, fig. 1) reach only a little beyond the lower end of the head. The femur is narrow, feebly curved, and a little longer than the three following joints together. The genu is as long as broad. The tibia is broadly produced at the lower hind corner, and has the under margin truncated and sharply serrated. The carpus is tolerably dilated; the carpal process is gouge-shaped with the front margins convex and sharply serrated; it is quite half as long as the metacarpus. The metacarpus is feebly curved, almost cylindrical, and only a little tapering towards the apex, where it

carries two laminar appendages. These appendages have been called »dactyloptera» by SPENCE BATE<sup>1)</sup> and extend on either side of the dactylus to more than half its length, articulating with the apex of the metacarpus. The hind margin of the dactyloptera is feebly concave, and strongly serrated, the front margin is somewhat curved. The dactylus is scarcely longer than the breadth of the metacarpus and is shorter than a sixth part of its length; at the apex it has a secondary tooth.

The *second pair* (Pl. XVI, fig. 2) are longer than the first, and reach to the middle of the carpus of the third pair. The femur is straight, linear, and quite as long as the three following joints together. The genu is longer than broad. The tibia is longer than the genu, and is produced at the lower hind corner into a process, which is longer than in the first pair and reaches nearly to the middle of the stem of the carpus; the apex is truncated and serrated as in the first pair. The carpus is like that in the first pair, only a little more elongated; the carpal process does not reach quite to the middle of the metacarpus. The metacarpus and the dactylus are like those in the first pair.

The *third and fourth pairs* are similar in shape and equal in length. The femur is narrow and feebly curved, and is a little broader below than above; it is shorter than the three following joints together. The genu is longer than broad. The tibia is about a third part longer than the genu, and has the front margin convex and the hind margin almost straight. The carpus is long and linear, and is considerably longer than the two preceding joints together; the hind margin is fringed with minute spines. The metacarpus is much narrower than the carpus, curved, and tapering towards the apex, the lower front corner projects into a very short, bluntly triangular process in front of the dactylus. The metacarpus is nearly as long as the carpus. The dactylus is minute, and spine-like.

The *fifth pair* (Pl. XVI, fig. 3) in the full-grown female reach considerably beyond the apex of the fourth pair. The femur is nearly straight, with the front margin feebly concave and the hind margin feebly convex; just above the lower hind corner projects a strong, more or less sharp-pointed, process; the lower front corner is obtuse; the joint is broader below than above, and is nearly as long as the tibia and the stem of the carpus. The genu is somewhat longer than it is broad below; the lower front corner projects into a more or less sharp-pointed angle. The tibia is more than twice as long as the genu, irregularly pear-shaped, having the base narrowed and the sides bulging. The carpus is elongate, thick and swollen, having the stem about twice as long as broad and the sides somewhat convex; the tubercle on the under margin is large, with the hind margin crenulated, or provided with eight or ten rounded teeth, the incision between the two apical or front crenulations is deeper than between the other crenulations, but not so deep that the tubercle can be properly called two-pointed; the carpal process is long and curved, evenly tapering towards the apex, more than half as long as the stem of the joint, and much more than twice as long as the tubercle on the under margin of the joint; it is more than two-thirds as long as the metacarpus. The metacarpus is a little shorter than the stem of the carpus, is arched, and has a large, triangular, crenulated tubercle on

<sup>1)</sup> SPENCE BATE. Catalogue of the specimens of Amphipodous Crustacea in the collection of the British Museum, p. 317.

the middle of the front margin, which is crenulated above as well as below the tubercle. The dactylus is present in younger females, and is very short, in the larger specimens it is wanting, and the apex of the metacarpus in there obtusely rounded. The glands are highly developed in this as well as in the other pairs of peræopoda, for a nearer knowledge of their structure I refer the reader to the excellent memoirs of CLAUS and P. MAYER.

The *sixth pair* reach scarcely to the middle of the carpus of the fifth pair. The femur is straight, with feebly convex margins, and is about four times as long as broad; the lower front corner is angular and sharp-pointed, and more or less projecting. The genu is as long as broad, with the lower front corner projecting and more or less obtuse, in the largest specimens it is broadly truncated. The tibia is narrower than the genu, but is twice as long; the upper front corner is angular. The carpus is linear, longer than the two preceding joints together, and more than half as long as the femur. The metacarpus is straight, feebly tapering towards the apex, and is quite half as long as the carpus. The dactylus is minute, and sharp-pointed.

The *seventh pair* are fully as long as the sixth. The femur is narrow, a little broader above the middle than at the apex; the front margin is nearly straight, the hind margin is feebly convex; the lower front corner projects into a sharp point; the femur is more than five times as long as broad; it is a little longer than the femur in the fifth pair, and a third part longer than that in the sixth. The genu is like that in the preceding pair. The tibia is a little longer than the genu, with the upper front corner angular. The carpus is somewhat longer than the two preceding joints together, and scarcely a third part as long as the femur. The metacarpus is more than half as long as the carpus. The dactylus is minute.

The *pleon* is almost as long as the whole peræon; the first segment is the longest and is nearly as long as the last peræonal segment. The lower hind corner of each segment is produced into a sharp-pointed process, which is longest in the third segment.

The *pleopoda* decrease in size from the first to the third pair. The peduncle is elongate-ovate, and is somewhat compressed. The outer ramus of the first pair has seventeen joints, the inner fifteen.

The *urus* is about as long as the last pleonal segment. The first ural segment is more than twice as long as the last coalesced, which is about as broad as long, with a deep emargination on either side for the insertion of the second pair of uropoda; at the middle of the hind part of the segment there is a broad and deep excavation, in which the telson is fixed, so that the hind margin of the telson projects only a trifle beyond the hind margin of the last coalesced segment.

The *uropoda*. The *first pair* reach to the apex of the third pair. The peduncle is elongated, broader at the apex than at the base, being about seven times as long as it is broad at the base; it is considerably more than twice as long as the inner ramus. The rami are equal in length, elongated and sharp-pointed; the outer ramus is finely serrated along the inner margin and smooth on the outer, the inner ramus is serrated along the outer margin and smooth on the inner. The *second pair* do not reach to the apex of the peduncle in the last pair, but reach beyond that in the first. The peduncle

is very narrow, and almost linear, being eight times as long as broad. The rami are equal in length, and serrated as in the first pair. The *third pair* have the peduncle about nine times as long as broad, and three times as long as the inner ramus. The rami are nearly equal in length, and are serrated as in the first pair.

The *telson* is broadly rounded, nearly as long as broad, and not half as broad as the hind part of the last ural segment.

### The male.

The *body* is somewhat more robust than in the female, with the *peræon* less narrowed behind.

The *head* is more than twice as deep as long, and is shorter than the first four *peræonal* segments together.

The *first pair of antennæ* are inserted considerably below the middle of the front side of the head. The first joint of the peduncle is about twice as long as the two following joints together. The first joint of the flagellum is tumid, spindle-shaped, thickly covered with olfactory hairs, and more than three times as long as the whole peduncle. The following joints are short, cylindrical, six or seven in number, and together less than half as long as the first flagellar joint.

The *second pair of antennæ* are about a third part longer than the first. The peduncle shows three free joints; the first is as long as broad, the second a little longer, the third still longer. The first joint of the flagellum is more than twice as long as the last joint of the peduncle, and is sparingly set with minute hairs along the under margin; the following joints are cylindrical, subequal in length, and each about half as long as the first joint. The flagellar joints are eight or ten in number.

The *peræon* is more compressed than in the female; the third segment is quite as long as the first and second together; the seventh segment is longer than the fifth and sixth together.

The *first four pairs of peræopoda* are like those pairs in the female.

The *fifth pair* have the *carpus* a little broader than in the female, but still nearly twice as long as broad; the *carpal process* is not half as long as the stem of the joint, and not twice as long as the tubercle on the under margin of the *carpus*; the tubercle is small, tolerably sharp-pointed, and without crenulation. The *metacarpus* is nearly as long as the stem of the *carpus*; the tubercle at the middle of the front margin is small and smooth. The *dactylus* is distinct in the younger males, but in the larger ones it is obsolete and the apex of the *metacarpus* is obtusely rounded as in the female.

The *sixth and seventh pairs* are like those in the female.

The *pleon* is as long as the five last *peræonal* segments together; the first *pleonal* segment is somewhat longer than the last *peræonal*. The lower hind corner of the *pleonal* segments is projecting and sharp-pointed.

The *pleopoda* have the peduncle elongate-ovate.

The *urus* and its appendages are like those organs in the female.

2. **PHRONIMA SPINOSA**, C. BOVALLIUS, 1887.

Pl. XVI, fig. 8—18.

**Diagn.** *Caput* segmenta quinque prima peræi longitudine fere æquans. Segmenta duo priora *peræi* segmento tertio haud altiora. Processus tibialis *pedum peræi* secundi paris dimidio stipite carpi multo brevior. Pedes quinti paris pedes quarti paris longitudine æquantes; femur curvatum; carpus longior quam lator; processus carpalis tuberculo marginis inferioris duplo longior; tuberculus leviter incisus; metacarpus tuberculo lato instructus. Femur *pedum septimi* paris angustum, femore *pedum sexti* paris duplo fere longius. Latera segmentorum *plei* post acuta, non producta. Ramus internus *pedum uri* secundi paris dimidio rami externi paullo longior.

The *head* is nearly as long as the five first peræonal segments together. The first two *peræonal* segments are hardly deeper than the third. The tibial process of the second pair of *peræopoda* is much shorter than half the stem of the carpus. The fifth pair are about as long as the fourth; the femur is S-curved; the carpus is longer than broad; the carpal process is twice as long as the tubercle on the under margin of the joint; the tubercle is broad, and is slightly notched; the metacarpus is provided with a broad tubercle on the front margin. The femur of the seventh pair is nearly twice as long as that of the sixth. The lateral parts of the *pleonal* segments are sharp-pointed, but not produced. The inner ramus of the second pair of *uropoda* is a little more than half as long as the outer.

**Colour.** Hyaline.

**Length.** 14—20 mm.

**Hab.** The subtropical and tropical regions of the Atlantic; the Indian Ocean. (D. M.; S. M.)

<b>Syn.</b> 1887.	<i>Phronima spinosa</i> , C. BOVALLIUS.	—	»Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11, N:o 16, p. 25.
»	»	»	TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1352.
»	»	»	C. CHUN. 1889. »Das Männchen von <i>Phronima sedentaria</i> nebst Bemerkungen über die <i>Phronima</i> -Arten». Zoologischer Anzeiger. 12 <sup>ter</sup> Jahrg. 1889, p. 382.

As I have said above *Phronima spinosa* is closely related to *Ph. sedentaria*, but it is to be distinguished by the S-shaped femur in the fifth pair of *peræopoda*, and by the inner ramus of the second pair of *uropoda* being shorter than the outer. As there are only slight variations in the other organs from those in *Ph. sedentaria*, I shall restrict myself to some few remarks only.

**The female.**

Pl. XVI, fig. 8—18.

The *peræon*. The third segment is shorter than the first two together; the seventh segment is as long as the three preceding together.

The *first and second pairs of peræopoda* (Pl. XVI, fig. 10—12) are like those in the preceding species in shape, but the femur is much longer than the three following joints together.

The *third and fourth pairs* (Pl. XVI, fig. 13 and 14). The lower hind corner of the femur, as well as that of the genu, projects into a sharp point. The front margin of the tibia, carpus, and metacarpus is fringed with minute spines. The lower front corner of the metacarpus is produced into an elongate-triangular, sharp-pointed process in front of the curved dactylus.

The *fifth pair* (Pl. XVI, fig. 15) are only a little longer than the fourth. The femur is feebly bent in the shape of a S, with the upper half of the front margin concave, and the lower half feebly convex; the lower front corner is angular and sharp-pointed; the upper part of the hind margin is strongly convex, the lower part excavated, and near the lower corner produced into a tolerably long and sharp-pointed process. The lower front corner of the genu projects into a sharp point. The stem of the carpus is elongated, but not twice as long as broad; the carpal process is more than twice as long as the tubercle on the under margin of the carpus, and scarcely a third part as long as the stem of the joint. The tubercle on the under margin is slightly incised at the top, but not two-pointed, and not distinctly crenulated. The metacarpus is arched, nearly as long as the stem of the carpus, and provided with a broad faintly crenulated tubercle at the middle of the front margin. A dactylus is present only in the younger specimens.

The *sixth pair* (Pl. XVI, fig. 16) reach beyond the apex of the carpus of the fifth pair. The femur is straight, with the lower front corner produced into a sharp-pointed, feebly curved process; the femur is fully as long as the three following joints together. The lower front corner of the genu projects into a sharp point, as does also the upper front corner of the tibia. The metacarpus is more than half as long as the carpus.

The *seventh pair* (Pl. XVI, fig. 17) are shorter than the sixth. The femur is more than a third part longer than the femur in the sixth pair, nearly twice as long as all the following joints together, and about six times as long as broad; it has the lower front corner produced and sharp-pointed as in the sixth pair. The genu and tibia are armed as in the preceding pair. The carpus equals a fourth part of the length of the femur, but is not twice as long as the metacarpus.

The *pleonal* segments have the lower hind corner angular but not produced.

The *uropoda*. The *first pair* do not reach to the apex of the last; the peduncle is more than twice as long as the equal rami. The *second pair* reach only a little beyond the apex of the peduncle of the first pair, but do not attain the apex of the peduncle of the third pair; the inner ramus is narrower, and considerably shorter, than the outer.

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3. **PHRONIMA SOLITARIA**, F. E. GUÉRIN MÉNEVILLE, 1836.

Pl. XVI, fig. 4—7.

**Diagn.** *Caput* segmentis tribus primis peræi paullulo brevius. Segmenta duo priora *peræi* segmento tertio paullo altiora. Processus tibialis *pedum peræi* secundi paris dimidio stipitis earpi multo brevior. Pedes quinti paris pedibus quarti paris longiores; earpus longior quam latior; processus carpalis tuberculo marginis inferioris longior; tuberculus maximus, integer, crenulatus; metacarpus tuberculo carens. Femur *pedum septimi* paris angustum, femore *pedum sexti* paris paullo longius. Latera segmentorum *plei* post acuta, non producta. Ramus internus *pedum uri* secundi paris ramo externo brevior.

The *head* is a trifle shorter than the first three peræonal segments together. The first two *peræonal* segments are a little deeper than the third. The tibial process of the second pair of *peræopoda* is much shorter than half the stem of the carpus. The fifth pair are longer than the fourth; the carpus is longer than broad; the carpal process is longer than the tubercle on the under margin of the joint; the tubercle is very large, undivided, and crenulated; the metacarpus wants a tubercle. The femur of the seventh pair is narrow, and is a little longer than that of the sixth. The lateral parts of the *pleonal* segments are sharp-pointed behind, but not produced. The inner ramus of the second pair of *uro-poda* is shorter than the outer.

**Colour.** Hyaline, with red spots on the lower parts of the body and on the femora of the *peræopoda*.

**Length.** 12—22 mm.

**Hab.** The subtropical and tropical regions of the Atlantic; the Indian Ocean. (D. M.; F. M.; P. M.; S. M.)

**Syn.** 1836. *Phronima solitaria*, F. E. GUÉRIN MÉNEVILLE. — Iconographie du Règne Animal de G. Cuvier. Crustacés, p. 21.  
1888. » *megalodus*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1353, pl. 162, A.

*Phronima solitaria* was shortly described in 1836 by GUÉRIN MÉNEVILLE, but was not recorded by subsequent authors; as I have said above it is most probably only a variety of *Ph. sedentaria*. The original description runs:

«Nous avons une autre espèce, prise dans l'Océan qui baigne les côtes d'Amérique, assez loin de l'embouchure de la Plata. Elle ressemble à la précédente (*Phronima atlantica*), mais la main de la cinquième paire de pattes est beaucoup plus longue et plus grêle, peu renflée vers l'extrémité, avec la griffe simple, mais fortement renflée au milieu et une forte dent au côté interne de la pointe opposée de cette griffe. Cette troisième espèce a, comme on le voit, beaucoup de ressemblance avec la *Ph. sedentaria*, mais elle s'en distingue facilement par l'absence de dent au milieu interne du doigt mobile. Nous lui avons donné le nom de *Phronima solitaria*.»

In 1888 STEBBING proposed the new specific name *Phronima megalodus*, a careful comparison of his description and drawings with those specimens at my disposal, which I previously had identified with GUÉRIN MÉNEVILLE'S *Ph. solitaria*, convinced me that they were the same species or variety, and thus I have retained the older name. I refer the reader to STEBBING'S description, giving here only a few particulars.

#### The female.

Pl. XVI, fig. 4—7.

The *first four pairs of pereopoda* (Pl. XVI, fig. 5) are almost in every respect like those pairs in *Phronima sedentaria*, except that the tibial process in the first and second pairs is much shorter.

The *fifth pair* (Pl. XVI, fig. 6). The femur, genu, and tibia are like those in *Ph. sedentaria*. The stem of the carpus is a third part longer than broad; the tubercle on the under margin is very high, crenulated on the hind margin; the carpal process does not equal a third part of the length of the stem of the carpus, and is scarcely more than a third part longer than the tubercle on the under margin of the joint. The metacarpus is much shorter than the stem of the carpus, with a feeble intumescence at the middle of the front margin.

The *sixth and seventh pairs* are like those in *Ph. sedentaria*, but the femur of the seventh pair is shorter, being only a little longer than the femur of the sixth pair, and considerably shorter than that of the fifth.

The lower hind corners of the *pleonal* segments are sharp-pointed, but not produced.

The *uropoda* (Pl. XVI, fig. 7) are comparatively shorter than those in *Ph. sedentaria*. The *second pair* reach fully to the apex of the peduncle of the third pair; the inner ramus is a little shorter than the outer. The peduncle of the *third pair* is only a fourth part longer than the inner ramus.

The *telson* is more than half as broad as the last coalesced ural segment.

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4. **PHRONIMA ATLANTICA**, F. E. GUÉRIN MÉNEVILLE, 1836.

Pl. XVI, fig. 19—26.

**Diagn.** *Caput* segmentis tribus primis peræi brevius. Segmenta duo priora peræi segmento tertio paullo altiora. Processus tibialis *pedum peræi* secundi paris dimidio stipitis carpi brevior. Pedes quinti paris pedibus quarti paris multo longiores; carpus longior quam latior; processus carpalis tuberculo marginis inferioris longior; tuberculus bidentatus; metacarpus tuberculo minimo instructus. Femur *pedum septimi* paris angustum, femore *pedum sexti* paris plus quam tertia parte longius. Latera segmentorum *plei* post acuta, non producta. Ramus internus *pedum uri* secundi paris ramo externo paullo brevior.

The *head* is shorter than the first three peræonal segments together. The first two *peræonal* segments are a little deeper than the third. The tibial process of the second pair of *peræopoda* is not half as long as the stem of the carpus. The fifth pair are much longer than the fourth; the carpus is longer than broad; the carpal process is longer than the tubercle on the under margin of the joint; the tubercle is two-pointed; the metacarpus is provided with a low tubercle on the front margin. The femur of the seventh pair is narrow, and is more than a third part longer than that of the sixth pair. The lateral parts of the *pleonal* segments are sharp-pointed behind, but not produced. The inner ramus of the second pair of *uropoda* is a little shorter than the outer.

**Colour.** Hyaline, sparingly spotted with red.

**Length.** 10—25 mm.

**Hab.** The subtropical and tropical regions of the Atlantic and of the Pacific; the Indian Ocean. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn. 1836.</b>	<i>Phronima atlantica</i> , F. E. GUÉRIN MÉNEVILLE.	—	»Description de quelques genres nouveaux des Crustacés appartenant à la famille des Hypérines». Magasin de Zoologie. 6 <sup>me</sup> Année, Classe 7 <sup>me</sup> , p. 7, pl. 18, fig. 1.
»	»	»	— 1836. Iconographie du Règne Animal de G. Cuvier. Crustacés, p. 21, pl. 25, fig. 4.
»	»	»	H. LUCAS. 1838. »Phronime». Dictionnaire pittoresque d'Histoire naturelle. Tome 7 <sup>me</sup> , p. 427, pl. 497, fig. 1.
»	»	»	H. MILNE EDWARDS. 1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 303.

- Phronima atlantica*, F. E. GUÉRIN MÉNEVILLE. H. MILNE EDWARDS. 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 93.
- »       »       »       A. WHITE. 1847. List of the Specimens of Crustacea in the Collection of the British Museum, p. 91.
- »       »       »       J. D. DANA. 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1001.
- »       »       »       SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 318, pl. 51, fig. 4.
- »       »       »       TH. STREETS. 1882. »A Study of the Phronimidæ of the North Pacific Surveying Expedition». Proc. of the U. S. National Museum. Vol. 5, p. 5, pl. 1, fig. 1—2.
- »       »       »       C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11, N:o 16, p. 25.
- »       »       »       TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1351, pl. 160.

From the original description given by GUÉRIN MÉNEVILLE in 1836 I reproduce the following passages:

» — — — pattes de la cinquième paire encore plus grandes, plus fortes; leur premier article armé d'une épine à son extrémité et en arrière, le second en ayant une au milieu et en avant; le troisième renflé et aigu à l'extrémité postérieure; le quatrième plus grand, renflé au milieu, prolongé en avant, en une grande épine courbée et armée à la base d'une forte dent bifide. Le cinquième article s'attache à l'angle postérieure du précédent; il forme la pince, en venant s'opposer, comme un doigt, à la grande pointe avancée dont nous avons parlé. Cet article est courbé, faiblement renflé en dedans et au milieu, et son extrémité dépasse de beaucoup celle du doigt qui lui est opposé. — — — — Les trois premiers segments de la queue sont presque égaux, assez grands, terminés en arrière par une pointe assez aiguë, et portant chacun une paire d'appendices natatoires à tige renflée, terminée par deux lanières ciliées, aussi longues que la tige. Les trois segments suivants sont plus étroits, et vont en diminuant de longueur; ils portent trois paires d'appendices à tige grêle, plate, terminés par deux petites lames pointues et beaucoup plus courtes: ces appendices sont dirigés en arrière, et constituent une espèce de queue dont le milieu est occupé par le septième segment, qui est très court et triangulaire.

« Nous avons observé un jeune individu de notre *Ph. Atlantica* bien caractérisé, mais ses antennes sont beaucoup plus grosses et plus longues que dans l'adulte.»

In 1838 LUCAS briefly recorded the species, and gave a new drawing of it.

In 1840 H. MILNE EDWARDS characterized the species with the following words:

»Pates des deux premières paires grêles et sans élargissement vers le bout. Deux dents entre le doigt immobile et la base de la griffe des pates de la cinquième paire.»

In 1862 SPENCE BATE recorded *Phronima atlantica* as follows:

»Third pair of pereopoda having two large tubercular teeth on the inferior margin of the carpal or fixed process.»

In 1882 STREETS described male and female specimens, taken in the Pacific. The following passages may be quoted:

»*Female.* — — — — The third and fourth pairs with the basal joint armed behind, at its extremity, with a sharp spine; the basal joint of the fifth pair armed in the same manner as the two preceding, but the spine is much larger in the former; there is likewise a spine on the middle of the following joint, in front. The third joint of the fifth pair enlarged, arched above, and lengthened; the fourth joint, or palm, long, attenuated at its articulation with the third, and gradually broadening to its junction with the fifth joint, arched above, the inferior angle produced anteriorly into a long and stout joint, corresponding to the immovable finger of the *Can-eridæ*, the anterior border with two stout, prominent teeth, the upper the larger, tuberculated on the edge towards the movable finger, and beset with a few bristles or hairs; the fifth joint, or movable finger, longer than the anterior border of the palm, arched above, and with a broad prominence on the middle of the inferior margin; the last joint very small, and in old subjects fused with the preceding joint. — — —»

»*Male.* The fifth pair of thoracic legs relatively shorter in the male; all the joints of the leg individually shorter and stouter than the corresponding parts in the female. The produced portion of the fourth joint, corresponding with the immovable finger of a crab, more produced downward, and less anteriorly, and arises from about the middle of the inferior surface. The fifth joint is more curved at its proximal extremity, so as to antagonize with the produced portion of the fourth joint. These sexual characters of the fifth pair of legs are only developed in the mature male; in the young of this sex, the fifth pair partakes of the characters, more or less, of the young female.»

In 1888 STEBBING gave a description and drawings, to which I refer the reader, here adding some details.

### The female.

Pl. XVI, fig. 19—26.

The *body* is more slender and thin than in *Phronima sedentaria*. The integument is entirely pellucid, and very thin.

The *first pair of antennæ* (Pl. XVI, fig. 21) are fixed considerably below the middle of the front side of the head. The single peduncular joint is nearly twice as long as broad. The single flagellar joint is thick and tumid at the apex, and is covered with olfactory hairs. The flagellum is nearly three times as long as the whole peduncle.

The *peræon*. The first two segments are only a little deeper and somewhat longer than the third segment. The seventh segment is as long as the three preceding together.

The *first pair of peræopoda* (Pl. XVI, fig. 22 and 23) reach far beyond the lower end of the head. The femur is almost as long as the four following joints together. The carpal process is more than half as long as the metacarpus. The dactyloptera are broadly triangular, and are only a little shorter than the dactylus.

The *second pair* do not fully reach to the middle of the carpus in the third pair. The carpal process is quite half as long as the metacarpus.

The *third and fourth pairs* are similar in shape and equal in length. The carpus is only a little longer than the two preceding joints together, and is quite as long as the metacarpus; the hind margin is finely pectinated, and set with six or seven equidistant, short hairs.

The *fifth pair* (Pl. XVI, fig. 24) reach considerably beyond the apex of the fourth. The femur is broader below, five times as long as it is broad at the apex, and is provided with a sharp-pointed process above the lower hind corner; the femur is much shorter than the tibia and the stem of the carpus together. The tibia is a little longer than the genu, ovate, and much constricted at the base. The carpus is thick and swollen, with the stem about a third part longer than broad; the tubercle on the under margin of the joint is distinctly two-pointed and feebly crenulated. The carpal process is short, not a third part as long as the stem of the joint, and not twice as long as the two-pointed tubercle; it is about a fourth part as long as the metacarpus. The metacarpus is shorter than the stem of the carpus, and has a thick intumescence, set with hairs, on the middle of the front margin.

The *sixth pair* reach to the apex of the tibia of the fifth pair. The femur is almost linear, somewhat more than three times as long as broad. The genu is broader than long, with the lower front corner squared. The metacarpus is not half as long as the carpus.

The *seventh pair* (Pl. XVI, fig. 25) are longer than the sixth. The femur is long and narrow, with the hind margin feebly convex and the lower front corner bluntly truncated; it is about a third part longer than the femur in the sixth pair. The genu is broader than long, with the lower front corner broadly rounded. The carpus is shorter than the two preceding joints together. The metacarpus is only a little shorter than the carpus.

The *pleon* is only a trifle longer than the last three peræonal segments together. The lower hind corner of each segment is angular, but not produced into a sharp point.

The *urus* is longer than the last pleonal segment. The first ural segment is nearly twice as long as the last coalesced, which is as broad as long.

The *uropoda* (Pl. XVI, fig. 26). The *first pair* do not reach to the apex of the last pair. The peduncle is somewhat more than a third part longer than the inner ramus, which is considerably longer than the outer. The *second pair* reach fully to the apex of the peduncle in the third pair. The peduncle is not twice as long as the inner ramus; the outer ramus is longer than the inner. The peduncle of the *third pair* is a third part longer than the inner ramus; the rami are almost equal in length.

The *telson* is semicircular, much broader than long, and is more than half as broad as the hind part of the last ural segment.

## 5. PHRONIMA COLLETTI, C. BOVALLIUS, 1887.

Pl. XVI, fig. 27—47.

The name is given in honour of Professor ROBERT COLLETT of Christiania.

**Diagn.** *Caput* segmentis tribus primis peræi paullulo longius. Segmenta duo priora *peræi* segmento tertio abrupte multo altiora. Processus tibialis *pedum peræi* secundi paris dimidio stipitis carpi multo brevior. Pedes quinti paris pedibus quarti paris multo breviores; carpus latitudine longitudinem æquans; processus carpalis tuberculo marginis inferioris paullulo longior; tuberculus latus, tridentatus; metacarpus tuberculo carens. Femur *pedum septimi* paris femore *pedum sexti* paris haud longius. Lateralia segmentorum *plei* post rotundata. Ramus internus *pedum uri* secundi paris ramo externo paullo longior.

The *head* is a trifle longer than the first three pereopodal segments together. The first two *peræopodal* segments are abruptly much deeper than the third. The tibial process of the second pair of *peræopoda* is much shorter than half the stem of the carpus. The fifth pair are much shorter than the fourth; the carpus is as broad as long; the carpal process is a little longer than the tubercle on the under margin of the joint; the tubercle is broad, and is three-pointed; the metacarpus wants a tubercle. The femur of the seventh pair is scarcely longer than that of the sixth. The lateral parts of the *pleopodal* segments are rounded behind. The inner ramus of the second pair of *uropoda* is a little longer than the outer.

**Colour.** Yellowish white, pellucid, and richly spotted with red.

**Length.** 12—18 mm.

**Hab.** The tropical and subtropical regions of the Atlantic; the Indian Ocean. (D. M.; F. M.; S. M.)

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|-------------------|--|---|---|
| <b>Syn.</b> 1887. | <i>Phronima Colletti</i> , C. BOVALLIUS. | — | »Systematical list of the Amphipoda Hyperidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 25.   |
| 1888.             | » <i>bucephala</i> , G. M. GILES.        | — | »On six new Amphipods from the Bay of Bengal». Journ. of the Asiatic Society of Bengal. Vol. 56. Part. 2. N:o 2, p. 215, pl. 3, fig. 1 and 2.   |
| 1889.             | » <i>Diogenes</i> , A. CHUN.             | — | »Bericht über eine nach den Canarischen Inseln im Winter 1887—88 ausgeführte Reise. II». Sitzungsberichte der K. Preussischen Akademie der Wissenschaften. 1889, p. 527, pl. 3, fig. 5 and 6. |
|                   | »        »        »                      | — | 1889. »Das Männchen der <i>Phronima sedentaria</i> , nebst Bemerkungen über die <i>Phronima</i> -Arten». Zoologischer Anzeiger. 12 <sup>ter</sup> Jahrg., p. 379.                             |

A comparison of the descriptions and drawings given by GILES and CHUN with the following description will prove that the new specific names *Phronima bucephala* and *Ph. Diogenes* are only synonyms for *Ph. Colletti*, which was proposed by me in 1887.

*Phronima Colletti* is most closely allied to *Ph. pacifica*, STREETS, but is easily distinguished by the length of the third and fourth pairs of peræopoda, and by the inner ramus of the second pair of uropoda being longer than the outer.

### The female.

Pl. XVI, fig. 44—47.

The *body* is comparatively more robust than in *Phronima sedentaria*; the head and peræon together are much longer than the pleon and urus together.

The *head* is tolerably long, not fully twice as deep as long. The front side is feebly convex, without antennal groove.

The *eyes* are closely like those in the preceding species.

The *first pair of antennæ* (Pl. XVI, fig. 45) are fixed below the middle of the front side of the head. The single peduncular joint is a little longer than broad. The single flagellar joint is almost cylindrical, rounded at the apex, and provided with long olfactory hairs; it is more than twice as long as the peduncle.

The *mouth-organs* are exactly like those in the male.

The *peræon*. The first two segments are abruptly much deeper than the third. The third segment is much shorter than the two preceding together. The seventh segment is thicker than in the preceding species, and is somewhat longer than the fifth and sixth together.

The *first pair of peræopoda* reach far beyond the lower end of the head. The femur is a little longer than the three following joints together. The tibia is only a little produced at the lower hind corner. The carpal process is not half as long as the metacarpus. The metacarpus is longer than the stem of the carpus; is tolerably thick at the base, and tapers gently towards the apex. The dactyloptera are elongated, somewhat more than half as long as the dactylus, and are finely pectinated along the hind margin. The dactylus is long, almost a third part as long as the metacarpus.

The *second pair* (Pl. XVI, fig. 46) reach a little beyond the apex of the tibia in the third pair. The femur is a little dilated, with the hind margin convex; it is longer than the three following joints together. The tibial process reaches hardly to a fourth part of the carpus. The carpal process is about a fourth part as long as the metacarpus. The metacarpus is somewhat longer than the stem of the carpus. The dactylus is long, nearly a fourth part as long as the metacarpus.

The *third and fourth pairs* are longer than the head and the whole peræon. The femur is much shorter than the three following joints together. The genu is longer than broad. The tibia is almost twice as long as the genu. The carpus is longer than the tibia, but shorter than the tibia and genu together. The metacarpus is as long as the carpus. The dactylus is minute.

The *fifth pair* (Pl. XVI, fig. 47) do not reach to the apex of the carpus in the fourth pair. The femur is straight, much broader below than above; the lower hind corner is rounded, not produced as in *Phronima sedentaria*; the femur is longer than the tibia and carpus together. The genu is nearly twice as long as it is broad below. The tibia is very broad, with the hind portion dilated and the hind margin strongly convex. The carpus is as broad as long, with the hind margin strongly convex and the front margin nearly straight; on the under margin there are three sharp-pointed tubercles, similar in shape and equal in length; the carpal process is very short, being scarcely a fourth part as long as the stem of the joint. The metacarpus is arched, smooth, without tubercle or intumescence on the front margin; it is shorter than the stem of the carpus, and does not reach beyond the front margin of the carpus when folded up.

The *sixth pair* reach beyond the apex of the tibia in the fifth pair, but do not attain the middle of the carpus. The femur is comparatively broad, being about three times as long as broad, with the margins feebly convex; the lower front corner is obtuse; the femur is as long as the three following joints together. The genu is as long as broad, with the lower front corner obtuse. The tibia is a little longer than the genu. The carpus is much longer than the two preceding joints together. The metacarpus is shorter than the carpus. The dactylus is tolerably long, being about a fourth part as long as the metacarpus.

The *seventh pair* are as long as the sixth. The femur is scarcely longer than that in the preceding pair, and of the same shape. The following joints are like those in the sixth pair.

The *pleon* is as long as the last four peræonal segments together; the first pleonal segment is considerably shorter than the last peræonal. The lower hind corner of the three segments is rounded.

The *urus* is quite as long as the last pleonal segment; the first ural segment is nearly twice as long as the last coalesced, which is broader than long.

The *uropoda*. The *first pair* reach to the apex of the third; the peduncle is nearly twice as long as the inner ramus; the rami are equal in length. The *second pair* reach beyond the middle of the outer ramus in the last pair; the peduncle is much longer than the inner ramus, but not twice as long; the inner ramus is a trifle longer than the outer. The peduncle of the *third pair* is about a fourth part longer than the inner ramus; the rami are equal in length.

The *telson* is about as long as broad, and is more than half as broad as the lower part of the last ural segment.

### The male.

Pl. XVI, fig. 27—43.

The *body* is thick and robust; the head and peræon together are as long as the pleon and urus together.

The *head* is somewhat shorter and deeper than in the female, being twice as deep as long; it is shorter than the first three peræonal segments together.

The *first pair of antennæ* (Pl. XVI, fig. 28) are inserted near the lower end of the head. The first joint of the peduncle is somewhat longer than the two following together. The first joint of the flagellum is elongate-ovate, tumid, and thickly covered with olfactory hairs; it is more than three times as long as the whole peduncle, and is nearly twice as long as the head. The following flagellar joints are five or six in number, increasing in length towards the apex.

The *second pair of antennæ* (Pl. XVI, fig. 29) are longer than the first, and reach to the front margin of the seventh peræonal segment; they are inserted closely beneath the first pair, just at the lower end of the front side of the head. The first free peduncular joint is as long as broad, the second and third are longer, and are equal in length. The first joint of the flagellum is long and slender, somewhat longer than the whole peduncle. The following flagellar joints are shorter, subequal in length, and are fringed on the under margin with minute hairs. The flagellar joints are twelve or thirteen in number.

The *labrum* (Pl. XVI, fig. 30) is comparatively small; it is bilobed at the hind margin.

The *mandibles* (Pl. XVI, fig. 31 and 32) are strongly developed. The stem is long and broad, slightly excavated on the inner side, and attached to the inner side-wall of the mouth-cavity with its base and outer margin. The incisive lamina is broad and thick, crenulated along the free margin, and furnished with fine bristles along the base of the crenulation. At the inner side of the incisive lamina project two strong, blunt processes, and at the outer side of the same lamina there is a thick bundle of strong bristles. The molar tubercle is long, but comparatively narrow, placed rectangularly to the incisive lamina, and is strongly crenulated, and provided with long, sharp spines and fine hairs. The interior of the stem is occupied by well developed, large glands.

The *labium* (Pl. XVI, fig. 33) has the lateral lobes very large and irregularly rounded; the median incision is squared, and fringed with minute hairs.

