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A. W. BRØGGERS BOGTRYKKERI

# Preliminary Notices on the Schizopoda of H. M. S. "Challenger" Expedition.

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By

G. O. Sars.

Meeting of 11th May 1883.

In preparing the Report on the "Challenger" Schizopoda, which have been confided to me for description, I have deemed it advisable to follow the method usually adopted in such cases, viz: to publish a preliminary account on the subject, in order to show the extent of the material which has to be subjected to an exhaustive treatment.

The Schizopoda form a very interesting portion of the extensive zoological collection acquired during the "Challenger" Expedition, and some of the most striking forms have already been partly treated upon by the late Dr. Willemoes Suhm, whose sudden death, occurring whilst on the Expedition, was so deeply deplored by his friends and scientific colleagues.

In a very interesting paper, inserted in the Transactions of the Linnean Society of London, the writer, besides giving a short description, with drawings, of a few other Crustacea, also treats of 5 remarkable forms of Schizopoda, taken from the great deeps of the Atlantic, viz: *Gnathophausia gigas*, *Gn. zoëa*, *Gn. gracilis*, *Petalophthalmus armiger* and *Chalaraspis ungviculata*, constituting 3

new genera, the last mentioned even forming a new family of Schizopoda.

Moreover, some of the manuscript notes, and drawings, made by the above mentioned, lamented, naturalist, during the Expedition, have been kindly placed at my disposition, by Professor Murray.

Drawings, and full descriptions of all the species mentioned in the present paper, will be given in the Report, which will be published as soon as possible.

## Fam. 1.

## Lophogastridæ.

Gen. 1. **Lophogaster.** M. Sars 1856.

(Forhdl. ved de skandin. Naturf. Møde i Christiania.)

1. *Lophogaster typicus*, M. Sars.

M. Sars: „Beskrivelse over *Lophogaster typicus*, en mærkværdig Form af de lavere tifføddede Krebsdyr.” (Univ.-Program f. 1862).

*Hab.* South of the Cape of Good Hope (Stat. 141 & 142), 98 to 150 fms. 3 specimens (one imperfect).

*Remarks.* After a carefull comparison of the "Challenger" specimens, with the form occurring on the Norwegian coast, I do not find any essential difference, requiring the establishment of a new species, and of course, I am induced to believe that the specimens ought to be referred to the typical species, in spite of the very remote locality, where they have been collected.

Gen. 2. **Ceratolepis.**<sup>1</sup> n.

*Generic char.* Integument very firm. Carapax large, covering the whole anterior division of the body, posteriorly truncated, not emarginated, anteriorly forming a broad frontal plate, covering the eyes, and antennular peduncles, and terminating in a mucroniform

<sup>1</sup> Derived from: κέρας: a horn and λεπίς: a scale.

rostrum, the side-edges prominent, and somewhat deflexed. Postabdominal segments, short, and narrow, with small epimera; the last not divided transversally. Antennal scale of very peculiar shape, forming a narrow, flexuous, plate, of very firm structure, but without any setæ. Last pair of legs wanting the exopodites, or natatory branches. Telson with a deep apical incision. Uropods very small, the lamellæ short, lanceolate, and setose on both margins.

*Remarks.* This new genus is at once distinguished from *Lophogaster*, by the very remarkable form of the antennal scale, the strong development of the carapax, and by the structure of the last pair of legs, and of the caudal fan.

## 2. *Ceratolepis hamata* n. sp.

Carapax slightly nodulose above, rostrum horizontal, reaching the end of the antennular peduncle, the side-edges of the frontal plate shorter than the rostrum. Epimera of the postabdominal segments finely serrate at the posterior margin. Last segment short, with two large lateral spines, and two terminal ones, embracing the base of the telson. Eyes rather small, only slightly expanded at the end. Antennal scale rather surpassing the antennular peduncle, slightly curved outward, and somewhat dilated at the apex, forming here two acute angles, the one directed forward, the other bent posteriorly, in the form of a hook. Telson deeply cleft at the apex, or forming two acuminate, and divergent, apical lobes. Length: 12 mm.

*Hab.* Pacific Ocean, North of Australia, (Api to Cape York); surface. 1 single specimen, female, with distinct, but small incubatory lamellæ.

## Gen. 3. **Gnathophausia.** Willem. Suhm 1879.

Transactions Linn. Soc. Lond. 2 ser. Vol. 1.

### 3. *Gnathophausia ingens* (Dohrn).

*Lophogaster ingens*, Dohrn, Untersuchungen über Bau und Entwicklung der Arthropoden. Zeitschr. f. wiss. Zool. Bd. XX, 4 Heft, pg. 610, pl. XXXI, fig. 12—14.

*Gnathophausia inflata*, Willem. Suhm, M. S.

*Hab.* Off Aru isl., Arafura Sea (Stat. 191) 800 fms. 1 single, very large, specimen, (length: 157 mm.), adult female, with enormously developed incubatory lamellæ.

4. *Gnathophausia gigas*, Willem. Suhm.

*Gnathophausia gigas*, Willem. Suhm, Transact. Linn. Soc. Lond. 2 ser. Vol 1, pg. 28, pl. IX fig. 16—17, pl. X fig. 2—3.

*Hab.* North Atlantic, W. of Azores (Stat. 69), 2200 fms. 1 single specimen, adult male.

5. *Gnathophausia calcarata* n. sp.

(*Gnathophausia gigas* var. Willem. Suhm, M. S.)

Integument rather firm. Carapax with strongly marked lateral keels, the dorsal keel obsolete in the middle, very high anteriorly, posteriorly produced in a short, but distinct, spine. Rostrum nearly as long as the carapax, straight, acuminate, rather broad at the base, and, as usual provided with 3 rows of teeth, one dorsal, and two laterals. Posterior angles of carapax produced in very long, and slender, finely serrate, spines. Supraorbital denticle obsolete, antennal and branchiostegal spine, well defined, the last very large, and serrate. Postabdominal segments sculptured with transverse furrows, the epimera produced in two acuminate lobes of nearly equal size. Epimeral spines of the last segment, as in the two preceding species, very large, and partly connected on the ventral face. Eyes narrowly pyriform, with rather long pedicles. Antennal scale, rather small, entire, without any transverse suture, ovate, the outer margin slightly serrate, apex obliquely truncate, inner edge somewhat produced. Telson very large, strongly spinous at the margins, terminal spines strong, and divergent, separated by a broad, semilunar emargination. Uropods much shorter than the telson, and of the usual form. Length of the largest specimen 98 mm.

*Hab.* Off Aru isl., Arafura sea (Stat. 191), 800 fms., 1 speci-

men, adult male. Off Talaur isl. South of Mindanao, Philipp. (Stat. 214), 500 fms., a rather small, male specimen.

*Remarks.* This new species is allied to the two preceeding, forming, together with them, a distinct section of the genus, characterised by the form of the antennal scale, and the peculiar development of the epimeral spines of the last segment. It is however readily distinguished from both of them, by the long, and slender spines, issuing from the infero-posterior angles of the carapax, and by the strong development of the antennal and branchiostegal spines.

#### 6. *Gnathophausia Willemoesii* n. sp.

Carapax, with the lateral keels, distinct, although not very prominent, the dorsal keel strongly marked, and uninterrupted in the middle, posteriorly produced in a rather large spine, reaching the end of the 2nd postabdominal segment. Rostrum a little shorter than the carapax, rather narrow, and sharply pointed, with few denticles. Infero-posterior angles of the carapax rounded off. Supra-orbital spine strongly developed, acute; antennal spine also well marked, branchiostegal spine obsolete. 5 anterior postabdominal segments dorsally keeled, and provided with small spines in the middle of the posterior margin. The posterior lobe of the epimera much more prominent than the anterior, and lanceolate. Epimeral spines of the last segment not connected on the ventral face. Eyes rather small, claviform, with short pedicles. Antennal scale of the form usual in the Caridea, scarcely twice the length of the antennular peduncle, broadly ovate, the outer margin straight, and produced in a strong anteriorly directed spine, the inner boldly curved, and densely setose, apex forming a rounded lobe, only very slightly surpassing the spine on the outer edge; a very oblique suture runs from the base of the apical spine, across the scale, dividing it into two unequal parts. Telson rather large, lingviform, the lateral margins evenly arched, and densely armed with unequal denticles; the terminal spines curved, and finely den-

ticulate at the inner margin. Uropods almost reaching the tip of the telson. Length of the largest specimen: 136 mm.

*Hab.* South of Amboyna, Banda Sea (Stat. 195), 1425 fms. 2 specimens, a female with distinct, but not yet fully developed incubatory lamellæ, and a somewhat smaller male specimen.

7. *Gnathophausia affinis* n. sp.

Very like the last species, but somewhat more slender, and with the rostrum and posterior dorsal spine shorter. Supraorbital spine distinct, but less prominent than in *G. Willemoesii*; antennal and branchiostegal spines obsolete. Postabdominal segments not dorsally keeled, nor provided with dorsale denticles; both lobes of the epimera obtuse. Antennal scale rather narrow, more than twice the length of the antennular peduncle, the apical lobe considerably surpassing the spine on the outer edge. Telson, and uropods, almost as in the last species. Length: 83 mm.

*Hab.* Tropical Atlantic, between the coast of Africa and Brazil (Stat 107), 1500 fms. A single specimen, female with distinct incubatory lamellæ.

8. *Gnathophausia elegans* n. sp.

Form of body rather slender and elegant. Carapax quite wanting the upper lateral keel, the cervical, and cardio-branchial suture very distinctly marked. Rostrum as long as the carapax, acuminate, with the upper crest very finely serrate. Posterior dorsal spine rather elongated, slightly surpassing the 2nd postabdominal segment. Infero-posterior angles of the carapax rounded off. Supraorbital spine distinctly developed, antennal very small, branchiostegal obsolete. 5 anterior postabdominal segments very slightly keeled above with small projections in the middle of the posterior margin; the lobes of the epimera imperfectly developed. Last segment rather elongated; the epimeral spines small. Eyes, short, claviform. Antennal scale, twice the length of the antennular peduncle, evenly attenuated, the spine at the outer edge, considerably surpassing the terminal lobe. Telson lingviform, rather constricted at the apex



the lateral margins densely spinous, the terminal spines short and thick, separated by a finely denticulated cleft. Uropods, nearly as long as the telson. Length: 56 mm.

*Hab.* Pacific Ocean, South of Fiji isl. (Stat. 174), 610 fms. 1 single specimen, female.

9. *Gnathophausia zoëa*, Willem. Suhm.

*Gnathophausia zoëa*, Willem. Suhm, Transact. of the Linn. Soc. of London, 2 ser. Vol. 1, pag. 32, pl. IX, fig. à - 15, pl. X, fig. 4.

*Hab.* North Atlantic, West of Azores (Stat. 73), 1000 fms. 1 specimen, male. Tropical Atlantic between coast of Africa and Brazil (Stat. 106), 1850 fms. 1 specimen, male. Off Rio Fransisco, Brazil (Stat. 126), 770 fms. 1 specimen, female (dissected). Pacific Ocean, North of Kermadec isl. (Stat. 171), 600 fms. 2 specimens, male and female.

10. *Gnathophausia longispina*, n. sp.

General form of the body rather like the same in *G. zoëa*, but somewhat more slender. Rostrum very long and narrow, nearly twice the length of the carapax, with densely serrate crests. Posterior dorsal spine also very long, surpassing the 4th postabdominal segment, finely serrate both at the dorsal and lateral margins. Supraorbital spine strongly developed as in *G. zoëa*; antennal spine obsolete, branchiostegal very large, triangular, and directed straight outward. 5 anterior postabdominal segments, dorsally slightly keeled, and provided with small denticles in the middle of the posterior margin; posterior lobe of the epimera, acuminate, on the 2nd segment, remarkably produced. Last segment with two epimeral denticles on every side, the apical spines rather elongated, mucroniform. Eyes claviform, rather small. Antennal scale very large, the outer margin denticulate, and produced in a very long and stout mucroniform spine, serrate at both margins; apical lobe very narrow, only reaching the middle of the terminal spine. Telson lingviform with densely spinous margins, the terminal spines short, connected by a semilunar serrated lamella. Uropods, a little shorter,

than the telson, the inner lamella rather narrow. Length: 59 mm.

*Hab.* Off Zomboanga, Mindanao, Philippine isl. (Stat. 200), 255 fms. 5 specimens (of which one dissected).

11. *Gnathophausia gracilis*, Willem. Suhm.

*Gnathophausia gracilis*, Willem. Suhm, Trans. Linn. Soc. Lond. 2 ser. Vol. 1, pg. 33, pl. IX, fig. 1.

*Hab.* Tropical Atlantic between the coast of Africa and Brazil (Stat. 107), 1500 fms. 1 specimen, male (somewhat injured).

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Fam. 2.

Eucopiidæ.

Gen. 1. **Eucopia** Dana 1852.

United States Exploring Exped. Zool.

(= *Chalaraspis* Willem. Suhm.)

*Remarks.* Mr. Sp. Bate in his paper „On the Penæidea“ in Ann. Nat. Hist. Sept. 1881 has shortly mentioned this genus and regards it, in accordance with the statement of Dana, together with *Chalaraspis* of Willem. Suhm as constituting a family belonging to the Penæid group of Macrura. To this view I cannot consent. A careful anatomical investigation of one of the "Challenger" specimens in connexion with the description of *Chalaraspis ungviculata* given by the late Dr. Willem. Suhm, has convinced me, that the family Eucopiidæ ought much more properly to be placed among the Schizopoda than among the Penæidea. As has already been shown by Willem. Suhm, the adult females of *Chalaraspis*, which genus, in my opinion, is identical with *Eucopia* of Dana, carry their eggs and young in a marsupial poche, of the very same structure as in the Lophogastridæ, and this is a feature never to be found in any of the true Penæidea, nor in any other Macrura, while it is also characteristic for another family of the Schizopoda, the Mysidæ,

and even in the fourth family of the Schizopoda, the Euphausiidæ; I have found, that the ova are carried in quite a similar manner beneath the anterior division of the body, although distinct incubatory lamellæ here are wanting. The very peculiar structure of the ambulatory legs in *Chalaraspis* or *Eucopia*, although rather unlike the usual Schizopode type, is equally different from the form characteristic of the Penæidea, while the strong development of the exopodites, or natatory branches, unquestionably points to the Schizopoda. The structure and arrangement of the branchiæ agrees very nearly with the same in the Lophogastridæ, and the antennæ, and oral parts, are very different from what is known in the Penæidea, and essentially of the same form, as in other Schizopoda.

### 12. *Eucopia australis*, Dana.

*Eucopia australis*, Dana, Unit. States Expl. Exp. Zool. pg. 609, pl. XI, fig. 10.

*Chalaraspis ungviculata*, Willem. Suhm, Transact. Linn. Soc. Lond. 2 ser. Vol. 1, pg. 37, pl. VIII.

*Remarks:* There cannot, I believe, be any doubt as to the identity of *Chalaraspis ungviculata* of Willem. Suhm with *Eucopia australis* of Dana. The last mentioned author says, it is true, that the two posterior pairs of legs, in *Eucopia*, are filiform, whereas in *Chalaraspis*, it is stated by Willem. Suhm, that only the last pair exhibit this form. But this divergent statement may in my opinion readily be explained from the circumstance, that in the solitary specimen examined by Dana, the four posterior pairs were partly broken. In all other respects the accordance between the two forms is very striking.

*Hab.* North Atlantic, South of Nova Scotia U. S. (Stat. 50), 1250 fms.; and West of Azores (Stat. 73), 1000 fms.; single specimens. Subantarctic Ocean, South of Australia (Stat. 158), 1800 fms.; 3 more or less complete specimens. North Pacific, off Lanagava, Japan (Stat. 237), 1875 fms.; 1 imperfect specimen.

## Fam. 3.

## Euphausiidæ.

*Remarks:* The numerous surface-gatherings, made during the "Challenger" Expedition, in many, different parts of the Ocean, and now placed in my hands for examination, have yielded a rather extensive material of forms, belonging to this interesting family of Schizopoda, both adults and larvæ, and although the specimens, owing to their being usually mingled with many other surface-animals, in the same small bottle, are not always in the best state of preservation, I have succeeded in determining many interesting new forms, and also have been enabled to verify, and more completely to settle, the distinctive characters of the species, formerly established by Dana, but generally very unsatisfactorily described, and drawn, by that author. Beside the genera, already established, viz: *Euphausia*, *Thysanopoda* and *Thysanoëssa*, 3 new genera are now proposed, and the closer examination of the "Challenger" Euphausiidæ, also has led me to establish a fourth new genus, *Boreophausia*, for the reception of the northern species formerly referred by me to the genus *Euphausia* of Dana. I subjoin below, diagnoses of all the forms collected during the "Challenger" Expedition. Full descriptions, and drawings, will be given in my Report, together with anatomical details, and representations of the very interesting, and remarkable, postembryonal, development, characteristic of this group of Schizopoda.