The *first pair of maxillæ* (Pl. XVI, fig. 34 and 35) have the stem robust, and filled with glands. The principal lamina is circularly hollowed, and has the margins fringed with stout bristles. The secondary lamina is long, feebly curved, and irregularly tapering towards the apex, where it carries a single bristle; it is provided at the inner side with a rectangularly projecting incisive lobe, which is strongly serrated along the lower half of its free margin.

The *second pair of maxillæ* (Pl. XVI, fig. 36) have the principal lamina narrow, and thickly covered with hairs at the apex. The secondary lamina is longer, and is thickly set with hairs.

The *maxillipeds* (Pl. XVI, fig. 37 and 38) are very large, with the stem broad and nearly linear. The lateral laminae are elongate, with the apex bent inwards; the outer margin is feebly S-shaped, and is smooth; the inner margin is convex, and strongly serrated. The median lobe is unusually strong, with the basal portion very broad and the apical portion forming a bluntly rounded process, which is covered with short hairs.

The *peræon* is comparatively shorter than in the female. The third segment is scarcely longer than the second; the seventh is quite as long as the two preceding together.

The *first two pairs of peræopoda* (Pl. XVI, fig. 39 and 40) are exactly like those pairs in the female.

The *third and fourth pairs* are comparatively a little shorter than in the female, being a trifle shorter than the head and *peræon* together; but otherwise they agree with those in the female.

The *fifth pair* (Pl. XVI, fig. 41) are like that pair in the female, but the *metacarpus* is a trifle longer, being almost as long as the stem of the *carpus*.

The *sixth and seventh pairs* (Pl. XVI, fig. 42) agree with those in the female, but the *femur* in the seventh pair is a little longer than that in the sixth.

The *pleon* is fully as long as the last five *peræonal* segments together; the first *pleonal* segment is quite as long as the last *peræonal*. The lower hind corners of the *pleonal* segments are broadly rounded.

The *pleopoda* have the peduncle thicker, and more globular, than in the female.

The *urus* and its appendages (Pl. XVI, fig. 43) are like those in the female.

## 6. PHRONIMA PACIFICA, TH. STREETS, 1877.

Pl. XVI, fig. 48—50.

**Diagn.** *Caput* segmentis tribus primis *peræi* brevius. Segmenta duo priora *peræi* segmento tertio non altiora. Processus tibialis *pedum peræi* secundi paris dimidio stipitis *carpi* multo brevior. Pedes quinti paris pedes quarti paris longitudine æquantes; *carpus* latitudine longitudinem æquans; processus *carpalis* tuberculo marginis inferioris haud longior; tuberculus latus, multi-dentatus; *metacarpus* tuberculo carens. Femur *pedum septimi* paris femore *pedum sexti* paris paullo longius. Latera segmentorum *plei* post rotundata. Ramus internus *pedum uri* secundi paris dimidium rami externi longitudine æquans.

The *head* is shorter than the first three *peræonal* segments together. The first two *peræonal* segments are not deeper than the third. The tibial process of the second pair of *peræopoda* is much shorter than half the stem of the *carpus*. The fifth pair are as long as the fourth; the *carpus* is as broad as long; the *carpal* process is not longer than the tubercle on the under margin of the joint; the tubercle is broad, and multi-dentate; the *metacarpus* wants a tubercle. The *femur* of the seventh pair is a little longer than that of the sixth. The lateral parts of the *pleonal* segments are rounded behind. The inner ramus of the second pair of *uropoda* is half as long as the outer.

**Colour.** Hyaline.

**Length.** 7—10 mm.

**Hab.** The tropical and subtropical regions of the Pacific and of the Atlantic. (S. M.)

- Syn. 1877. *Phronima pacifica*. TH. STREETS. — »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. N:o 7. 1877, p. 128.
- » » » — 1883. »A Study of the Phronimidæ of the Northern Pacific Surveying Expedition». Proc. of the United States National Museum. Vol. 5, p. 6, pl. 1, fig. 3 and 3a.
- » » » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1348, pl. 159.

From the original description given in 1877 by STREETS I reproduce the following passage:

»— — First pair of gnathopoda having the meros produced, and with the inferior margin furnished with minute spinules, one of which, larger and longer than the rest, at the apex; the superior border of the carpus arched, produced antero-inferiorly, and very slightly anteriorly; produced part not reaching half the length of the propodos; the anterior margin closely set with acute, triangular teeth; one at the inferior apex, long and slender; the inferior margin finely serrated; propodos about the same length as the superior border of the carpus, cylindrical, arcuate, slightly tapering toward the distal extremity, finely serrated on the inferior surface, and three or four longer spines on the superior surface; dactylos short, about one-fourth the length of the propodos, curved, and notched on the under surface, posterior to the apex; on either side of the base is a wing-like plate. The second pair of gnathopoda longer than the first pair, and the antero-inferior angle not produced to the same extent; in other respects they are similar. The first pair of thoracic feet shorter than the second, and much longer than the gnathopoda; the posterior margin of the carpus and propodos of both pairs minutely spinulose; dactylos minute. The third pair chelately developed; carpus large, irregularly quadrilateral, almost as broad as long, the inferior surface rounded, and the antero-inferior angle produced as a long tooth; on the middle of the anterior surface is a large crenulated tubercle, from which rise five or six long, straight hairs. In specimens from the 0,15 to the 0,20 of an inch long, there are, in the position of the tubercle, two or three sharp, prominent teeth, springing from a slightly raised base; and the angle of the carpus is less projecting in the same specimens. Propodos bowed; when flexed on the carpus reaching to the apex of the tooth at the inferior angle — in smaller specimens somewhat longer; a low convexity on the inferior surface opposite the crenulated tubercle of the carpus; the prominence not crenulated; inferior surface bimarginate. Dactylos present, minute. The posterior apex of the coxa of the third pair acute, prominent; the meros projecting posteriorly and rounded. The two posterior pairs of thoracic feet subequal, shorter than any of the preceding pairs. Telson rudimentary.»

It is possible that the larger specimens mentioned in the above description do not belong to *Phronima pacifica*. In 1882 STREETS gave the following new details:

»— — The fifth pair of legs (= the fifth pair of pereopoda) are relatively shorter, when compared with those of *atlantica*; a prominent spine on the posterior extremity of the basal joint, in front; the third joint short, broad, and considerably arched above; the fourth joint (palm) broadly quadrate, almost as broad as long, the superior border rounded posteriorly to the articulation of the third joint, the lower border slightly curved, the character of the dentition on the anterior border similar to that of *atlantica* in the general arrangement of the teeth, but the teeth are not nearly so prominent, or pointed, the lower, single tooth but slightly separated from the larger crenulated tubercle; the prolonged inferior angle more curved upward, and shorter

than in the former species (= *Ph. atlantica*). The fifth joint curved, about as long as the anterior margin of the palm, a low convexity on the inferior margin. The first pair of caudal appendages do not reach as far backward as the third pair, extending to, or slightly beyond, the middle of the rami of the last pair; the second pair extends to, or slightly beyond, the point of articulation of the rami of the third pair, and more than half way the length of the branches of the first pair.»

The description and drawings given by STEBBING in 1888 agree closely with the specimens which I have examined and identified with *Phronima pacifica*. I refer the reader to his splendid work, adding here a few details.

*Phronima pacifica* comes nearest to *Ph. Colletti*, but differs in the length of the third and fourth pairs of peræopoda, in the armature of the fifth pair, and in the form of the second pair of uropoda.

### The male.

Pl. XVI, fig. 48—50.

The forepart of the *body* is more elongated than in *Phronima Colletti*, the head and peræon together being much longer than the pleon and urus together.

The *head* is not twice as deep as long, and is fully as long as the first three peræonal segments together.

The *first pair of antennæ* have the first peduncular joint more than twice as long as the two following together. The first flagellar joint is about four times as long as the whole peduncle, but is not twice as long as the head. The flagellar joints are six in number.

The *second pair of antennæ* are only a little longer than the first, and reach scarcely to the hind margin of the fourth peræonal segment. The flagellar joints are eight or nine in number.

The *peræon*. The first two segments are a little deeper than the third.

The *first pair of peræopoda*. The carpal process is nearly half as long as the metacarpus. The metacarpus is a little longer than the stem of the carpus.

The *second pair* reach beyond the middle of the carpus in the third pair.

The *third and fourth pairs* are similar in shape, but the fourth pair are a little longer than the third; the fourth pair are considerably shorter than the head and peræon together. The metacarpus is considerably shorter than the carpus.

The *fifth pair* (Pl. XVI, fig 49) reach nearly to the apex of the fourth pair. The lower hind corner of the femur is produced and sharp-pointed. The carpus is about as long as broad, and is similar in shape to that in *Phronima Colletti*, the armature on the under margin of the carpus consists of a longer, slightly crenulated tubercle near the articulation of the metacarpus, and a smaller sharp-pointed tubercle at the middle of the under margin. The carpal process is nearly a third part as long as the stem of the carpus. The metacarpus is arched, and is a little longer than the stem of the carpus.

The *seventh pair* are a little longer than the sixth. The femur is about a fourth part longer than that in the sixth.

The *urus* is shorter than the last pleonal segment. The first segment is only a little longer than the last coalesced, which is considerably broader than long.

The *uropoda* (Pl. XVI, fig. 50). The *first pair* reach a little beyond the middle of the outer ramus in the third pair; the peduncle is much longer than the inner ramus, but not twice as long; the outer ramus is a little shorter than the inner. The *second pair* reach a trifle beyond the apex of the peduncle in the third pair; the peduncle is three times as long as the inner ramus, but not twice as long as the outer; the inner ramus is scarcely more than half as long as the outer. The peduncle of the *third pair* is not fully twice as long as the inner ramus; the outer ramus is a little shorter than the inner.

The *telson* is broadly rounded, and is more than half as broad as the hind end of the last coalesced ural segment.

## 7. PHRONIMA TENELLA, TH. STEBBING, 1888.

**Diagn.** Processus tibialis *pedum peræi* secundi paris dimidio stipitis carpi multo brevior. Pedes quinti paris pedibus quarti paris breviores; carpus longior quam latior; processus carpalis minimus, dentiformis, tuberculo marginis inferioris multo brevior; tuberculus bidentatus; metacarpus tuberculo carens. Femur pedum septimi paris latum, elongato-ovatus, femore pedum sexti paris tertia parte longius. Latera segmentorum *plei* post acuta, non producta. Ramus internus *pedum uri* secundi paris ramo externo brevior.

The tibial process of the second pair of *peræopoda* is much shorter than half the stem of the carpus. The fifth pair are shorter than the fourth; the carpus is longer than broad; the carpal process is very small, tooth-like, and much shorter than the tubercle on the under margin of the joint; the tubercle is two-pointed; the metacarpus wants a tubercle. The femur of the seventh pair is broad, clongate-ovate, and a third part longer than that of the sixth pair. The lateral parts of the *pleonal* segments are sharp-pointed behind, but not produced. The inner ramus of the second pair of *uropoda* is shorter than the outer.

**Colour.** ?

**Length.** »Without the antennæ, rather more than two-fifths of an inch.» (STEBBING.)

**Hab.** »Mid Pacific, Lat. 3° 48' S., Long. 152° 56' W.» (STEBBING.)

**Syn.** 1888. *Phronima tenella*, TH. STEBBING. — »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1354, pl. 161, A.

As I did not succeed in finding any specimen of this species in the collections at my disposal, I refer the reader to the description given by STEBBING, l. c., p. 1354—1356, pl. 161, A.

Genus 2. **PHRONIMELLA**, C. CLAUS, 1872.

**Diagn.** *Caput* altum, conicum. *Peræon* compressum, post anguste elongatum. *Pedes peræi* primi et secundi parium fere simplices, sequentibus dissimiles et multo breviores. Metacarpus pedum tertii ac quarti parium valde elongatus. *Pedes quinti* paris manu replicata instructi. *Pedes vri* secundi paris in mare reducti, in femina nulli; pedunculus pedum ultimi paris angustus. *Telson* subterminale.

The *head* is deep and conical. The *peræon* is compressed, with the hind part narrowly elongated. The first two pairs of *peræopoda* are almost simple, dissimilar to the following, and much shorter. The metacarpus of the third and fourth pairs is much elongated. The fifth pair are provided with a folding hand. The second pair of *uropoda* are more or less reduced in the male, and entirely wanting in the female; the peduncle of the last pair is narrow. The *telson* is fixed subterminally.

<b>Syn. 1872.</b> <sup>1)</sup>	<i>Phronimella</i> , C. CLAUS.	—	Grundzüge der Zoologie. 2 <sup>te</sup> Aufl., p. 467.
	" "	—	1875. " 3 <sup>te</sup> Aufl., p. 518.
	" "	—	1878. »Ueber Herz und Gefäss-system der Hyperiden«. Zoologischer Anzeiger. 1 <sup>ster</sup> Jahrg., p. 269.
	" "	—	1879. »Der Organismus der Phronimiden«. Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 64 (2).
	" "	TH. STREETS.	1883. »A study of the Phronimidæ of the North Pacific Surveying Expedition«. Proc. of the U. S. National Museum. Vol. 5, p. 7.
	" "	C. CLAUS.	1884. Grundzüge der Zoologie. 4 <sup>te</sup> Aufl., 1 <sup>ster</sup> Bd., p. 586.
	" "	J. V. CARUS.	1885. Prodrum Faunæ Mediterraneæ. Vol. 1, p. 423.
	" "	A. GERSTÆCKER.	1886. Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. Band. 5, Abth. 2, p. 489.
	" "	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperideæ«, Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 26.
	" "	G. M. GILES.	1887. »On six new Amphipods from the Bay of Bengal«. Journal of the Asiatic Soc. of Bengal. Vol. 56. Part 2. N:o 2, p. 214.
	" "	TH. STEBBING.	1888. »Report on the Amphipoda«. Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1361.

<sup>1)</sup> In 1871, in »Untersuchungen über den Bau und die Verwandtschaft der Hyperiden«, p. 149, CLAUS used the name *Phronimella elongata*, but without giving any generic diagnosis.

1877. *Anchylonyx*, TH. STREETS.

»Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. 1877. N:o 7, p. 130.

The type for the genus *Phronimella* was described in 1862 by CLAUS under the name *Phronima elongata*. As far as I know he did not give any other generic diagnosis of *Phronimella* than the few words accompanying that name in the second edition of his »Grundzüge der Zoologie», till in 1879, when he published his excellent memoir, »Der Organismus der Phronimiden».

His diagnosis of 1872, repeated in 1875, runs:

»Das fünfte Beinpaar endet mit langgestreckter Greifhand. Drittes Beinpaar sehr lang. Nur zwei Paare stiltförmiger Caudalgriffel. Vorderfühler des Männchens mit starkem Schaft und vielgliedriger Gcissel.»

In 1877 TH. STREETS described a *Phronimella* under the name of *Anchylonyx hamatus*, n. g. et sp., which in 1882 he identified with *Phronimella elongata*, CLAUS. His generic description runs thus:

»Head moderately large, broad and rounded at the top, tapering inferiorly to the oral apparatus, and excavated in front. Eyes on the lateral and dorsal surfaces of the head. Both pairs of antennæ present, long; base of the superior pair long and stout, three-jointed; inferior pair slender, four-jointed; flagellum very attenuated and elongated. Thorax broad, somewhat compressed; segments six. Abdomen narrow. The gnathopoda not subchelate, nor much reduced in size, when compared with the following feet; the first and second pairs of thoracic feet long, slender; carpus and meros linear. The third pair enlarged; carpus and meros dilated, with the anterior margin armed with teeth; propodus flexes on the carpus, impinging against the teeth on its anterior margin; dactylus fused with the propodus. The fourth and fifth pairs of feet subequal, shorter than the preceding. The three posterior pairs of abdominal appendages biramous, lanceolate; rami pointed.»

In 1879 CLAUS gave the following generic diagnosis:

»Körper sehr gestreckt, überaus pellucid, mit nur 2 Paar stiltförmiger Uropoden. Kopf kurz, mit hohem, gewölbtem Scheitel, Scheitelmundachse sehr verlängert. Die zwei vordern Brustsegmente ohne Grenzen verschmolzen. Mandibeltaster fehlen auch dem Männchen. Zunge der Unterlippe (Maxillarfusspaar) auf einen warzenförmigen Höcker reducirt. Die beiden Gnathopodenpaare schwächig mit schwacher (zusammengesetzter) Greifhand. Das dritte Beinpaar etwas weniger, das vierte stark verlängert. Das fünfte Beinpaar endet mit sehr langgestreckter (zusammengesetzter) Greifhand. Drei Paare von Kiemenschläuchen am 4., 5. und 6. Brustringe.»

In 1882 STREETS gave the following new diagnosis:

»The shape of the head and antennæ, and the general form of the thorax and abdomen very similar to *Phronima*. The third pair of thoracic feet *long* — much longer than the succeeding pair. The fifth pair enlarged, and used for prehension; *the extremity, or claw, resembling that of the Squilla* — the movable finger (fifth joint) flexing against the anterior aspect of the palm, which is furnished with teeth. Three pairs of styliform caudal appendages; the second, or middle, pair short, or rudimentary.

*Sexual differences.* Males smaller than the females, and more robust. In the females the second pair of caudal appendages are rudimentary, almost obsolete; in the males well developed.»

In 1885 CARUS translated in Latin the diagnosis given by CLAUS in 1879.

In 1886 GERSTAECKER gave the following diagnosis:

»Kopf lang ausgezogen, mit hoch gewölbtem Scheitel. Kiefertaster beiden Geschlechtern fehlend. Die beiden ersten Mittelleibsringe fest mit einander verschmolzen, ihre Beinpaare dünn, mit schwacher Greifhand; viertes Beinpaar stark verlängert, das fünfte in eine langstreckige Greifhand endigend. Kiemenschläuche wie bei *Phronima*. Von den griffelförmigen Hinterleibsbeinen nur zwei Paare ausgebildet.»

In 1887 I described a new species *Phronimella filiformis*, which, however, according to further examination, is only a variety of *Ph. elongata*.

In the same year GILES proposed the new specific name *Phronimella hippocephala*, which is also a synonym for *Ph. elongata*.

In 1888 STEBBING gave elaborate descriptions of different forms of *Phronimella elongata* taken during the »Challenger»-expedition.

The sexual differences are greater than in the genus *Phronima*, being the following:

1. The body and the legs are more robust in the male than in the female.
2. The flagellum of the first pair of antennæ is multi-articulate in the male, but consists of a single joint in the female.
3. The second pair of antennæ are filiform and multi-articulate in the male, but wanting in the female.
4. All the pairs of peræopoda, and especially the third pair, are more elongated in the female than in the male.
5. The carpus of the fifth pair is more elongated in the female than in the male, being five or six times as long as broad, while in the male it is only about three times as long as broad. The second pair of uropoda are more or less developed in the male, but wanting in the female.

Most of the specimens of *Phronimella* have been captured swimming free in the surface of the sea, but a few female specimens have been found inhabiting very thin and hyaline »houses», probably the remains of some *Siphonophora*.

The single species is thus *Phronimella elongata*, CLAUS.

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## 1. PHRONIMELLA ELONGATA, C. CLAUS, 1862.

Pl. XVI, fig. 51—67.

**Diagn.** *Caput* segmenta tria prima peræi longitudine æquans. Segmenta duo priora *peræi* coalita. *Pedes peræi* tertii paris pedibus quarti paris multo longiores. Carpus pedum quinti paris plus quam ter longior quam latior. Femur pedum parium trium ultimorum elongatum, plus minusve lineare. Ramus internus *pedum uri* primi paris ramo externo paullo brevior. *Telson* marginem posteriorem segmenti ultimi uri non superans.

The *head* is as long as the first three peræonal segments together. The first two *peræonal* segments are coalesced. The third pair of *peræopoda* are longer than the fourth. The carpus of the fifth pair is more than three times as long as broad. The femur of the last three pairs is elongated, and more or less linear. The inner ramus of the first pair of *uropoda* is a little shorter than the outer. The *telson* does not reach beyond the hind margin of the last ural segment.

**Colour.** Vitreous.

**Length.** 5—20 mm.

**Hab.** The subtropical and tropical regions of the Atlantic, and of the Pacific; the Mediterranean; the Indian Ocean. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn. 1862.</b>	<i>Phronima elongata</i> , C. CLAUS.	—	»Bemerkungen über <i>Phronima sedentaria</i> Forsk. und <i>elongata</i> n. sp.» Zeitschrift für wissenschaftliche Zoologie. 12 <sup>ter</sup> Bd, p. 193, pl. 19, fig. 2, 3 and 7.
	»        »        »	—	1862. »Ueber <i>Phronima elongata</i> Cls» Würzburger naturwiss. Zeitschrift. 3 <sup>ter</sup> Bd, p. 247, pl. 3, fig. 6—11.
	<i>Phronimella</i> »        »	—	1871. »Untersuchungen über den Bau und die Verwandtschaft der Hyperiden». Nachrichten von der K. Gesellsch. der Wissenschaften und der Georg-Augusts-Universität zu Göttingen. 1871, p. 149.
	»        »        »	—	1872. Grundzüge der Zoologie. 2 <sup>te</sup> Aufl., p. 467.
	»        »        »	—	1875.        »        3 <sup>te</sup> Aufl., p. 518.
	»        »        »	—	1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität. Wien. Tom. 2, p. 63 (5), pl. 2, fig. 15, and pl. 4, fig. 26.

- Phronimella elongata*, C. CLAUS. TH. STREETS. 1883. »A Study of the Phronimidæ of the North Pacific Surveying Expedition». Proc. of the U. S. National Museum. Vol. 5, p. 8, pl. 1, fig. 4 and 5.
- »       »       » C. CLAUS. 1884. Grundzüge der Zoologie. 4<sup>te</sup> Aufl. 1<sup>ster</sup> Band, p. 586.
- »       »       » J. V. CARUS. 1885. Prodronus Faunæ Mediterraneæ. Vol. 1, p. 423.
- »       »       » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 26.
- »       »       » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1362, pl. 163.
- »       »       » C. CHUN. 1889. »Bericht über eine nach den Canarischen Inseln im Winter 1887—88 ausgeführte Reise. II. Sitzungsberichte der K. Preuss. Akad. der Wissenschaften zu Berlin. 1889, p. 531.
1877. *Anchylonyx hamatus*, TH. STREETS. — »Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California». Bulletin of the United States National Museum. 1877. N:o 7, p. 131.
1887. *Phronimella filiformis*, C. BOVALLIUS. — »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 26.
- »       »       » TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1370.
1887.       »       *hippocephala*, G. M. GILES. — »On six new Amphipods from the Bay of Bengal». Journal of the Asiatic Soc. of Bengal. Vol. 56. Part. 2. N:o 2, p. 217, pl. 3, fig. 3.

The original diagnosis given by CLAUS in 1862 runs:

»Körper schlank und zart. Das Abdomen sehr langgestreckt mit 3 Schwimffusspaaren und 2 Paaren von Springfüssen versehen. Thoracalfüsse sehr dünn und schwach, die dritten und noch mehr die vierten<sup>1)</sup> fast geisselförmig verlängert; die fünften sind nicht Scheeren sondern Klauenfüsse.»

<sup>1)</sup> Probably a typographical error instead of: »die vierten und noch mehr die dritten fast geisselförmig verlängert».

In the same year he described the male form of the species as follows:

»Die Hyperine, welche ich als Männchen der *Phr. elongata* in Anspruch nehme, hat eine Länge von c. 12 mm. und schliesst sich in der gesammten Leibesform dem beschriebenen Weibchen an; allerdings fällt der gedrungene Bau des Abdomens und die kräftigere Entwicklung seiner 3 Schwimmfusspaare als eine Differenz in die Augen, welcher man anfangs die Bedeutung einer Artverschiedenheit beilegt, indess gewinnt man durch die Untersuchung der Augen und namentlich der Mundwerkzeuge und der Brustgliedmassen bald die Ueberzeugung, dass es sich nur um Unterschiede des Geschlechtes handelt. Die Mundtheile stimmen mit denen des Weibchens fast vollständig überein, der inneren Lobus der ersten Maxille besitzt ganz dieselbe Bezahlung als dort, der äussere die gleichen Kerben an dem einen Seitenrande. Nur das dritte zur Unterlippe verschmolzene Kieferpaar zeichnet sich durch eine mediane kammartige Erhebung des Basalthestes aus. Die Thoracalfüsse aber zeigen bis in die Einzelheiten die nämlichen Form- und Grössenverhältnisse, entbehren aber der inneren blattförmigen Anhänge, welche beim Weibchen am dritten, vierten und fünften Paare zur Herstellung eines Brutraumes dienen. Die 3 Paare von Branchialsäckchen sind an den entsprechenden Segmenten vorhanden, und der Mangel jener Lamellen weist auf die Natur und die Leistungen des männlichen Geschlechtes hin. Ebenso wird man auch die allerdings auffallend modificirten Antennen auf die eigenthümlichen Leistungen des Männchens zurückführen können.»

In 1877 STREETS gave a detailed specific description of *Anychlonyx hamatus*, from which I reproduce the following passages.

»— — — Segments of the thorax six; the first and second soldered together; the five anterior subequal; the sixth (the seventh normal) narrows posteriorly, and is nearly as long as the two preceding. First pair of gnathopoda shorter and slenderer than the second; meros of the same length as the preceding joint, slightly produced inferiorly at the distal extremity — the produced portion finely serrated below and anteriorly, at the angle one of the serrations produced to a fine acicular spine; carpus long, at inferior apex a slender spine propodos somewhat shorter than the carpus, arched; dactylus about one-half the length of the propodos, arched, acute, notched below the apex, with a wing-like plate on either side of base. The carpal and meral joints of the second pair of gnathopoda neither produced, nor spiniferous; dactylus less than one-half the length of the propodos; with these exceptions the second pair is similar to the first. First and second pairs of thoracic feet longer than the third; the first pair longer than the second; the external surface of the coxæ ridged along the middle, with posterior angles acute, spinous; all the joints narrow and elongate; claw ankylosed with the tarsus, and fixed at a right angle to it; the apex of the tarsus produced in the form of a long, straight, acute spine. The third pair of thoracic feet enlarged, more robust than the others, with coxa ridged on the middle of the external surface, and with the anterior and posterior margins armed with short, stout spines; meros slender, convex posteriorly, and anteriorly concave; anterior surfaces of the carpus and meros armed with long, sharp teeth — three on the latter, and seven on the former; the fifth tooth, counting from the base of the carpus, much larger and longer than the others; propodos about half the length of the carpus, arched; dactylus small, ankylosed, fixed at a right angle to the propodos. Fourth and fifth pairs of feet subequal, shorter than the preceding, with the anterior angles of coxæ spinous; in other respects similar to the preceding. — — —»

In 1883 he gave a new description of male and female specimens under the name *Phronimella elongata*, CLAUS. The following passages may be quoted.

»Female: — — — The first pair of caudal appendages terminate half way the rami of the third pair; the second pair rudimentary, represented only by a projecting tubercle».

»Male: — — — The body of the animal smaller and stouter than the female; the last two joints of the third pair of feet relatively shorter, and all the feet shorter and more robust; the fifth joint of the fifth pair about one-half the length of the fourth joint, and impinges on the large tooth anterior to its middle. The second pair of caudal appendages well developed, and extends to the commencement of the rami of the first pair.»

In 1885 CARUS gave the following Latin diagnosis, translated from CLAUS:

»Corpus gracile; abdomen pedibus 3 natatoriis, 2 saltatoriis munitum; pedes thoracales tenuissimi, debiles, et paris III. et magis IV. fere flagelliformes; pedes paris V. unguiferi, haud chelati.»

In 1887 I gave the following diagnosis of a variety of *Phronimella elongata*, under the name *Ph. filiformis*.

»Second pair of peræopoda much longer than the first; metacarpal processes longer than half the dactylus. Fourth pair longer than fifth. Femora of sixth and seventh pairs equal in length. Second pair of uropoda well developed.»

In the same year GILES described as a new species *Phronimella hippocephala*, which, however, in my opinion, is only a very young male of *Ph. elongata*. From his description the following passages may be quoted:

»The head somewhat resembles that of a horse in shape, but the resemblance is not nearly so striking as that of the first species (= *Phronima bucephala*) to the head of a bull. It is not so broad at the top, and no fold surrounds it; so that the appearance of a cephalic shield is not produced; its dorsal aspect is covered with a large, widely separated pair of apical eyes. — — — The thorax is long, narrow, depressed rather than compressed, the first two dorsally visible segments scarcely separable. The third has the inferior angle of its pleuron produced into a sort of triangular spine, overlapping the second. The fourth and fifth, of nearly equal length, form the widest portion of the body; the sixth longer and narrower than these; and the last, the longest and narrowest of all, is provided behind with a spine on either side of the middle line and has this posterior border considerably everted, so as to admit of hyperextension of the abdomen on the thorax.»

In 1888 STEBBING gave exhaustive descriptions of several forms or varieties of *Phronimella elongata*, so that, referring the reader to his work, I shall restrict myself to give here only some details respecting the variety which I previously called *Ph. filiformis*.

#### The female.

Pl. XVI, fig. 51—57.

The body is very slender, with extremely elongated and almost filiform appendages. The head and peræon together are quite as long as the pleon and urus together. The integument is very thin and vitreous in appearance.

The head is not twice as deep as long.

The eyes are smaller, and consist of fewer elements than in the larger and more robust form of *Phronimella elongata*.

The first pair of antennæ (Pl. XVI, fig. 53) are fixed at the middle of the front side of the head. The single peduncular joint is cylindrical, and is nearly twice as long as broad. The single flagellar joint is very slender, cylindrical, four times as long as the peduncle, and is furnished with six or eight long, olfactory hairs at the apex.

The peræon. The seventh segment is very narrow, and is somewhat longer than the two preceding segments together.

The *first pair of peræopoda* (Pl. XVI, fig. 54) have the femur narrowly linear, more than ten times as long as broad, and considerably longer than all the following joints together. The tibia is scarcely longer than the genu. The carpus is longer than the two preceding joints together, and has a small, tooth-like projection on the hind margin near the apex, but does not form a carpal process of any kind. The metacarpus is as long as the carpus, with a feeble serration on the hind margin near the apex, and two feebly curved dactyloptera, which are considerably longer than half the dactylus. The dactylus has a blunt secondary tooth near the apex on the hind margin.

The *second pair* (Pl. XVI, fig. 55) are longer than the first and reach quite to the apex of the femur in the third pair. The femur is like that in the first pair, and is longer than all the following joints together. The carpus is twice as long as the two preceding joints together, and is armed as in the first pair. The metacarpus is a little shorter than the carpus. The dactylus is scarcely a third part as long as the metacarpus.

The *third pair* are nearly as long as the head, peræon, and pleon together. The femur is very elongated, narrowly linear, and is about fifteen times as long as broad. The genu is short; the tibia elongated, about half as long as the femur; the carpus is elongated, feebly tapering towards the apex, and is only a little shorter than the femur. The metacarpus is very elongated, filiform, and is somewhat longer than the femur. The dactylus is spine-like, immoveably fixed at right angles to the metacarpus.

The *fourth pair* are much shorter than the third, equalling in length only the head and the six first peræonal segments together. The femur is narrow, linear, and a little more than half as long as that in the preceding pair. The carpus is a little shorter than the femur, and the metacarpus is shorter than the carpus.

The *fifth pair* (Pl. XVI, fig. 56) are much longer than the fourth, and reach to the apex of the carpus in the third pair, being a little longer than the head and peræon together. The femur is very elongated and almost linear, about twelve times as long as broad, and without distinct teeth on the front margin. The genu is longer than broad. The tibia is not half as long as the femur, very feebly marked with tooth-like prominences on the front margin. The carpus is a little longer than the tibia, and about half as long as the femur; it is nearly five times as long as it is broad near the apex, and has five or six low teeth on the front margin and a somewhat larger one near the apex. The metacarpus is feebly arched, slender, and about a third part as long as the metacarpus. The dactylus is very minute.

The *sixth and seventh pairs* are equal in length and tolerably similar in shape. The femur is a little broader below than above; that in the seventh pair is a little longer than in the sixth. The carpus is longer than the tibia, and the metacarpus is scarcely half as long as the carpus.

The *pleon* is slender and is quite as long as the whole peræon. The first segment is the longest, and is longer than the last peræonal segment.

The *pleopoda* have the peduncle elongate and slender, and longer than the rami. The outer ramus of the first pair has seven joints, the inner five.

The *urus* is only a little shorter than the last pleonal segment. The first ural segment is somewhat longer than the last coalesced one, which is considerably longer than broad.

The *uropoda* (Pl. XVI, fig. 57). The *first pair* reach to the middle of the outer ramus in the last pair; the rami are elongate-lanceolate, and finely serrated on both margins; the inner ramus is a little shorter than the outer. The *second pair* are represented only by a minute sack-like prominence on either side of the base of the last ural segment. The peduncle of the third pair is elongated, a little broader below than above, and about six times as long as it is broad at the apex; the inner ramus is half as long as the peduncle, and is a trifle shorter than the outer.

The *telson* is scarcely more than a third part as broad as the hind portion of the last ural segment.

### The male.

Pl. XVI, fig. 58—67.

The *body* is thicker and more robust than in the female.

The *first pair of antennæ* (Pl. XVI, fig. 58) are considerably longer than the head and peraeon together. The first joint of the peduncle is thick, almost globular, and is nearly twice as long as the two following together. The first joint of the flagellum is more than twice as long as the whole peduncle, and has the lower front corner produced into a conical process; the under margin of the joint is thickly fringed with olfactory hairs. The second, third, and fourth flagellar joints are short; the following are long, slender, cylindrical, and furnished with minute hairs on the under margin. The flagellar joints are nineteen or twenty in number.

The *second pair of antennæ* (Pl. XVI, fig. 59) are only a little longer than the first. The first two free joints of the peduncle are equal in length, the third is longer. The first flagellar joint is slender, tapering, and is longer than the last peduncular joint. The flagellar joints are thirteen or fourteen in number.

The *labrum* is very small, the hind, free margin is slightly bilobed.

The *mandibles* (Pl. XVI, fig. 60) are in general form similar to those in *Phronima Colletti*. The corners of the incisive lamina are irregularly serrated, the median portion of the lamina is finely crenulated. The molar tubercle is long but narrow, armed with blunt teeth, sharp-pointed spine-like prominences, and stout bristles.

The *labium* has the median incision more shallow than in *Phronima*.

The *first pair of maxillæ* (Pl. XVI, fig. 61) have the principal lamina cup-like, with the margins strongly serrated with spine-like teeth; the secondary lamina is narrowly helmet-shaped with the apical parts of the margins serrated.

The *second pair of maxillæ* (Pl. XVI, fig. 62) have the principal lamina conical and sparingly set with long hairs; the secondary lamina is feebly curved, two-pointed at the apex, and furnished with a few long hairs.

The *maxillipeds* (Pl. XVI, fig. 63) are comparatively small. The lateral laminae are narrow, feebly curved, with the outer margin convex, and the inner margin feebly

S-shaped, and strongly serrated. The median lobe is very short and thin, with two minute hairs at the apex.

The *peræon* is longer than the pleon; the seventh segment is scarcely as long as the two preceding together.

The *first pair of peræopoda* are like that pair in the female, but somewhat more robust. The femur is about eight times as long as broad.

The *second pair* (Pl. XVI, fig. 64) reach nearly to the middle of the tibia in the third pair.

The *third pair* (Pl. XVI, fig. 65) are longer than the head, the peræon, and the first pleonal segment together. The metacarpus is longer than the femur.

The *fourth pair* are much shorter than the third, but still quite as long as the head and the first six peræonal segments together.

The *fifth pair* are only a little longer than the fourth, and reach a little beyond the apex of the carpus in the third pair. The carpus is more robust than in the female, and more strongly serrated; it is a little more than three times as long as broad.

The *sixth and seventh pairs* are like those pairs in the female, but the femur is somewhat more dilated, with convex margins.

The *pleon* is considerably more robust than in the female. The first segment is a trifle longer than the last peræonal.

The *pleopoda* (Pl. XVI, fig. 66) have the peduncle thicker than in the female. The coupling spines have a hook-like tooth on either side below the head.

The *uropoda* (Pl. XVI, fig. 67). The *first and third pairs* are like those in the female, but have the peduncle comparatively shorter. The *second pair* are short and slender, and reach to the apex of the peduncle in the first pair; the outer ramus is two thirds as long as the peduncle; the inner ramus is not developed.

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The tenth family **ANCHYLOMERIDÆ**, C. BOVALLIUS, 1887.

**Diagn.** *Caput* magnum, tumidum, plus minusve globosum. *Oculi* grandes. *Antennæ* primi paris rectæ, parti anteriori capitis affixæ; articulus primus flagelli crassus elongatus, ceteri in mare plus minusve numerosi, filiformes, in femina nulli. *Antennæ* secundi paris in mare longæ filiformes, parti anteriori capitis affixæ, in femina obsoletæ. Instrumenta oris masticatoria, mandibulæ in mare palpo instructæ, in femina palpo carentes. *Pedes peræi* parium quattuor mediorum prensorii, vel pedes quinti paris solum prensorii; pedes septimi paris plus minusve transformati vel reducti. *Pedes uri* ramis distinctis carentes.