Gen. 1. **Euphausia** Dana 1852.

United States Expl. Exped. Vol. XIII. Crustacea.

*Generic characters.* Antennular peduncle, subcylindrical, and of the same structure in both sexes. Flagella of both pairs of antennæ, greatly elongated. Last joint of the 2nd pair of maxillæ, large, and broad, outer plate, small. Two anterior pairs of legs (the modified maxillipeds) only slightly differing from the succeeding; last joint of the 2nd pair, somewhat dilated, and compressed,

with a row of curved, ciliated, spines, in the middle of the posterior margin. Two posterior pairs of legs quite rudimentary, only forming very small inarticulate stems, without any trace of exopodites. Three posterior pairs of branchiæ complex, sending off a branch on the ventral face. Inner lamella of the two anterior pairs of pleopoda in the male, very much modified, and of rather complicate structure. Phosphorescent globules (ocelli) present in the adult, on all postabdominal segments, between the bases of the pleopoda, except on the two last; 2 pairs of similar organs on the anterior division of the body, at the base of the 2nd and 7th pair of legs, beside another pair of imperfectly developed luminous globules in the ocular pedicles.

### 13. *Euphausia pellucida* Dana.

*Euphausia pellucida*, Dana, United States Expl. Exped. Vol. XIII. Crustacea, pg. 641, pl. 42, fig. 4, a—m.

*Euphausia Mülleri*, Dohrn, Zeitschrift f. wiss. Zool. Bd. XIII, Heft 3, 1863, pg. 432, pl. XXVIII, fig. 29—31, pl. XXIX.

*Thysanopoda bidentata* G. O. Sars, Oversigt af Norges Crustaceer I. pg. 50, pl. 1, fig. 11—14.

Body rather slender, and quite pellucid in living specimens. Carapax with two lateral denticles on each side, above the inferior margin; anterior part, distinctly keeled, dorsally; rostrum somewhat produced, and sharply pointed. Epimera of the postabdominal segments distinctly developed, and somewhat angular. Last segment rather elongated; the ventral spine at the base of the caudal fan (præanal spine) tridentate. Eyes of moderate size, pyriform. Antennular peduncle provided above, at the end of the basal joint, with an erect membranous leaflet, divided at the tip, in 2 or more acuminate lappets. Antennal scale scarcely surpassing the 2nd joint of the antennular peduncle, oblong, obtusely truncated at the apex, the denticle on the outer edge obsolete; the basal spine very long, mucroniform, and densely serrate at the inner margin. Last joint of 2nd pair of maxillæ short, and broad, with a row of small teeth anteriorly. Telson with two pairs of dorsal denticles, the subapical

spines very large and finely denticulated at the inner margin. Inner lamella of the uropods, a little longer than the outer, both rather shorter than the telson. Usual length of adult female 15 mm.

*Hab.* Widely distributed, and occurring in almost every part of the ocean: North and South Atlantic, Australian sea, North and South Pacific, Mediterranean, Norwegian coast.

*Remarks.* I think this form must be the *Euphausia pelucida* of Dana, although the description and drawings, do not, in every respect, fully correspond with my own observations. The *E. Mülleri* of Dohrn, from the Mediterranean, is unquestionably identical with this species, and I also regard the single specimen, collected by me last year, on the Norwegian coast, and described as *Thysanopoda bidentata*, as belonging to the same species.

#### 14. *Euphausia similis* n. sp.

In general shape, rather like the last species, but much larger. Carapax with only a single, small, lateral, denticle, at the middle of the inferior margin; anterior part slightly keeled above; rostrum rather produced, and very acute. Epimera of the 4th and 5th postabdominal segment small, and inferiorly truncated, or slightly emarginate. Last segment rather elongated; præanal spine, simple. Eyes moderate, pyriform. Antennular peduncle with a very small bifid lappet above, at the end of the basal joint. Antennal scale, scarcely surpassing the 2nd joint of the antennular peduncle, rather broad, ovate, obliquely rounded at the apex, the denticle on the outer edge, obsolete. Telson narrow, and elongated, with rather small, and quite smooth, subapical spines. Uropods shorter than the telson, inner lamella, scarcely surpassing the outer. Length of the largest specimen: 30 mm.

*Hab.* South Atlantic, (Stat. 320) from trawl; 1 adult male and two smaller specimens.

15 *Euphausia splendens* Dana.

*Euphausia splendens*, Dana, United States Expl. Exped. Vol. XIII, Crustacea, pg. 642, pl. 42, fig. 5, a-h.

Form of body, somewhat more robust, than in the two last species. Carapax with a single lateral denticle about the middle of the inferior margin; anterior part slightly keeled above; rostrum very short, scarcely surpassing the ocular segment. Epimera of the postabdominal segments, rather small, and evenly rounded. Last segment longer than the preceding; præanal spine simple, unguiform. Eyes rather large, pyriform. Antennular peduncle without any dorsal leaflet, but provided, close to the end of the basal joint above, with a fascicle of very strong and curved setæ. Antennal scale slightly surpassing the 2nd joint of the antennular peduncle, oblong, truncated at the apex, without any denticle on the outer edge; basal spine of moderate length, and distinctly serrate at the inner margin. Telson with 2 pairs of dorsal denticles, the subapical spines rather elongated, and narrow, smooth. Uropods a little shorter than the telson, the outer lamella slightly surpassing the inner. Length: 18 mm.

*Hab.* South Atlantic, Subantarctic Ocean, South of the Cape of Good Hope, and of Kerguelen, South Pacific; surface.

*Remarks.* It is rather difficult to decide with full certainty, whether this form, in reality, is identical with Dana's *E. splendens*, or belongs to some other allied species. Supposing however, that the species described by Dana must, in all probability, be represented in the rich collection of "Challenger" Euphausiidæ, I believe this form to be the one most properly referable to that species.

16. *Euphausia Murrayi* n. sp.

General form of body about as that of the last species. Carapax somewhat more elongated, with a single lateral denticle placed somewhat in front of the middle of the inferior margin; anterior part slightly keeled above, rostrum short triangular, frontal margin forming an obtuse angle on both sides, above the eyes. Epimera

of the postabdominal segments rather deep. Last segment scarcely longer than the preceeding; the præanal spine obsolete. Eyes rather thick, claviform. Antennular peduncle elongated, provided above, at the end of 1st and 2nd joint, with an anteriorly directed lobe slightly emarginated at the tip. Antennal scale somewhat surpassing the 2nd joint of the antennular peduncle, elongated oblong, somewhat obliquely truncated at the apex, the denticle on the outer edge small but distinct. Telson of the usual form with smooth subapical spines. Uropods almost reaching the tip of the telson, inner lamella shorter than the outer. Length: 43 mm.

*Hab.* Antarctic Ocean, near the ice barrier, (Stat. 154); surface. A single specimen, female.

*Remarks.* This is, next *E. superba*, the largest species of *Euphausia* procured during the Expedition. I have much pleasure in dedicating it to Prof. John Murray, whose interesting papers on the Expedition are well known, and who has also been very much interested in the accomplishment of the surface gatherings, during the various cruises.

### 17. *Euphausia superba*, Dana.

*Euphausia superba*, Dana, United States Expl. Exped. Vol. XIII, Crustacea, pg. 645, pl. 43, fig. 1, a—o.

Form of body almost as in the last species. Carapax rather narrow, without any lateral denticle; anterior part very slightly keeled above, rostrum short, and obtuse; frontal margin not forming any distinct angles above the eyes. Postabdominal segments with rather deep, and rounded epimera; the last short, not exceeding in length the preceeding; præanal spine obsolete. Eyes rather large, pyriform. Antennular peduncle strong, and robust, the dorsal lobe at the end of the basal joint, small, and rounded. Antennal scale short, not reaching the end of the 2nd joint of the antennular peduncle, ovate, apex subtruncate, the denticle on the outer edge very small. Exopodites, or natatory branches of the legs, as well as the pleopoda, very largely developed. Telson narrow, with smooth subapical spines. Uropods slightly surpassing the tip of



the telson, inner lamella, a little shorter than the outer. Length: 48 mm.