The *head* is large, tumid, more or less globose. The *eyes* are large. The first pair of *antennæ* are straight, fixed on the front side of the head; the first joint of the flagellum is thick and elongated; the following are more or less numerous in the male and filiform, in the female they are wanting. The second pair of *antennæ* in the male are long and filiform, fixed on the front side of the head; in the female they are obsolete. The mouth-organs are adapted for mastication; the mandibles in the male are furnished with a palp, in the female without a palp. The four middle pairs of *peræopoda*, or only the fifth pair, are prehensile; the seventh pair are more or less transformed or reduced. The *uropoda* want distinct rami.

Syn. 1887.	<i>Anchylomeridæ</i> , C. BOVALLIUS,	—	»Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet.-Ak. Handl. Bd. 11. N:o 16, p. 26.
	»	»	1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 571.
1888.	<i>Phrosinidæ</i> , TH. STEBBING.	—	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29.

The genera composing the family *Anchylomeridæ* were previously united under the name *Phrosininæ* as a subfamily of the family *Phronimidæ* (see above p. 330, 331 and 341).

In 1887 I proposed the new family-name *Anchylomeridæ*, considering the *Phrosininæ* so different from the *Phronimidæ*, that they ought to form an independent family.

In 1888 STEBBING changed the name to *Phrosinidæ*, but as *Anchylomeridæ* has priority by a year and is taken from a generic name still in use within the family I must reject the later name. Another practical reason why *Anchylomeridæ* ought to be retained instead of *Phrosininæ* is that the latter name sounds very like *Phronimidæ* and would possibly make confusion.

The first described genus belonging to the family was *Phrosina* instituted in 1822 by RISSO; in 1829 LATREILLE applied the name *Dactylocera* to the same genus.

In 1830 H. MILNE-EDWARDS founded the new genus *Anchylomera*; which in 1832 was called *Cheiropristis* by COCCO; and in 1836 *Hieraconyx* by GUÉRIN MÉNEVILLE.

In 1836 GUÉRIN MÉNEVILLE instituted the new genus *Primno*, which name is here corrected into *Euprimno*, because *Primno* was previously applied to a genus of Crustacea by RAFINESQUE-SCHMALTZ in 1814.

No new genus has subsequently been added to the family.

The three genera are easily distinguished as shows the following table:

- |    |   |                         |
|----|---|-------------------------|
| A. | The first four pairs of peræopoda are simple, not prehensile, the fifth pair have a folding hand, the sixth and seventh pair are simple; the dactylus of the seventh pair is transformed.....           | 1. <i>Enprimno</i> .    |
| B. | The first two pairs of peræopoda are simple, the third, fourth, and fifth pairs are subheliform, the sixth pair have a folding hand, and the seventh pair are simple with the dactylus transformed..... | 2. <i>Anchylomera</i> . |
| C. | The first two pairs of peræopoda are simple; the second, third, fifth, and sixth pairs are more or less subheliform, the seventh pair are reduced, consisting only of the femur.....                    | 3. <i>Phrosiua</i> .    |

Genus 1. **EUPRIMNO**, F. E. GUÉRIN MÉNEVILLE, 1836.

**Diagn.** *Caput* ante leviter productum. *Pedes perai* parium quattuor anteriorum simplices, non prehensiles. *Pedes quinti* paris manu replicata instructi. *Pedes sexti* paris simplices. *Pedes septimi* paris completi; dactylus transformatus. *Pedes uri* crassiuseuli, laminares.

The *head* is somewhat produced in front. The first four pairs of *peræopoda* are simple, not prehensile. The fifth pair are provided with a folding hand. The sixth pair are simple. The seventh pair are complete; the dactylus is transformed. The *uropoda* are comparatively thick and laminar.

**Syn. 1836.** *Primno*, F. E. GUÉRIN MÉNEVILLE.

»Description de quelques genres nouveaux des Crustacés appartenant à la famille des Hypérines». Magasin de Zoologie. 6<sup>me</sup> Année. Classe 7<sup>me</sup>, p. 2.

- |   |   |                         |  |
|---|---|-------------------------|--|
| » | » | H. MILNE EDWARDS. 1838. | Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 306. |
| » | » | »                       | 1839. » 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.   |
| » | » | »                       | 1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 81.  |
| » | » | A. WHITE.               | 1847. List of the Specimens of Crustacea in the Collection of the British Museum, p. 91.   |

<i>Primno</i> , F. E. GUÉRIN MÉNEVILLE.	H. LUCAS.	1849.	» <i>Primno</i> ». Dictionnaire universel d'Histoire naturelle --- par Ch. d'Orbigny. Tome 10 <sup>me</sup> , p. 465.
»	»	H. NICOLET.	1849. Historia física y política de Chile --- por C. Gay. Zoologia. Tomo 3 <sup>ro</sup> , p. 246.
»	»	H. LUCAS.	1851. Histoire naturelle des Crustacés, des Arachnides et des Myriapodes, p. 239.
»	»	J. D. DANA.	1852. »On the Classification of the Crustacea Choristopoda or Tetrade-capoda». The American Journal of Science and Arts. 2 <sup>nd</sup> Ser. Vol. 14, p. 315.
»	»	»	1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000 and 1442.
»	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 321.
»	»	C. CLAUS.	1872. Grundzüge der Zoologie. 2 <sup>te</sup> Aufl., p. 467.
»	»	»	1875. » 3 <sup>tte</sup> Aufl., p. 518.
»	»	»	1879. »Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 61 (3).
»	»	»	1884. Grundzüge der Zoologie. 4 <sup>te</sup> Aufl., 1 <sup>ster</sup> Bd, p. 587.
»	»	A. GERSTAECKER.	1886. Der H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Band. 2 <sup>te</sup> Abth., p. 488.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 28.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1440.

The original description given by GUÉRIN MÉNEVILLE in 1836 contains many purely specific characteristics, which are excluded in the following quotation:

»Corps allongé, de quatorze segmens, non compris la tête. Tête ovale, très bombée, perpendiculaire et terminée en pointe. — — — Pieds de la première paire, les plus courts de tous, à article cylindrique, dépassant la tête de presque toute sa hauteur, et terminées par un petit ongle pointu. Seconds pieds un peu plus longs; — — — troisièmes et quatrièmes pieds encore plus longs, simples, à articles cylindriques; cinquièmes pieds de plus du double plus grands que les précédens; — — — quatrième article presque aussi grand que le premier, large et aplati, armé de fortes épines à son côté antérieur; — — — sixièmes pieds beaucoup plus courts; septièmes pattes encore plus courtes, à premier article large et aplati, ayant les autres articles cylindriques et grêles et la griffe du dernier renflée et arrondie, au lieu d'être aiguë comme

aux autres pattes. Trois premiers segmens de l'abdomen grands; — — — les suivans courts, plus étroits, et donnant support à des lames natatoires simples, larges, un peu lobées au bout, mais n'étant point terminées par deux petits appendices, comme dans les Phronimes.»

In 1838 H. MILNE EDWARDS gave the following description, which he repeated in 1839 and 1840:

»Le genre *Primno* de M. GUÉRIN parait être intermédiaire entre les *Dactylocères*, les *Hyperies* et les *Phronimes*; la tête est conformée à-peu-près comme chez ces derniers et ne porte aussi qu'une seule paire d'antennes styliformes; les pattes des quatre premières paires sont médiocres, grêles vers le bout et non chélifformes; celles de la cinquième paire sont très grandes et leur antépénultième article est très large et très épineux sur le bord intérieur, tandis que les deux derniers articles sont grêles et cylindriques; les pattes de la sixième paire sont aussi très longues, mais très grêles excepté vers leur base, et celles de la septième paire sont filiformes dans presque toute leur longueur; enfin les appendices abdominaux des trois dernières paires sont lamelleux et simples.»

This description was, with slight variation, repeated in 1849 by LUCAS and NICOLET.

In 1862 SPENCE BATE gave the following description:

»Superior antennæ as long as the cephalon. Inferior antennæ obsolete. Gnathopoda not subchelate, nor very small. First two pairs of pereopoda having the carpi not dilated; third pair twice as long as the preceding, and having the carpus largely dilated and armed, propodos and dactylos not fused together; fourth pair considerably smaller, not having the carpus dilated; fifth pair much smaller. Three posterior pairs of pleopoda consisting each of a uniaarticulate membranous lamella. Telson single.»

In 1886 GERSTAECKER gave the following description:

»Kopf oberhalb stumpf abgerundet, nach unten und hinten zurückweichend und schnauzenförmig verjüngt. Nur das erste Mittelleibssegment verkürzt, das selbständige zweite und die folgenden länger. Das erste, dritte und vierte Beinpaar mit linearem, die übrigen mit lamellös erweitertem Schenkelgliede, dieses an dem besonders stark verlängerten fünften Beinpaar auffallend herabreichend und schräg abgestutzt, am zweiten und sechsten unterhalb birnförmig erweitert und abgerundet. An den vier vorderen Paaren das sechste Glied schmal, fingerförmig, die Endklaue klein, am fünften und sechsten das drittletzte Glied mit gezähntem Vorderrand, die Endklaue lang, aufgebogen, am fünften das vorletzte Glied sehr lang und dünn. Die drei vorderen Hinterleibssegmente gross, die drei letzten Paare der Spaltbeine ungegliedert, flossenförmig.»

The type species was *Primno macropa*, instituted in 1836 by GUÉRIN MÉNEVILLE. No new species was proposed till 1888, when STEBBING described three new ones, *P. Latreillei*, *P. Menevillei*, and *P. antarctica*.

After a careful re-examination of the material at my disposal I am convinced that these three new species are at most varieties of the type species, because the chief differences recorded by STEBBING are liable to great variation, purely individual as well as owing to the age of the animals.

The diagram on p. 402 shows the great variation of the number and order of teeth on the front margin of the carpus in the fifth pair of peræopoda.

The dorsal carina and the spine-like processes of the last peræonal segment and the first two pleonal are not developed or only a little developed in small and young spe-

cimens of 1,5 mm. or 2 mm. in length, but this armature becomes more and more distinct with the growth of the animals.

The uropoda are very narrow in the smaller and younger specimens but increase gradually in breadth with the age of the animals, and the serration becomes gradually more indistinct.

Thus I feel justified to place the last three species as synonyms for *Euprimno macropus*, GUÉRIN MÉNEVILLE.

The sexual difference in the genus is small and consists in the female being destitute of the second pair of antennæ and of mandibular palp, and further in the female having only a single-jointed flagellum in the first pair of antennæ.

### 1. **EUPRIMNO MACROPUS**<sup>1</sup>, F. E. GUÉRIN MÉNEVILLE, 1836.

Pl. XVII, fig. 23—40, Pl. XVIII, fig. 1—2.

**Diagn.** *Caput* segmenta tria prima peræi longitudine æquans, altius quam longius. Segmentum ultimum peræi ac segmenta duo priora plei in tergo acute producta. Femur pedum peræi primi paris angustum, femur pedum secundi paris dilatatum. Pedes quinti paris quam peræon multo longiores; carpus ante fortiter dentatus, femur longitudine fere æquans. Latera segmentorum plei post acuta. *Pedes uri* primi paris apicem pedum tertii paris non attingentes.

The *head* is as long as the first three peræonal segments together, and is deeper than long. The last peræonal segment and the first two pleonal are dorsally produced into sharp-pointed processes directed backwards. The femur of the first pair of *peræopoda* is narrow, that of the second dilated. The fifth pair are much longer than the whole peræon; the carpus is strongly denticulated on the front margin, and is nearly as long as the femur. The lateral parts of the *pleonal* segments are sharp-pointed behind. The first pair of *uropoda* do not reach to the apex of the third pair.

**Colour.** Whitish red, with metallic lustre on the pleonal segments.

**Length.** 5—12 mm.

**Hab.** The subtropical and tropical regions of the Atlantic and of the Pacific; the Indian Ocean; the Australian Antarctic region. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1836.** *Primno macropa*, F. E. GUÉRIN MÉNEVILLE.

— „Description de quelques genres nouveaux des Crustacés appartenant à la famille des Hypérines». Magasin de Zoologie. 6<sup>me</sup> Année.

<sup>1</sup>) *Macropus* is the right spelling instead of *macropa*, as the word is composed of *μακρός* and *πούς*.

Classe 7<sup>me</sup>, p. 4, pl. 17, fig. 1.

*Primno macropa*, F. E. GUÉRIN MÉNEVILLE. H. MILNE EDWARDS. 1838. Histoire naturelle des Animaux sans vertèbres - - - par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 307.

» » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>nd</sup>, p. 370.

» » » » 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 81.

» » » H. LUCAS. 1849. «Primno». Dictionnaire universel d'Histoire naturelle - - - par Ch. d'Orbigny. Tome 10<sup>me</sup>, p. 465.

» » » H. NICOLET. 1849. Historia fisica y politica de Chile - - - par Claudio Gay. Zoologia. Tomo 3<sup>ro</sup>, p. 246.

» » » H. LUCAS. 1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 239, pl. 18, fig. 7.

» » » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 322, pl. 51, fig. 8.

» » » A. GERSTÄCKER. 1884. Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5<sup>ter</sup> Bd. 2<sup>te</sup> Abth., pl. 35, fig. 3.

» » » C. BOVALLIUS. 1887. «Systematical list of the Amphipoda Hyperideæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 28.

» » » TH. STEBBING. 1888. «Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1441, pl. 178.

1888. *Primno Latreillei*, TH. STEBBING. — » p. 1445, pl. 179 A.

1888. *Primno Menevillei*, TH. STEBBING. — » p. 1447, pl. 179 B.

1888. *Primno antarctica*, TH. STEBBING. — » p. 1448, pl. 209 B.

The first specific description published in 1836 by GUÉRIN MÉNEVILLE is mixed up with the generic description of *Primno*. The following passages may be quoted:

» — — Deux antennes plus longues que la tête, subulées, composées de deux articles, dont le premier court et le second effilé vers le bout, et n'étant pas articulé. Pieds de la première paire — — — à article cylindrique — — — et terminés par un petit ongle pointu. Seconds pieds un peu plus longs, avec le premier article large et aplati; les deuxièmes très courts, les quatrièmes et cinquièmes plus longs, égaux entre eux, et le cinquième terminé par un petit ongle pointu; troisièmes et quatrièmes pieds encore plus longs, simples, à articles cylindriques; cinquièmes pieds de plus du double plus grands que les précédens; le premier article grand, un peu aplati, presque aussi long que les pieds qui précèdent; le second court, armé d'une

épine, en arrière; le troisième également court, très étroit à la base, reufflé en demi-lune, et aigu à ses extrémités; quatrième article presque aussi grand que le premier, large, et aplati, armé de fortes épines à son côté antérieur; cinquième, grêle, plus long que le quatrième, cylindrique et un peu courbé, terminé par un ongle assez long, très aigu et un peu courbé; sixième pieds beaucoup plus courts, à premier article large et plat; deuxième court, inerme; troisième deux fois plus long; quatrième aussi long que le premier, étroit et armé d'épines en avant; cinquième aussi long que le précédent et terminé par un ongle aigu; septième paires encore plus courtes; à premier article large et aplati, ayant les autres articles cylindriques et grêles.»

In 1840 H. MILNE EDWARDS gave the following description:

»Antennes sétacées, plus longues que la tête et composées de deux articles. Hanche des pattes de la seconde paire élargie. Antépénultième article des pattes des troisième, quatrième, cinquième et sixième paires épineux sur le bord; dernier article des pattes de la septième paire aplati et obtus au bout; appendices abdominaux des trois dernières paires troqués au bout.»

In 1888 STEBBING gave a detailed description of the species, and observed himself (l. c. p. 1445) that the dorsal spines on the last peræonal segment and the first two pleonal are not developed in very young animals, and that the front margin of the carpus of the fifth pair of peræopoda is almost smooth in the same stage of growth. At the same time he described the three above named new species, which, in my opinion, are only varieties of the old species.

In order to prove the variation of the dentition on the front margin of the carpus in the fifth pair of peræopoda I give here a table showing the number of those teeth on the carpus of the *right* (*r*) and *left* (*l*) leg of the fifth pair in 15 specimens from different localities and in different stages of growth. The big figures (**1**) signify long teeth, the small figures (*1*) short ones. The bifid tooth at the apex of the carpus is *not* included.

Sp. 1.	Length of the animal 1,5 mm.	Ind. Oc.	$\frac{r \text{ 4}}{l \text{ 1 3}}$
Sp. 2.	» » » » 2,5 mm.	S. Atl.	$\frac{r \text{ 1 1 2 1 2 2}}{l \text{ 1 2 1 2 1}}$
Sp. 3.	» » » » 4 mm.	S. Atl.	$\frac{r \text{ 3 1 1 1 2 1 3}}{l \text{ 2 1 2 1 3 1 1}}$
Sp. 4.	» » » » 4,5 mm.	Ind. Oc.	$\frac{r \text{ 2 2 1 2 1 3}}{l \text{ 1 2 1 3 1 2}}$
Sp. 5.	» » » » 5 mm.	Antarct. Oc.	$\frac{r \text{ 1 3 1 4 1 4 1 2}}{l \text{ 1 2 1 4 1 3 1 2}}$
Sp. 6.	» » » » 6 mm.	S. Atl.	$\frac{r \text{ 1 1 1 3 1 3 1 1}}{l \text{ 1 2 1 3 1 2 1 1}}$
Sp. 7.	» » » » 6,5 mm.	S. Atl.	$\frac{r \text{ 1 3 1 4 1 2 1}}{l \text{ 1 2 1 3 1 3 1}}$
Sp. 8.	» » » » 6,5 mm.	S. Atl.	$\frac{r \text{ 1 1 1 3 1 3 1 2}}{l \text{ 1 2 1 4 1 3 1 1}}$

Sp. 9.	Length of the animal 7 mm.	S. Atl.	$\frac{r \ 1 \ 1 \ 3 \ 1 \ 4 \ 1 \ 3 \ 1 \ 1}{l \ 1 \ 3 \ 1 \ 3 \ 1 \ 4 \ 1 \ 2}$
Sp. 10.	» » » » 7 mm.	Trop. Pac.	$\frac{r \ 1 \ 2 \ 1 \ 4 \ 1 \ 3 \ 1 \ 1}{l \ 1 \ 2 \ 1 \ 4 \ 1 \ 3 \ 1 \ 1}$
Sp. 11.	» » » » 8 mm.	Trop. Pac.	$\frac{r \ 1 \ 2 \ 2 \ 1 \ 2 \ 1}{l \ 1 \ 2 \ 1 \ 2 \ 1 \ 2 \ 1}$
Sp. 12.	» » » » 9 mm.	Trop. Atl.	$\frac{r \ 1 \ 2 \ 1 \ 4 \ 1 \ 3 \ 1}{l \ 1 \ 3 \ 1 \ 4 \ 1 \ 3 \ 1 \ 1}$
Sp. 13.	» » » » 10 mm.	Ind. Oc.	$\frac{r \ 1 \ 2 \ 1 \ 2 \ 1 \ 3 \ 1 \ 1}{l \ 1 \ 2 \ 1 \ 3 \ 1 \ 3 \ 1 \ 1}$
Sp. 14.	» » » » 11 mm.	Antarct. Oc.	$\frac{r \ 1 \ 3 \ 1 \ 3 \ 1 \ 3 \ 1 \ 1}{l \ 1 \ 3 \ 1 \ 4 \ 1 \ 3 \ 1}$
Sp. 15.	» » » » 12 mm.	S. Atl.	$\frac{r \ 1 \ 1 \ 2 \ 1 \ 3 \ 1 \ 2 \ 1}{l \ 1 \ 1 \ 2 \ 1 \ 4 \ 1 \ 2 \ 1}$

This diagram shows that among these fifteen specimens there is only one, spec. 10, which has exactly the same dentition on the right and left carpus, and that no two of the specimens show the same combination of teeth, although they are closely similar to one another in other respects and belong without doubt to one and the same species.

In the form and serration of the uropoda there is a similar variation, but more connected with the age of the animal, so that the older animals which have attained a length of ten or twelve mm., have the uropoda comparatively much broader than in the young, less distinctly serrated, and hardly emarginated at the apex, while the young have the first and second pairs very narrow, sharp-pointed and finely serrated, and the third pair only a little dilated, sharp-pointed, and deeply emarginate.

### The male.

Pl. XVII, fig. 23 and 26—40.

The *body* is thick and stout, not very much compressed. The integument is thick, of a whitish red or yellowish colour, that of the hind part of the body has a metallic lustre and is feebly phosphorescent. The head and peræon together are much shorter than the pleon and urus together, and about as long as the pleon.

The *head* is about a fourth part deeper than long; at the upper front corner it projects into a very short rostrum, which is obtuse, and feebly bent downwards. The front side of the head is feebly excavated, and forms a broad and shallow antennal groove.

The *eyes* form only one portion on either side of the head.

The *first pair of antennæ* in the fullgrown male are longer than the head and peræon together. The first joint of the peduncle is longer than broad, and is more than

twice as long as the two following together. The first joint of the flagellum is somewhat longer than the whole peduncle, tumid, feebly tapering towards the apex, and sparingly provided with short olfactory hairs; the following joints are short, only a little longer than broad, and each is furnished with one or two minute hairs on the under margin. The flagellar joints are twenty-six or twenty-eight in number.

The *second pair of antennæ* are much longer than the first, and in the adult male reach almost to the hind margin of the second pleonal segment. The first free joint of the peduncle is as long as broad, nearly globular; the glandular cone is only a little shorter than the first peduncular joint; the second joint is a little longer than the first; the third is somewhat shorter and narrower. The first joint of the flagellum is long and slender, feebly tapering towards the apex, and a little shorter than the peduncle; the following joints are cylindrical, slender, and considerably longer than broad. The flagellar joints are twenty-two or twenty-three in number.

The *labrum* is small and faintly bilobed.

The *mandibles* (Pl. XVII, fig. 26 and 27) are short but stout. The incisive lamina is finely crenulated, with a large rounded prominence at the outer corner and a smaller one at the inner; the secondary lamina of the left mandible is small, and is armed with three teeth. The molar tubercle is large, furnished with densely set sharp-pointed teeth and long bristles. The mandibular palp is comparatively short, fixed a little above the middle of the stem; the first joint is very short, only a trifle longer than broad; the second is more than three times as long as the first; the third is about as long as the second.

The *labium* is thick; the lateral lobes are provided with bristle-like hairs.

The *first pair of maxillæ* (Pl. XVII, fig. 28) have the principal lamina spoon-shaped, and the margins fringed with stout spines. The secondary lamina is feebly curved, and armed at the apex with six or seven sharp teeth.

The *second pair of maxillæ* (Pl. XVII, fig. 29) are comparatively small. The principal lamina is short, triangular, and armed at the apex with three spine-like bristles. The secondary lamina is narrower, curved, sparingly fringed with long hairs, and armed with a spine-like bristle at the apex.

The *maxillipeds* (Pl. XVII, fig. 30) have the stem almost linear. The lateral laminae are narrowly lanceolate, the margins fringed with short hairs. The median lobe is obtuse at the apex, and fringed with minute hairs.

The *peræon* is only a little longer than the first two pleonal segments together; it is not much compressed, and very deep. The first segment is fully as long as the second; the seventh is the longest of all, and is dorsally produced in the median line into a sharp-pointed process, which is almost half as long as the first pleonal segment in the adult animal, but much shorter in the younger, and entirely wanting in the very young.

The *epimerals* are distinct; they are broader than long, with the corners rounded, except in that of the second pair, which has the front corner sharp-pointed.

The *branchial vesicles* are attached to the second, third, fourth, fifth, and sixth pairs of peræopoda; they are fully as long as the femora of the corresponding pairs, except that of the fifth pair, which is shorter than the femur.

The *first pair of peraeopoda* (Pl. XVII, fig. 31 and 32) are the smallest of all the pairs. The femur is very narrow, a little broader below than above, with the margins smooth; it is longer than the three following joints together. The genu is considerably longer than broad. The tibia is shorter than the genu. The carpus is nearly as long as the two preceding joints together, and is almost cylindrical. The metacarpus is fully as long as the two preceding joints together, broad at the base, and tapering evenly towards the apex; the hind margin is fringed with short, slender bristles. The dactylus is stout, conical, more than a third part as long as the metacarpus; it is provided with a secondary tooth near the apex, and is pectinated along the hind margin.

The *second pair* (Pl. XVII, fig. 33) are longer than the first, and reach a little beyond the apex of the tibia in the third pair. The femur is broadly dilated, about half as broad as long, and considerably longer than the three following joints together. The genu is longer than broad. The tibia is shorter than the genu. The carpus is thicker than in the first pair, cylindrical, and fully as long as the two preceding joints together. The metacarpus is considerably longer than the two preceding joints together, broad and swollen at the base, and rapidly tapering towards the apex. The dactylus is slender, feebly curved, without secondary tooth, and about a fifth part as long as the metacarpus. Glands are well developed, especially in the femur.

The *third and fourth pairs* (Pl. XVII, fig. 34 and 35) are similar in shape and subequal in length. The femur is narrow, a little broader below than above, and is much longer than the three following joints together. The genu is longer than broad. The tibia is longer than the genu; the hind margin is smooth in the third pair, but armed with two or three broad teeth in the fourth pair. The carpus is fully as long as the two preceding joints together; the hind margin is armed with four low, broad teeth. The metacarpus is as long as the carpus, and has the hind margin minutely serrated. The dactylus is slender, feebly curved, and more than a third part as long as the metacarpus.

The *fifth pair* (Pl. XVII, fig. 36) are much longer than the head and peraeon together. The femur is dilated, broader below than above, and more than twice as long as it is broad below; the lower half of the front margin is convex and more or less distinctly serrated. The genu is about as long as broad; the lower front corner is sharp-pointed. The tibia is as long, but twice as broad, as the genu, with the lower front and hind corners sharp-pointed. The carpus is elongate-ovate, as long as, or longer than, the femur; the front margin is furnished with ten to eighteen larger and smaller teeth, varying in order, as shows the diagram above p. 402; the apical tooth is two-pointed; the hind margin is smooth, with the lower corner sharp-pointed. The metacarpus is slender, linear, and fully as long as the carpus in adult animals; in younger it is much shorter. The dactylus is long and feebly curved; it is about a third part as long as the metacarpus in adult animals, in younger it is more than half as long as the metacarpus.

The *sixth pair* (Pl. XVII, fig. 37) reach beyond the apex of the carpus in the fifth pair. The femur is dilated, more than twice as long as broad, and about as long as the three following joints together; the front margin is convex, with four or five low

teeth on its lower half, the hind margin is straight. The genu is longer than broad, and has a low tooth on the front margin. The tibia is much longer than the genu, with the lower front and hind corners produced into long, sharp-pointed processes; on the front margin there are two low teeth. The carpus is longer than the tibia, the front margin is provided with three large teeth and three minute ones, the lower corner is produced and sharp-pointed, the hind margin is almost smooth. The metacarpus is fully as long as the carpus, slender, and has the front margin finely serrated, and the hind margin smooth. The dactylus is not a third part as long as the metacarpus.

The *seventh pair* (Pl. XVII, fig. 38 and 39) reach to the middle of the carpus in the sixth pair. The femur is dilated, with the front margin concave and the upper half of the hind margin strongly convex, the lower half of the hind margin is straight or slightly excavated; it is longer than all the following joints together, and is as long as the femur in the sixth pair. The genu is as long as broad. The tibia is longer than the genu. The carpus is about as long as the two preceding joints together. The metacarpus is longer and narrower than the carpus. The dactylus is transformed into a comb-like instrument, the lower portion of the front margin being densely set with fine, sharp-pointed bristles, rectangularly to the front margin; the dactylus is more than half as long as the metacarpus.

The *pleon* is large and deep. The first two segments are each produced dorsally in the median line into a long and sharp-pointed process, which is considerably longer in the adult animal than in the younger. The lateral parts of the first two segments are squared behind and somewhat sharp-pointed; that of the third segment is produced behind and sharp-pointed.

The *pleopoda* decrease rapidly in size from the first pair. The outer ramus of the first pair has twelve or fourteen joints, the inner eleven or twelve.

The *urus* is considerably shorter than the last pleonal segment. The first ural segment is a trifle shorter than, or as long as, the last coalesced one, which is more than twice as broad as long.

The *wropoda* (Pl. XVII, fig. 40) are liable to great variation with the age of the animals. In the adult male the *first pair* reach beyond the middle of the third pair, are dilated, about three times as long as broad, and sharp-pointed at the apex, the lower half of the outer margin is finely serrated, and the apical portion of the inner margin is slightly serrated. In the very young male the first pair are narrow, almost styloform, about ten times as long as broad, and sharply serrated on both margins. The *second pair* in the adult do not reach to the apex of the third pair but reach to that of the first pair, are broadly laminar, nearly half as broad as long, with the outer margin coarsely serrated with low, indistinct teeth, and the apical portion of the inner or under margin minutely serrated; the apex is sharp-pointed, or the hind portion is emarginate and provided with three teeth. In the young the second pair are much narrower, four or five times as long as broad, and more distinctly serrated. The *third pair* in the adult are broadly laminar, more than half as broad as long, and more or less rounded behind; the outer margin is serrated as in the second pair, the inner is smooth. In the young they

are about four times as long as broad, with both margins serrated, and the hind portion more or less deeply emarginate.

The *telson* is triangular, broader than long, more than half as long as the last ural segment, and about a fourth part as long as the last pair of uropoda.

### The female.

Pl. XVII, Fig. 24 and 25; pl. XVIII, fig. 1 and 2.

The *body* is scarcely thicker and broader than in the male. The head and peræon together are quite as long as the pleon and urus together.

The *first pair of antennæ* (Pl. XVII, fig. 25) in the adult female are as long as the head and the first two peræonal segments together. The single peduncular joint is as long as broad. The flagellum consists of a single joint, which is tolerably broad at the base and tapers slowly towards the apex; it is about ten times as long as the peduncle, and is sparingly set with olfactory hairs along the inner margin. In the young female the single flagellar joint is thick, short and conical, and is scarcely twice as long as the peduncle.

The *second pair* are wanting, only represented by a small tubercle at the lowest end of the front side of the head.

The *mouth-organs* are like those in the male, but the mandibles want a palp.

The *peræon*. The first segment is longer than the second; the seventh is furnished with spine-like processes as in the male.

The *ovitrices* are very thin, broad, and longer than the branchial vesicles.

The *peræopoda* agree in every respect with those in the male.

The *pleon* is a little longer than the whole peræon; the segments are armed as in the male.

The *urus* is as long as the last pleonal segment; the first ural segment is fully as long as the last coalesced, which is considerably broader than long.

The *uropoda* are like those in the male.

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Genus 2. **ANCHYLOMERA**, H. MILNE EDWARDS, 1830.

**Diagn.** *Caput* fere globosum, ante non productum. *Pedes peræi* primi et secundi parium simplices. *Pedes tertii*, quarti et quinti parium subcheliformes. *Pedes sexti* paris manu replicata instructi. *Pedes septimi* paris completi; dactylus transformatus. *Pedes uvi* tenues, laminares. *Telson* magnum.

The *head* is almost globular, and not produced anteriorly. The first and second pairs of *peræopoda* are simple. The third, fourth, and fifth pairs are subcheliform. The sixth pair are provided with a folding hand. The seventh pair are complete; the dactylus is transformed. The *wropoda* are thin and laminar. The *telson* is large.

**Syn. 1830.** *Anchylomera*, H. MILNE EDWARDS.

				»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes. Ann. des Sciences nat. Tome 20 <sup>me</sup> , p. 394.
	»	»	H. BURMEISTER.	1837. Handbueh der Naturgeschichte, 2 <sup>te</sup> Abth. Zoologie, p. 569.
	»	»	H. MILNE EDWARDS.	1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 307.
	»	»	»	1839. » 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
	»	»	»	1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 85.
<i>Ancylomerus</i> ,	»		H. LUCAS.	1849. »Ancylomère». Dictionnaire universel d'Histoire naturelle ---, par Ch. d'Orbigny. Tome 1 <sup>er</sup> , p. 480.
<i>Anchylomera</i> ,	»		»	1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238.
»	»		J. D. DANA.	1852. »On the Classification of the Crustacea Choristopoda or Tetrade-capoda». The American Journal of Science and Arts. 2 <sup>nd</sup> Ser. Vol. 14, p. 315.
»	»		»	1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000—1004 and 1442.
»	»		SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 322.
»	»		J. C. SCHIÖDTE.	1875. »Krebsdyrenes Sugemund». Naturhist. Tidskr. 3 <sup>de</sup> Rekke. 4 <sup>de</sup> Bind, p. 229, pl. 8, fig. 15.

<i>Anchylomera</i> , H. MILNE EDWARDS.	C. CLAUS.	1879.	»Der Organismus der Phronimiden». Arb. Zool. Inst. der Universität Wien. Tom. 2, p. 61 (3).
»	J. V. CARUS.	1885.	Prodromus Faunæ Mediterraneæ. Vol. 1 <sup>mus</sup> , p. 423.
»	A. GERSTAECKER.	1886.	Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Band. 2 <sup>te</sup> Abth., p. 487.
»	C. BOVALLIUS.	1887.	»Arctic and Antarctic Hyperids». Vega-Exp. Vetensk. Iakttagelser. Bd. 4, p. 571.
»	»	1887.	»Systematical list of the Amphipoda Hyperiidea.» Bil. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 26.
»	TH. STEBBING.	1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1432.
<b>1832.</b> <i>Cheiropristes</i> , A. COCCO.	—		»Su di alcuni nuovi crustacei de' mari di Messina». Effemeridi scientifiche e letterarie per la Sicilia. Tomo 2 <sup>do</sup> , p. 206.
»	G. DE NATALE.	1850.	Descrizione zoologica d'una nuova specie di plojaria e di alcuni Crostacei del porto di Messina, p. 8.
<b>1836.</b> <i>Hieraconyx</i> , F. E. GUÉRIN MÉNEVILLE.	—		»Description de quelques genres nouveaux des Crustacés appartenant à la famille des Hypérines». Magasin de Zoologie. 6 <sup>me</sup> Année. Classe 7, p. 4.
»	H. MILNE EDWARDS.	1838.	Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 306.
»	»	1839.	» 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
»	»	1840.	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 88.
»	H. LUCAS.	1851.	Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 237.

The original generic description given by H. MILNE EDWARDS in 1830 runs:

»Forme générale du corps la même que dans le genre précédent (= *Phrosina*); antennes très-courtes et styliformes ou nulles; thorax divisé en six segmens; pattes des deux premières paires terminées par un article aplati et lancéolé; celles de la troisième et de la quatrième paires terminées par une petite main formée par le troisième article; pattes de la cinquième paire grosses et subchelifères; enfin celles des deux dernières paires terminées par une tige grêle et cylindrique.»

In 1836 GUÉRIN MÉNEVILLE gave the following description of *Hieraconyx* n. g., which is the young male form of *Anchylomera*:

»Corps court et ramassé, composé de treize segmens non compris la tête. Tête ovale, très grosse, perpendiculaire, occupée en entier par les yeux; quatre antennes inégales; les supérieures de la longueur de la tête, cachées dans une fossette, les inférieures un peu plus longues; ces quatre antennes composées d'un support plus épais, court, et d'une tige multiarticulée. Premier et second segmens du thorax réunis, et portant les deux premières paires de pattes, — — — pieds des deux premières paires assez courts, simples, égaux entre eux; à articles peu aplatis, troisièmes et quatrièmes terminés par une petite main imparfaitement didactyle, ayant le doigt mobile formé du cinquième article et de l'ongle aigu qui le termine; cinquièmes pieds les plus grands de tous, ayant le premier article très large et aplati, les deux suivans courts et transversaux; le quatrième grand, épais, denté au côté antérieur; le cinquième de la longueur du précédent, cylindrique et terminé par un ongle assez grand, aigu et un peu courbé; sixièmes pieds plus courts, à premier article aplati, les deux suivans petits, le quatrième renflé, inerme; pieds de la septième paire encore plus courts, ayant le premier article grand, plat, et les suivans cylindriques, moins longs ensemble que le premier, recourbés et cachés sous celui-ci dans le repos; les trois premiers segmens de l'abdomen grands, diminuant de grandeur, portant chacun une paire d'appendices natatoires, semblables à ceux des autres genres de la même famille; les trois segmens suivans courts, portant chacun une paire de lames plates, ovales, un peu échancrées au bont, mais d'une seule pièce, comme dans le genre précédent (= *Prinno*).»

In 1838 H. MILNE EDWARDS gave the following new description of *Anchylomera*:

»Dans le genre *Anchylomère* la forme générale du corps est à-peu-près la même que chez les *Hypéries*, mais l'article basilaire des pattes des trois dernières paires est lamelleux et extrêmement grand; les pattes de la cinquième paire se terminent par une grande main subchéliforme dirigée en arrière, tandis que celles des deux paires suivantes ne sont pas préhensiles; les antennes sont très courtes et styloformes ou nulles, et les appendices abdominaux des trois dernières paires sont foliacés et ovalaires.»