*Hab.* Antarctic Ocean, together with the last species (Stat. 154); surface. A single specimen, male.

18. *Euphausia antarctica* n. sp.

Form of body rather narrow. Carapax without any lateral denticle, anterior part distinctly keeled above, rostrum forming a broad triangular plate, obtecting the bases of the eyes above. Postabdominal segments with rather small rounded epimera; last segment somewhat longer than the preceding, præanal spine obsolete. Eyes rather large, claviform. Antennular peduncle relatively narrow, without any dorsal lobe, basal joint much flattened, outer margin setose, and produced at the end in a short spine. Antennal scale surpassing the 2nd joint of the antennular peduncle, oblong or linear, apex obtusely truncated, the denticle on the outer edge small but distinct. Legs rather elongated, and densely ciliated. Telson evenly tapering posteriorly, with three pairs of dorsal denticles, subapical spines, smooth. Uropods much shorter than the telson, inner lamella very slightly surpassing the outer. Length: 17 mm.

*Hab.* Antarctic ocean, at the ice barrier (Stat. 153); surface. Numerous specimens.

19. *Euphausia mucronata* n. sp.

Form of body almost as in *E. splendens*. Carapax with a single lateral denticle about the middle of the inferior margin; a very marked rounded crest above, on the anterior part; rostrum short. Postabdominal segments with well developed rounded epimera; third segment armed above, in the middle of the posterior margin, with a strong mucroniform spine, pointing backward. Last segment somewhat longer than the preceding; præanal spine obsolete. Eyes rather large, pyriform. Antennular peduncle moderate, with a very small, bifid lobe, at the end of the basal joint. Antennal scale slightly surpassing the 2nd joint of the antennular

peduncle, oblong, apex obtusely truncated without any distinct denticle on the outer edge. Telson rather elongated and narrow with large and smooth subapical spines. Uropods much shorter than the telson, inner lamella of the same length as the outer. Length: 14 mm.

*Hab.* South Pacific, off the coast of Chili, surface. A few specimens.

#### 20. *Euphausia gracilis* Dana.

*Euphausia gracilis*, Dana, United States Expl. Exped. Vol. XIII Crustacea, pg. 644 pl. 42, fig. 6, a—c.

Form of body very narrow and elongated. Carapax with a single lateral denticle placed about the middle of the inferior margin, anterior part very slightly keeled above; rostrum sharply pointed. Postabdominal segments smooth above, with very small epimera. Last segment rather elongated and narrow; præanal spine simple, ungviform. Eyes unusually small, scarcely expanded at the tip. Antennular peduncle elongated, without any distinct dorsal lobe. Antennal scale slightly surpassing the 2nd joint of the antennular peduncle, oblong ovate, apex rounded, without any distinct denticle on the outer edge. Telson evenly tapering posteriorly, subapical spines narrow and smooth. Inner lamella of the uropods much longer than the outer, and reaching the tip of the telson. Length: 10 mm.

*Hab.* Tropical Atlantic, Australian sea and Pacific, surface.

#### 21. *Euphausia gibba* n. sp.

Very like the last species, but of rather larger size. Carapax with a single lateral denticle, placed somewhat behind the middle of the inferior margin; rostrum short, but acute. Third postabdominal segment forming with the succeeding a distinct angle as in the genus *Hippolyte*, its posterior margin produced above in the middle as a sharply pointed and somewhat curved lappet, advancing over the next segment. Last segment rather elongated and much compressed, præanal spine with a small denticle at the posterior margin.

Eyes small, although somewhat expanded at the tip. Antennular peduncle almost exactly as in the last species. Antennal scale somewhat more elongated, distinctly surpassing the 2nd joint of the antennular peduncle, obovate, apex rounded, without any denticle on the outer edge. Telson much narrowed in the posterior part, subapical spines rather small and smooth. Inner lamella of the uropods only very slightly surpassing the outer, and not reaching the tip of the telson. Length: 15 mm.

*Hab.* North Atlantic and tropical Pacific, surface.

## 22. *Euphausia spinifera* n. sp.

Form of body somewhat robust. Carapax with a strong lateral denticle, placed in a sinus above the inferior margin a little back of the middle, anterior part distinctly crested above, the crest forming in the middle an erect denticle; rostrum unusually produced, straight, acute, reaching almost the tip of the basal joint of the antennulæ; a sharply pointed tooth on each side of the rostrum above the eyes. Postabdominal segments with rather deep epimera; 2nd and 3th segment armed with a posteriorly directed spine above in the middle of the posterior margin, the anterior small, the posterior very strong and mucroniform. 4th and 5th segment with the posterior margin divided in several sharply pointed lappets. Last segment somewhat elongated; præanal spine small, bidentate. Eyes short and thick, almost globular. Antennular peduncle of moderate size, with a rather large bifid and anteriorly directed lobe above at the end of the basal joint, and another simply pointed at the end of the 2nd joint. Antennal scale considerably surpassing the 2nd joint of the antennular peduncle, oblong, obliquely truncated at the apex, outer edge produced in a distinct tooth. Telson rather elongated, the subapical spines narrow and serrate at the inner margin. Uropods reaching the tip of the telson, inner lamella scarcely surpassing the outer. Length: 26 mm.

*Hab.* Australian sea and South Pacific, surface. A few specimens.

23. *Euphausia latifrons* n. sp.

Form of body rather short and stout. Carapax without any lateral denticle, scarcely keeled above, rostrum of very peculiar shape, forming a broad horizontal quadrangular plate, truncate or slightly emarginate at the apex. Postabdominal segments smooth above, with rather small rounded epimera. Last segment somewhat longer than the preceeding and slightly produced above at the end; præanal spine very small. Eyes of moderate size, clavi-form, the cornea only slightly expanded. Antennular peduncle of usual form, basal joint provided at the end above with a short serrate lobe, outer edge produced in a strong spine. Antennal scale scarcely surpassing the 2nd joint of the antennular peduncle, ovate, apex rounded, the denticle on the outer edge small, but distinct. Telson with three pairs of dorsal denticles, subapical spines not very elongated and serrated at the inner margin. Uropods shorter than the telson, inner lamella surpassing the outer. Length: 6 mm.

*Hab.* Australian sea (off Port Jackson), Arafura sea and Celebes sea (off Mindanao); surface. A few solitary specimens.

*Remarks.* The very small size of the specimens referred to the present species, might excite suspicion of their being only the young of some other form. Having however found in one of the specimens all the marks characteristic of the adult male, I cannot have any doubt as to the claim of the present form as a distinct species.

Gen. 2. **Thysanopoda** Edw.

Ann. des Sciences nat. Tome. XIX.

*Generic characters:* General aspect as in *Euphausia*. Flagella of both pairs of antennæ greatly elongated. Terminal joint of the 2nd pair of maxillæ rather large and rounded, outer plate very small, almost obsolete. 2 anterior pairs of legs about as in *Euphausia*; 7th pair of legs distinctly developed and of the same structure as the preceeding; last pair with distinctly developed exopodites

but with the main stem quite obsolete. Three posterior pairs of branchiæ very complex.

*Remarks.* Of this genus, the first which has been established in the family Euphausiidae, only the typical form described by M. Edwards has hitherto been known. All the other forms which have been referred by subsequent authors to this genus, belong in my opinion to different genera. In the restriction wherein the genus is taken here, it comprises, beside the typical form, also 3 new species from the 'Challenger' Expedition, two of which however only are represented by solitary specimens, of which it has not been possible to make a closer anatomical investigation. The genus is chiefly characterised by the structure of the 7th pair of legs, which is of the very same form as the preceeding, so that only the last pair remains rudimentary.

#### 24. *Thysanopoda tricuspidata* Edw.

*Thysanopoda tricuspidata*, Milne Edwards, Histoire naturelle des Crustacés, Tome II, pg. 463, pl. XXVI, fig. 1—6.