In 1840 he gave a very detailed description of the genus. The following passages may be quoted:

»Le *corps* de ces Crustacés est large et déprimé; la tête est grosse, arrondie et inclinée au bas; les yeux en occupent une grande partie, mais ne se réunissent pas sur la ligne médiane comme cela paraît avoir lieu chez les *Thémistos*. Les *antennes* manquent complètement dans l'un des sexes; dans l'autre elles sont courtes et insérées assez près les unes des autres dans un petit enfoncement qu'on remarque à la partie antérieure et inférieure de la tête. L'organisation des appendices de la bouche est la même que chez les *Hypéries* — — — — —. Le *thorax* n'est divisé qu'en six anneaux, et c'est le premier de ces segmens qui porte les quatre pattes antérieures, — — — —. Les pattes de la cinquième paire, au lieu d'être grêles et allongées comme dans les genres précédens, sont courtes, très-larges, et ressemblent à des boucliers latéraux qui seraient terminés par une grosse main subchéliforme — — — —.»

In 1862 SPENCE BATE gave the following description:

»Cephalon large, transversely ovate. Eyes occupying nearly the whole of the cephalon, but not united in the median line. Antennæ in one sex (male?) as long as the cephalon, in the other short, rudimentary. Gnathopoda having the propoda with the inferior margin directed horizontally, not subchelate. First two pairs of pereopoda complexly subchelate: third pair large, robust, having the basis largely dilated, pentangular; carpus dilated, against the anterior margin of which the propodos impinges: fourth pair shorter than the third, not dilated: fifth still shorter. Three posterior pairs of pleopoda consisting of single foliaceous plates.»

In 1885 CARUS gave the following diagnosis:

»Antennæ longæ; mandibulæ palpo triarticulato; segmentum I. thoracale cum secundo coalitum; par pedum V. manu prehensili cheliformi, articulo basali laminari amplo; par VII. gracile exungue; stili caudales lamellosi.»

In 1886 GERSTAECKER characterized the genus with following words:

»Kopf äusserst plump, oval abgerundet, weiter nach unten als der Mittelleib herabreichend. An diesem die beiden vordersten Segmente stark verkürzt oder selbst verschmolzen, das fünfte am längsten, die beiden letzten nach unten und hinten ausgezogen. Die beiden vorderen Beinpaare verkürzt, mit scharfer Endklaue, das dritte und vierte verlängert, mit erweiterem und fingerförmig ausgezogenem drittletzten Gliede, das fünfte mit grossem, schildförmigem Schenkelgliede (unter welchem das sechste Paar theilweise versteckt liegt) und sehr breiter, am Innenrande gezählter Greifhand, gegen welche sich die zweigliedrige Endklaue in der Richtung nach vorn hin einschlägt. Auch das sechste und siebente Paar mit schildförmigem Schenkelgliede, aber ohne Greifhand. Am Hinterleib die vier Endsegmente stark verkürzt, zusammen kaum länger als jedes der drei grossen Basalsegmente.»

The first instituted species of the genus were *Anchylomera Blossevillei* and *A. Hunteri*, proposed in 1830 by H. MILNE EDWARDS.

The next was *Hieraconyx abbreviatus* n. sp., described in 1836 by GUÉRIN MÉNEVILLE; it is a synonym for *Anchylomera Blossevillei*.

In 1850 DE NATALE described *Cheiroprestis messanensis*, which also is synonymous with *A. Blossevillei*.

In 1852 DANA proposed the two new species *Anchylomera purpurea* and *A. thyropoda*, the former of which is the male, and the latter the female of *A. Blossevillei*.

In 1862 SPENCE BATE instituted the new species *A. antipodes*, describing and delineating the male and female form. Even this specific name is, in my opinion, a synonym for *A. Blossevillei*.

Thus we have to record only two species, viz. *A. Blossevillei* and *A. Hunteri*, the latter of which is somewhat dubious, and not actually examined since it was described by H. MILNE EDWARDS.

The sexual dimorphism is shown only in the form of the first pair of antennæ and in the female wanting the second pair of antennæ and the mandibular palp.

The two species are distinguished as shown in this table:

- |   |                                   |
|---|-----------------------------------|
| <p><b>A.</b> The head is large and much deeper than the peræon. The first pair of peræopoda are much shorter than the second. The foremost tooth on the under margin of the carpus, or the carpal process, in the fifth pair does not reach deeper than the following teeth; the dactylus of the same pair is long.....</p>                   | <p><b>1. A. Blossevillei.</b></p> |
| <p><b>B.</b> The head is comparatively small and not deeper than the peræon. The first pair of peræopoda are almost as long as the second. The foremost tooth on the under margin of the carpus, or the carpal process, in the fifth pair reaches much deeper than the following teeth. The dactylus of the same pair is very short .....</p> | <p><b>2. A. Hunteri.</b></p>      |

## 1. ANCHYLOMERA BLOSSEVILLEI, H. MILNE EDWARDS, 1830.

Pl. XVII, fig. 1—22.

**Diagn.** *Caput* magnum, quam peræon multo altius ac segmentis tribus primis peræi multo longius; segmentum quintum *peræi* longissimum. *Pedes peræi* primi paris pedibus secundi paris breviores. Processus carpalis pedum quinti paris dentes marginis inferioris carpi non superans, dactylus longus. *Telson* longum, triangulato-rotundatum.

The *head* is large, much deeper than the peræon, and considerably longer than the first three peræonal segments together. The fifth segment of the peræon is the longest. The first pair of *peræopoda* are shorter than the second. The carpal process of the fifth pair does not reach beyond the teeth on the under margin of the carpus; the dactylus is long. The *telson* is long, triangular and rounded.

**Colour.** Yellowish, white, shining as if polished, and with metallic lustre on the lower parts of the peræonal segments and on the pleonal segments.

**Length.** 5—9 mm.

**Hab.** The Atlantic; the Mediterranean; the Indian Ocean; the Pacific; the Antarctic Ocean. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

<b>Syn. 1830.</b>	<i>Anchylomera Blosssevillæi</i> ,	H. MILNE EDWARDS.	—	»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences nat. Tome 20 <sup>me</sup> , p. 394.
»	»	»	—	1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 307.
»	»	»	—	1839. » 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
»	»	»	—	1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 87.
»	»	»	H. LUCAS.	1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238.
»	»	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 323, pl. 52, fig. 1.
»	»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak.

- Anchylomera Blossvillei*, H. MILNE EDWARDS. TH. STEBBING. 1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1433, pl. 177.
1836. *Hieraconyx abbreviatus*, F. E. GUÉRIN MÉNEVILLE. — »Description de quelques genres nouveaux des Crustacés appartenant à la famille des Hypérines». Magasin de Zoologie. 6<sup>me</sup> Année. Classe 7<sup>me</sup>, p. 5, pl. 17, fig. 2.
- » » » H. MILNE EDWARDS. 1838. Histoire naturelle des Animaux sans vertèbres - - - par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 306.
- » » » » 1839. » 3<sup>me</sup> éd. Tome 2<sup>nd</sup>, p. 370.
- » » » » 1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 89.
- » » » H. LUCAS. 1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 237, pl. 18, fig. 4.
- Anchylomera abbreviata*, » SPENCE BATE. 1862. Catal. Amph. Crust. Brit. Museum, p. 324, pl. 52, fig. 8.
- » » » A. GERSTAECKER. 1884. Dr H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5<sup>ter</sup> Bd. 2<sup>te</sup> Abth., pl. 35, fig. 4.
- » » » C. BOVALLIUS. 1887. »Systematical list of the Amphipoda Hyperideae». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 27.
- » » » » 1887. »Arctic and Antarctic Hyperids». Vega-Exp. Vet. Iakttagelser. Bd. 4, p. 571.
1850. *Cheiropristes messanensis*, G. DE NATALE. — Descrizione zoologica d'una nuova specie di ploveria e di alcuni Crostacei del porto di Messina, p. 8, pl. 1, fig. 2.
- » » » F. G. HOPE. 1851. Catalogo dei Crostacei Italiani, etc., p. 21.
- » » » A. COSTA. 1867. »Saggio della collezione de' Crostacei del Mediterra-



coudées; leur pédoncule composé de trois articles et la tige terminale de plus de cinquante. Les pattes de la première paire beaucoup plus courtes que les secondes; l'angle inférieur de la main de celles de la cinquième paire est prolongé en pointe, mais ne dépasse point les dents dont le bord postérieur de cet article est armé; enfin l'ongle qui termine la griffe mobile de ces mêmes pattes, long et grêle.

In 1852 DANA gave the following descriptions of *Anchylomera purpurea* and *A. thyropoda*.

»*A. purpurea*: Four antennæ about as long as body. Hands of third and fourth pairs sub-triangular, third with an acute point as an immoveable finger, fourth with this finger elongate and slender, moveable finger (without the claw) a little longer than the surface on which it closes, claw rather long. Feet of fifth pair very large, coxa oblong, pentagonal, with sides a little concave, narrowed towards the apex, where it is but little wider than next joint, hand oblong, triangular, straight and dentate within, finger (claw excluded) longer than the hand, claw rather long. Sixth pair of feet long, fourth joint rather long subcylindrical, coxa acute at apex and posterior basal angle rounded. Seventh pair weak, coxa a little longer than the following part.»

»*A. thyropoda*: Head transverse. Antennæ (probably not adult) very short, without a flagellum. Second pair of feet longer than first, subulate. Hand of third and fourth pairs triangular, inner margin and palm very finely serrulate or spinulose, finger (claw excluded) not longer than palm. Fifth pair of feet very large, coxæ oblong, pentagonal, at apex but little wider than preceding joint and entire, sides a little excavate; hand oblong triangular, palm dentate, external tooth little the largest; finger, excluding claw, much shorter than palm. Sixth feet of moderate size, second, third, and fourth joints short, subequal; seventh pair obsolete, excepting coxa. Caudal lamellæ broad elliptical, some of them ciliate, entire.»

The former species agrees in every respect with the specimens of *Anchylomera Blossevillei* in the collection of »Musée d'Histoire naturelle» in Paris; the latter is a young female and agrees exactly with female specimens taken together with typical specimens of *A. Blossevillei* by myself during the expedition of His Swed. Majesty's Corvette Balder in 1882; such being the case, I have, without hesitation, placed both species as synonyms for *A. Blossevillei*.

In 1862 SPENCE BATE described *A. antipodes*, n. sp.; in all the quoted characteristics it agrees with the type species, so that there is no doubt about its identity with *A. Blossevillei*.

In 1888 STEBBING gave an exhaustive description of *A. Blossevillei*, recording all the other species as synonyms for it.

### The male.

Pl. XVII, fig. 1, 2, 4, 6—18, 20, and 22.

The *body* is thick and robust, *Hyperia*-like. The integument is very thick and hard, calcareous. The head and peræon together are about as long as the pleon and nrus together.

The *head* is large and deep, nearly twice as deep as long. The antennal groove commences just above the middle of the front side, and is tolerably deep.

The *eyes* are divided into an upper and a lower portion on each side of the head; the lower portion is much the larger. At the crown of the head the eyes are separated by a tolerably broad space.

The *first pair of antennæ* (Pl. XVII, fig. 4) are fixed at the middle of the front side of the head, and, in the adult male, reach to the middle of the third pleonal segment. The first joint of the peduncle is very thick and large, broader than long, and more than twice as long as the two following joints together. The first joint of the flagellum is more than twice as long as the whole peduncle, and is thick and tumid; its lower front corner is produced into a blunt process; the inner and under sides of the joint are densely set with long olfactory hairs. The following joints are slender, cylindrical, about twice as long as broad. In the adult male the flagellar joints are more than fifty in number. In the young male the first pair are short and stout, and comparatively much thicker than in the adult male.

The *second pair of antennæ* (Pl. XVII, fig. 1) are longer than the first, and reach to about the hind margin of the first ural segment. The first free joint of the peduncle is longer than broad, the second is shorter than the first, the third is a little longer. The first joint of the flagellum is a trifle longer than the last peduncular joint; the following are shorter, slender, cylindrical, with a few minute hairs on the under margin. The flagellar joints in the adult male are about fifty-five in number.

The *labrum* is broad and short, and is slightly bilobed.

The *mandibles* (Pl. XVII fig. 6) are broad and stout. The incisive lamina is comparatively short and finely crenulated. The secondary lamina of the left mandible is small, with the edge finely crenulated. The molar tubercle is large and broad, set with six or seven rows of pebble-like teeth, and provided with long bristle-like hairs. The mandibular palp is long and well developed; the first joint is the longest and thickest; the second is a little more than half as long as the first; the third is nearly as long as the second.

The *labium* has the lateral lobes thickly covered with hairs.

The *first pair of maxillæ* (Pl. XVII, fig. 7) have the apical portion of the principal lamina deeply hollowed, and the margins fringed with strong teeth and five hairs. The secondary lamina reaches only a little beyond the principal; the apex is armed with sharp-pointed small teeth; the outer margin is furnished with long hairs, and at the base of the inner margin there is a bundle of long bristle-like hairs.

The *second pair of maxillæ* (Pl. XVII, fig. 8) have the principal lamina small, narrow, and curved; it is armed at the apex with a strong, sharp-pointed spine and three or four smaller ones. The secondary lamina is much larger than the principal, feebly bent, the outer margin fringed with long hairs, and the apex ending in a sharp-pointed tooth.

The *maxillipeds* (Pl. XVII, fig. 9) have the basal portion narrow and nearly linear. The lateral laminae are narrowly lanceolate, with the inner margin furnished with bristle-like hairs, and the apex tipped with two spines and a few minute hairs. The median lobe is tolerably long, rounded at the apex, and densely set with hairs.

The *peræon* is quite as long as the *pleon*. The first two segments are firmly coalesced, without any trace of a suture; the third segment is as long as the coalesced first and second; the fifth segment is the longest of all; its lower lateral parts are expanded backwards, overlapping half the sixth segment.

The *epimerals* (Pl. XVII, fig. 1, 2, and 22) of the first and second pairs of peræopoda impinge on the under margin of the coalesced first and second peræonal segment. That of the first pair is very deep and narrow, feebly curved, and nearly four times as deep as it is long (Pl. XVII, fig. 22); the epimeral of the second pair reaches only a little beyond the middle of the first, and is twice as deep as long; that of the third pair is much longer than the under margin of the third peræonal segment, with the ends rounded; it is fully twice as long as it is deep. The following epimerals are much longer than deep, and have the corners rounded.

The *branchial vesicles* are well developed and are somewhat longer than the corresponding femora in the second, third, and fourth pairs of peræopoda; in the fifth and sixth pairs they are a little shorter.

The *first pair of peræopoda* (Pl. XVII, fig. 10 and 11) are tolerably short. The femur is about as long as the four following joints together; it is narrow and feebly curved. The genu is as long as broad. The tibia is scarcely longer than the genu. The carpus is a little shorter than the two preceding joints together, and is narrower at the base than at the apex. The metacarpus is longer than the carpus, wide at the base, with convex margins, and rapidly tapering from the middle towards the apex, the margins fringed with short hairs. The dactylus is robust, curved, with an incision on the hind margin near the apex; it is scarcely a third part as long as the metacarpus. Glands are present in all the joints.

The *second pair* (Pl. XVII, fig. 12 and 13) are longer than the first, and reach considerably beyond the apex of the tibia in the third pair. The femur is broader than that in the first pair, and is about as long as the four following joints together. The genu is broader than long. The tibia is as long as the genu. The carpus is almost as long as the two preceding joints together. The metacarpus is three times as long as the carpus, wide at the base, and rapidly tapering towards the middle, its last half being slender and cylindrical (Pl. XVII, fig. 13); the margins are fringed with short hairs. The dactylus is feebly curved, and about a fifth part as long as the metacarpus. Glands are present in all the joints.

The *third and fourth pairs* (Pl. XVII, fig. 14 and 15) are subequal in length. The femur is narrow, feebly bent at the base, and much shorter than the three following joints together. The genu is much longer than broad. The tibia is rather shorter than the genu, with the lower portion very wide; the hind margin is fringed with minute hairs. The carpus is about as long as the two preceding joints together; it is broad, with the lower hind corner produced into a short process which is directed backwards, and is a little longer in the fourth pair than in the third; the hind margin of the joint is notched or incised, and is fringed with minute, spine-like hairs; the under margin is finely pectinated; the front margin is feebly convex, and smooth. The metacarpus is as long as the carpus, with the hind margin finely pectinated; in the third pair it reaches considerably beyond the apex of the carpal process when folded, in the fourth pair it reaches only a little beyond it. The dactylus is long and feebly curved; it is about half as long as the metacarpus.

The *fifth pair* (Pl. XVII, fig. 17) are considerably longer than the fourth pair, but are shorter than the head and peræon together. The femur is very dilated, shield-like, irregularly pentagonal, with the upper portion broader than the lower; the apex is deeply incised for the reception of the genu; the joint is only a third part longer than its greatest breadth, and is fully as long as the three following joints together. The genu is very large, longer than broad, and has the lower front corner projecting into a triangular process. The tibia is shorter than the genu, but much wider. The carpus is about as broad as long, with the front margin short and feebly convex, the under margin is oblique to the axis of the joint, and is armed with five or six more or less rounded teeth decreasing in size from the front corner to the articulation of the metacarpus; each tooth is tipped with a minute bristle; the hind margin of the joint is feebly convex, and much longer than the front margin. The metacarpus is as long as the carpus, and reaches, when folded, almost to the front corner of the carpus or a little beyond it; the front margin is smooth. The dactylus is straight, and nearly half as long as the metacarpus.

The *sixth pair* (Pl. XVII, fig. 17) are shorter than the fifth, reaching to the apex of the carpus in that pair. The femur is dilated, very irregular in shape; the hind margin is nearly straight from the constriction at the base; the front side of the joint projects into a broad laminar process just above the middle; the lower front corner is produced downwards into a bluntly triangular process, which is set with minute hairs; the femur is fully as long as all the following joints together. The genu is broader than long. The tibia is as long as the genu, with the front margin fringed with minute hairs. The carpus is considerably longer than the two preceding joints together; it is dilated, irregularly ovate, and together with the metacarpus forms a folding hand; the front margin is convex, feebly notched, and fringed with minute, spine-like hairs. The metacarpus is almost as long as the carpus, and has the front margin finely pectinated. The dactylus is long, feebly curved, and more than two thirds as long as the metacarpus.

The *seventh pair* (Pl. XVII, fig. 18) reach nearly to the middle of the carpus in the sixth pair. The femur is dilated, almost as long as that in the preceding pair, much broader above than below, and nearly twice as long as broad at the base; it is considerably longer than all the following joints together. The genu is longer than broad. The tibia is shorter than the genu. The carpus is almost as long as the two preceding joints together, with the margins smooth. The metacarpus is not half as long as the carpus. The dactylus is transformed, like that organ in the family *Vibilidæ*; it is tumid, and set at the apex with small, spine-like teeth.

The *pleon*. The segments are equal in length; the first is as long as the last two peræonal segments together, and is produced downwards, with the lateral part irregularly rounded and projecting to the apex of the peduncle in the first pair of pleopoda; the lateral parts of the last two segments are evenly rounded below and behind.

The *pleopoda* (Pl. XVII, fig. 19) have the peduncle fully as long as the rami. The outer ramus of the first pair has nine or eleven joints, the inner eight or ten.

The *urus* is somewhat more than half as long as the last pleonal segment. The first ural segment is nearly twice as long as the last coalesced one, which is more than twice as broad as long.

The *uropoda* (Pl. XVII, fig. 20). The *first pair* do not reach fully to the apex of the third pair; they are broadly ovate, broader below than above, and fringed with minute hairs. The *second pair* do not attain the apex of the first pair, and are considerably narrower; they are fringed with minute hairs as in the first pair. The *third pair* are rather broader than the first pair, and are more than twice as long as the last coalesced ural segment; the margins are fringed with minute hairs.

The *telson* is broadly triangular, with the margins somewhat convex and the apex rounded; it is broader than long, and about half as long as the last pair of uropoda.

### The female.

Pl. XVII, fig. 3, 5, 19, and 21.

The *body* is thicker and shorter than in the male. The head and peræon together are longer than the pleon and urus together.

The *head* is comparatively deeper than in the male.

The *first pair of antennæ* (Pl. XVII, fig. 5) consist of a two-jointed peduncle and a minute flagellar joint. The first joint of the peduncle is thick and swollen, the second is very short, and a little broader than long. The single flagellar joint is rather shorter and narrower than the last peduncular joint, and is covered with long stout olfactory hairs.

The *second pair of antennæ* are represented by a slightly protruding tubercle below the insertion of the first pair.

The *mouth-organs* are like those in the male, but the mandibles want a palp.

The *peræon*. The first and second coalesced segments are longer than the third; the fifth segment is the longest of all.

The *ovitrices* are thin, irregularly ovate, and a little shorter than the corresponding branchial vesicles.

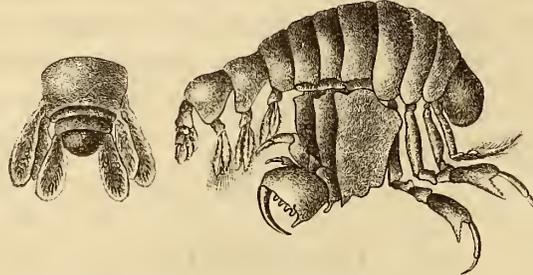
The *peræopoda* are exactly like those in the male.

The *pleon* is considerably shorter than the peræon.

The *urus* and its appendages are like those organs in the male.

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## 2. ANCHYLOMERA HUNTERI, H. MILNE EDWARDS, 1830.

*Anchylomera Hunteri*, H. MILNE EDWARDS.

Facsimile from H. MILNE EDWARDS. Hist. nat. des Crustacés, pl. 30, fig. 4.

**Diagn.** *Caput* parvum, quam peræon non altius, ac segmentis tribus primis peræi multo brevius. Segmentum quartum *peræi* segmentum quintum longitudine æquans. *Pedes peræi* primi paris *pedes* secundi paris longitudine æquantes. Processus carpalis pedum quinti paris dentes marginis inferioris valde superans; *dactylus* curtus. *Telson* curtum, semicirculare.

The *head* is small, not deeper than the peræon, and much shorter than the first three peræonal segments together. The fourth *peræonal* segment is as long as the fifth. The first pair of *peræopoda* are as long as the second. The carpal process of the fifth pair reaches considerably beyond the teeth on the under margin of the joint; the *dactylus* is short. The *telson* is short and semicircular.

**Colour.** Brownish?

**Length.** About 7 mm.

**Hab.** The Indian Ocean: the Isle of Bourbon. (H. MILNE EDWARDS.)

1830. *Anchylomera Hunteri*, H. MILNE EDWARDS. --

»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences nat. Tome 20<sup>me</sup>, p. 394.

» » » —

1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2<sup>me</sup> éd. Tome 5<sup>me</sup>, p. 307.

» » » —

1839. » 3<sup>me</sup> éd. Tome 2<sup>nd</sup>, p. 370.

» » » —

1840. Histoire naturelle des Crustacés. Tome 3<sup>me</sup>, p. 88, pl. 30, fig. 4.

<i>Anchylomera Hunteri</i> ,	H. MILNE EDWARDS.	SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 324, pl. 52, fig. 2.
»	»	»	C. K. HOFFMANN.	1874. Recherches sur la Faune de Madagascar etc. 5 <sup>me</sup> partie. Crustacés et Echinodermes, p. 43.
»	»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperideae». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 27.

The first characteristic, given by H. MILNE EDWARDS in 1830, was the following:

»Pattes de la première et de la seconde paire à peu près de même grandeur.»

In 1840 he gave a more detailed description. It runs thus:

»Le corps beaucoup plus renflé que dans l'espèce précédente; les antennes guère plus longues que la tête et n'ayant leur tige terminale composée que d'environ quinze articles. Les pattes des deux premières paires presque de la même longueur. La main de celles de la cinquième paire présente à l'angle inférieur une grosse dent conique beaucoup plus saillante que celles situées au dessus; l'ongle qui termine la griffe mobile est très-court.»

### Genus 3. **PHROSINA**, A. RISSO, 1822.

**Diagn.** *Caput* maximum, ante rostratum. *Pedes pererei* primi et secundi parium simplices. *Pedes* tertii, quarti, quinti ac sexti parium subcheliformes. *Pedes* septimi paris incompleti. *Telson* magnum.

The *head* is very large, anteriorly rostrate. The first and second pairs of *peræopoda* are simple. The third, fourth, fifth, and sixth pairs are subcheliform. The seventh pair are incomplete. The *telson* is large.

**Syn. 1822.** *Phrosina*, A. RISSO.

		—	»Mémoire sur quelques nouveaux Crustacés observés dans la mer de Nice». Journ. de Physique, de Chimie, d'Histoire naturelle, etc.» Tome 95 <sup>me</sup> , p. 244.
»	»	A. G. DESMAREST.	1823. »Malacostracés». Dictionnaire des Sciences naturelles. Tome 28 <sup>me</sup> , p. 348.
»	»	F. E. GUÉRIN.	1825. »Uroptère». Encyclopédie Méthodique. Histoire naturelle. Tome 10 <sup>me</sup> , p. 771.

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|-----------------------------|-------------------|--|
| <i>Phrosina</i> , A. RISSO. | P. A. LATREILLE.  | 1825. Familles naturelles du Règne Animal, p. 289.   |
| »                           | A. G. DESMAREST.  | 1825. Considérations générales sur la classe des Crustacés, p. 258.  |
| »                           | A. RISSO.         | 1826. Histoire naturelle des principales productions de l'Europe méridionale. Tome 5 <sup>me</sup> , p. 91.  |
| »                           | F. A. GUÉRIN.     | 1828. »Phrosine». Dictionnaire classique d'Histoire naturelle. Tome 13 <sup>me</sup> , p. 458.   |
| »                           | P. A. LATREILLE.  | 1829. Le Règne Animal --- par Cuvier. 2 <sup>me</sup> éd. Tome 4 <sup>me</sup> , p. 117.   |
| »                           | »                 | 1836. Le Règne Animal ---, par Cuvier. 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 204.  |
| »                           | F. S. VOIGT.      | 1836. Das Thierreich --- vom Baron von Cuvier. 4 <sup>ter</sup> Bd, p. 202.  |
| »                           | H. LUCAS.         | 1838. »Phrosine». Dictionnaire pittoresque d'Histoire naturelle. Tome 7 <sup>me</sup> , p. 427.  |
| »                           | H. MILNE EDWARDS. | 1840. Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 89.  |
| »                           | »                 | 1849. Le Règne Animal ---, par G. Cuvier. Ed. acc. des planches, p. 173.   |
| »                           | H. LUCAS.         | 1849. »Phrosina». Dictionnaire universel d'Histoire naturelle --- par Ch. d'Orbigny. Tome 10 <sup>me</sup> , p. 9.   |
| »                           | J. D. DANA.       | 1852. »On the Classification of the Crustacea Choristopoda or Tetradecapoda». The American Journal of Science and Arts. 2 <sup>nd</sup> Ser. Vol. 14, p. 315.  |
| »                           | »                 | 1852. United States Exploring Expedition. Crustacea. Vol. 2, p. 1000 and 1442.   |
| »                           | A. COSTA.         | 1853. »Frosine», p. 1. Fauna del Regno di Napoli.  |
| »                           | SPENCE BATE.      | 1862. Catal. Amph. Crust. Brit. Museum, p. 318.  |
| »                           | A. COSTA.         | 1862. »Osservazione sulla <i>Diphya quadrivalvis</i> e su' Crostacei che si sviluppano entro i bottoni delle appendici urticanti». Annuario del Museo Zoologico della R. Università di Napoli. Anno 1 <sup>mo</sup> , p. 90. |
| »                           | J. V. CARUS.      | 1885. Prodrömus Faunæ Mediterraneæ. Vol. 1, p. 422.  |
| »                           | A. GERSTAECKER.   | 1886. Dr. H. G. Bronn's Klassen und Ordnungen des Thier-Reichs. 5 <sup>ter</sup> Bd. 2 <sup>te</sup> Abth., p. 488.  |

<i>Phrosina</i> , A. RISSO.	C. BOVALLIUS.	1887.	»Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 27.
»	»	TH. STEBBING.	1888. »Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1424.
1829. <i>Dactylocera</i> , P. A. LATREILLE.	—		Le Règne Animal --- par G. Cuvier. 2 <sup>me</sup> éd. Tome 4 <sup>me</sup> , p. 117.
»	»	H. MILNE EDWARDS.	1830. Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences naturelles. Tome 20 <sup>me</sup> , p. 393.
»	»	P. A. LATREILLE.	1831. Cours d'Entomologie. p. 398.
»	»	»	1836. Le Règne Animal --- par Cuvier. 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 204.
»	»	F. S. VOIGT.	1836. Das Thierreich --- vom Baron von Cuvier. 4 <sup>ter</sup> Band, p. 203.
»	»	H. BURMEISTER.	1837. Handbuch der Naturgeschichte. 2 <sup>te</sup> Abth. Zoologie, p. 569.
»	»	H. MILNE EDWARDS.	1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 305.
»	»	»	1839. » 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
»	»	»	1849. Le Règne Animal ---, par G. Cuvier. Ed. acc. des planches, p. 173.
»	»	H. LUCAS.	1851. Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238.
»	»	C. CLAUS.	1872. Grundzüge der Zoologie. 2 <sup>te</sup> Aufl., p. 467.
»	»	»	1875. » 3 <sup>tte</sup> Aufl., p. 518.

Risso's original diagnosis of the genus, published in 1822, runs:

»Deux antennes à peine apparentes; yeux sessiles; tête prolongée sur le devant en forme de museau; mandibules palpigères; corps oblong, un peu arqué, sub-arrondi sur les côtés, à segmens crustacés transverses, dix pattes monodactyles, dissemblables, le dernier article falciforme, aigu au sommet.»

In 1823 he gave an enlarged description. It runs:

»Deux antennes supérieures grandes et en forme de cuillers; deux inférieures sétacées et très-petites. Les dix pattes proprement dites monodactyles formées de cinq articles aplatis; la première paire courte, mince, crochue; la seconde un peu moins longue que la troisième; la quatrième fort grande, avec son premier article large, ovale, les deux suivans triangulaires, la quatrième ovale, épineux, et le dernier long, aigu, arqué, falciforme; cinquième paire de pieds plus courte que la précédente, mais de même forme. Corps oblong, un peu arqué, sub-arrondi sur les côtés, à segmens crustacés, transverses. Tête prolongée sur le devant en forme de mu-

seau. Queue composée de cinq segmens, presque quadrangulaires, terminée par deux lames oblongues, ciliées, et une plaque intermédiaire courte, aplatie et arrondie au bout.»

In 1826 RISSO gave the following diagnosis:

»Testa subsolida, oblonga; caput mediocre; pedes decem monodactyli; abdomen articulo ultimo rotundato.»

In 1840 H. MILNE EDWARDS gave a detailed description, from which the following passages may be quoted:

»Le corps des Phrosines est moins élargi que celui des Hypéries, et la tête extrêmement grande et placée plus obliquement, de façon que sa partie supérieure est beaucoup plus saillante que la partie inférieure. Le front est armé de deux prolongemens coniques qui ressemblent à des cornes, et qui paraissent représenter les antennes de la première paire, dont on ne voit pas d'autre vestige. Les antennes, au nombre de deux seulement, s'insèrent à quelque distance de la ligne médiane, un peu au-dessous des cornes frontales; elles sont très-courtes, styloformes, et composées seulement de trois articles, dont les deux premiers presque rudimentaires. L'espace compris entre l'insertion des antennes et la bouche est très-grand. L'appareil buccal ne présente rien de remarquable, si ce n'est que les mandibules manquent de branches palpiformes. Le thorax n'est divisé qu'en six articles; les pièces épimériennes sont bien distinctes, et tous les segmens ont à peu près la même longueur. Les pattes des deux premières paires sont petites, et s'insèrent au premier anneau thoracique, de chaque côté de la bouche; elles sont un peu comprimées, et diminuent graduellement de largeur vers le bout qui est pointu. Les pattes des quatre paires suivantes se terminent par une main subchéliforme dont le bord préhensile est fortement dentelé, et dont la griffe formée par le sixième article seulement est très longue; — — — — Quant aux pattes de la septième paire, elle ne sont représentées que par un seul article lamelleux, assez semblable à la hanche des deux paires précédentes. Enfin l'abdomen se termine par une sorte de nageoire composée du quatrième anneau, des cinquième et sixième segmens soudés ensemble, d'une lame caudale impaire, et de trois paires de grandes lames ovalaires, semi-membraneuses.»

In 1883 COSTA gave the following diagnosis:

»Caput magnum sessile rostratum: antennæ duæ setaceæ fronti insertæ, triarticulatæ; duæque inferiores conicæ, vel cylindricæ. Corpus elongatum, lateribus subrotundis, transversim sexpartitum. Pedes decem monodactyli, corporis longitudine, articulis 5 depressis compositi, quorum medii ceteris majores, latissimi, denticulatique. Cauda annulis quinque composita, lamellis sex lanceolatis, fimbriatis, appendice cuspidata terminata.»

In 1862 SPENCE BATE gave the following description:

»Cephalon with the antero-superior margin laterally produced to an angle on each side. Pereion having the first two segments fused together. Mandibles without an appendage. Eyes large. Superior antennæ rudimentary; inferior antennæ obsolete. Gnathopoda small, not subchelate. First four pairs of pereopoda consisting of but six joints, the terminal one probably being the propodos and dactylos fused together; carpi dilated: fifth pair not developed from the basos. Three posterior pairs of pleopoda single-branched, unarticulate, membranous, lamelliform. Telson single, membranous.»

In 1885 CARUS gave the following diagnosis:

»Antennæ I. triarticulatæ; thorax specie sexsegmentatus; par pedum V. maximum, sicut III. IV. et VI. manu prehensili terminatum, par VII. laminam simplicem refert; stili caudales simplices lamellosi.»

In 1886 GERSTAECKER described the genus as follows:

»Kopf oberhalb spitz ausgezogen, nach unten und hinten schräg oder gerundet abfallend. Die beiden ersten Mittelleibssegmente gleichfalls stark verkürzt oder mit einander verschmolzen, die folgenden länger. Die beiden ersten Beinpaare verkürzt und dünn, mit kleiner Endklaue, die vier folgenden gross und sehr kräftig, in eine mit starker, gekrümmter Greifklaue und dreieckig verbreitertem, am Innenrande gesägtem Carpalgliede versehene Hand endigend, das fünfte am längsten. Siebentes Beinpaar auf Hüft- und Schenkelglied beschränkt. Die drei vorderen Hinterleibsringe gleichfalls stark vergrössert, mit stark ausgeschweiftem Hinterrand.»

The typical species was *Phrosina semilunata*, instituted in 1822 by RISSO; at the same time he proposed another new species, *Ph. macrophthalma*, which however does not belong to the genus *Phrosina*.

In 1830 H. MILNE EDWARDS described *Dactylocera nicæensis* as a new species, it must be considered identical with *Phrosina semilunata*.

In 1862 SPENCE BATE proposed the new species *Ph. longispina*. I considered it first as a good species, but after further studies I have been convinced that it is only a young form of *Ph. semilunata*.

In 1888 STEBBING described two new species, *Ph. pacifica* and *Ph. australis*. The former of these may possibly prove to be an independent species, or at least a variety, but as I have not seen any specimen of it, and STEBBING's description is short and without drawings, I am not able to judge about its validity as a species. The latter species, *Ph. australis*, is without doubt only a young form of *Ph. semilunata*.

The sexual dimorphism is the same as in the two preceding genera.

## 1. PHROSINA SEMILUNATA, A. RISSO, 1822.

Pl. XVIII, fig. 3—30.

**Diagn.** *Caput* segmentis tribus primis peræi longius. *Peraeon* leve, setis carens. *Pedes peræi* primi paris pedibus secundi paris multo breviores. *Pedes quinti* paris longitudinem totius corporis æquant. *Pedes uri* primi paris apicem pedum tertii paris non attingentes. *Telson* longius quam latius.

The *head* is longer than the first three peræonal segments together. The *peræon* is smooth, without hairs. The first pair of *peræopoda* are much shorter than the second. The fifth pair are as long as the whole body. The first pair of *uropoda* do not reach to the apex of the third pair.

**Colour.** Yellowish red.

**Length.** 8—30 mm.

**Hab.** The Atlantic; the Mediterranean; the Indian Ocean; the Pacific. (D. M.; F. M.; K. M.; P. M.; S. M.; U. M.)

**Syn. 1822.** *Phrosina semilunata*, A. RISSO.

			—	»Mémoire sur quelques nouveaux Crustacés observés dans la mer de Nice». Journ. de Physique, de Chimie, d'Histoire naturelle etc. Tome 95 <sup>me</sup> , p. 245.
	»	»	A. G. DESMAREST. 1823.	»Malacostracés». Dictionnaire des Sciences naturelles. Tome 28 <sup>me</sup> , p. 348.
	»	»	»	1825. Considérations générales sur la classe des Crustacés, p. 259.
	»	»	A. RISSO. 1826.	Histoire naturelle des principales productions de l'Europe méridionale. Tome 5 <sup>me</sup> , p. 92.
	»	»	F. E. GUÉRIN. 1828.	»Phrosine». Dictionnaire classique d'Histoire naturelle. Tome 13 <sup>me</sup> , p. 458.
	»	»	P. A. LATREILLE. 1829.	Le Règne Animal, --- par G. Cuvier. 2 <sup>me</sup> éd. Tome 4 <sup>me</sup> , p. 117.
<i>Dactylocera</i>	»	»	»	1831. Cours d'Entomologie, p. 398.
»	»	»	F. S. VOIGT. 1836.	Das Thierreich --- vom Baron von Cuvier. 4 <sup>ter</sup> Bd, p. 203.
»	»	»	P. A. LATREILLE. 1836.	Le Règne Animal --- par Cuvier. 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 204.

<i>Phrosina semilunata</i> ,	A. RISSO.	H. LUCAS.	1838.	»Phrosine». Dictionnaire pittoresque d'Histoire naturelle. Tome 7 <sup>me</sup> , p. 427.
<i>Dactylocera</i>	»	H. MILNE EDWARDS.	1838.	Histoire naturelle des Animaux sans vertèbres, par J. B. P. A. de Lamarck. 2 <sup>me</sup> éd. Tome 5 <sup>me</sup> , p. 306.
»	»	»	1839.	» 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
<i>Phrosina</i>	»	»	1840.	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 91.
<i>Dactylocera</i>	»	»	1849.	Le Règne Animal --- par G. Cuvier. Ed. acc. des planches, p. 173, pl. 58, fig. 2.
<i>Phrosina</i>	»	F. G. HOPE.	1851.	Catalogo dei Crostacei Italiani etc., p. 21.
»	»	A. COSTA.	1853.	»Frosine», Fauna del Regno di Napoli, p. 1.
»	»	»	1857.	»Ricerche sui Crostacei Amphipodi del Regno di Napoli». Memorie della Reale Accademia delle Scienze di Napoli. Vol. 1, p. 234.
»	»	SPENCE BATE.	1862.	Catal. Amph. Crust. Brit. Museum, p. 319, pl. 51, fig. 5.
»	»	C. BOVALLIUS.	1867.	»Systematical list of the Amphipoda Hyperiidæ». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 27.
»	»	TH. STEBBING.	1888.	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1425, pl. 176.
<b>1830.</b>	<i>Dactylocera niceensis</i> ,	H. MILNE EDWARDS.	—	»Extrait de Recherches pour servir à l'Histoire naturelle des Crustacés amphipodes». Ann. des Sciences nat. Tome 20 <sup>me</sup> , p. 393.
»	»	»	—	1838. Histoire naturelle des Animaux sans vertèbres --- par J. B. P. A. de Lamarck. Tome 5 <sup>me</sup> , p. 306.
»	»	»	—	1839. » 3 <sup>me</sup> éd. Tome 2 <sup>nd</sup> , p. 370.
<i>Phrosina nicetensis</i> ,	»	—	1840.	Histoire naturelle des Crustacés. Tome 3 <sup>me</sup> , p. 91, pl. 30, fig. 21.
»	»	H. LUCAS.	1849.	»Phrosina». Dictionnaire universel d'Histoire naturelle --- par Ch. d'Orbigny. Tome 10 <sup>me</sup> , p. 9.

<i>Dactylocera nicæensis</i> , H. MILNE EDWARDS.	H. LUCAS.	1851.	Histoire naturelle des Crustacés des Arachnides et des Myriapodes, p. 238.
<i>Phrosina nicetensis</i> ,	»	SPENCE BATE.	1862. Catal. Amph. Crust. Brit. Museum, p. 320, pl. 51, fig. 6.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 28.
1862. <i>Phrosina longispina</i> ,	SPENCE BATE.	—	Catal. Amph. Crust. Brit. Museum, p. 320, pl. 51, fig. 7.
»	»	C. BOVALLIUS.	1887. »Systematical list of the Amphipoda Hyperiiidea». Bih. t. K. Sv. Vet. Ak. Handl. Bd. 11. N:o 16, p. 28.
1888. <i>Phrosina australis</i> ,	TH. STEBBING.	—	»Report on the Amphipoda». Voy. of H. M. S. Challenger. Zoology. Vol. 29, p. 1431.

The original description was published in 1822 by Risso. It runs:

»Cette phrosine a le corps oblong, renflé antérieurement, teinté de jaune; plus mince postérieurement et coloré de rouge pourpre; la tête est grosse, arrondie en dessus, armée de deux pointes coniques qui forment au milieu comme une espèce de croissant; le front est tronqué, sinué; le museau pointu, perpendiculaire, garni à son extrémité de mandibules palpigères, avec des petits palpes setacés qui entourent l'ouverture de la bouche; l'œil est petit, sphérique, noir, orné en dessus de deux taches oblongues placées obliquement de chaque côté. Le corcelet est divisé en cinq anneaux arrondis, glabres, luisans, à peine séparés par des lignes transversales dont l'antérieure et la postérieure sont arqués; les pattes sont monodactyles, à cinq articles aplatis; la première paire courte, mince, crochue, et la seconde un peu moins longue que la troisième, ont leur avant-dernier article armé d'aiguillons; toutes les trois sont implantées et correspondent chacune à la base des trois premiers anneaux; la quatrième paire de pattes est fort grande, à articulation inférieure, large, longue, ovalaire; les deux qui viennent ensuite sont triangulaires, garnies sur leurs angles latéraux d'une pointe; la quatrième articulation est ovale, hérissée sur une des faces de quatre aiguillons disposés en forme de dents de peigne, la dernière disposée en longue pointe subtile, aiguë, courbée, semblable à une faux; la cinquième paire de pattes un peu plus courte est égale à la précédente. La queue, peu convexe, est composée de cinq segmens subquadrangulaires, aigus en dessous, le dernier terminé au milieu par une petite pointe. Les écailles caudales sont oblongues, ciliées; la plaque intermédiaire courte, aplatie, au sommet arrondi.»

In 1840 H. MILNE EDWARDS gave the following specific description of *Phrosina nicetensis*:

»Angle antéro-inférieur du pénultième article des pates des deux premières paires spini-forme et s'avancant beaucoup au delà des dentelures du bord situé au dessus. Six dents dont deux plus fortes que les autres sur le bord inférieur du pénultième article des pates de la cinquième paire. Troisième anneau de l'abdomen obscurément tricaréné en dessus. Appendices abdominaux des trois dernières paires arrondis postérieurement.»

In 1862 SPENCE BATE gave the following description of *Phrosina longispina*:

»First pair of pereopoda having the carpus large, increasing towards the distal extremity, against which the fused propodos and dactylos closely impinge; anterior margin slightly cre-

nulated; inferior angle produced to an outwardly directed blunt tooth. Second pair of pereopoda resembling the first, but having the carpus longer and the inferior angle not so prominent. Third pair having the carpus with the anterior margin subparallel with the posterior; anterior margin oblique, serrated with four large and two small teeth; tooth of inferior angle largest and outwardly directed. Fourth pair of pereopoda having the meros with the antero-distal angle produced as long as the carpus; carpus long, gradually increasing in diameter, antero-distal margin denticulated and produced towards the inferior angle; tooth of the inferior angle considerably the longest, directed straight forward; anterior margin of the united propodos and dactylos rugose.»

As the description of *Phrosina semilunata* given by STEBBING in 1888 is very detailed, I shall restrict myself to a few remarks, referring the reader to STEBBING'S work.

### The male.

Pl. XVIII, fig. 12—20.

The *first pair of antennæ*, in a not fully adult specimen of the *longispina*-form, reach to the hind margin of the fifth peræonal segment. They are fixed immediately below the rostral horns; the first joint of the peduncle is thick, as long as broad, and considerably longer than the two following joints together. The first joint of the flagellum is not fully twice as long as the whole peduncle, not very tumid, and almost cylindrical. The following joints are short and narrow, being scarcely longer than broad. The flagellar joints are about thirty in number.

The *second pair of antennæ* are a little longer than the first. The first free joint of the peduncle is as long as broad, the second is a little longer, the third is still longer. The first flagellar joint is somewhat shorter than the last peduncular, and is slender, about four times as long as broad. The following joints are very short, scarcely longer than broad. The flagellar joints are twenty-six or twenty-eight in number.

The *labrum* is tolerably broad, bilobed.

The *mandibles* (Pl. XVIII, fig. 13) are long and straight. The incisive lamina is sharply crenulated; the secondary lamina of the left mandible is rounded, crenulated, and set with fine hairs. The molar tubercle is broad, armed with five rows of minute, sharp-pointed teeth, and densely set with spine-like bristles. From the middle of the stem arises the mandibular palp, which is unusually short; the first joint is the longest, nearly as long as the two following together, the third joint is shorter than the second. In older males the last two joints of the palp are often lost, and the first or basal joint is bent inwards, so that it easily escapes attention.

The *labium*. The lateral lobes are densely covered with fine hairs.

The *first pair of maxillæ* (Pl. XVIII, fig. 14). The apical portion of the principal lamina is narrowly hollowed, the margins fringed with long bristles. The secondary lamina reaches a little beyond the principal, it is curved, and fringed at the apex with short bristles.

The *second pair of maxillæ* (Pl. XVIII, fig. 15) have the principal lamina very small, and sparingly set with fine hairs. The secondary lamina is much longer, with a few short hairs at the apex.

The *maxillipeds* (Pl. XVIII, fig. 16) have a very short, almost linear, basal portion. The lateral laminae are elongate-lanceolate, with a few short hairs on the inner margin. The median lobe is short, rounded at the apex, and provided with minute hairs.

The *peræopoda* are much more slender in the younger specimens than in the adult ones, and a little more slender in the male than in the female.

The *uropoda* are narrower in the young than in the adult, and angular at the apex in very young individuals.

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## 2. PHROSINA PACIFICA, TH. STEBBING, 1888.

**Syn. 1888.** *Phrosina pacifica*, TH. STEBBING.

— »Report on the Amphipoda». Voy. of H.  
M. S. Challenger. Zoology. Vol. 29,  
p. 1430.

STEBBING says that the skin of this species »appears to be studded with numerous minute hairs».

For a nearer knowledge of this species I refer the reader to STEBBING'S work.

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<i>Ph. atlantica</i> .....	2.	» 374.	2. » XVI, 19—26.
<i>Ph. Colletti</i> .....	2.	» 378.	2. » XVI, 27—47.
<i>Ph. pacifica</i> .....	2.	» 382.	2. » XVI, 48—51.
<i>Ph. tenella</i> .....	2.	» 385.	
The 2 <sup>nd</sup> gen. <i>Phronimella</i> .....	2.	» 386.	
<i>Phronimella elongata</i> .....	2.	» 389.	2. » XVI, 52—67.
The 10 <sup>th</sup> fam. <i>Anchylomeridæ</i> .....	2.	» 396.	
The 1 <sup>st</sup> gen. <i>Euprimno</i> .....	2.	» 397.	
<i>Euprimno macropus</i> .....	2.	» 400.	2. » XVII, 23—40 and XVIII, 1 and 2.
The 2 <sup>nd</sup> gen. <i>Anchylomera</i> .....	2.	» 408.	
<i>Anchylomera Blossevilci</i> .....	2.	» 412, fig.	2. » XVII, 1—22.
<i>A. Hunteri</i> .....	2.	» 420, fig.	
The 3 <sup>d</sup> gen. <i>Phrosina</i> .....	2.	» 421.	
<i>Phrosina semilunata</i> .....	2.	» 426.	2. » XVIII, 3—30.
<i>Ph. pacifica</i> .....	2.	» 430.	

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#### Abbreviations.

- D. M. = »Universitetets Zoologiske Museum» in Copenhagen.  
 F. M. = »Musée d'histoire naturelle» in Paris.  
 K. M. = »Königliches Museum» in Dresden.  
 P. M. = »Naturhistorisches Museum» in Berlin.  
 S. M. = »Naturhistoriska Riksmuseum» in Stockholm.  
 U. M. = »Universitetets Zoologiska Museum» in Upsala.
-

2. I  
Cyllopus.

I. 2. PLATE I.

CYLLOPUS ARMATUS AND C. LEVIS.

---

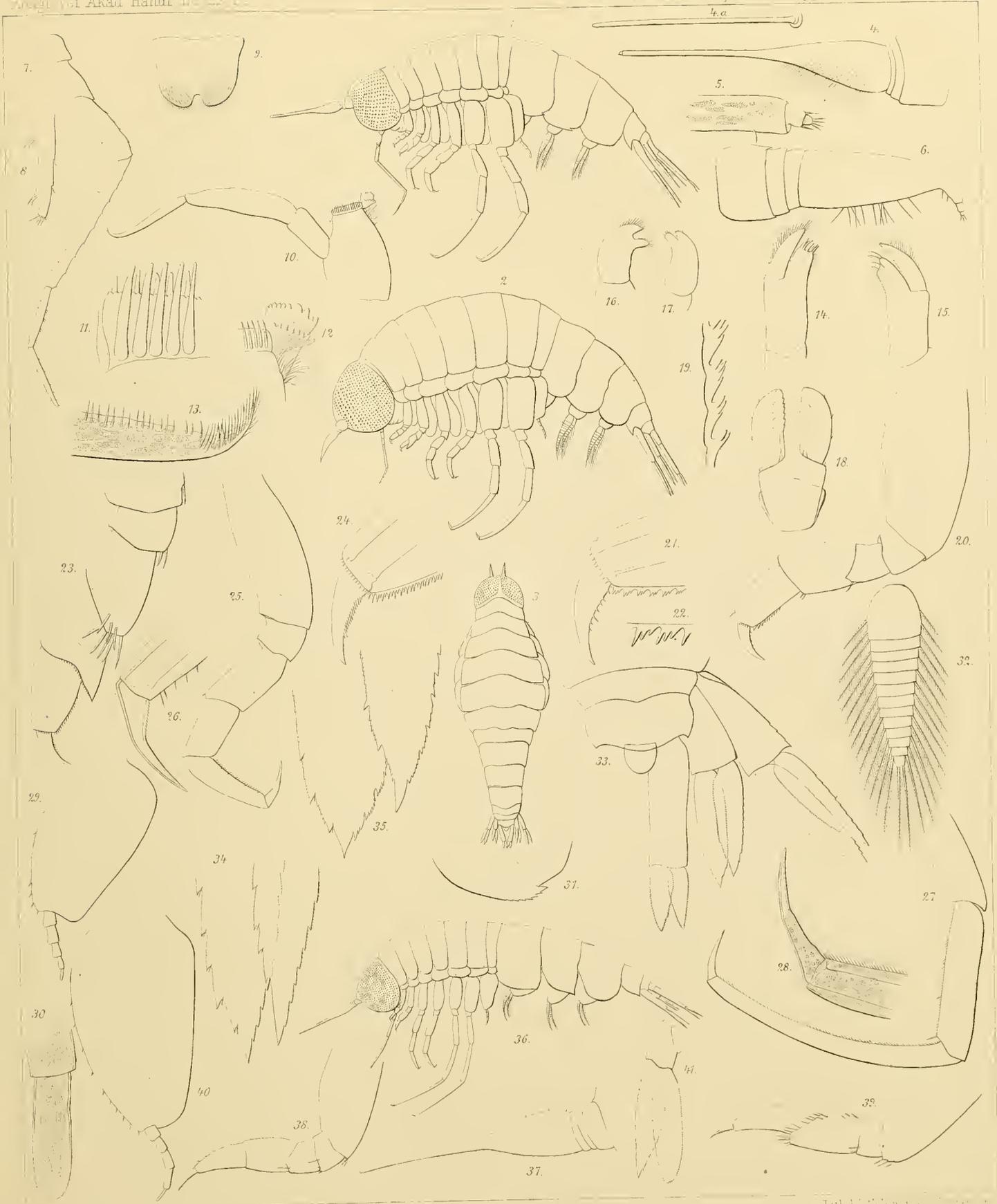
## 2. PLATE I.

### CYLLOPUS ARMATUS.

- Fig. 1. The adult male from the side ( $\frac{4}{1}$ ).  
» 2. » » female » » » ( $\frac{3}{1}$ ).  
» 3. » » » » above ( $\frac{4}{1}$ ).  
» 4. The first pair of antennæ. ♂ ( $\frac{16}{1}$ ).  
» 4a. A bristle from the same pair ( $\frac{80}{1}$ ).  
» 5. The terminal joints of the same pair ♂ ( $\frac{80}{1}$ ).  
» 6. The first pair of antennæ. ♀ ( $\frac{16}{1}$ ).  
» 7. The second pair of antennæ. ♂ ( $\frac{16}{1}$ ).  
» 8. The end of the last joint of the same pair ♂ ( $\frac{45}{1}$ ).  
» 9. The labrum ( $\frac{30}{1}$ ).  
» 10. The left mandible ( $\frac{25}{1}$ ).  
» 11. A piece of the grinding surface of the molar tubercle of the left mandible ( $\frac{220}{1}$ ).  
» 12. The incisive process and secondary process of the same ( $\frac{100}{1}$ ).  
» 13. The end of the last joint of the mandibular palp ( $\frac{110}{1}$ ).  
» 14. The right maxilla of the first pair ( $\frac{30}{1}$ ).  
» 15. The left » » » » ( $\frac{30}{1}$ ).  
» 16. The right » » » second » ( $\frac{30}{1}$ ).  
» 17. The left » » » » ( $\frac{30}{1}$ ).  
» 18. The maxillipeds ( $\frac{25}{1}$ ).  
» 19. A piece of the inner margin of the left lamina in the maxillipeds ( $\frac{160}{1}$ ).  
» 20. The first pair of peræopoda ( $\frac{50}{1}$ ).  
» 21. The end of the metacarpus of the same pair ( $\frac{100}{1}$ ).  
» 22. A piece of the hind margin of the metacarpus ( $\frac{200}{1}$ ).  
» 23. The second pair of peræopoda ( $\frac{60}{1}$ ).  
» 24. The end of the metacarpus of the same pair ( $\frac{100}{1}$ ).  
» 25. The fourth pair of peræopoda ( $\frac{16}{1}$ ).  
» 26. The dactylus of the same pair ( $\frac{40}{1}$ ).  
» 27. The last joints of the fifth pair of peræopoda ( $\frac{16}{1}$ ).  
» 28. The end of the metacarpus of the same pair ( $\frac{40}{1}$ ).  
» 29. The seventh pair of peræopoda ( $\frac{16}{1}$ ).  
» 30. The dactylus of the same pair ( $\frac{150}{1}$ ).  
» 31. The lower part of the second pleonal segment of the male ( $\frac{20}{1}$ ).  
» 32. The outer ramus of the first pair of pleopoda ( $\frac{25}{1}$ ).  
» 33. The urus ( $\frac{18}{1}$ ).  
» 34. The ends of the rami of the first pair of uropoda ( $\frac{75}{1}$ ).  
» 35. » » » » » » second » » » ( $\frac{75}{1}$ ).

### CYLLOPUS LEVIS.

- » 36. The male from the side ( $\frac{8}{1}$ ).  
» 37. The first pair of antennæ ( $\frac{32}{1}$ ).  
» 38. The first pair of peræopoda ( $\frac{80}{1}$ ).  
» 39. » second » » » ( $\frac{80}{1}$ ).  
» 40. » seventh » » » ( $\frac{60}{1}$ ).  
» 41. The rami of the second pair of uropoda ( $\frac{40}{1}$ ).
-



Andersson et A. J. Westergren del.

Au t. e. (Cron.)

Tafel V. Pl. I. 9. 1907

Fig. 1-3. *Gyllopus armatus*. Fig. 36-40. *Gyllopus borealis*.



2. II  
Paraphronima.

I. 2. PLATE II.

PARAPHRONIMA GRACILIS, P. CRASSIPES AND P. CLYPEATA.

---

## 2. PLATE II.

### PARAPHRONIMA GRACILIS. ♀

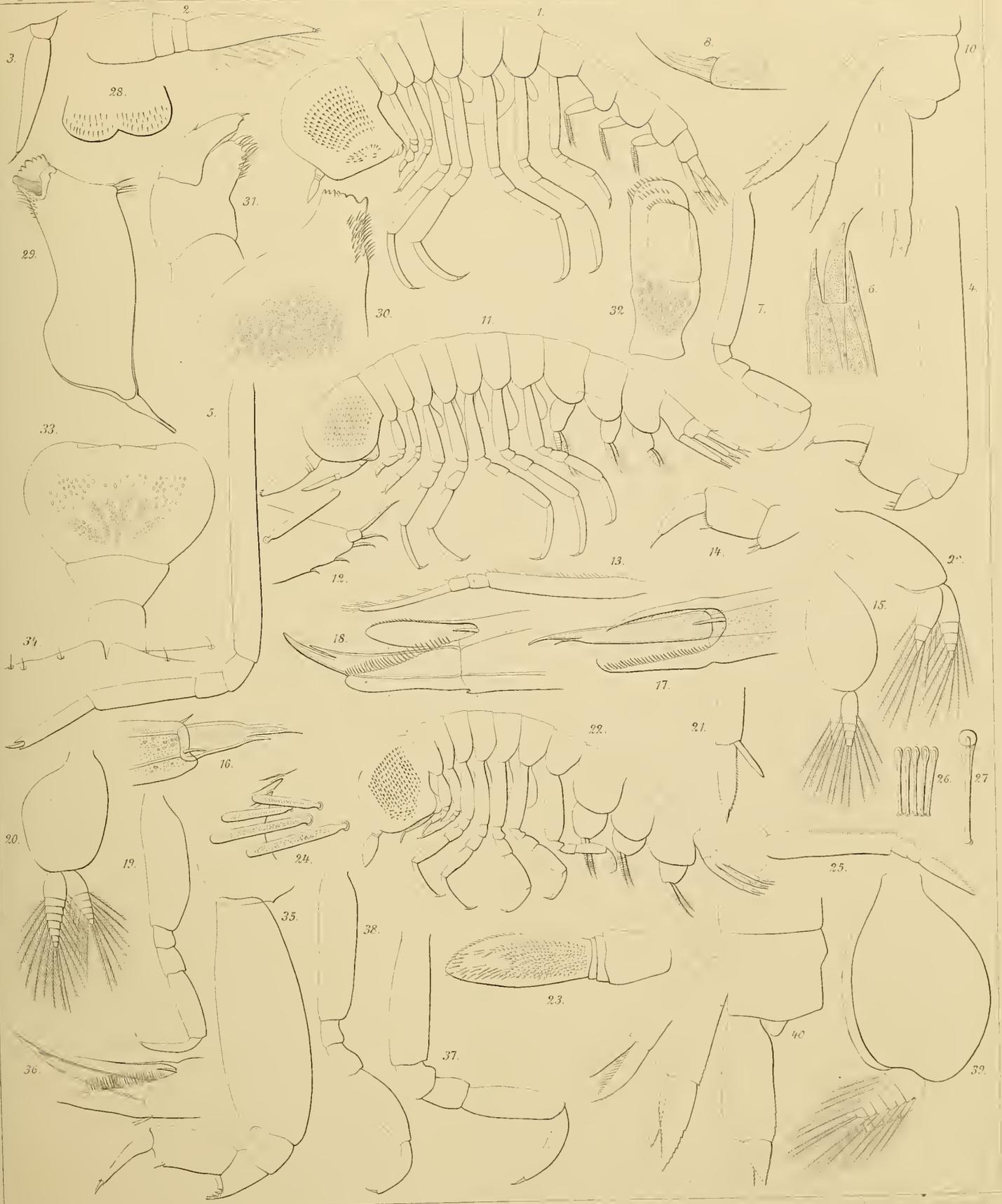
- Fig. 1. The female from the side ( $12/1$ ).  
» 2. The first pair of antennæ ( $72/1$ ).  
» 3. The second » » » ( $150/1$ ).  
» 4. The first pair of peræopoda ( $60/1$ ).  
» 5. The second » » » ( $60/1$ ).  
» 6. The end of the metacarpus of the same pair ( $270/1$ ).  
» 7. The seventh pair of peræopoda ( $25/1$ ).  
» 8. The dactylus of the same pair ( $125/1$ ).  
» 9. The first pair of pleopoda ( $45/1$ ).  
» 10. The urus ( $45/1$ ).

### PARAPHRONIMA CRASSIPES. ♂

- » 11. The male from the side ( $20/1$ ).  
» 12. The end of the first pair of antennæ ( $300/1$ ).  
» 13. The second pair of antennæ ( $70/1$ ).  
» 14. The last joints of the first pair of peræopoda ( $80/1$ ).  
» 15. The first pair of pleopoda ( $60/1$ ).

### PARAPHRONIMA CLYPEATA.

- » 16. The dactylus of the first pair of peræopoda. ♀ ( $350/1$ ).  
» 17 and 18. The end of the metacarpus of the second pair of peræopoda. ♀ ( $400/1$ ).  
» 19. The seventh pair of peræopoda. ♀ ( $15/1$ ).  
» 20. The first pair of pleopoda. ♀ ( $16/1$ ).  
» 21. The rami of the first pair of uropoda. ♀ ( $28/1$ ).  
» 22. The male from the side ( $7/1$ ).  
» 23. The first pair of antennæ. ♂ ( $35/1$ ).  
» 24. The end of the flagellum of the same pair ( $350/1$ ).  
» 25. The second pair of antennæ. ♂ ( $28/1$ ).  
» 26. Clavate spines from the same pair. ♂ ( $250/1$ ).  
» 27. The same enlarged ( $400/1$ ).  
» 28. The labrum ( $80/1$ ).  
» 29. The right mandible ( $80/1$ ).  
» 30. The end of the same ( $220/1$ ).  
» 31. The left maxilla of the first pair ( $80/1$ ).  
» 32. » » » » second » ( $80/1$ ).  
» 33. The maxillipeds ( $80/1$ ).  
» 34. The end of the same ( $150/1$ ).  
» 35. The first pair of peræopoda ( $50/1$ ).  
» 36. The end of the metacarpus of the second pair ( $350/1$ ).  
» 37. The fifth pair of peræopoda ( $24/1$ ).  
» 38. The seventh » » » ( $24/1$ ).  
» 39. The first pair of pleopoda ( $28/1$ ).  
» 40. The urus ( $28/1$ ).
-



A. M. Westergren, auctor del.

Auctor lith.

Fig. 1-10. *Paraproniira gracilis*. Fig. 11-17. *Paraproniira crassipes*. Fig. 18-21. *Pariproniura* sp. n.



2. III  
Thaumatops.

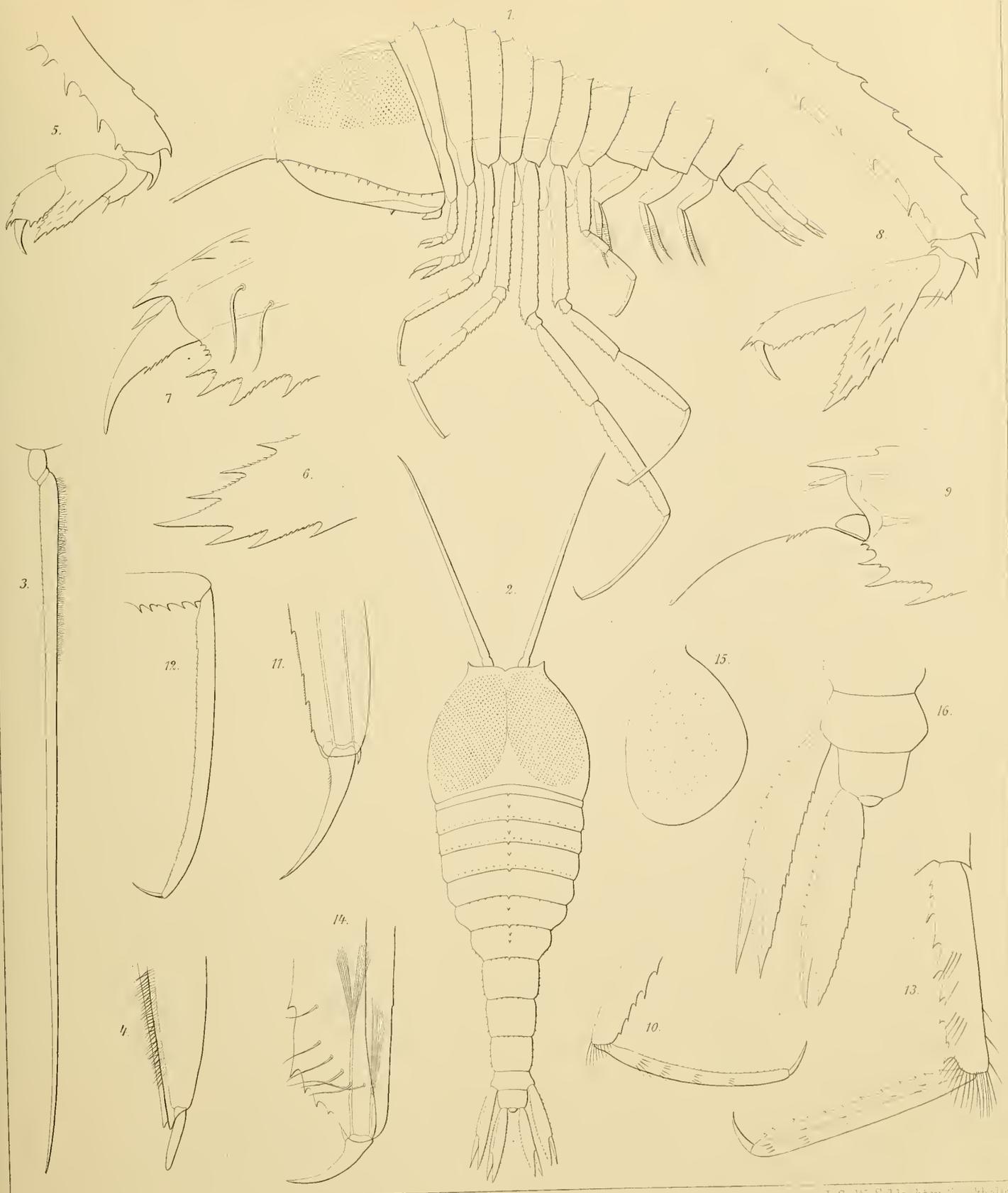
I. 2. PLATE III.  
THAUMATOPS LONGIPES.

---

## 2. PLATE III.

### THAUMATOPS LONGIPES.

- Fig. 1. The male from the side, spec. *A.* ( $\frac{2}{1}$ ).  
» 2. » » » above » *B.* ( $\frac{2}{1}$ ).  
» 3. The first pair of antennæ » » ( $\frac{6}{1}$ ).  
» 4. The end of the same pair » » ( $\frac{30}{1}$ ).  
» 5. The first pair of peræopoda ( $\frac{10}{1}$ ).  
» 6. The end of the carpal process of the same pair ( $\frac{40}{1}$ ).  
» 7. The dactylus and the end of the metacarpus of the same pair ( $\frac{40}{1}$ ).  
» 8. The second pair of peræopoda ( $\frac{10}{1}$ ).  
» 9. The dactylus of the same pair ( $\frac{40}{1}$ ).  
» 10. The last joints of the fourth pair of peræopoda ( $\frac{6}{1}$ ).  
» 11. The end of the metacarpus of the fifth pair ( $\frac{15}{1}$ ).  
» 12. The last joints of the sixth pair ( $\frac{6}{1}$ ).  
» 13. » » » » » seventh » spec. *A.* ( $\frac{10}{1}$ ).  
» 14. The dactylus and the end of the metacarpus of the seventh pair. Spec. *B.* ( $\frac{24}{1}$ ).  
» 15. The branchial sack of the fifth pair ( $\frac{8}{1}$ ).  
» 16. The urus ( $\frac{6}{1}$ ).
-



A. M. Westergren del.

*Auctor circum*

Lith. W. Schlichter, Stockholm

Fig. 1-17. *Thaumtops longipes*



**2. IV**  
**Thaumatops.**

**I. 2. PLATE IV.**

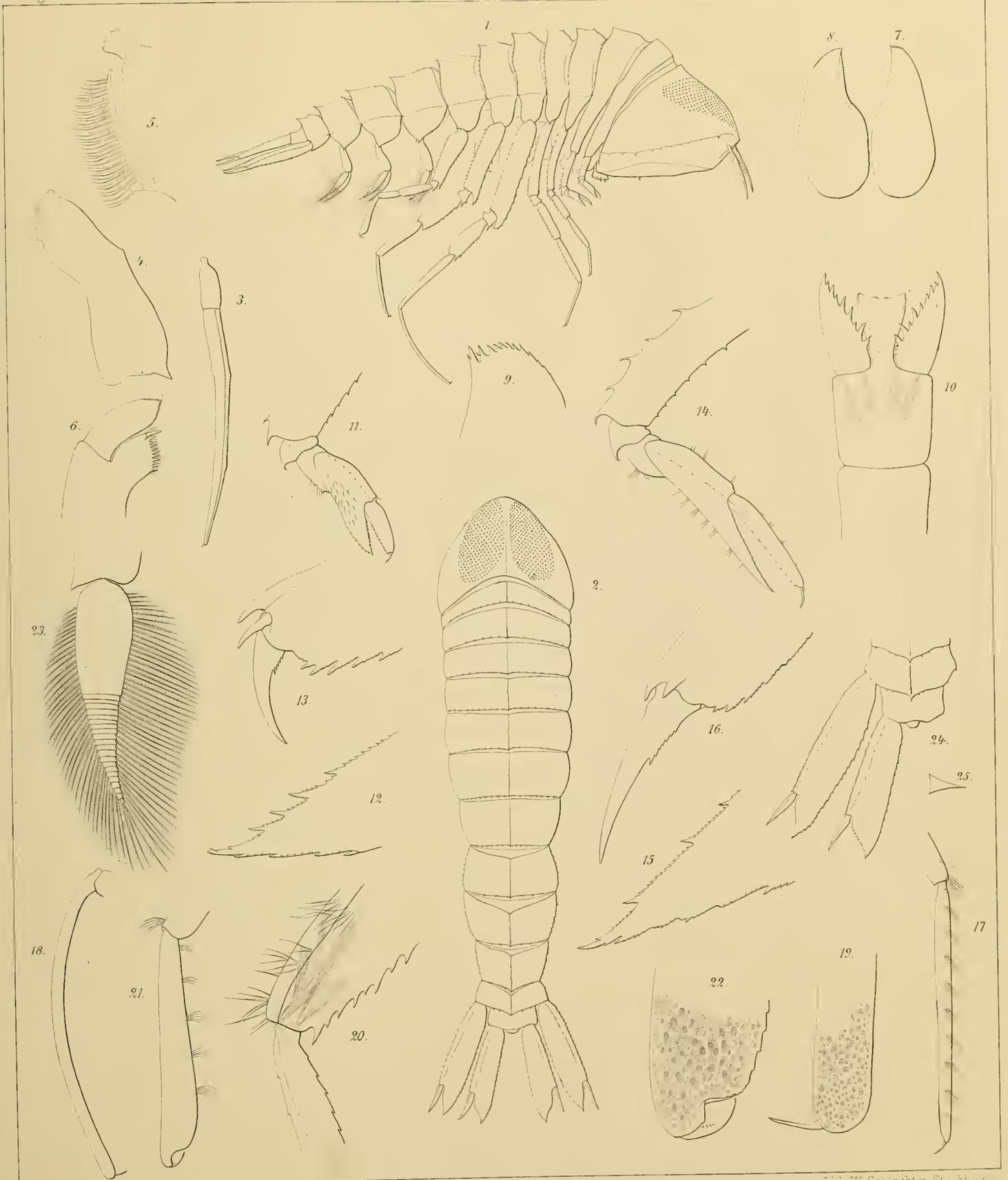
**THAUMATOPS LOVÉNI.**

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## 2. PLATE IV.

### THAUMATOPS LOVÉNI.

- Fig. 1. The male from the side ( $1/1$ ).  
» 2. » » » above ( $1/1$ ).  
» 3. The first pair of antennæ ( $3/1$ ).  
» 4. The mandible ( $10/1$ ).  
» 5. The end of the same ( $30/1$ ).  
» 6. The right maxilla of the first pair ( $20/1$ ).  
» 7. » » » » second » ( $20/1$ ).  
» 8. » left » » » » ( $20/1$ ).  
» 9. The end of the same ( $100/1$ ).  
» 10. The maxillipeds ( $15/1$ ).  
» 11. The first pair of peræopoda ( $7/1$ ).  
» 12. The end of the carpal process of the same pair ( $30/1$ ).  
» 13. The dactylus and the end of the metacarpus of the same pair ( $30/1$ ).  
» 14. The second pair of peræopoda ( $7/1$ ).  
» 15. The end of the carpal process of the same pair ( $40/1$ ).  
» 16. The dactylus and the end of the metacarpus of the same pair ( $40/1$ ).  
» 17. The last joints of the fourth pair ( $6/1$ ).  
» 18. » » » » fifth » ( $4/1$ ).  
» 19. The end of the metacarpus of the same pair ( $15/1$ ).  
» 20. The end of the carpus of the sixth pair ( $10/1$ ).  
» 21. The last joints of the seventh pair ( $3/1$ ).  
» 22. The end of the metacarpus of the same pair ( $15/1$ ).  
» 23. The outer ramus of the first pair of pleopoda ( $7/1$ ).  
» 24. The urus ( $3/1$ ).  
» 25. Section of the base of the peduncle of the last pair of uropoda ( $3/1$ ).
-



A.M. Westergren et auctor del.