Form of body not much elongated and rather compressed. Carapax armed with two strong lateral denticles at the inferior margin above the bases of the 1st and 7th pair of legs; rostrum rather produced, straight and sharply pointed; an anteriorly directed somewhat flattened spine above at some distance behind the rostrum. Third postabdominal segment armed with a strong dorsal spine in the middle of the posterior margin; 4th and 5th segment with similar, but much smaller dorsal spines. Two anterior pairs of epimera curved anteriorly, the first rather large and complex, divided in two acuminate lobes, the foremost partly covered by the carapax. Last segment elongated, somewhat produced at the end above; præanal spine ungviform, with a small denticle at the posterior margin. Eyes rather large, pyriform. Antennular peduncle of moderate size, subcylindric, with a small lanceolate lappet above at the end of the 1st and 2nd joints. Antennal scale slightly surpassing the 2nd joint of the antennular peduncle, oblong, apex

rounded, the denticle on the outer edge very small. 7th pair of legs rather shorter than the preceding. Telson with 4 pairs of dorsal denticles, the apex very much narrowed and provided close to the tip with two pairs of small lateral denticles; subapical spines scarcely surpassing the apex, smooth. Uropods shorter than the telson; inner lamella very slightly surpassing the outer. Length of the largest specimen: 24 mm.

*Hab.* Pacific Ocean on two different localities (off Kandavu Fiji isl. and North of Australia).

*Remarks.* I have had some doubt in referring this form to the typical species established by M. Edwards, as neither the very strong dorsal spine on the third postabdominal segment, nor the peculiar flattened spine of the carapax behind the rostrum is represented on the figure given in M. Edwards' work. On the other hand the figure shows distinctly another feature very characteristic of the species in question and not found in any other form known to me, viz the peculiar shape and anterior curvature of the two anterior pairs of postabdominal epimera. The specimen originally examined by M. Edwards was from the North Atlantic, while all the 'Challenger' specimens have been collected in the Pacific ocean. Considering however the wide geographical distribution of some species of Euphausiidæ, this circumstance does not seem in my opinion to prevent an identification of the 'Challenger' specimens with the form described by M. Edwards.

25. *Thysanopoda obtusifrons* n. sp.

Form of body somewhat robust, not much compressed. Carapax without any lateral denticles or dorsal keel, frontal part slightly produced, but bluntly rounded, not forming any distinct rostrum. Postabdominal segments smooth above, the epimera of moderate size, none of them anteriorly curved, 2nd, 3th and 4th somewhat sinuated at the inferior margin. Last segment longer than the preceding; præanal spine obsolete. Eyes rather small, scarcely exceeding the sides of the carapax. Antennular peduncle very

strong and somewhat depressed, with an anteriorly curved and densely hispid lobe above at the end of the basal joint. Antennal scale scarcely surpassing the 2nd joint of the antennular peduncle, rather broad, ovate, apex rounded, without any denticle on the outer edge, basal spine very narrow, subulate, smooth; basal portion of the flagellum unusually thick and massive. Terminal joint of 1st pair of maxillæ very small and narrow, of the 2nd pair on the contrary unusually large and broad. 7th pair of legs almost of the same length as the preceding pair. Telson with two parallel serrated crests above, apex bluntly lanceolate; subapical spines large, widely surpassing the apex. Inner lamella of the uropods shorter than the outer, the last surpassing the tip of the telson. Length: 23 mm.

*Hab.* South Pacific (Stat. 285) from townet at the trawl. 2 specimens.

26. *Thysanopoda cristata* n. sp.

Body rather compressed. Carapax without any lateral denticle; anterior part provided with a very marked dorsal crest; rostrum produced, compressed, with a small denticle above near the apex, tip of rostrum forming a sharply pointed deflexed tooth. Postabdominal segments rather high, 4th and 5th provided above with a small spine in the middle of the posterior margin. Last segment short, not exceeding in length the others; præanal spine obsolete. Eyes very short and somewhat flattened. Antennular peduncle rather strong, subcylindric, the basal joint slightly produced above at the end and, provided with stiff hairs; both flagella greatly elongated. Antennal scale distinctly surpassing the 2nd joint of the antennular peduncle, oblong, obtusely truncated at the apex, the denticle on the outer edge small, but distinct. Telson with 7 pairs of dorsal denticles, apex acuminate; subapical spines of moderate length, and smooth. Uropods slightly surpassing the tip of the telson, inner lamella shorter than the outer. Length: 55 mm.

*Hab.* Pacific, S. off Mindanao Phillip. (Stat. 213), 2050 fms. A single specimen, adult male.

27. *Thysanopoda? amblyops* n. sp.

Body somewhat elongated, subcylindrical. Carapax without any lateral denticle, anterior part very slightly keeled above; rostrum short, triangular, flattened. Postabdominal segments smooth above, epimera small and evenly rounded. Last segment longer than the preceding; præanal spine obsolete. Eyes scarcely expanded at the end, cornea very small, with the optical parts imperfectly developed. Antennular peduncle unusually thick and massive, without any dorsal lappets. Antennal scale reaching the tip of the antennular peduncle, oblonge, apex rounded, the denticle on the outer edge distinct. Legs (only the anterior pair preserved) unusually short and robust, with much flattened joints. Telson not much elongated, evenly tapering, apex acuminate; subapical spines smooth and elongated. Uropods shorter than the telson, outer lamella of somewhat unusual shape, rather broad, with a strong spine at the outer margin, apex very obliquely truncated; inner lamella shorter than the outer, lanceolate. Length: 20 mm.

*Hab.* South Atlantic, off Tristan d'Acunha, 1000 fms. A single imperfect specimen.

*Remarks.* It may be, that this form more properly ought to be regarded as the type of a new genus allied to *Thysanopoda*; but as the solitary specimen does not allow any closer anatomical investigation, I prefer to describe it preliminarily as a species of that genus.

Gen. 3. **Nyctiphanes**<sup>1</sup> n.

*Generic characters.* General form of body almost as in *Euphausia*. Flagella of both pairs of antennæ greatly elongated. Antennular peduncle cylindric and rather elongated, much stronger in the male than in the female; basal joint provided above at the end with a membranous reflexed leaflet. Two anterior pairs of legs almost as in *Euphausia*; 7th pair distinctly developed, but unlike the preceding, the stem only consisting of two elongated and

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<sup>1</sup> Νυκτιφανης: luminous at night.



densely ciliated joints, beside the basal portion. Last pair of legs quite rudimentary, forming a very small inarticulated and naked flexuous stem, without any trace of exopodite. Last pair of branchiæ very complex. Inner lamella of 2nd pair of pleopoda in the male only slightly modified. Number and arrangement of the phosphorescent spherules as in *Euphausia*.

*Remarks.* This new genus is mainly characterised by the peculiar reflexed leaflet on the antennular peduncle, as well as by the structure of the two last pairs of legs, which is equally different from what is observed both in *Thysanopoda* and *Euphausia*. Beside the new species described below, the northern forms *Thysanopoda Couchii* Bell and *Thysanopoda norvegica* M. Sars belong to this genus. The generic name here proposed is a translation in Greek of the appellation „Noctiluca“ contrived by V. Thompson for a form of this family but preoccupied in the Zoology for a Protozoan.

28. *Nyctiphanes australis* n. sp.

Form of body rather narrow. Carapax without any lateral denticle; anterior part distinctly keeled above; rostrum very short; frontal margin forming on both sides an obtuse angle above the eyes. Two anterior postabdominal segments slightly produced above in the middle of the posterior margin; epimera of moderate size, posteriorly curved, obtusely pointed at the tip. Last segment short, not exceeding in length the others; præanal spine obsolete. Eyes rather large, pyriform. Antennular peduncle much elongated, basal joint somewhat flattened, and produced at the outer edge in a strong spine; dorsal leaflet with the inner edge pointed, the outer margin entire; 2nd joint in the female twice the length of the third. Antennal scale rather small and narrow, not reaching the end of the 2nd joint of the antennular peduncle, apex truncated, outer edge produced in a distinctly developed tooth; basal spine very small. Mandibular palpus rather elongated, with the last joint slightly dilated at the end, and armed at the interior

margin with numerous curved spines. Last joint of 7th pair of legs scarcely half the length of the preceding joint. Telson rather narrowed posteriorly, apex bluntly lanceolate, subapical spines elongated and smooth. Uropods almost reaching the tip of the telson, inner lamella very slightly surpassing the outer. Length of the adult male: 17 mm.

*Hab*: Australian sea (Bass Strait, Port Jackson, Cape Howe), surface; rather plentiful.

Gen. 4. **Thysanoëssa** Brandt 1851.

Middendorf's Sibirische Reise. Zool.