Auctor inexit.

Lith. W. Scheu Inter. St. Kl.

Fig. 1-25. *Thaumtops Lovéni*.



2. v  
Mimonectes.

I. 2. PLATE V.  
MIMONECTES LOVÉNI.

---

## 2. PLATE V.

### MIMONECTES LOVÉNI.

- Fig. 1. The female from the side ( $\frac{4}{1}$ ).  
» 2. The same from below ( $\frac{3}{1}$ ).  
» 3. The first pair of antennæ ( $\frac{25}{1}$ ).  
» 4. The last joints of the same pair ( $\frac{140}{1}$ ).  
» 5. Glandular tubercle between the bases of the first and second pairs of antennæ ( $\frac{150}{1}$ ).  
» 6. The second pair of antennæ ( $\frac{60}{1}$ ).  
» 7. The right maxilla of the first pair ( $\frac{80}{1}$ ).  
» 8. The left » » second » ( $\frac{80}{1}$ ).  
» 9. The maxillipeds ( $\frac{60}{1}$ ).  
» 10. The ganglionic chain ( $\frac{15}{1}$ ).  
» 11. The cephalic ganglia ( $\frac{35}{1}$ ).  
» 12. The pleonal ganglia ( $\frac{75}{1}$ ).  
» 13. The first pair of peræopoda ( $\frac{30}{1}$ ).  
» 14. The second » » » ( $\frac{25}{1}$ ).  
» 15. The metacarpus of the fourth pair ( $\frac{65}{1}$ ).  
» 16. The seventh pair ( $\frac{25}{1}$ ).  
» 17. The end of the metacarpus of the same pair ( $\frac{75}{1}$ ).  
» 18. Branchial sack and ovitectorix from the sixth pair ( $\frac{25}{1}$ ).  
» 19. The first pair of pleopoda ( $\frac{35}{1}$ ).  
» 20. Coupling spines from the same pair ( $\frac{600}{1}$ ).  
» 21. The cleft bristle » » » » ( $\frac{300}{1}$ ).  
» 22. The urus ( $\frac{25}{1}$ ).
-



FIG. 7. *Miconia* (L.) Benth.



I. 2. PLATE VI.

MIMONECTES SPHÆRICUS AND M. STEENSTRUPI.

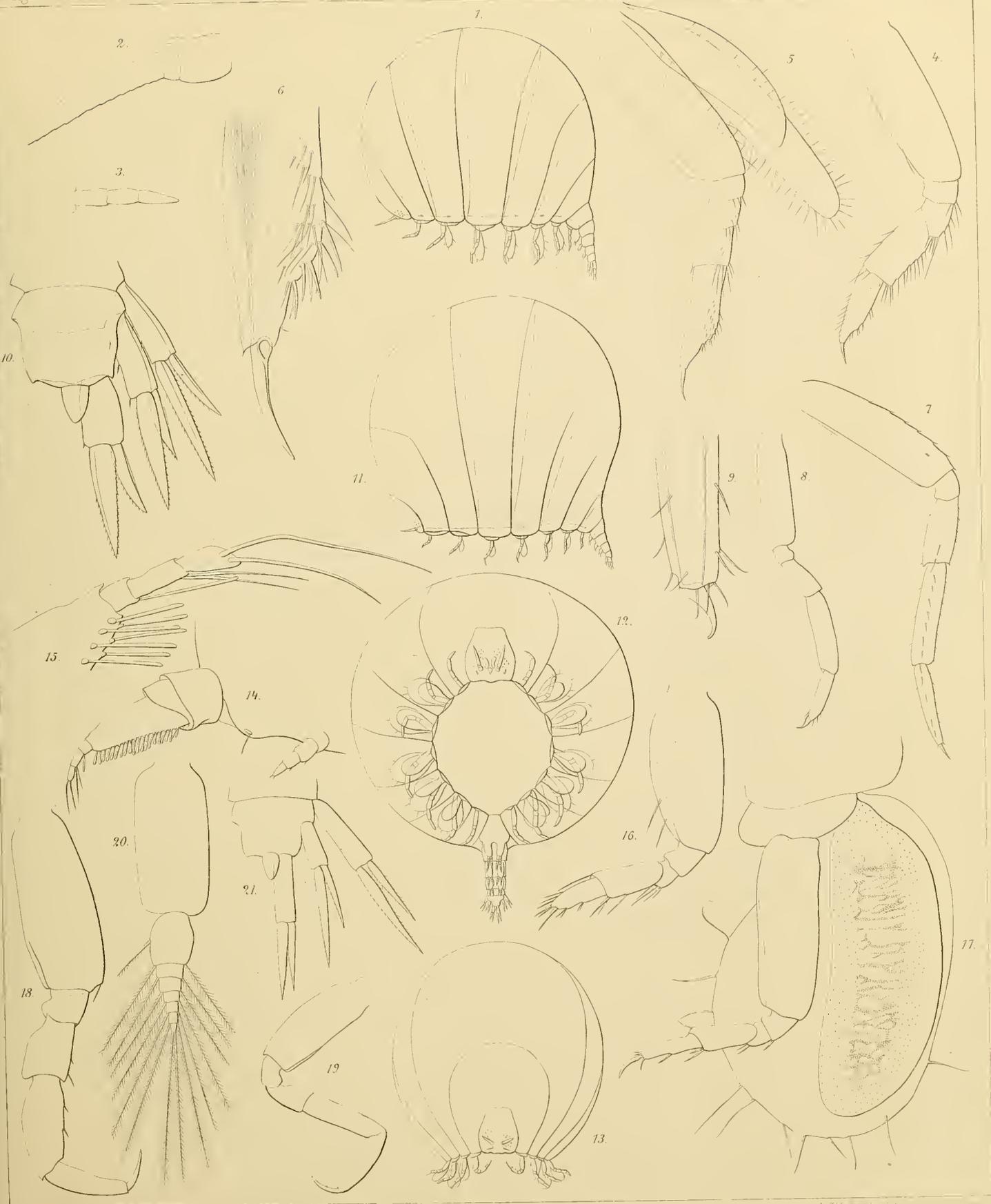
## 2. PLATE VI.

### MIMONECTES SPHÆRICUS.

- Fig. 1. The female from the side ( $\frac{4}{1}$ ).  
» 2. The first pair of antennæ ( $\frac{40}{1}$ ).  
» 3. The second » » » ( $\frac{70}{1}$ ).  
» 4. The first pair of peræopoda ( $\frac{50}{1}$ ).  
» 5. The second » » » ( $\frac{50}{1}$ ).  
» 6. The end of the metacarpus of the same pair ( $\frac{220}{1}$ ).  
» 7. The fifth pair of peræopoda ( $\frac{40}{1}$ ).  
» 8. The seventh » » » ( $\frac{40}{1}$ ).  
» 9. The end of the metacarpus of the same pair ( $\frac{150}{1}$ ).  
» 10. The urus ( $\frac{50}{1}$ ).

### MIMONECTES STEENSTRUPI.

- » 11. The male from the side ( $\frac{6}{1}$ ).  
» 12. The female from below ( $\frac{10}{1}$ ).  
» 13. » » in a front view ( $\frac{8}{1}$ ).  
» 14. The antennæ ( $\frac{70}{1}$ ).  
» 15. The last joints of the first pair of antennæ ( $\frac{200}{1}$ ).  
» 16. The first pair of peræopoda ( $\frac{90}{1}$ ).  
» 17. The second » » » ( $\frac{90}{1}$ ).  
» 18. The third » » » ( $\frac{120}{1}$ ).  
» 19. The seventh » » » ( $\frac{80}{1}$ ).  
» 20. The first pair of pleopoda ( $\frac{100}{1}$ ).  
» 21. The urus ( $\frac{70}{1}$ ).
-



A. H. Westgren et al.

Amato, di ex'

Lith. W. Beckwith Co. Wash. D. C.

Fig. 1-10. *Musca domestica* L. (Diptera, Muscidae). Fig. 11-21. *Musca domestica* L. (Diptera, Muscidae).



2. VII  
Hyperoche.

I. 2. PLATE VII.

HYPEROCHE LUETKENI, H. MARTINEZII, AND H. PICTA.

---

## 2. Plate VII.

### HYPEROCHE LUETKENI. ♂

- Fig. 1. The animal from the side ( $\frac{6}{1}$ ).  
» 2. The first pair of antennæ ( $\frac{18}{1}$ ).  
» 3. The end of the last joint of the same pair ( $\frac{280}{1}$ ).  
» 4. The second pair of antennæ ( $\frac{25}{1}$ ).  
» 5. The left mandible ( $\frac{30}{1}$ ).  
» 6. The first joint of the palp of the same ( $\frac{75}{1}$ ).  
» 7. The left maxilla of the first pair ( $\frac{30}{1}$ ).  
» 8. The right » » » second » ( $\frac{30}{1}$ ).  
» 9. The maxillipeds from the inner side ( $\frac{30}{1}$ ).  
» 10. The first pair of peræopoda ( $\frac{35}{1}$ ).  
» 11. The end of the carpal process of the same pair ( $\frac{150}{1}$ ).  
» 12. The dactylus of the same pair ( $\frac{150}{1}$ ).  
» 13. The second pair of peræopoda ( $\frac{35}{1}$ ).  
» 14. The fourth » » » ( $\frac{25}{1}$ ).  
» 15. The sixth » » » ( $\frac{25}{1}$ ).  
» 16. The outer ramus of the first pair of pleopoda ( $\frac{25}{1}$ ).

### HYPEROCHE LUETKENI. ♀

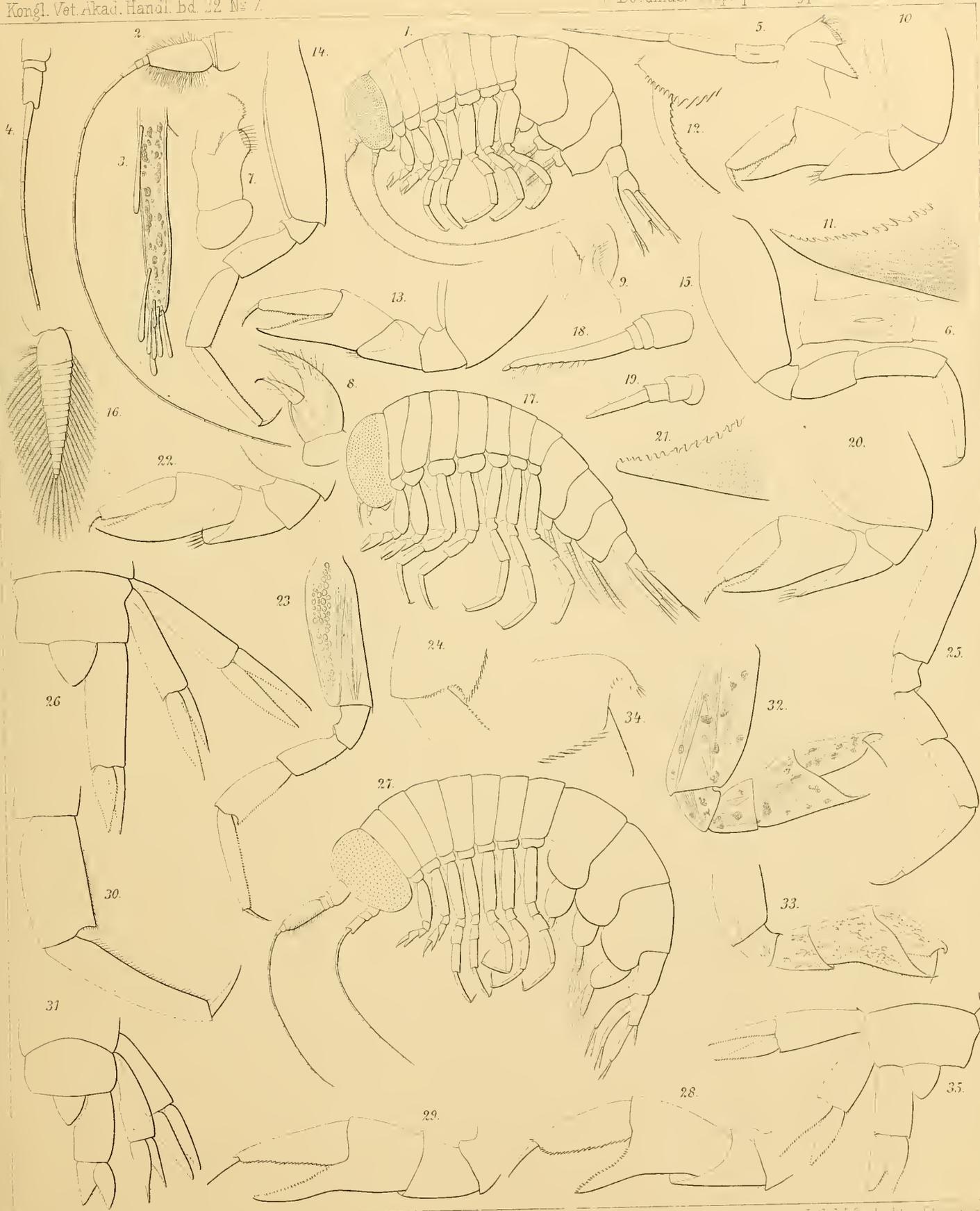
- » 17. The animal from the side ( $\frac{6}{1}$ ).  
» 18. The first pair of antennæ ( $\frac{40}{1}$ ).  
» 19. The second » » » ( $\frac{40}{1}$ ).  
» 20. The first » » peræopoda ( $\frac{30}{1}$ ).  
» 21. The end of the carpal process of the same pair ( $\frac{150}{1}$ ).  
» 22. The second pair of peræopoda ( $\frac{30}{5}$ ).  
» 23. The third » » » ( $\frac{25}{1}$ ).  
» 24. The apex of the carpus of the same pair ( $\frac{65}{1}$ ).  
» 25. The fifth pair of peræopoda ( $\frac{25}{1}$ ).  
» 26. The urus ( $\frac{15}{1}$ ).

### HYPEROCHE MARTINEZII. ♂

- » 27. The animal from the side ( $\frac{20}{1}$ ).  
» 28. The first pair of peræopoda ( $\frac{100}{1}$ ).  
» 29. The second » » » ( $\frac{100}{1}$ ).  
» 30. The third » » » ( $\frac{100}{1}$ ).  
» 31. The urus ( $\frac{35}{1}$ ).

### HYPEROCHE PICTA.

- » 32. The first pair of peræopoda ( $\frac{100}{1}$ ).  
» 33. The second » » » ( $\frac{100}{1}$ ).  
» 34. The end of the metacarpus of the same pair ( $\frac{250}{1}$ ).  
» 35. The urus ( $\frac{60}{1}$ ).
-



Auctor et A.M. Westergren del.

Lith. H. Schaeffer, Copenhagen.

Fig. 1-16 *Hyperoche Luetkeni* ♂. 17-26 *Hyperoche Luetkeni* ♀. 27-31 *Hyperoche Martinezii* ♂. 32-35 *Hyperoche pinnata*.



2. VIII  
Euiulopis.

I. 2. PLATE VIII.

EUIULOPIS LOVÉNI AND E. MIRABILIS.

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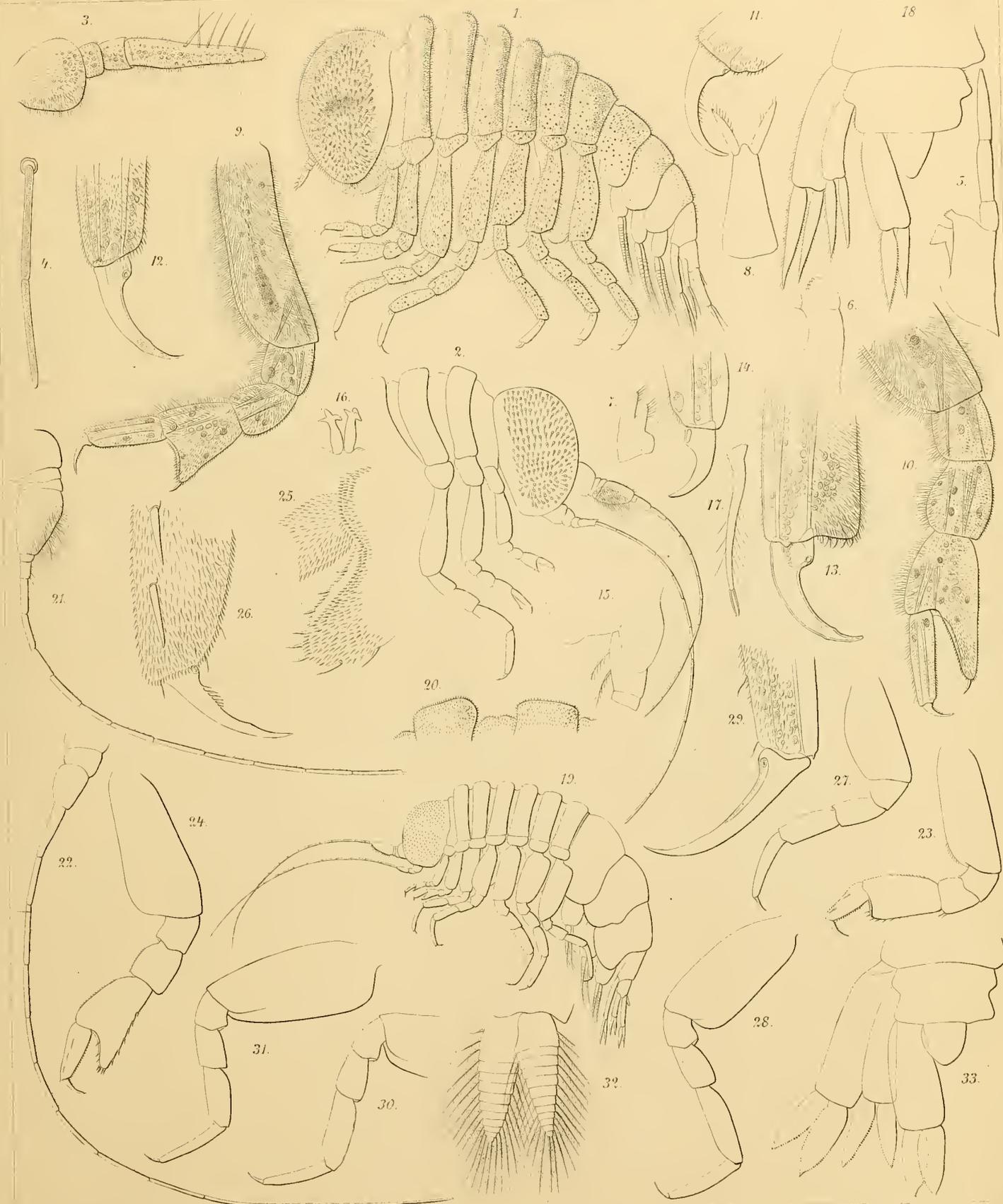
## 2. Plate VIII.

### EUIULOPIS LOVÉNI.

- Fig. 1. The female from the side ( $20/1$ ).  
» 2. The forepart of the male from the side ( $20/1$ ).  
» 3. The first pair of antennæ. ♀ ( $120/1$ ).  
» 4. An olfactory hair from the same pair. ♀ ( $120/1$ ).  
» 5. The right mandible. ♂ ( $120/1$ ).  
» 6. The first pair of maxillæ. ♂ ( $120/1$ ).  
» 7. The second » » » ♂ ( $120/1$ ).  
» 8. The maxillipeds. ♂ ( $80/1$ ).  
» 9. The first pair of peræopoda. ♂ ( $60/1$ ).  
» 10. » second » » » ♂ ( $60/1$ ).  
» 11. The dactylus of the same pair. ♂ ( $200/1$ ).  
» 12. The » » » third » ♂ ( $200/1$ ).  
» 13. The » » » fifth » ♀ ( $200/1$ ).  
» 14. The » » » » » young ♀ ( $250/1$ ).  
» 15. The apex of the peduncle of the first pair of pleopoda. ♂ ( $200/1$ ).  
» 16. Coupling spines from the same pair. ♂ ( $800/1$ ).  
» 17. Cleft bristle » » » » ♂ ( $500/1$ ).  
» 18. The urus. ♀ ( $50/1$ ).

### EUIULOPIS MIRABILIS. ♂

- » 19. The animal from the side ( $10/1$ ).  
» 20. The dorsal side of the third and fourth peræonal segments ( $40/1$ ).  
» 21. The first pair of antennæ ( $25/1$ ).  
» 22. The second » » » ( $25/1$ ).  
» 23. The first » » peræopoda ( $40/1$ ).  
» 24. The second » » » ( $40/1$ ).  
» 25. The carpal process of the same pair ( $130/1$ ).  
» 26. The metacarpus and dactylus of the same pair ( $200/1$ ).  
» 27. The third pair of peræopoda ( $25/1$ ).  
» 28. The fifth » » » ( $25/1$ ).  
» 29. The dactylus of the same pair ( $150/1$ ).  
» 30. The sixth pair of peræopoda ( $25/1$ ).  
» 31. The seventh » » » ( $25/1$ ).  
» 32. The first » » pleopoda ( $40/1$ ).  
» 33. The urus ( $25/1$ ).
-



Autor et A.M. Westergrën del.

Lith. W. Schlichter, Stockholm.

Figs. 1-12 Euvallius borealis. 19-33 Euvallius mirabilis.



I. 2. PLATE IX.

HYPERIA MEDUSARUM, H. HYSTRIX, AND H. LATREILLEI.

---

## 2. PLATE IX.

### HYPERIA MEDUSARUM.

- Fig. 1. The male from the side ( $\frac{5}{1}$ ).  
 » 2. The first pair of antennæ. ♂ ( $\frac{25}{1}$ ).  
 » 3. The second » » » ♂ ( $\frac{25}{1}$ ).  
 » 4. The labrum. ♂ ( $\frac{40}{1}$ ).  
 » 5. The right mandible. ♂ ( $\frac{40}{1}$ ).  
 » 6. The last joint of the mandibular palp. ♂ ( $\frac{220}{1}$ ).  
 » 7. The first pair of maxillæ. ♂ ( $\frac{40}{1}$ ).  
 » 8. » second » » » ♂ ( $\frac{40}{1}$ ).  
 » 9. The maxillipeds. ♂ ( $\frac{40}{1}$ ).  
 » 10. The first pair of peræopoda. ♂ ( $\frac{15}{1}$ ).  
 » 11. » second » » » ♂ ( $\frac{25}{1}$ ).  
 » 12. » third » » » ♂ ( $\frac{22}{1}$ ).  
 » 13. » fifth » » » ♂ ( $\frac{16}{1}$ ).  
 » 14. Cleft bristle from the first pair of pleopoda. ♂ ( $\frac{200}{1}$ ).  
 » 15. Coupling spine » » » » » ♂ ( $\frac{660}{1}$ ).  
 » 16. The urus. ♂ ( $\frac{16}{1}$ ).  
 » 17. The right mandible of the female ( $\frac{40}{1}$ ).  
 » 18. The dactylus of the third pair of peræopoda. ♀ ( $\frac{120}{1}$ ).  
 » 19. The » » » seventh » » » ♀ ( $\frac{140}{1}$ ).  
 » 20.<sup>1)</sup> A young a day after having been hatched ( $\frac{100}{1}$ ).  
 » 21. The first pair of peræopoda of the same ( $\frac{300}{1}$ ).

### HYPERIA HYSTRIX, ♂.

- Fig. 22. The animal from the side ( $\frac{7}{1}$ ).  
 » 23. The first pair of antennæ ( $\frac{20}{1}$ ).  
 » 24. » second » » » ( $\frac{20}{1}$ ).  
 » 25. The first pair of peræopoda ( $\frac{25}{1}$ ).  
 » 26. » second » » » ( $\frac{25}{1}$ ).  
 » 27. » third » » » ( $\frac{20}{1}$ ).  
 » 28. » fifth » » » ( $\frac{20}{1}$ ).  
 » 29. » seventh » » » ( $\frac{20}{1}$ ).  
 » 30. The urus ( $\frac{20}{1}$ ).

### HYPERIA LATREILLEI, ♂.

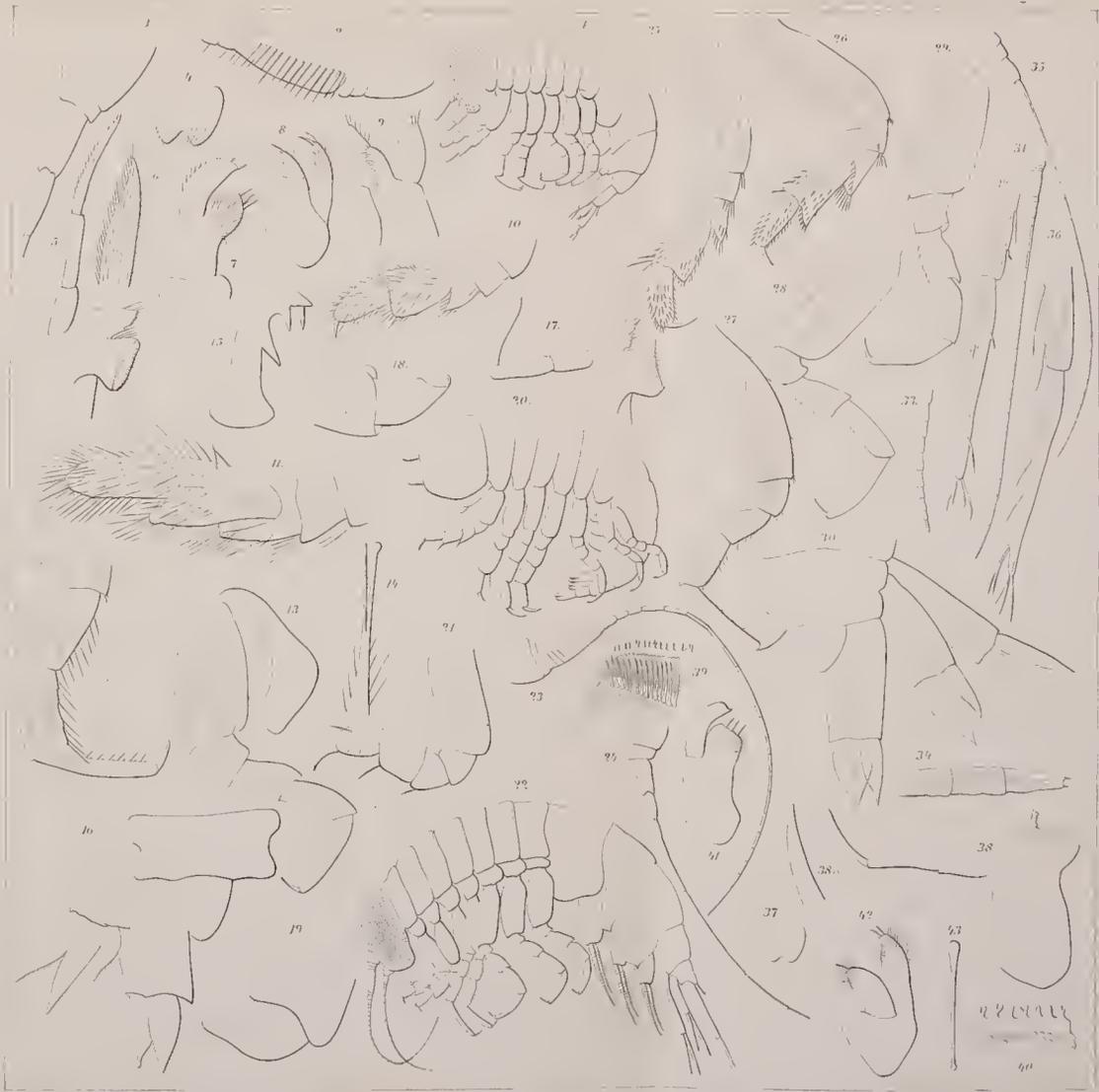
- » 31. The first pair of antennæ ( $\frac{8}{1}$ ).  
 » 32. The last joints of the flagellum of the same pair ( $\frac{100}{1}$ ).  
 » 33. The first pair of antennæ of a young ( $\frac{20}{1}$ ).  
 » 34. The last joints of the flagellum of the same pair ( $\frac{180}{1}$ ).  
 » 35. The second pair of antennæ ( $\frac{8}{1}$ ).  
 » 36. The last joints of the flagellum of the same pair ( $\frac{100}{1}$ ).  
 » 37. The labrum ( $\frac{25}{1}$ ).  
 » 38. The right mandible ( $\frac{25}{1}$ ).  
 » 39. A piece of the molar tubercle ( $\frac{320}{1}$ ).  
 » 40. The same more enlarged ( $\frac{640}{1}$ ).  
 » 41. The first pair of maxillæ ( $\frac{25}{1}$ ).  
 » 42. » second » » » ( $\frac{18}{1}$ ).  
 » 43. A glandular hair from the same pair ( $\frac{120}{1}$ ).

<sup>1)</sup> Through a change of drawings at the engraving of the plate that of an older young was engraved instead of the stage described in the text p. 158, the drawing of which will be given in the morphological part.



Author of A. M. Westergren  
1870-1871







I. 2. PLATE X.

HYPERIA LATREILLEI, H. GAUDICHAUDII, H. GALBA,  
H. SPINIGERA, AND H. FABREI.

---

## 2. PLATE X.

### HYPERIA LATREILLEI.

- Fig. 1. The male from the side. ♂ ( $\frac{5}{1}$ ).  
» 2. The maxillipeds from the inner side. ♂ ( $\frac{35}{1}$ ).  
» 3. The laminæ of the same. ♂ ( $\frac{60}{1}$ ).  
» 4. The first pair of peræopoda. ♂ ( $\frac{25}{1}$ ).  
» 5. The dactylus of the same pair. ♂ ( $\frac{80}{1}$ ).  
» 6. A spine from the metacarpus of the same pair. ♂ ( $\frac{160}{1}$ ).  
» 7. The second pair of peræopoda. ♂ ( $\frac{25}{1}$ ).  
» 8. The dactylus of the same pair. ♂ ( $\frac{150}{1}$ ).  
» 9. The third pair of peræopoda. ♂ ( $\frac{13}{1}$ ).  
» 10. » fifth » » » ♂ ( $\frac{13}{1}$ ).  
» 11. » seventh » » » ♂ ( $\frac{13}{1}$ ).  
» 12. The dactylus of the same pair. ♂ ( $\frac{35}{1}$ ).  
» 13. The urus. ♂ ( $\frac{10}{1}$ ).  
» 14. The first pair of antennæ of the female ( $\frac{15}{1}$ ).  
» 15. The tip of the flagellum of the same pair. ♀ ( $\frac{60}{1}$ ).  
» 16. The second pair of antennæ. ♀ ( $\frac{15}{1}$ ).  
» 17. The tip of the flagellum of the same pair. ♀ ( $\frac{60}{1}$ ).

### HYPERIA GAUDICHAUDII.

- » 18. A young male from the side. ♂ ( $\frac{6}{1}$ ).  
» 19. The first pair of peræopoda. ♂ ( $\frac{30}{1}$ ).  
» 20. The dactylus of the same pair ( $\frac{120}{1}$ ).  
» 21. The second pair of peræopoda. ♂ ( $\frac{30}{1}$ ).  
» 22. » third » » » ♂ ( $\frac{16}{1}$ ).  
» 23. » fifth » » » ♂ ( $\frac{16}{1}$ ).  
» 24. The urus. ♀ ( $\frac{15}{1}$ ).

### HYPERIA GALBA.

- » 25. The male from the side ( $\frac{8}{1}$ ).  
» 26. The first pair of peræopoda. ♂ ( $\frac{42}{1}$ ).

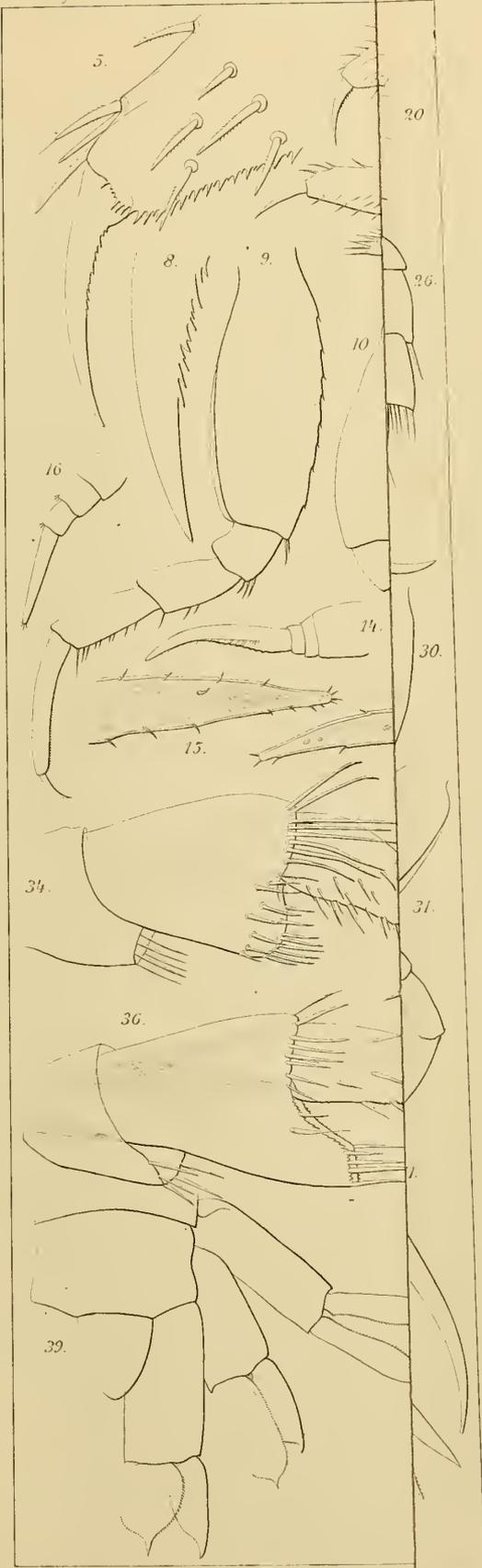
- Fig. 27. The metacarpus and dactylus of the same pair. ♂ ( $\frac{65}{1}$ ).  
» 28. The second pair of peræopoda. ♂ ( $\frac{42}{1}$ ).  
» 29. The dactylus of the same pair. ♂ ( $\frac{125}{1}$ ).  
» 30. The third pair of peræopoda. ♂ ( $\frac{16}{1}$ ).  
» 31. » sixth » » » ♀ ( $\frac{16}{1}$ ).  
» 32. The urus. ♀ ( $\frac{18}{1}$ ).

### HYPERIA SPINIGERA, ♂.

- » 33. The animal from the side ( $\frac{7}{1}$ ).  
» 34. The first pair of peræopoda ( $\frac{50}{1}$ ).  
» 35. The dactylus of the same pair ( $\frac{150}{1}$ ).  
» 36. The second pair of peræopoda ( $\frac{45}{1}$ ).  
» 37. Coupling spines from the first pair of pleopoda ( $\frac{400}{1}$ ).  
» 38. Cleft bristle from the same pair ( $\frac{200}{1}$ ).  
» 39. The urus ( $\frac{15}{1}$ ).

### HYPERIA FABREI, ♂.

- » 40. The animal from the side ( $\frac{14}{1}$ ).  
» 41. The first pair of antennæ ( $\frac{45}{1}$ ).  
» 42. The first and second joints of the flagellum of the same pair ( $\frac{180}{1}$ ).  
» 43. The second pair of antennæ ( $\frac{45}{1}$ ).  
» 44. The first pair of peræopoda ( $\frac{60}{1}$ ).  
» 45. The dactylus of the same pair ( $\frac{150}{1}$ ).  
» 46. The second pair of peræopoda ( $\frac{60}{1}$ ).  
» 47. The third » » » ( $\frac{55}{1}$ ).  
» 48. The fifth » » » ( $\frac{45}{1}$ ).  
» 49. The sixth » » » ( $\frac{45}{1}$ ).  
» 50. The seventh » » » ( $\frac{45}{1}$ ).  
» 51. The dactylus of the same pair ( $\frac{200}{1}$ ).  
» 52. The urus ( $\frac{45}{1}$ ).  
» 53. The inner ramus of the first pair of uropoda ( $\frac{100}{1}$ ).



Antennae et M. Vestierger del.

Kl. 10.