*Generic Characters.* Body rather tapering posteriorly. Carapax short, distinctly rostrate, antero-inferior angles much produced. Eyes of somewhat irregular shape; upper part of the cornea more or less distinctly narrowed. Flagella of both pairs of antennæ very short. Antennular peduncle with the basal joint flattened, without any dorsal lappet, two last joints narrow and elongated. Terminal joint of 2nd pair of maxillæ not very large, exterior plate in both pairs of maxillæ well developed. First pair of legs rather small and narrow; 2nd pair very strongly developed, much larger than any of the others, geniculate, third joint very much elongated and almost naked, 5th joint compressed and provided on both margins with strong ciliated setæ, last joint very short and armed with curved spines. Subsequent pairs of legs rapidly diminishing in size, and of the usual form. 7th pair of legs very small, the stem biarticulate, exopodite distinct. Last pair of legs quite rudimentary, only forming a small inarticulate setigerous plate (exopodite). 3 posterior pairs of branchiæ complex. Inner lamella of the two anterior pairs of pleopoda in the male modified in the usual manner. Phosphorescent spherules as in *Euphausia*.

*Remarks.* This genus, the most marked feature of which is the strong development of the 2nd pair of legs, has been established by Brandt for the reception of an arctic species from the Sibirian sea, *Th. longipes*. I have described<sup>1</sup> two species from the Nor-

<sup>1</sup> G. O. Sars, Oversigt over Norges Crustaceer. I.

wegian coast, *Th. borealis* and *Th. tenera*, and in the 'Challenger' collection are two additional species from the southern hemisphere, to be described below.

29. *Thysanoëssa gregaria* n. sp.

Form of body rather short and stout. Carapax with a small lateral denticle at the posterior part of the inferior margin; rostrum produced, straight, keeled above and somewhat flattened at the sides, apex lanceolate. Postabdominal segments slightly compressed, with rounded epimera. Last segment somewhat longer than the preceding, præanal spine rather large and densely serrated at the posterior margin. Eyes very large and massive, irregularly globose, the cornea distinctly contracted above. Antennal scale surpassing the 2nd joint of the antennular peduncle, oblong, slightly curved, tapering anteriorly, apex obliquely rounded, outer edge prominent. 2nd pair of legs, when extended, exceeding half the length of the body, third joint reaching the tip of the antennular peduncle. Telson with two pairs of dorsal denticles, apex acuminate, subapical spines smooth. Inner lamella of the uropods only slightly surpassing the outer, and not quite reaching the tip of the telson. Length: 18 mm.

*Hab.* South Atlantic on several places (rather plentiful at Stat. 331 & 332), Subantarctic ocean (South of Cape of Good Hope and Australia), Pacific; surface.

30. *Thysanoëssa macrura* n. sp.

Form of body rather more slender than in the last species. Carapax with a single lateral denticle placed as in *Th. gregaria*; rostrum shorter, triangular, very slightly keeled above, apex acute. Postabdominal segments almost cylindrical, with very small epimera. Last segment very much elongated and narrow, as long as the two preceding together; præanal spine simple, ungviform. Eyes somewhat smaller than in the last species, but of a similar form. Antennal scale considerably surpassing the 2nd joint of the antennular peduncle, very narrow, sublinear, apex obtusely truncated.

2nd pair of legs much smaller than in *Th. gregaria*, by no means attaining half the length of the body, when fully extended. Telson rather elongated and much narrowed posteriorly. Inner lamella of the uropods much longer than the outer, and surpassing the tip of the telson. Length: 13 mm.

*Hab.* Antarctic ocean near the ice barrier, and off Kerguelen; surface.

### Gen. 5. **Nematoscelis**<sup>1</sup> n.

*Generic characters.* Form of body and structure of eyes and antennæ almost as in *Thysanoëssa*. Mandibular palpus very small. Terminal joint of 2nd pair of maxillæ poorly developed. 1st pair of legs slender, with the last joint compressed and provided with a row of ciliated spines. 2nd pair of legs greatly elongated and very narrow, filiform, almost quite naked, only last joint provided with a few setæ, forming a small brush at the tip of the leg. The subsequent pairs of legs much smaller and stouter than the 1st, with the terminal portion very short. 7th pair of legs with the stem small, twojointed. Last pair quite rudimentary, only forming a broad setiferous lamella (exopodite). Most of the branchiæ sending off a narrow branch on the ventral face, the 2 posterior pairs very complex. Phosphorescent organs as in *Thysanoëssa*.

*Remarks.* This new genus is nearest allied to *Thysanoëssa*, but is readily distinguished by the structure of the legs, especially the greatly elongated and filiform 2nd pair. 4 different species of this genus are represented in the 'Challenger' collection.

#### 31. *Nematoscelis megalops* n. sp.

Body rather stout, tapering posteriorly. Carapax without any lateral denticle, anterior part keeled above; rostrum very narrow, subulate, and generally curved downward at the tip. 4th and 5th postabdominal segments slightly keeled above. Last segment longer than the preceding; præanal spine simple, ungviform. Eyes

<sup>1</sup> Derived from νῆμα: a thread and σκελίς: a shin-bone.

enormously developed, irregularly globose, the cornea contracted in the middle. Antennal scale elongated, almost reaching the tip of the antennular peduncle, very narrow, linear, apex truncated, the denticle on the outer edge distinct. 2nd pair of legs very much elongated and, when fully extended, as long as the whole body, third joint widely surpassing the tip of the antennular peduncle, penultimate joint somewhat shorter than the preceding. Telson rather elongated and narrow, apex acuminate; subapical spines smooth. Inner lamella of the uropods longer than the outer and surpassing the tip of the telson. Length: 26 mm.

*Hab.* South Atlantic (Stat. 332 & 333), surface. Rather plentiful together with *Thysanoëssa gregaria*.

### 32. *Nematoscelis microps* n. sp.

Form of body somewhat more slender than in the last species. Carapax without any lateral denticle, very slightly keeled above in the anterior part; rostrum straight, acute, broad at the base. None of the postabdominal segments keeled above. Last segment as in *N. megalops*. Eyes much smaller than in that species, the cornea narrow in the upper part. Antennal scale rather broader than in *N. megalops*, and not reaching the tip of the antennular peduncle, apex obtusely truncated, the denticle on the outer edge small, but distinct. 2nd pair of legs, when fully extended, shorter than the body, third joint surpassing the tip of the antennular peduncle, penultimate joint longer than the preceding. Telson almost as in *N. megalops*; the subapical spines however somewhat shorter. Inner lamella of the uropods longer than the outer, but scarcely reaching the tip of the telson. Length: 16 mm.

*Hab.* North Atlantic (29 April 1876). 2 specimens. North Pacific West of Sandwick isl. 1 specimen with ovisacs (mounted).

### 33. *Nematoscelis tenella* n. sp.

Form of body very slender and narrow. Carapax with a small lateral denticle at the posterior part of the inferior margin; anterior part distinctly keeled above; rostrum rather produced, straight,

acuminate. Epimera of the postabdominal segments very small. Last segment rather elongated; præanal spine obsolete. Eyes of moderate size, subclavate, the cornea slightly contracted in the middle. Antennular peduncle very narrow and much elongated. Antennal scale not surpassing the 2nd joint of the antennular peduncle, rather narrow, linear, the apex truncated. 2nd pair of legs, when extended, much shorter than the body, third joint reaching to the tip of the antennular peduncle, penultimate joint longer than the preceding. Inner lamella of the uropods longer than the outer, and reaching the tip of the telson. Length: 10 m. m.

*Hab.* Tropical Atlantic, South of Cape of Good Hope, Pacific; surface. A few specimens.

#### 34. *Nematoscelis rostrata* n. sp.

Form of body somewhat shorter and stouter than in the last species. Carapax with a rather strong lateral denticle at the posterior part of the interior margin, and a conspicuous rounded crest above in front of the middle; rostrum much produced, almost reaching the end of the basal joint of the antennular peduncle, straight, acuminate. Last postabdominal segment somewhat longer than the preceding; præanal spine very small but distinct. Eyes rather large, the cornea distinctly contracted in the upper part. Antennal scale scarcely reaching the end of the 2nd joint of the antennular peduncle, sublinear, apex truncated. 2nd pair of legs somewhat shorter than in the last species, third joint not reaching the tip of the antennular peduncle. Uropods a little shorter than the telson, inner lamella slightly surpassing the outer. Length: 8 mm.

*Hab.* Tropical Atlantic (at Stat. 348); surface. A few specimens.