Fig. 1-



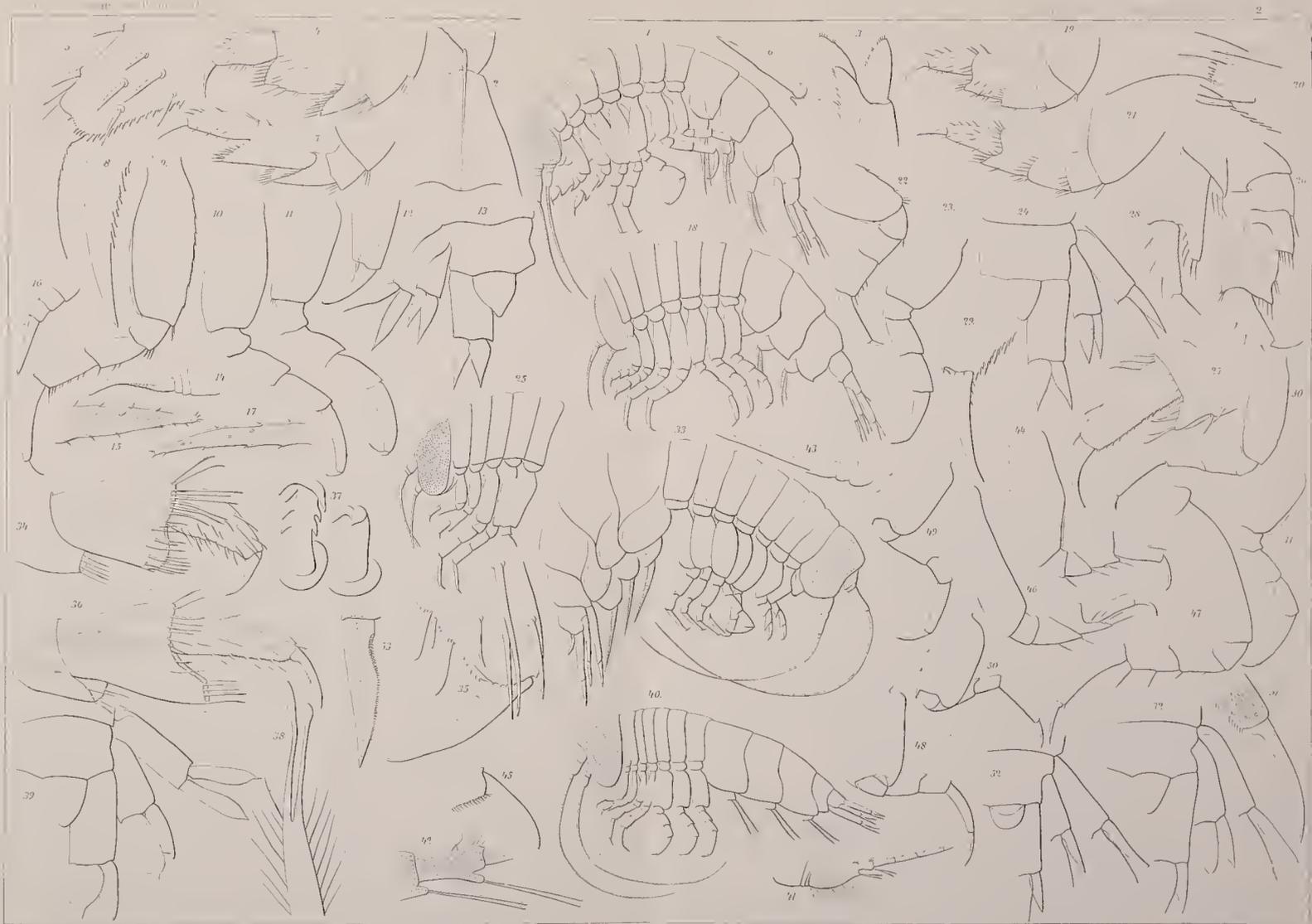


Fig. 1. Head and thorax. Fig. 2. Head and thorax. Fig. 3. Head and thorax. Fig. 4. Head and thorax. Fig. 5. Head and thorax. Fig. 6. Head and thorax. Fig. 7. Head and thorax. Fig. 8. Head and thorax. Fig. 9. Head and thorax. Fig. 10. Head and thorax. Fig. 11. Head and thorax. Fig. 12. Head and thorax. Fig. 13. Head and thorax. Fig. 14. Wing venation. Fig. 15. Wing venation. Fig. 16. Wing venation. Fig. 17. Wing venation. Fig. 18. Dorsal view of abdomen. Fig. 19. Dorsal view of abdomen. Fig. 20. Dorsal view of abdomen. Fig. 21. Dorsal view of abdomen. Fig. 22. Dorsal view of abdomen. Fig. 23. Leg. Fig. 24. Leg. Fig. 25. Leg. Fig. 26. Leg. Fig. 27. Leg. Fig. 28. Leg. Fig. 29. Leg. Fig. 30. Leg. Fig. 31. Leg. Fig. 32. Leg. Fig. 33. Terminal abdominal segments. Fig. 34. Terminal abdominal segments. Fig. 35. Terminal abdominal segments. Fig. 36. Genitalia. Fig. 37. Genitalia. Fig. 38. Genitalia. Fig. 39. Genitalia. Fig. 40. Male genitalia. Fig. 41. Male genitalia. Fig. 42. Male genitalia. Fig. 43. Female genitalia. Fig. 44. Female genitalia. Fig. 45. Female genitalia. Fig. 46. Female genitalia. Fig. 47. Female genitalia. Fig. 48. Female genitalia. Fig. 49. Detail of structure.



I. 2. PLATE XI.

HYPERIA DYSSCHISTUS, H. PROMONTORII, H. CRUCIPES, H. LATISSIMA, H. THORACICA AND HYPERIELLELLA ANTARCTICA.

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## 2. PLATE XI.

### HYPERIA DYSSCHISTUS, ♂.

- Fig. 1. The first pair of peræopoda ( $180/1$ ).  
» 2. The second » » » ( $180/1$ ).

### HYPERIA PROMONTORII, ♂.

- » 3. The animal from the side ( $15/1$ ).  
» 4. The first pair of peræopoda ( $110/1$ ).  
» 5. The dactylus of the same pair ( $220/1$ ).  
» 6. The second pair of peræopoda ( $110/1$ ).  
» 7. The fourth » » » ( $45/1$ ).  
» 8. The dactylus of the same pair ( $120/1$ ).  
» 9. The fifth pair of peræopoda ( $45/1$ ).  
» 10. Coupling spine from the first pair of pleopoda ( $600/1$ ).  
» 11. Cleft bristle » » » » » » ( $200/1$ ).  
» 12. The urus ( $40/1$ ).  
» 13. The inner ramus of the last pair of uropoda ( $120/1$ ).

### HYPERIA CRUCIPES.

- » 14. The female from the side ( $20/1$ ).  
» 15. The first pair of antennæ. ♀ ( $100/1$ ).  
» 16. The second » » » ♀ ( $100/1$ ).  
» 17. The first » » peræopoda. ♂ ( $75/1$ ).  
» 18. The dactylus of the same pair. ♂ ( $200/1$ ).  
» 19. The second pair of peræopoda. ♂ ( $75/1$ ).  
» 20. The third » » » ♀ ( $45/1$ ).  
» 21. The dactylus of the same pair. ♂ ( $175/1$ ).  
» 22. The sixth pair of peræopoda. ♂ ( $45/1$ ).  
» 23. The dactylus of the same pair. ♂ ( $200/1$ ).  
» 24. The seventh pair of peræopoda. ♀ ( $40/1$ ).  
» 25. The dactylus of the same pair. ♀ ( $250/1$ ).

### HYPERIA LATISSIMA, ♀.

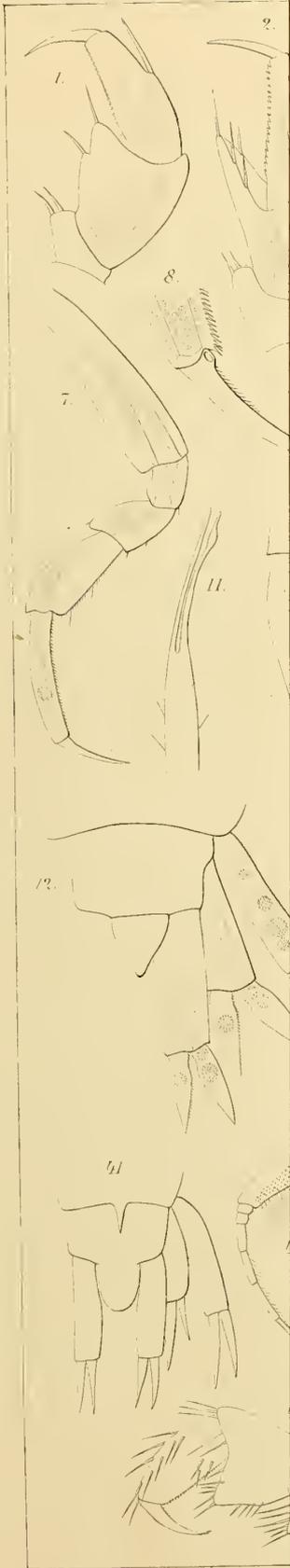
- Fig. 26. The animal from the side. ( $15/1$ ).  
» 27. The first pair of antennæ. ( $50/1$ ).  
» 28. An olfactory hair from the same pair. ( $150/1$ ).  
» 29. The second pair of antennæ ( $50/1$ ).  
» 30. The first pair of peræopoda ( $80/1$ ).  
» 31. The dactylus of the same pair ( $150/1$ ).  
» 32. The third pair of peræopoda ( $45/1$ ).  
» 33. The dactylus of the same pair ( $400/1$ ).  
» 34. The sixth pair of peræopoda ( $50/1$ ).  
» 35. The dactylus of the same pair ( $150/1$ ).  
» 36. The urus ( $45/1$ ).

### HYPERIA THORACICA, young male.

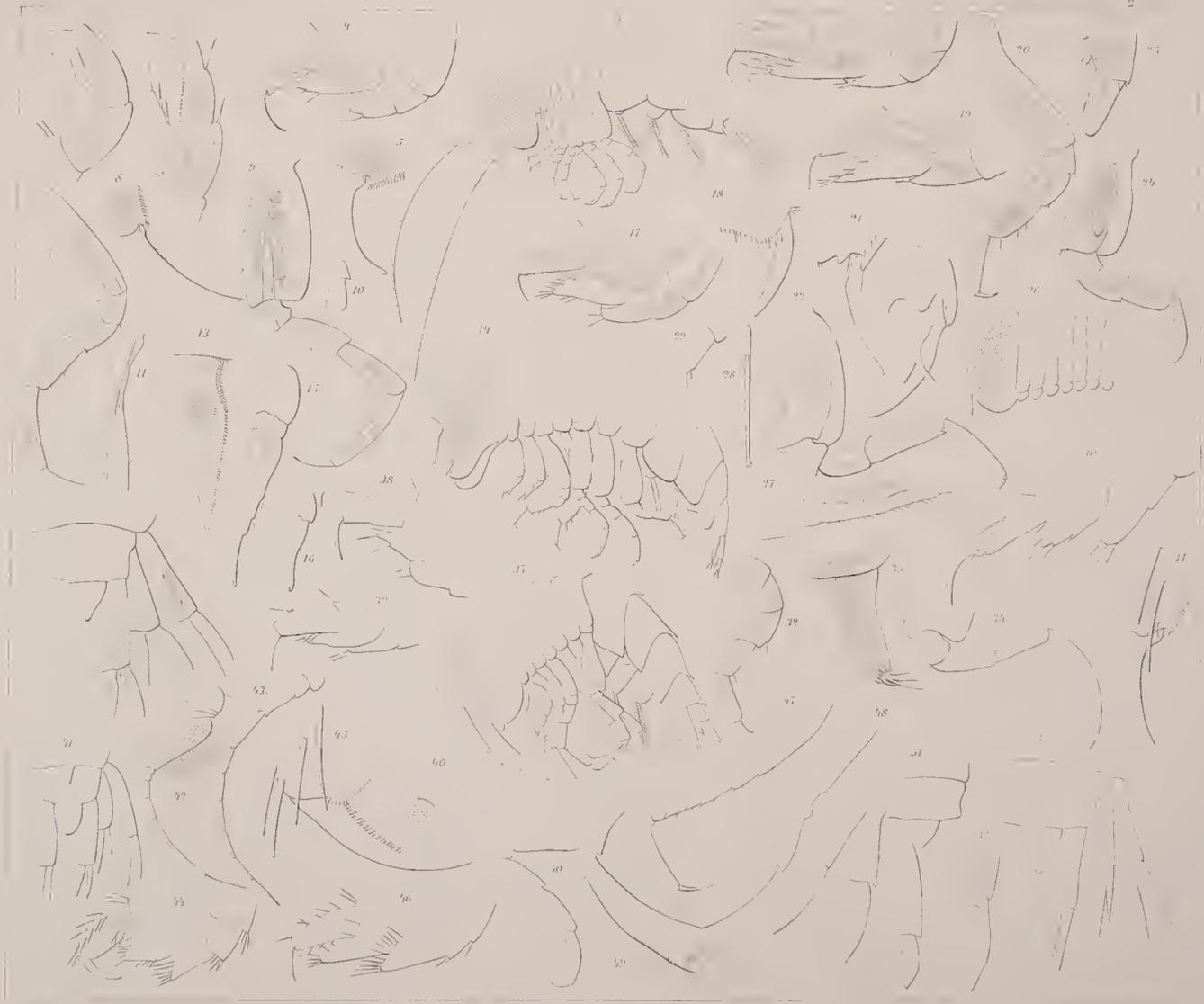
- » 37. The animal from the side ( $30/1$ ).  
» 38. The first pair of peræopoda ( $150/1$ ).  
» 39. » second » » » ( $140/1$ ).  
» 40. » third » » » ( $90/1$ ).  
» 41. The urus ( $80/1$ ).

### HYPERIELLA ANTARCTICA, ♂.

- » 42. The first pair of antennæ ( $20/1$ ).  
» 43. » second » » » ( $20/1$ ).  
» 44. » first » » peræopoda ( $40/1$ ).  
» 45. The dactylus of the same pair ( $160/1$ ).  
» 46. The second pair of peræopoda ( $40/1$ ).  
» 47. » third » » » ( $20/1$ ).  
» 48. » fifth » » » ( $20/1$ ).  
» 49. The dactylus of the same pair ( $60/1$ ).  
» 50. The sixth pair of peræopoda ( $20/1$ ).  
» 51. The urus ( $15/1$ ).









2. XII  
Parthemisto.  
Euthemisto.

I. 2. PLATE XII.

PARATHEMISTO GOËSI, P. OBLIVIA, P. JAPONICA,  
AND EUTHEMISTO COMPRESSA.

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## 2. PLATE XII.

### PARATHEMISTO GOËSI.

- Fig. 1. The female from the side ( $12/1$ ).  
» 2. The first pair of antennæ. ♀ ( $50/1$ ).  
» 3. The second » » » ♀ ( $40/1$ ).  
» 4. The first pair of peræopoda. ♀ ( $65/1$ ).  
» 5. The second » » » ♀ ( $50/1$ ).  
» 6. The third » » » ♀ ( $30/1$ ).  
» 7. The fifth » » » ♀ ( $35/1$ ).  
» 8. The dactylus of the same pair. ♀ ( $100/1$ ).  
» 9. The » » » seventh » ♀ ( $150/1$ ).  
» 10. The urus ( $35/1$ ).

### PARATHEMISTO OBLIVIA.

- » 11. The apex of the first pair of antennæ. ♀ ( $160/1$ ).  
» 12. The first pair of peræopoda. ♂ ( $50/1$ ).  
» 13. » second » » » ♂ ( $50/1$ ).  
» 14. » third » » » ♂ ( $20/1$ ).  
» 15. » fifth » » » ♂ ( $20/1$ ).  
» 16. The urus ( $25/1$ ).

### PARATHEMISTO JAPONICA.

- » 18. The female from the side ( $10/1$ ).  
» 18. The first pair of antennæ. ♀ ( $30/1$ ).  
» 19. Olfactory hairs from the same pair. ♀ ( $150/1$ ).  
» 20. The second pair of antennæ. ♀ ( $40/1$ ).  
» 21. The apex of the same pair. ♀ ( $120/1$ ).  
» 22. The labrum. ♂ ( $45/1$ ).  
» 23. The left lobe of the labium. ♂ ( $60/1$ ).  
» 24. Teeth from the same. ♂ ( $250/1$ ).  
» 25. The left mandible. ♂ ( $45/1$ ).  
» 26. A piece of the upper corner of the molar tubercle. ♂ ( $400/1$ ).

Fig. 27. A piece of the grinding surface of the same. ♂ ( $400/1$ ).

- » 28. The first pair of maxilla. ♂ ( $45/1$ ).  
» 29. The second » » » ♂ ( $45/1$ ).  
» 30. The maxillipeds. ♂ ( $45/1$ ).  
» 31. The first pair of peræopoda. ♂ ( $35/1$ ).  
» 32. The dactylus of the same pair. ♂ ( $100/1$ ).  
» 33. The second pair. ♂ ( $35/1$ ).  
» 34. The end of the carpal process of the same pair. ♂ ( $75/1$ ).  
» 35. The third pair. ♂ ( $20/1$ ).  
» 36. The dactylus of the fourth pair. ♂ ( $60/1$ ).  
» 37. The fifth pair. ♂ ( $20/1$ ).  
» 38. The dactylus of the same pair. ♂ ( $70/1$ ).  
» 39. The carpus and metacarpus of the sixth pair. ♀ ( $100/1$ ).  
» 40. The dactylus of the sixth pair. ♀ ( $75/1$ ).  
» 41. The » » » » » ♂ ( $70/1$ ).  
» 42. The seventh pair. ♂ ( $15/1$ ).  
» 43. The urus ( $20/1$ ).  
» 44. The first pair of antennæ. ♂ ( $12/1$ ).  
» 45. The second » » » ♂ ( $12/1$ ).

### EUTHEMISTO COMPRESSA.

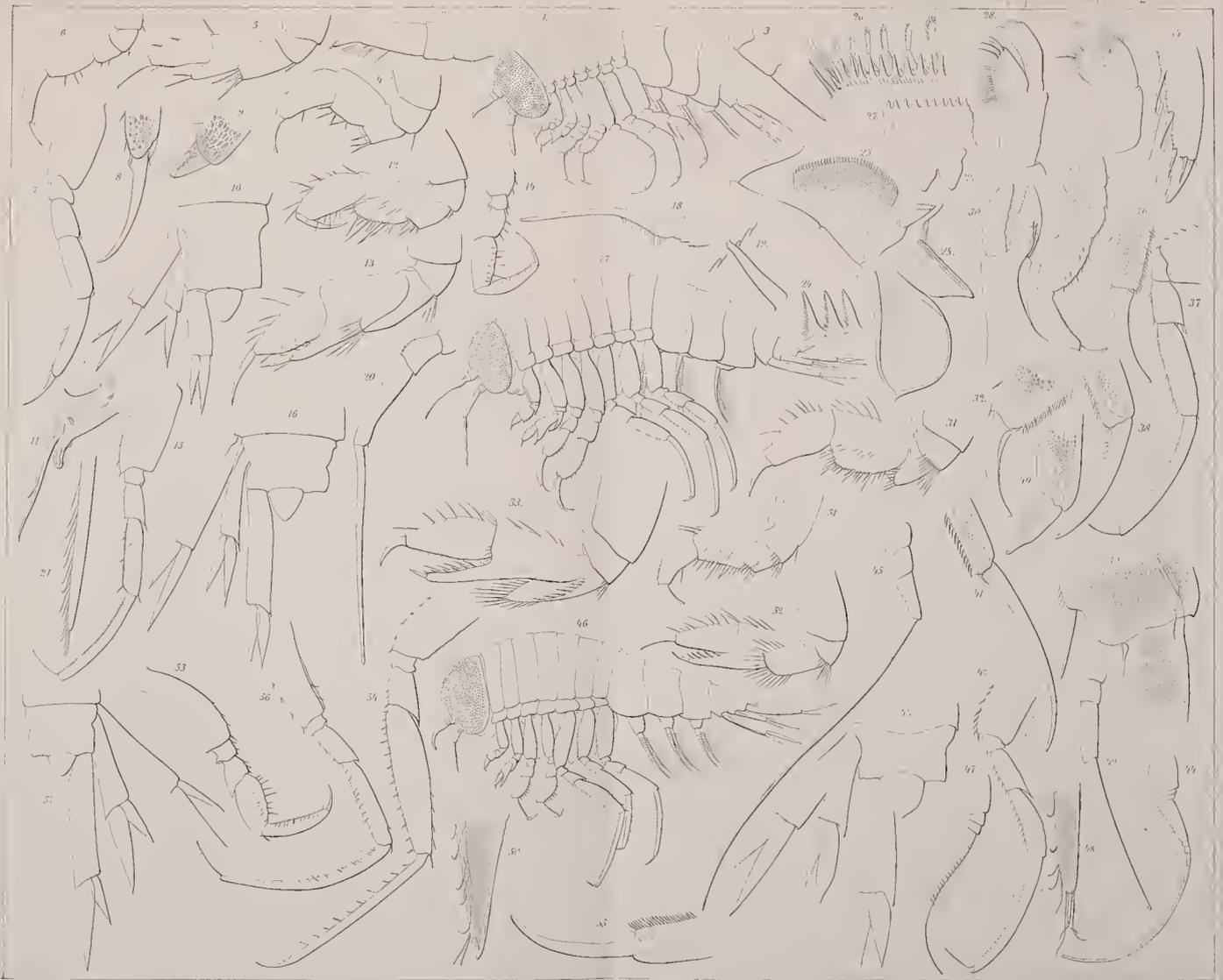
- » 46. The female from the side ( $8/1$ ).  
» 47. The first pair of antennæ. ♀ ( $40/1$ ).  
» 48. The apex of the same pair. ♀ ( $150/1$ ).  
» 49. The second pair of antennæ. ♀ ( $40/1$ ).  
» 50. The apex of the same pair. ♀ ( $220/1$ ).  
» 51. The first pair of peræopoda. ♀ ( $40/1$ ).  
» 52. The second » » » ♀ ( $40/1$ ).  
» 53. The third » » » ♀ ( $15/1$ ).  
» 54. The fifth » » » ♀ ( $20/1$ ).  
» 55. The dactylus of the same pair. ♀ ( $75/1$ ).  
» 56. The seventh pair of peræopoda. ♀ ( $20/1$ ).  
» 57. The urus. ♀ ( $20/1$ ).



Inutor et A. J. Westergren del.

Fig. 1-11





*Phyllotreta*

1. Labrum, 2. Labrum, 3. Labrum, 4. Labrum, 5. Labrum, 6. Labrum, 7. Labrum, 8. Labrum, 9. Labrum, 10. Labrum, 11. Labial palpus, 12. Labial palpus, 13. Labial palpus, 14. Labial palpus, 15. Labial palpus, 16. Labial groove, 17. Labial groove, 18. Labial groove, 19. Labial groove, 20. Labial groove, 21. Labium, 22. Labium, 23. Labium, 24. Labium, 25. Labium, 26. Labial palpus, 27. Labial palpus, 28. Labial palpus, 29. Labial palpus, 30. Labial palpus, 31. Labial palpus, 32. Labial palpus, 33. Labial palpus, 34. Labial palpus, 35. Labial palpus, 36. Labial palpus, 37. Labial palpus, 38. Labial palpus, 39. Labial palpus, 40. Labial palpus, 41. Labial palpus, 42. Labial palpus, 43. Labial palpus, 44. Labial palpus, 45. Labial palpus, 46. Labial palpus, 47. Labial palpus, 48. Labial palpus, 49. Labial palpus, 50. Labial palpus, 51. Labial palpus, 52. Labial palpus, 53. Labial palpus, 54. Labial palpus, 55. Labial palpus, 56. Labial palpus, 57. Labial palpus, 58. Labial palpus, 59. Labial palpus, 60. Labial palpus, 61. Labial palpus, 62. Labial palpus, 63. Labial palpus, 64. Labial palpus, 65. Labial palpus, 66. Labial palpus, 67. Labial palpus, 68. Labial palpus.



**2. XIII**  
**Euthemisto.**  
**Themistella.**

**I. 2. PLATE XIII.**

**EUTHEMISTO LIBELLULA, E. COMPRESSA, E. GAUDICHAUDII,**  
**AND THEMISTELLA STEENSTRUPI.**

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## 2. PLATE XIII.

### EUTHEMISTO LIBELLULA.

- Fig. 1. The flagellum of the first pair of antennæ. ♀ ( $\frac{20}{1}$ ).  
 » 2. A piece of the upper margin of the same. ♀ ( $\frac{80}{1}$ ).  
 » 3. A piece of the under " " " " ♀ ( $\frac{80}{1}$ ).  
 » 4. The apex of the first pair of antennæ in a young female ( $\frac{30}{1}$ ).  
 » 5. The apex of the second pair of antennæ. ♀ ( $\frac{30}{1}$ ).  
 » 6. The labrum. ♂ ( $\frac{12}{1}$ ).  
 » 7. The left mandible. ♂ ( $\frac{12}{1}$ ).  
 » 8. The apex of the same. ♂ ( $\frac{35}{1}$ ).  
 » 9. The incisive lamina of the same. ♂ ( $\frac{25}{1}$ ).  
 » 10. A piece of the margin of the molar tubercle. ♂ ( $\frac{200}{1}$ ).  
 » 11. A tooth from the same margin. ♂ ( $\frac{600}{1}$ ).  
 » 12. The apex of the last joint in the mandibular palp. ( $\frac{30}{1}$ ).  
 » 13. The first pair of maxillæ. ♂ ( $\frac{12}{1}$ ).  
 » 14. The apex of the secondary lamina of the same pair. ♂ ( $\frac{40}{1}$ ).  
 » 15. The second pair of maxillæ. ♂ ( $\frac{12}{1}$ ).  
 » 16. The apex of the secondary lamina of the same pair. ♂ ( $\frac{50}{1}$ ).  
 » 17. The maxillipeds seen from behind. ♂ ( $\frac{12}{1}$ ).  
 » 18. A piece of inner margin of the left lateral lamina in the maxillipeds. ♂ ( $\frac{75}{1}$ ).  
 » 19. The maxillipeds from the inner side. ♂ ( $\frac{12}{1}$ ).  
 » 20. The maxillipeds from the side. ♂ ( $\frac{12}{1}$ ).  
 » 21. The apex of the median lobe in the maxillipeds. ♂ ( $\frac{25}{1}$ ).  
 » 22. Branchial sack and ovitatrix from the fifth pair of peræopoda. ♀ ( $\frac{16}{1}$ ).  
 » 23. The first pair of peræopoda. ♂ ( $\frac{9}{1}$ ).  
 » 24. The third " " " Young ♂ ( $\frac{30}{1}$ ).  
 » 25. The fifth " " " ♂ ( $\frac{5}{1}$ ).  
 » 26. The dactylus of the same pair. ♂ ( $\frac{35}{1}$ ).  
 » 27. The fifth pair of peræopoda. Young ♂ ( $\frac{30}{1}$ ).  
 » 28. The dactylus of the same pair. Young ♂ ( $\frac{100}{1}$ ).  
 » 29. The seventh pair of peræopoda. Young ♂ ( $\frac{30}{1}$ ).  
 » 30. The first pair of pleopoda. ♂ ( $\frac{9}{1}$ ).  
 » 31. The urus. Young ♂ ( $\frac{25}{1}$ ).

### EUTHEMISTO COMPRESSA.

- » 32. The apex of the second pair of antennæ. ♂ ( $\frac{30}{1}$ ).  
 » 33. The first pair of peræopoda. ♂ ( $\frac{30}{1}$ ).

- Fig. 34. The apex of the carpal process in the second pair. ♂ ( $\frac{120}{1}$ ).  
 » 35. The hind margin of the carpus in the third pair. ♂ ( $\frac{100}{1}$ ).  
 » 36. A piece of the metacarpus in the same pair. ♂ ( $\frac{120}{1}$ ).  
 » 37. The fifth pair of peræopoda. ♂ ( $\frac{15}{1}$ ).  
 » 38. A piece of the front margin of the carpus in same pair. ♂ ( $\frac{60}{1}$ ).  
 » 39. The dactylus in the same pair. ♂ ( $\frac{45}{1}$ ).  
 » 40. The seventh pair of peræopoda. ♂ ( $\frac{15}{1}$ ).  
 » 41. A piece of the front margin of the carpus in the same pair. ♂ ( $\frac{45}{1}$ ).  
 » 42. A piece of the front margin of the metacarpus in the same pair. ♂ ( $\frac{45}{1}$ ).  
 » 43. The urus. ♂ ( $\frac{12}{1}$ ).

### EUTHEMISTO GAUDICHAUDII.

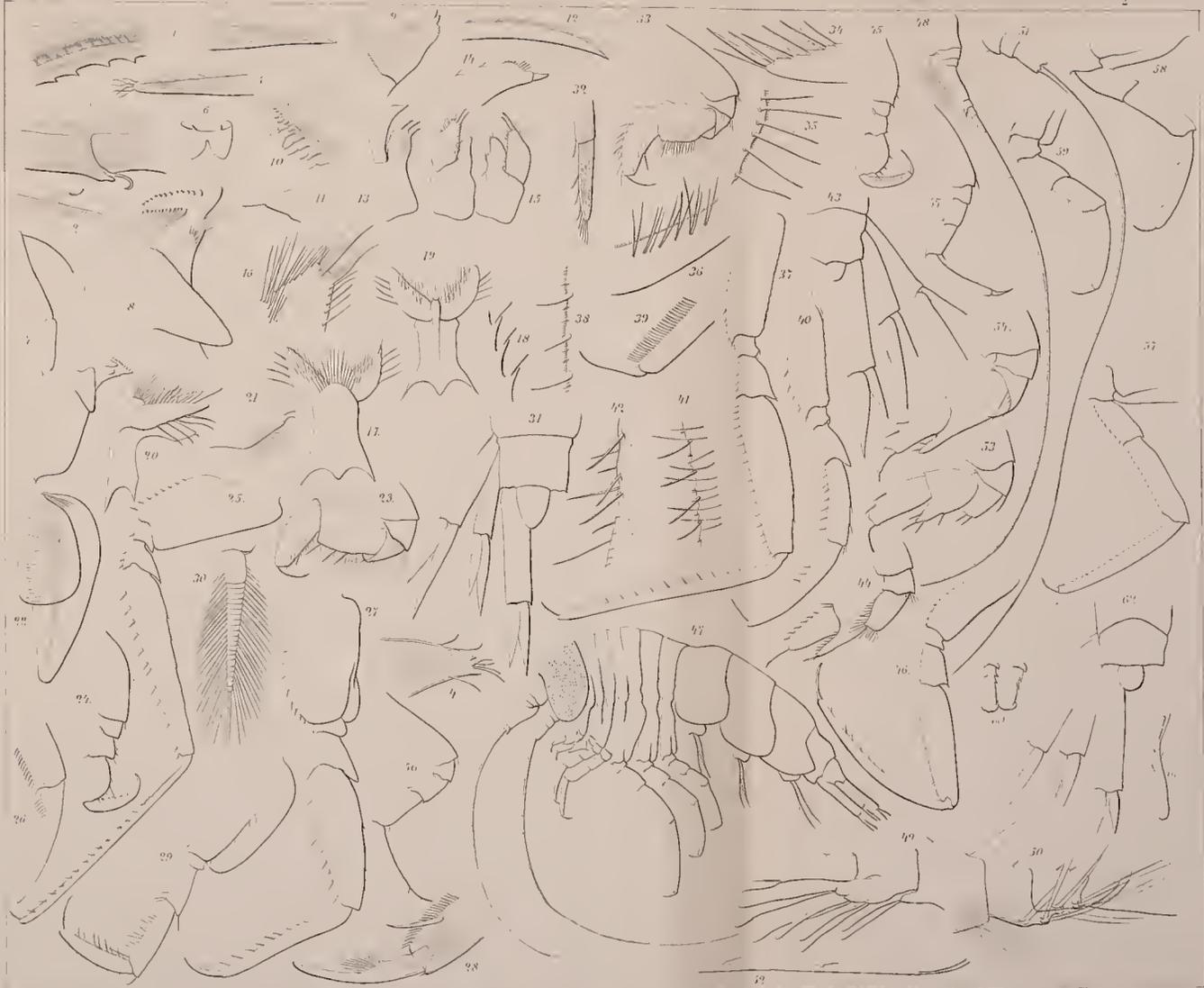
- » 44. The second pair of peræopoda. ♂ ( $\frac{20}{1}$ ).  
 » 45. The third " " " ♂ ( $\frac{10}{1}$ ).  
 » 46. The fifth " " " ♂ ( $\frac{10}{1}$ ).

### THEMISTELLA STEENSTRUPI.

- » 47. The male from the side ( $\frac{18}{1}$ ).  
 » 48. The first pair of antennæ. ♂ ( $\frac{35}{1}$ ).  
 » 49 and 50. The second and third flagellar joints in the same pair. ♂ ( $\frac{250}{1}$ ).  
 » 51. The second pair of antennæ. ♂ ( $\frac{35}{1}$ ).  
 » 52. The apex of the same pair. ♂ ( $\frac{150}{1}$ ).  
 » 53. The first pair of peræopoda. ♂ ( $\frac{100}{1}$ ).  
 » 54. The second " " " ♂ ( $\frac{100}{1}$ ).  
 » 55. The third " " " ♂ ( $\frac{35}{1}$ ).  
 » 56. The fourth " " " ♂ ( $\frac{35}{1}$ ).  
 » 57. The fifth " " " ♂ ( $\frac{35}{1}$ ).  
 » 58. The sixth " " " ♂ ( $\frac{35}{1}$ ).  
 » 59. The seventh " " " ♂ ( $\frac{35}{1}$ ).  
 » 60. Coupling spines from the first pair of pleopoda. ♂ ( $\frac{700}{1}$ ).  
 » 61. The cleft bristle from the same pair. ♂ ( $\frac{350}{1}$ ).  
 » 62. The urus. ♂ ( $\frac{40}{1}$ ).









I. 2. PLATE XIV.

PHRONIMOPSIS SARSI, AND PH. SPINIFERA.

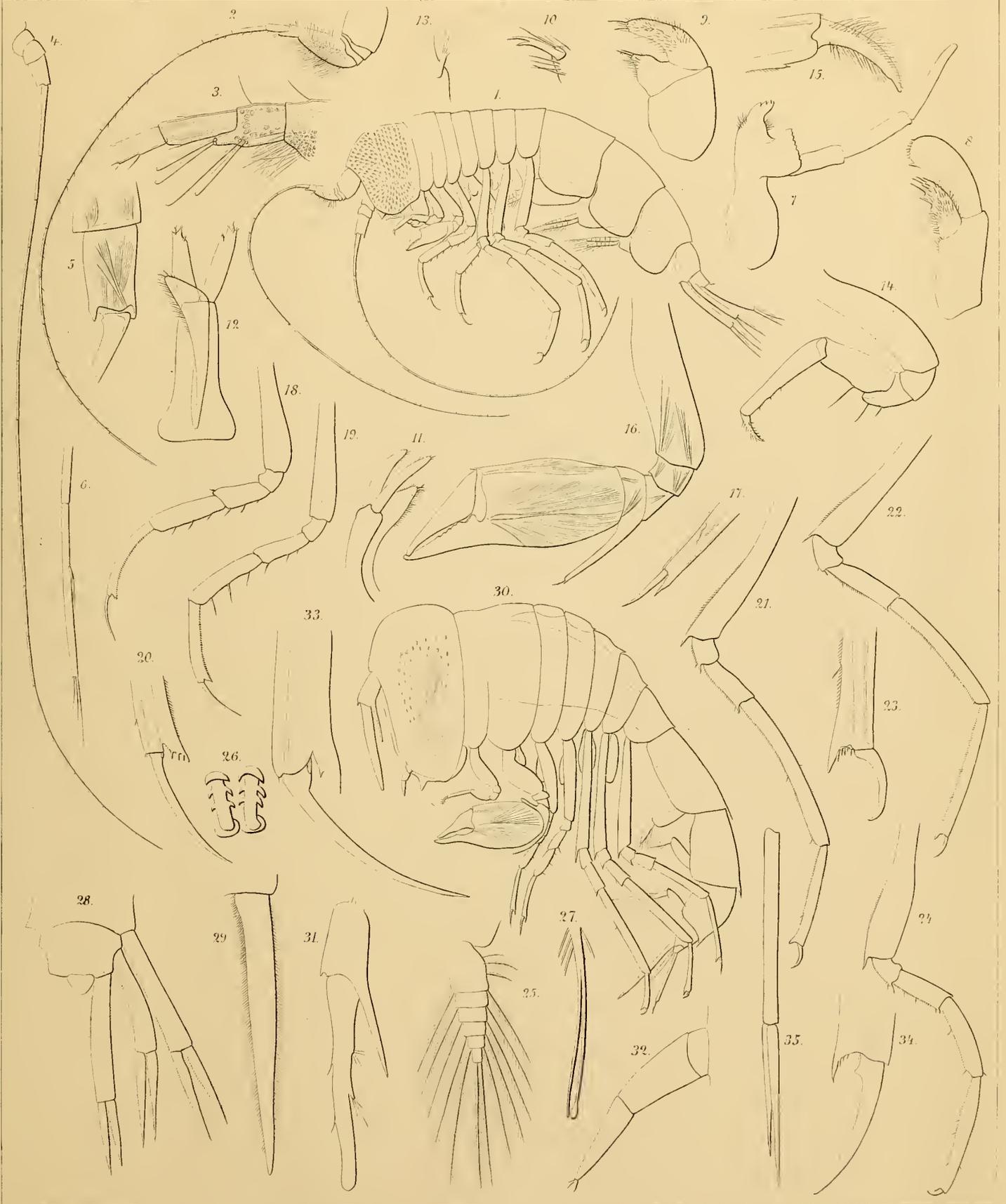
## 2. PLATE XIV.

### PHRONIMOPSIS SARSI, ♂.

- Fig. 1. The animal from the side ( $18/1$ ).  
» 2. The first pair of antennæ ( $40/1$ ).  
» 3. The second and third flagellar joints of the same pair ( $150/1$ ).  
» 4. The second pair of antennæ ( $40/1$ ).  
» 5. The last peduncular joint of the same pair ( $120/1$ ).  
» 6. The last flagellar » » » » » ( $150/1$ ).  
» 7. The right mandible ( $100/1$ ).  
» 8. The first pair of maxillæ ( $100/1$ ).  
» 9. The second » » » ( $100/1$ ).  
» 10. The end of the principal lamina of the same pair ( $350/1$ ).  
» 11. The maxillipeds from the left side ( $100/1$ ).  
» 12. The » » » inner » ( $100/1$ ).  
» 13. A spine from the apex of the left lamina of the same ( $450/1$ ).  
» 14. The first pair of peræopoda ( $90/1$ ).  
» 15. The dactylus of the same pair ( $300/1$ ).  
» 16. The second pair of peræopoda ( $90/1$ ).  
» 17. The end of the tibial process of the same pair ( $250/1$ ).  
» 18. The third pair of peræopoda ( $40/1$ ).  
» 19. The fourth » » » ( $40/1$ ).  
» 20. The dactylus of the same pair ( $100/1$ ).  
» 21. The fifth pair of peræopoda ( $40/1$ ).  
» 22. The sixth » » » ( $40/1$ ).  
» 23. The dactylus of the same pair ( $100/1$ ).  
» 24. The seventh pair of peræopoda ( $40/1$ ).  
» 25. The outer ramus of the first pair of pleopoda ( $70/1$ ).  
» 26. Coupling spines from the first pair of pleopoda ( $700/1$ ).  
» 27. The cleft bristle from the same pair ( $400/1$ ).  
» 28. The urus ( $40/1$ ).  
» 29. The outer ramus of the first pair of uropoda ( $120/1$ ).

### PHRONIMOPSIS SPINIFERA, ♀.

- » 30. The animal from the side ( $25/1$ ).  
» 31. The first pair of antennæ ( $60/1$ ).  
» 32. The second » » » ( $175/1$ ).  
» 33. The dactylus of the fourth pair of peræopoda ( $350/1$ ).  
» 34. The » » » seventh » » » ( $250/1$ ).  
» 35. The third pair of uropoda ( $130/1$ ).
-



Aut. 1895

Fig. 1-29. *Phronimopsis Garsni*. 30-35. *Phronimopsis spinifera*



I. 2. PLATE XV.

DAIRELLA LATISSIMA, AND D. CALIFORNICA.

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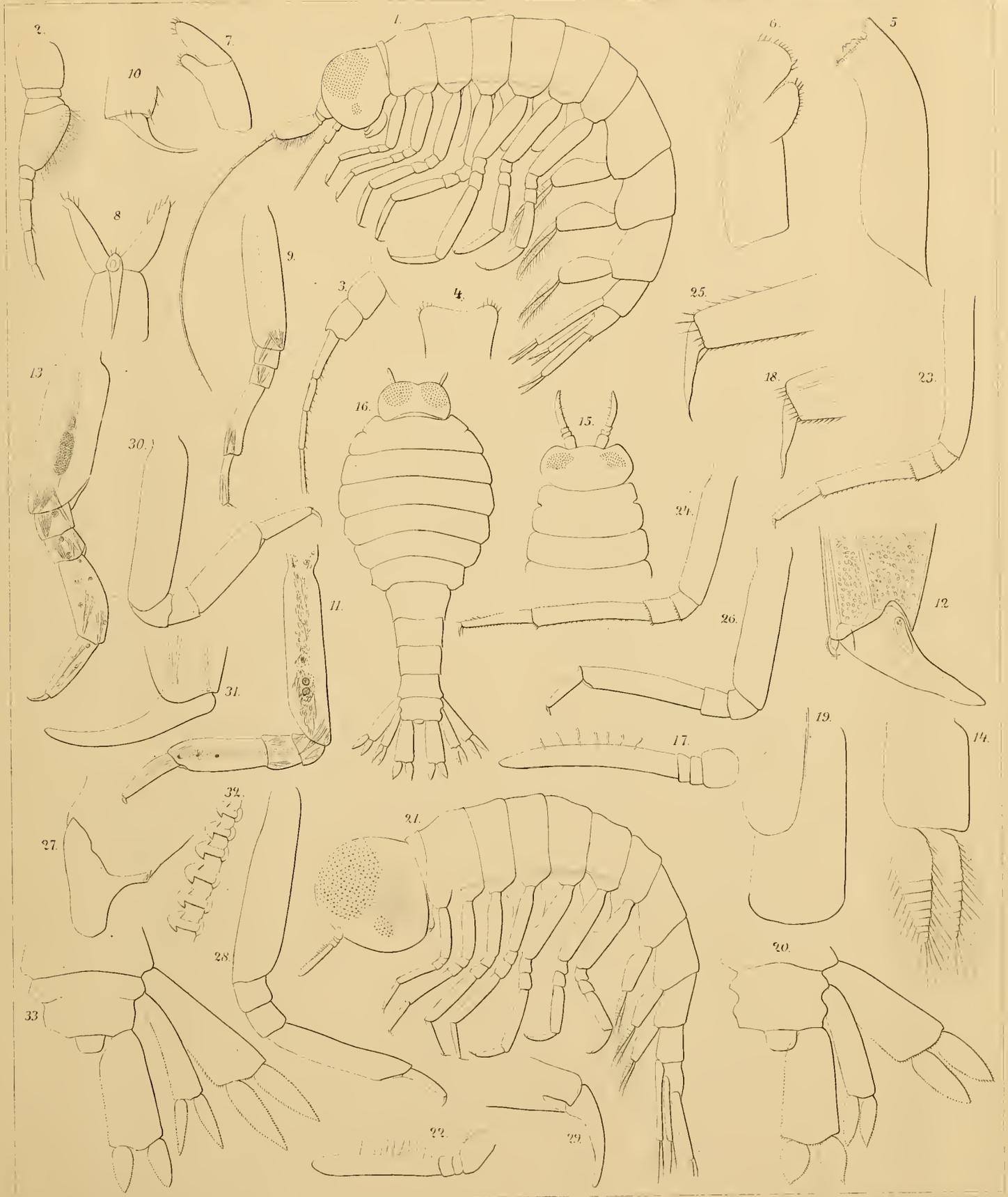
## 2. PLATE XV.

### DAIRELLA LATISSIMA.

- Fig. 1. The male from the side ( $12/1$ ).  
» 2. The first pair of antennæ. ♂ ( $25/1$ ).  
» 3. The second » » » ♂ ( $50/1$ ).  
» 4. The labrum. ♂ ( $120/1$ ).  
» 5. The right mandible. ♂ ( $120/1$ ).  
» 6. The first pair of maxillæ. ♂ ( $120/1$ ).  
» 7. The second » » » ♂ ( $120/1$ ).  
» 8. The maxillipeds from the inner side. ♂ ( $120/1$ ).  
» 9. The first pair of peræopoda. ♂ ( $30/1$ ).  
» 10. The dactylus of the same pair. ♂ ( $110/1$ ).  
» 11. The fourth pair of peræopoda. ♂ ( $30/1$ ).  
» 12. The dactylus of the same pair. ♂ ( $350/1$ ).  
» 13. The seventh pair of peræopoda. ♂ ( $30/1$ ).  
» 14. The first pair of pleopoda. ♂ ( $30/1$ ).  
» 15. The head and the first three peræonal segments of a young male. ( $24/1$ ).  
» 16. The female from above ( $10/1$ ).  
» 17. The first pair of antennæ. ♀ ( $80/1$ ).  
» 18. The dactylus of the first pair of peræopoda. ♀ ( $110/1$ ).  
» 19. Branchial vesicle and ovitatrix from the third pair of peræopoda ( $25/1$ ).  
» 20. The urus. ♀ ( $25/1$ ).

### DAIRELLA CALIFORNICA.

- » 21. The female from the side ( $12/1$ ).  
» 22. The first pair of antennæ. ♀ ( $30/1$ ).  
» 23. The first pair of peræopoda. ♀ ( $30/1$ ).  
» 24. The second » » » ♀ ( $20/1$ ).  
» 25. The dactylus of the same pair. ♀ ( $100/1$ ).  
» 26. The third pair of peræopoda. ♀ ( $25/1$ ).  
» 27. The dactylus of the same pair. ♀ ( $300/1$ ).  
» 28. The fifth pair of peræopoda. ♀ ( $25/1$ ).  
» 29. The dactylus of the same pair. ♀ ( $200/1$ ).  
» 30. The seventh pair of peræopoda. ♀ ( $25/1$ ).  
» 31. The dactylus of the same pair. ♀ ( $260/1$ ).  
» 32. Coupling spines from the first pair of pleopoda. ♀ ( $600/1$ ).  
» 33. The urus. ♀ ( $24/1$ ).
-



Quater del.

Ed. A. S. La. 1850. 10. 10.

Fig. 1-20. *Damella latissima*. 21-33. *Tareta albifrons*.



2. XVI  
Phronima.  
Phronimella.

I. 2. PLATE XVI.

PHRONIMA SEDENTARIA, PHRONIMA SOLITARIA, PHRONIMA SPI-  
NOSA, PHRONIMA ATLANTICA, PHRONIMA COLLETTI, PHRONIMA  
PACIFICA, AND PHRONIMELLA FILIFORMIS.

---

## 2. PLATE XVI.

### PHRONIMA SEDENTARIA.

- Fig. 1. The first pair of peræopoda. ♀ ( $\frac{12}{1}$ ).  
» 2. The second » » » ♀ ( $\frac{12}{1}$ ).  
» 3. The fifth » » » ♀ ( $\frac{9}{1}$ ).

### PHRONIMA SOLITARIA.

- » 4. The female from the side ( $\frac{5}{1}$ ).  
» 5. The first pair of peræopoda. ♀ ( $\frac{25}{1}$ ).  
» 6. The fifth pair » » ♀ ( $\frac{12}{1}$ ).  
» 7. The urus. ♀ ( $\frac{20}{1}$ ).

### PHRONIMA SPINOSA.

- » 8. The female from the side ( $\frac{5}{1}$ ).  
» 9. The first pair of antennæ. ♀ ( $\frac{45}{1}$ ).  
» 10. The first pair of peræopoda. ♀ ( $\frac{20}{1}$ ).  
» 11. The second » » » ♀ ( $\frac{20}{1}$ ).  
» 12. The dactylus of the same pair. ♀ ( $\frac{300}{1}$ ).  
» 13. The fourth pair of peræopoda. ♀ ( $\frac{12}{1}$ ).  
» 14. The dactylus of the same pair. ♀ ( $\frac{130}{1}$ ).  
» 15. The fifth pair of peræopoda. ♀ ( $\frac{12}{1}$ ).  
» 16. The sixth » » » ♀ ( $\frac{12}{1}$ ).  
» 17. The seventh » » » ♀ ( $\frac{12}{1}$ ).  
» 18. The urus. ♀ ( $\frac{20}{1}$ ).

### PHRONIMA ATLANTICA.

- » 19. The female from the side ( $\frac{5}{1}$ ).  
» 20. A young recently hatched ( $\frac{50}{1}$ ).  
» 21. The first pair of antennæ. ♀ ( $\frac{25}{1}$ ).  
» 22. The first pair of peræopoda. ♀ ( $\frac{20}{1}$ ).  
» 23. The dactylus of the same pair. ♀ ( $\frac{170}{1}$ ).  
» 24. The fifth pair of peræopoda. ♀ ( $\frac{10}{1}$ ).  
» 25. The seventh » » » ♀ ( $\frac{15}{1}$ ).  
» 26. The urus. ♀ ( $\frac{20}{1}$ ).

### PHRONIMA COLLETTI.

- » 27. The male from the side ( $\frac{6}{1}$ ).  
» 28. The first pair of antennæ. ♂ ( $\frac{15}{1}$ ).  
» 29. The second » » » ♂ ( $\frac{25}{1}$ ).  
» 30. The labrum. ♂ ( $\frac{50}{1}$ ).  
» 31. The right mandible. ♂ ( $\frac{50}{1}$ ).

- Fig. 32. The apex of the same. ♂ ( $\frac{150}{1}$ ).  
» 33. The labrum. ♂ ( $\frac{50}{1}$ ).  
» 34. The first pair of maxillæ. ♂ ( $\frac{50}{1}$ ).  
» 35. The secondary lamina of the same pair. ♂ ( $\frac{100}{1}$ ).  
» 36. The second pair of maxillæ. ♂ ( $\frac{50}{1}$ ).  
» 37. The maxillipeds from the inner side. ♂ ( $\frac{50}{1}$ ).  
» 38. » » » right side. ♂ ( $\frac{50}{1}$ ).  
» 39. The first pair of peræopoda. ♂ ( $\frac{25}{1}$ ).  
» 40. The second » » » ♂ ( $\frac{25}{1}$ ).  
» 41. The fifth » » » ♂ ( $\frac{15}{1}$ ).  
» 42. The seventh » » » ♂ ( $\frac{20}{1}$ ).  
» 43. The urus. ♂ ( $\frac{15}{1}$ ).  
» 44. The female from the side ( $\frac{6}{1}$ ).  
» 45. The first pair of antennæ. ♀ ( $\frac{35}{1}$ ).  
» 46. The dactylus of the second pair of peræopoda. ♀ ( $\frac{80}{1}$ ).  
» 47. The fifth pair of peræopoda. ♀ ( $\frac{15}{1}$ ).

### PHRONIMA PACIFICA.

- » 48. The male from the side ( $\frac{12}{1}$ ).  
» 49. The fifth pair of peræopoda. ♂ ( $\frac{30}{1}$ ).  
» 50. The urus. ♂ ( $\frac{40}{1}$ ).  
» 51. A young ( $\frac{150}{1}$ ).

### PHRONIMELLA ELONGATA.

- » 52. The female from the side ( $\frac{5}{1}$ ).  
» 53. The first pair of antennæ. ♀ ( $\frac{80}{1}$ ).  
» 54. The first pair of peræopoda. ♀ ( $\frac{20}{1}$ ).  
» 55. The second » » » ♀ ( $\frac{20}{1}$ ).  
» 56. The fifth » » » ♀ ( $\frac{15}{1}$ ).  
» 57. The urus. ♀ ( $\frac{25}{1}$ ).  
» 58. The first pair of antennæ. ♂ ( $\frac{35}{1}$ ).  
» 59. The second » » » ♂ ( $\frac{60}{1}$ ).  
» 60. The apex of the left mandible. ♂ ( $\frac{150}{1}$ ).  
» 61. The first pair of maxillæ. ♂ ( $\frac{80}{1}$ ).  
» 62. The second » » » ♂ ( $\frac{100}{1}$ ).  
» 63. The maxillipeds. ♂ ( $\frac{50}{1}$ ).  
» 64. The dactylus of the second pair of peræopoda. ♂ ( $\frac{250}{1}$ ).  
» 65. The apex of the third pair of peræopoda. ♂ ( $\frac{150}{1}$ ).  
» 66. Coupling spines from the first pair of pleopoda. ♂ ( $\frac{800}{1}$ ).  
» 67. The urus. ♂ ( $\frac{45}{1}$ ).

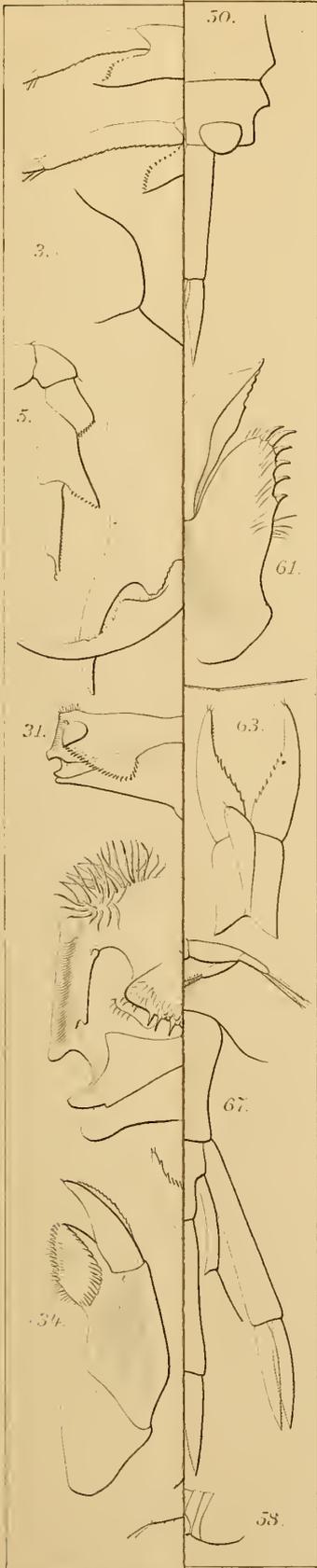
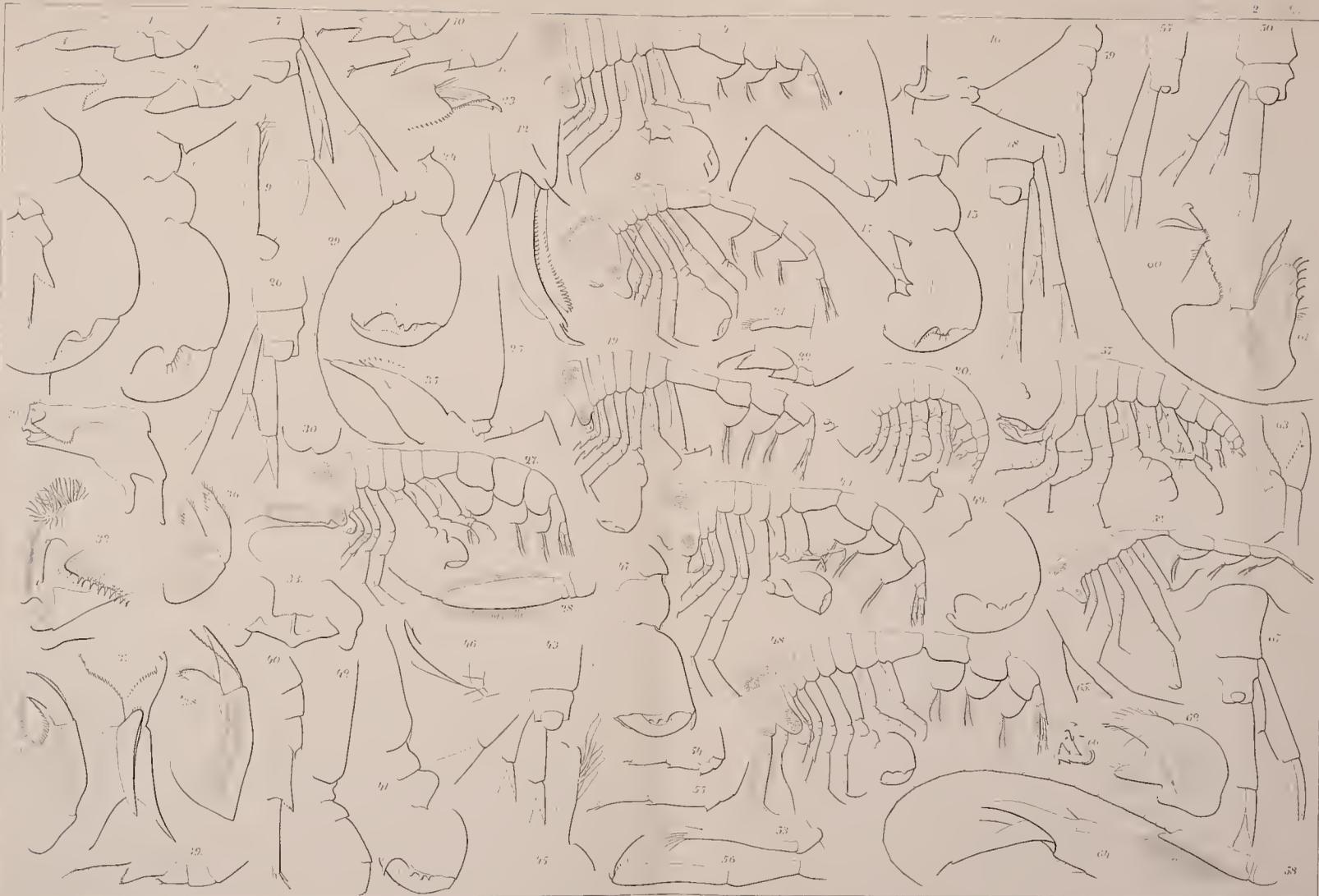


PLATE XVI.  
MOUTH PARTS.







**2. XVII**  
**Anchylomera.**  
**Euprimno.**

**I. 2. PLATE XVII.**

**ANCHYLOMERA BLOSSEVILLEI, AND EUPRIMNO MACROPUS.**

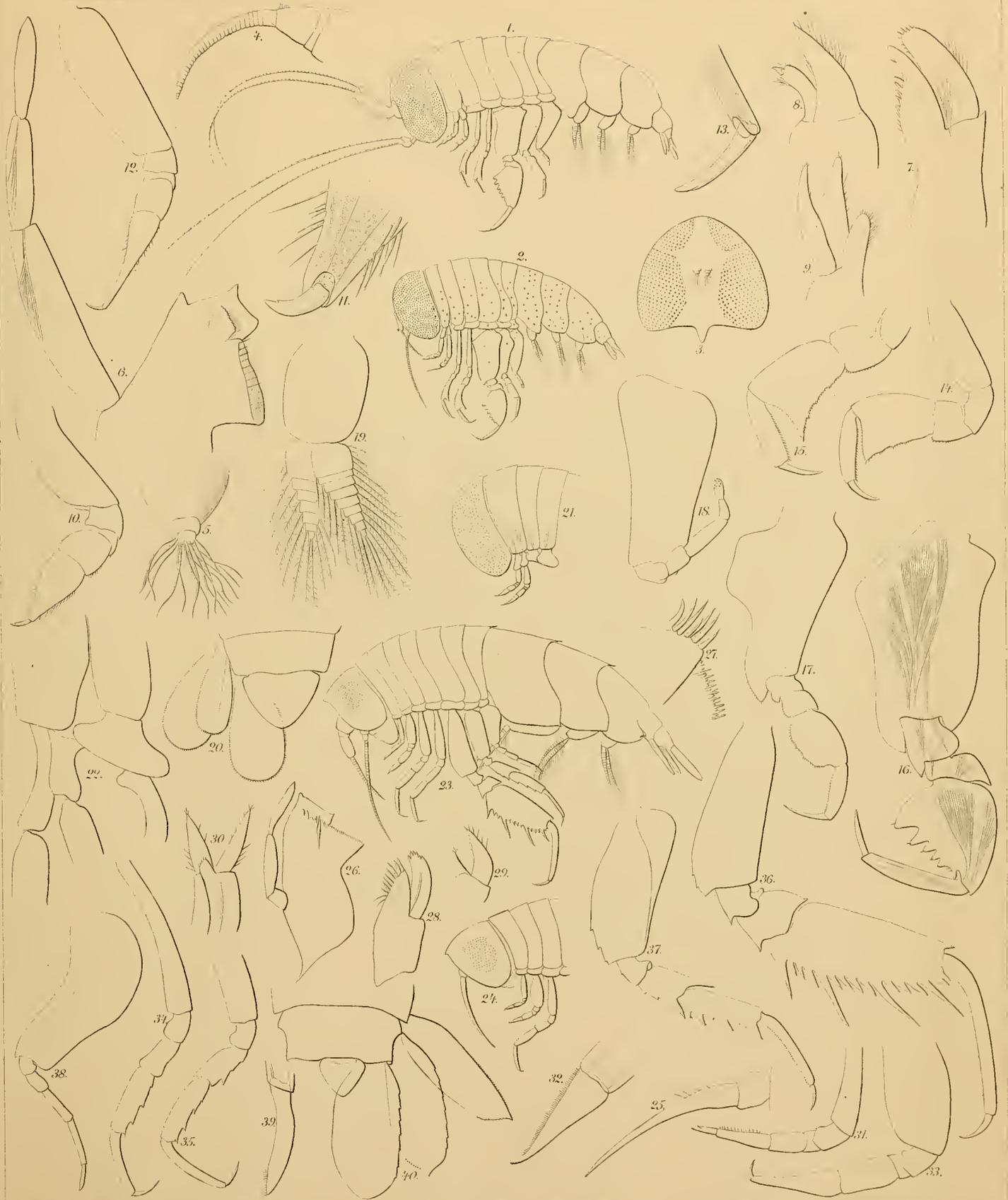
## 2. PLATE XVII.

### ANCHYLOMERA BLOSSEVILLEI.

- Fig. 1. The male from the side ( $\frac{6}{1}$ ).  
» 2. A young male from the side ( $\frac{10}{1}$ ).  
» 3. The head of a female, front view ( $\frac{5}{1}$ ).  
» 4. The first pair of antennæ of a young male ( $\frac{50}{1}$ ).  
» 5. The » » » » » female ( $\frac{40}{1}$ ).  
» 6. The left mandible. ♂ ( $\frac{170}{1}$ ).  
» 7. The first pair of maxillæ. ♂ ( $\frac{100}{1}$ ).  
» 8. The second » » » ♂ ( $\frac{100}{1}$ ).  
» 9. The maxillipeds from the side. ♂ ( $\frac{100}{1}$ ).  
» 10. The first pair of peræopoda. ♂ ( $\frac{40}{1}$ ).  
» 11. The dactylus of the same pair. ♂ ( $\frac{120}{1}$ ).  
» 12. The second pair of peræopoda. ♂ ( $\frac{40}{1}$ ).  
» 13. The dactylus of the same pair. ♂ ( $\frac{150}{1}$ ).  
» 14. The third pair of peræopoda. ♂ ( $\frac{20}{1}$ ).  
» 15. The fourth » » » ♂ ( $\frac{20}{1}$ ).  
» 16. The fifth » » » ♂ ( $\frac{20}{1}$ ).  
» 17. The sixth » » » ♂ ( $\frac{20}{1}$ ).  
» 18. The seventh » » » ♂ ( $\frac{20}{1}$ ).  
» 19. The first » » pleopoda. ♂ ( $\frac{20}{1}$ ).  
» 20. The urus. ♂ ( $\frac{18}{1}$ ).  
» 21. The head of a young female from the side ( $\frac{12}{1}$ ).  
» 22. The epimerals of the first three pairs of peræopoda. ♂ ( $\frac{25}{1}$ ).

### EUPRIMNO MACROPUS.

- » 23. The male from the side ( $\frac{8}{1}$ ).  
» 24. The forepart of the body of the female, from the side ( $\frac{8}{1}$ ).  
» 25. The first pair of antennæ. ♀ ( $\frac{18}{1}$ ).  
» 26. The left mandible. ♂ ( $\frac{72}{1}$ ).  
» 27. The molar tubercle of the same. ♂ ( $\frac{700}{1}$ ).  
» 28. The first pair of maxillæ. ♂ ( $\frac{72}{1}$ ).  
» 29. The second » » » ♂ ( $\frac{72}{1}$ ).  
» 30. The maxillipeds. ♂ ( $\frac{72}{1}$ ).  
» 31. The first pair of peræopoda. ♂ ( $\frac{35}{1}$ ).  
» 32. The dactylus of the same pair. ♂ ( $\frac{160}{1}$ ).  
» 33. The second pair of peræopoda. ♂ ( $\frac{35}{1}$ ).  
» 34. The third » » » ♂ ( $\frac{25}{1}$ ).  
» 35. The fourth » » » ♂ ( $\frac{25}{1}$ ).  
» 36. The fifth » » » ♂ ( $\frac{18}{1}$ ).  
» 37. The sixth » » » ♂ ( $\frac{18}{1}$ ).  
» 38. The seventh » » » ♂ ( $\frac{30}{1}$ ).  
» 39. The dactylus of the same pair. ♂ ( $\frac{120}{1}$ ).  
» 40. The urus. ♂ ( $\frac{25}{1}$ ).



Pl. 12. A. 24. Anchyimera

Fig. 1-40. Blossfeldi

Fig. 1-22. Anchyimera Blossfeldi; Fig. 23-40. Eupomus Blossfeldi



2. XVIII  
Euprimno.  
Phrosina.

I. 2. PLATE XVIII.

EUPRIMNO MACROPUS, VAR., PHROSINA SEMILUNATA.

---

## 2. PLATE XVIII.

### EUPRIMNO MACROPUS, VAR.

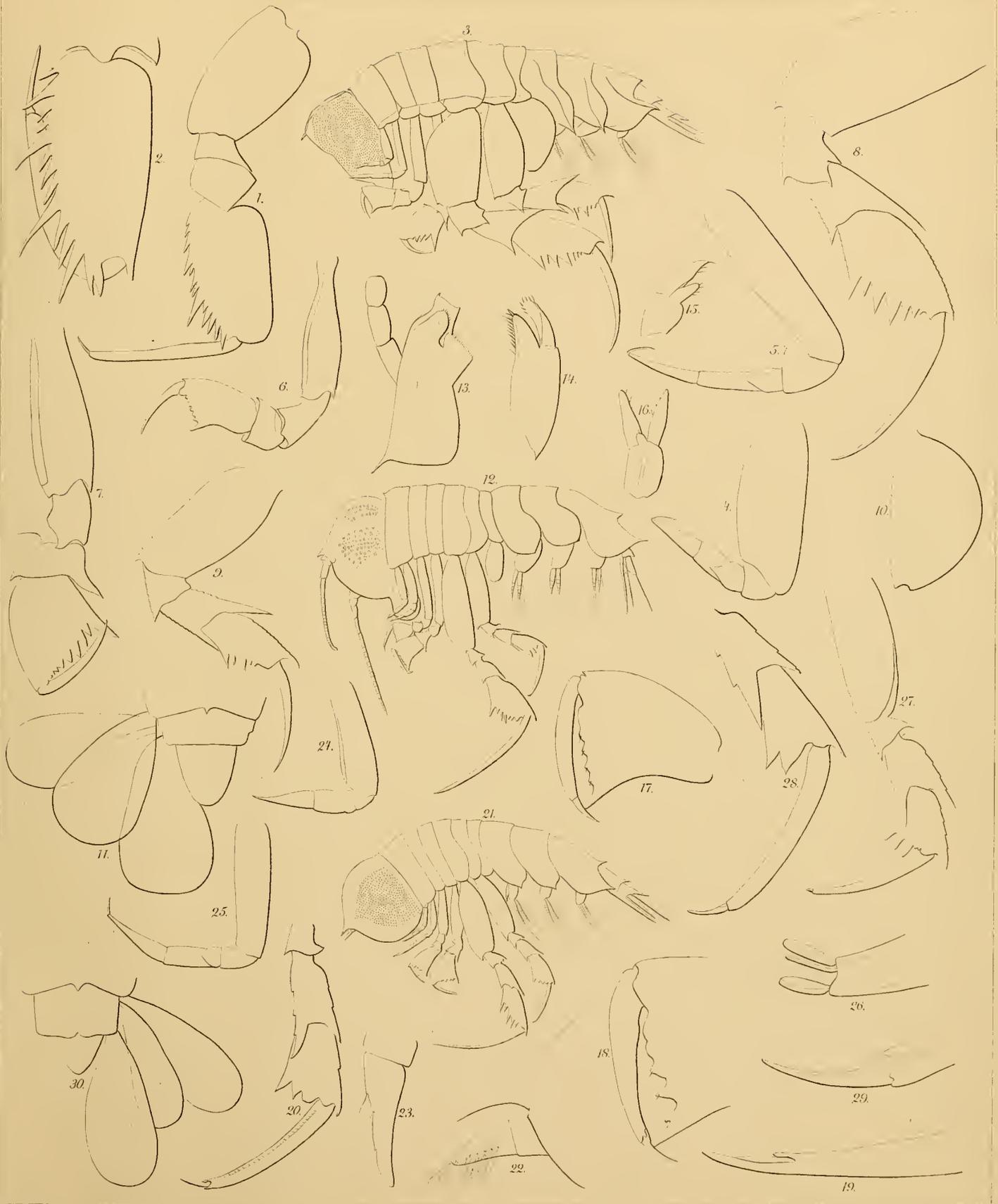
Fig. 1. The fifth pair of peræopoda. ♂ ( $60/1$ ).

### EUPRIMNO MACROPUS, VAR. MENEVILLEI.

» 2. The fifth pair of peræopoda. ♀ ( $24/1$ ).

### PHROSINA SEMILUNATA.

- » 3. The female from the side ( $3/1$ ).  
» 4. The first pair of peræopoda. ♀ ( $15/1$ ).  
» 5. The second » » » ♀ ( $15/1$ ).  
» 6. The third » » » ♀ ( $6/1$ ).  
» 7. The fourth » » » ♀ ( $6/1$ ).  
» 8. The fifth » » » ♀ ( $5/1$ ).  
» 9. The sixth » » » ♀ ( $5/1$ ).  
» 10. The seventh » » » ♀ ( $6/1$ ).  
» 11. The urus. ♀ ( $10/1$ ).  
» 12. A young male from the side ( $20/1$ ).  
» 13. The left mandible. ♂ ( $120/1$ ).  
» 14. The first pair of maxillæ. ♂ ( $120/1$ ).  
» 15. The second » » » ♂ ( $120/1$ ).  
» 16. The maxillipeds. ♂ ( $80/1$ ).  
» 17. The third pair of peræopoda. ♂ ( $110/1$ ).  
» 18. The fourth » » » ♂ ( $110/1$ ).  
» 19. The dactylus of the fifth pair. ♂ ( $400/1$ ).  
» 20. The sixth pair of peræopoda. ♂ ( $110/1$ ).  
» 21. The female from the side ( $10/1$ ).  
» 22. The front side of the head. ♀ ( $45/1$ ).  
» 23. The first pair of antennæ. Young ♀ ( $120/1$ ).  
» 24. The first pair of peræopoda. ♀ ( $40/1$ ).  
» 25. The second » » » ♀ ( $40/1$ ).  
» 26. The transformed dactylus of the fourth pair. ♀ ( $350/1$ ).  
» 27. The sixth pair of peræopoda. ♀ ( $25/1$ ).  
» 28. The sixth » » » Young ♀ ( $80/1$ ).  
» 29. The dactylus of the same pair. ♀ ( $270/1$ ).  
» 30. The urus. ♀ ( $30/1$ ).
-



Antenn. et A. IV. W. et G. p. 24.

et. W. et G. p. 24.

Fig. 1. *Eurytoma macropus* van Fig. 2. *h. naonipus* - Macropus. Fig. 3. *h. naonipus* - Macropus. Fig. 4. *h. naonipus* - Macropus. Fig. 5. *h. naonipus* - Macropus. Fig. 6. *h. naonipus* - Macropus. Fig. 7. *h. naonipus* - Macropus. Fig. 8. *h. naonipus* - Macropus. Fig. 9. *h. naonipus* - Macropus. Fig. 10. *h. naonipus* - Macropus. Fig. 11. *h. naonipus* - Macropus. Fig. 12. *h. naonipus* - Macropus. Fig. 13. *h. naonipus* - Macropus. Fig. 14. *h. naonipus* - Macropus. Fig. 15. *h. naonipus* - Macropus. Fig. 16. *h. naonipus* - Macropus. Fig. 17. *h. naonipus* - Macropus. Fig. 18. *h. naonipus* - Macropus. Fig. 19. *h. naonipus* - Macropus. Fig. 20. *h. naonipus* - Macropus. Fig. 21. *h. naonipus* - Macropus. Fig. 22. *h. naonipus* - Macropus. Fig. 23. *h. naonipus* - Macropus. Fig. 24. *h. naonipus* - Macropus. Fig. 25. *h. naonipus* - Macropus. Fig. 26. *h. naonipus* - Macropus. Fig. 27. *h. naonipus* - Macropus. Fig. 28. *h. naonipus* - Macropus. Fig. 29. *h. naonipus* - Macropus. Fig. 30. *h. naonipus* - Macropus.













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