#### Gen. 6. **Stylocheiron**<sup>1</sup> n.

*Generic characters:* Form of body somewhat different in the different species. Eyes of more or less irregular shape. An-

<sup>1</sup> Derived from *στυλος*: a style and *χείρ*: a hand.

tennular peduncle in the female elongated and narrow, flagella of both pair of antennæ filiform, and consisting of few articulations. Mandibulæ quite wanting the palpi. 1st pair of maxillæ with the outer plate obsolete; 2nd pair indistinctly articulated, without spines at the inner margin, but only provided with a few ciliated setæ. Two anterior pairs of legs small and slender. Third pair of legs greatly developed, geniculate, 3d and 4th joint very much elongated and narrow, without setæ; 5th joint suddenly rather swollen and provided with strong setæ, which impinge against the curved spines issuing from the small terminal joint, both together forming a sort of hand or grasping organ. Succeeding pairs very small, the terminal part short, in the 5th pair only 2-jointed, in the 6th pair one-jointed. 7th pair of legs with the stem consisting of 2 short articulations. Last pair of legs quite rudimentary, only forming a small setiferous plate. The exopodites rapidly diminishing in size from the 1st to the last pair of legs. Branchiæ rather simple, excepting the last pair. Inner lamella of the two anterior pairs of pleopoda in the male modified in the usual manner. Only three phosphorescent spherules present, one ventral between the bases of the 1st pair of pleopoda, and two lateral at the bases of the 7th pair of legs, the last very largely developed in the male.

*Remarks.* This very distinct new genus is at once distinguished by the peculiar structure of the third pair of legs, which are so modified as to act as a sort of grasping organ. Also in other respects it differs somewhat considerably from the other Euphausiidæ. 5 different species of this remarkable genus are represented in the collection. All these are comparatively of very small size, but certainly cannot be regarded as larval stages, as at least in one of the species both ovigerous females and adult males have been observed. The genus is also known to me from an earlier date, a species having been observed by me in the Mediterranean at Messina in the year of 1876.

35. *Stylocheiron carinatum* n. sp.

Form of body rather stout, especially in the male. Carapax short in proportion to its height, distinctly keeled above, the keel forming in the anterior part a rounded crest; rostrum produced, straight, and very acute. Last postabdominal segment much longer than the preceeding. Eyes large, of irregular form, the cornea much narrowed in the upper part. Antennular peduncle shorter than the carapax, the two last joints subequal in length, very narrow in the female, but rather swollen in the male. Antennal scale only slightly surpassing the 2nd joint of the antennular peduncle, oblong, apex obliquely truncated, the denticle at the outer edge small. Third pair of legs, when extended, much shorter than the body, 4th joint shorter than the third, penultimate joint with 3 strong setæ at the posterior margin. Inner lamella of the uropods longer than the outer, and surpassing the tip of the telson. Length of ovigerous female: 11 mm.

*Hab.* Pacific (off Kandavu Fiji isl.), Celebes sea (of Mindanao Philipp.); surface. A few specimens.

36. *Stylocheiron Suhmii* n. sp.

Form of body almost as in the last species. Carapax however more elongated, without any distinct dorsal crest; rostrum somewhat shorter, acute. Last postabdominal segment only very slightly longer than the preceeding. Eyes much smaller than in *S. carinatum*, cornea much narrowed in the upper part. Antennular peduncle very slender and almost as long as the carapax, last joint longer than the 2nd. Antennal scale considerably surpassing the 2nd joint of the antennular peduncle, sublinear, apex very obliquely truncated, the denticle on the outer edge rather strong. Third pair of legs, when fully extended, almost as long as the body, third and 4th joints subequal in length, penultimate joint with only two setæ at the posterior margin. Uropods much shorter than the telson, inner lamella scarcely surpassing the outer. Length: 8 mm.

*Hab.* North of New Guinea; surface. 1 single specimen (mounted).



*Remarks.* A drawing of this species after life, with some manuscript notes of the late Dr. Willem. Suhm has been sent to me for reference, and I therefore take the occasion to associate the name of this lamented naturalist with the present species.

37. *Stylocheiron longicorne* n. sp.

Form of body rather slender and narrow. Carapax slightly keeled above in the anterior part, without however exhibiting any distinctly marked crest; rostrum rather short and sharply pointed. Last postabdominal segment not exceeding the others in length. Eyes rather large and compressed, the cornea very narrow, vertical, slightly contracted in the middle. Antennular peduncle very much elongated and slender, longer than the carapax, both flagella also rather long and filiform. Antennal scale slightly surpassing the 2nd joint of the antennular peduncle, almost of the same form as in *S. Suhmii*, the flagellum enormously prolonged, with very long articulations. Third pair of legs, when fully extended, exceeding in length the whole body, 4th joint a little shorter than third, the hand almost as in *S. Suhmii*. Uropods reaching the tip of the telson, both lamellæ nearly subequal. Length: 9 mm.

*Hab.* Off the Cape of Good Hope (19de December 1873). 1 specimen (mounted).

38. *Stylocheiron elongatum* n. sp.

Form of body very slender and elongated. Carapax somewhat gibbous above in the anterior part; rostrum very short, triangular, only slightly surpassing the ocular segment. Last postabdominal segment very elongated, exceeding in length the two preceding together; præanal spine obsolete. Eyes very large, somewhat compressed, the cornea oblong vertically, and slightly contracted in the middle. Antennular peduncle almost as long as the carapax, the two last joints only slightly dilated in the male. Antennular scale surpassing the 2nd joint of the antennular peduncle, rather narrow, apex obliquely tapering, outer edge prominent. Third pair of legs, when extended, shorter than the body, third joint longer

than the 4th, hand rather swollen, with a strong spine at the posterior margin near the tip; last joint ungviform, and armed at the base with several curved spines. Inner lamella of the uropods much longer than the outer, and surpassing the tip of the telson. Length of adult male: 13 mm.

*Hab.* South Atlantic (March 1876); surface. 2 specimens.

39. *Stylocheiron abbreviatum* n. sp.

Form of body very short and stout. Carapax very unusually abbreviated, with a slight rounded crest above, rostrum rather produced, straight, lanceolate, the tip very acute and somewhat deflexed. Last postabdominal segment much longer than the preceeding. Eyes enormously developed, the pedicle very much swollen, cornea narrowed in the upper part. Antennular peduncle rather elongated, the two last joints narrow and subequal in length. Antennal scale large, considerably surpassing the 2nd joint of the antennular peduncle, sublinear, apex obliquely truncated, the denticle on the outer edge small, but distinct. Third pair of legs, when extended, not attaining the length of the body, 4th joint only half the length of the third, hand rather elongated, and armed with a strong spine at the end posteriorly, terminal joint ungviform, both together forming a rather complete chela. Inner lamella of the uropods somewhat longer than the outer, and slightly surpassing the tip of the telson. Length: 8 mm.

*Hab.* Australian sea (off Port Jackson), Arafura sea, Celebes sea (off Mindanao, Philipp.); surface. A few specimens.

Fam. 4.

Mysidæ.

Gen. 1. **Petalophthalmus.** Will. Suhm 1879.

Transact. Linn. Soc. Lond. Vol. 1. 2 ser.

40. *Petalophthalmus armiger* Will. Suhm.

*Petalophthalmus armiger*, Willem. Suhm, Transact. Linn. Soc. Lond. 2. ser. Vol. 1. pg. 40. pl. VIII.

*Remarks.* I have not myself been enabled to examine this remarkable form, which is wanting in the collection sent to me. But the description of Willem. Suhm seems to warrant its claim to be regarded as the type of a distinct genus, although nearly allied to *Boreomysis*.<sup>1</sup>

Gen. 2. **Boreomysis.** G. O. Sars 1869.

"Undersøgelser over Christianiafjordens Dybvandsfauna."

41. *Boreomysis scyphops.* G. O. Sars.

*Boreomysis scyphops*, G. O. Sars, Crustacea & Pycnogonida nova Expeditionis Norvegicæ No. 3.

*Petalophthalmus inermis* Willem. Suhm M. S.

*Hab.* Antarctic ocean (Stat. 147, 157, 158), depth from 1600 to 1950 fms.

*Remarks.* I do not find any essential difference between the 'Challenger' specimens of this gigantic deep-sea Myside and the specimens procured during the Norwegian Expedition West of Spitsbergen. The occurrence of this form in the great deeps of both the arctic and antarctic oceans is very interesting.

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<sup>1</sup> Since the above was printed, Prof. Murray has forwarded me a rather well preserved male specimen, which will enable me to include also this interesting genus in my Report.

42. *Boreomysis obtusata* n. sp.

Form of body somewhat robust. Carapax rather large, covering the whole anterior division of the body, with a very marked cervical furrow across the anterior part, antero-inferior angles exserted and triangular, frontal margin produced, and obtusely truncated anteriorly, with only a very slight projection in the middle, as a rudiment of rostrum. Last postabdominal segment rather elongated. Eyes short, but rather expanded, somewhat flattened, almost circular, the cornea deeply emarginated above. Antennular peduncle rather strong, and of the structure peculiar to the genus. Antennal scale surpassing by half its length the antennular peduncle, very slightly tapering, apex truncated, the denticle on the outer edge well marked. Telson about as long as the last segment, slightly tapering posteriorly, the lateral margins densely and unequally spinous, apical incision occupying about  $\frac{1}{5}$  of the length of the telson, rather narrow, and densely serrated at the margins. Uropods of the usual structure. Length of adult male: 30 mm.

*Hab.* Off coast of Japan (Stat. 232), 346 fms. A single specimen, adult male. — North Pacific (Stat. 252), 2740 fms. Another male specimen.

*Remarks.* This new species is most nearly allied to the Norwegian form *B. tridens*, but readily distinguished by the obtusely rounded frontal margin.

43. *Boreomysis microps* n. sp.

Form of body somewhat more slender than in the last species. Carapax rather large, and of the usual form, frontal margin arched, with a slight pointed projection in the middle. Last postabdominal segment elongated and narrow. Eyes very small, only slightly expanded at the apex, claviform, cornea occupying only a small part of the upper face. Antennular peduncle somewhat more slender than in *B. obtusata*. Antennal scale only surpassing the antennular peduncle by  $\frac{1}{4}$  of its length, apex truncated, the den-

ticle on the outer edge rather small. Telson much longer than the last segment, very narrowed in the outer part, lateral margins armed with rather strong spines intermingled with numerous much smaller ones, apical incision rather short, only occupying  $\frac{1}{7}$  to  $\frac{1}{8}$  of the length of the telson, very narrow at the bottom, terminal lobes obtusely rounded at the tips. Inner lamella of the uropods considerably surpassing the telson. Length: 24 mm.

*Hab:* North Atlantic, South of Nova Scotia U. S. (Stat 50), 1250 fms. 1 broken specimen, adult female.

Gen. 3. **Amblyops.** G. O. Sars 1872.

"Monographie over Norges Mysider", Hefte 2.

44. *Amblyops Crozetii*, Willem. Suhm M. S.

Form of body about as in the typical species. Carapax rather large, almost entirely covering the anterior division of the body, the cervical sulcus well marked, frontal margin evenly arched. Last postabdominal segment somewhat longer than the preceding. Ocular plates rather large; and of the usual form, with a little dentiform projection anteriorly. Antennal scale by about half its length surpassing the antennular peduncle, of somewhat rhomboidal form, the denticle of the outer edge placed almost in the middle of the length of the scale, inner corner (or apex) projecting in the form of a narrow lingviform lobe. Legs rather slender, terminal portion very narrow, with the first joint longer than the two last together. Pleopoda of the male strongly developed. Telson relatively short, scarcely as long as the last segment, apex broadly truncated or slightly emarginated in the middle, with numerous strong apical spines. Inner lamella of the uropods considerably surpassing the telson, and about half as long as the outer, auditory organ very slightly developed. Length of adult male: 29 mm.

*Hab.* Subantarctic ocean (off Crozet isl.) Stat. 147, 1600 fms. 1 single specimen, adult male.

*Remarks.* From the typical species, *Amblyops abbreviata*, this form is readily distinguished by the different shape of the antennal scale and of the telson. It is also of rather larger size.

45. *Amblyops australis* n. sp.

Frontal margin of the carapax evenly arched. Ocular plates divided by a longitudinal keel, forming a slight projection anteriorly, external part somewhat hollowed. Antennular peduncle rather short and robust. Antennal scale by about half its length surpassing the antennular peduncle, rather narrow, lanceolate, the spine on the outer margin placed close to the base of the scale. Posterior part of body wanting in the specimen examined. Length of anterior division: 3 mm.

*Hab.* Off entrance to Port Philip, Bass Strait (Stat 161), 38 fms. Only the anterior division of the body of an adult male.

*Remarks.* Although only represented by a fragment, this form may be satisfactorily distinguished from either of the two other species by the rather different shape of the ocular plates and of the antennal scales.

Gen. 4. **Pseudomma** G. O. Sars 1869.

"Nye Dybvandscrustaceer fra Lofoten". Chr. Vid.-Selsk. Forhandl. f. 1869.

46. *Pseudomma Sarsii* Willem. Suhm M. S.

Form of body about as in *P. roseum*. Carapax rather small and narrow, not completely obtecting the anterior division of the body, the two last segments of which remain uncovered, frontal margin evenly arched. Postabdomen subcylindric, scarcely tapering posteriorly; last segment longer than the preceeding. Ocular plates rather large, slightly curved, with an obtuse angle anteriorly, lateral margin in its anterior half serrated. Antennal scale by almost half its length surpassing the antennular peduncle, oblong, apex somewhat obliquely truncated, the denticle on the outer edge not far removed from the apex, inner edge bluntly produced. Ambulatory legs wanting in the specimens examined. Telson about as long as the last segment, lingviform, apex broadly rounded, and armed with 10 strong spines, the 6 innermost of which are very long, marginal spines rather small. Uropods of the usual structure. Length: 14 mm.

*Hab.* Off Christmas Harbour Kerguelen, 120 fms. Several specimens. Antarctic ocean (Stat. 153), 1675 fms. 1 single rather large but imperfect specimen.

*Remarks.* This species is very nearly allied to *P. roseum* from the Norwegian coast, but may be known by the somewhat different form of the antennal scale and of the telson, the armature of which also exhibits some difference.

### Gen. 5. **Anchialus** Kröyer.

Naturhist. Tidsskrift. 2 Række. Bind 1.

#### 47. *Anchialus truncatus* n. sp.

Form of body rather short and stout. Carapax very large, expanded posteriorly, and obtecting the whole anterior division of the body and part of the posterior, hinder margin straight, and not, as usual, emarginated above; rostrum forming a rather broad horizontal plate, advancing over the base of the eyes, with the apex truncated or slightly emarginated in the middle. Postabdominal segments cylindric, the anterior in the female slightly fornicate, last somewhat longer than the preceeding. Eyes of moderate size, claviform, slightly expanded at the apex. Antennular peduncle short and thick, with the last joint about as long as the two others together. Antennal scale very small, scarcely surpassing the basal joint of the antennular peduncle, rhomboidal, the denticle on the outer edge almost obsolete. Legs of the usual structure. Marsupial poche in the female very large. Telson rather large, as long as the two last segments together, very slightly tapering, lateral margins straight, and armed with rather long denticles, apical incision only occupying  $\frac{1}{7}$  of the length of the telson, rather narrow at the bottom, its margins densely spinous, terminal lobes acuminate, and each armed with a very strong apical spine. Inner lamella of the uropods reaching the tip of the telson, outer margin setose, inner strongly spinous, outer lamella rather shorter, with a row of small spines along the outer half of the exterior margin, apex obtusely rounded. Length of adult female: 9 mm.

*Hab.* Off the Cape of Good Hope (Stat. 141); surface. Several specimens, both males and females.

*Remarks.* In its outer aspect this species is very much like *A. agilis* G. O. Sars from the Mediterranean, but is at once distinguished by the form of the rostrum, which is truncated or slightly emarginated at the tip, while it is sharply pointed in the Mediterranean species. It also differs from the description and drawings given by Kröyer of *A. typicus*.

48. *Anchialus angustus* n. sp.

Form of body much more slender and narrow than in the last species. Carapax comparatively much smaller, not covering the anterior division of the body, its posterior margin being deeply emarginated above, so as to leave uncovered the dorsal portion of the two last segments; rostrum short, pointed, frontal margin forming on both sides an obtuse dentiform lobe, projecting between the eyes and the base of the antennæ; antero-inferior angle with two sharp denticles pointing anteriorly. Postabdomen subcylindric, slightly tapering posteriorly, anterior segment distinctly fornicate, last as long as the two preceding together. Eyes rather narrow, scarcely expanded at the apex, cornea slightly emarginated above. Antennular peduncle more slender than in *A. truncatus*, last joint shorter than the two others together. Antennal scale small, but considerably surpassing the basal joint of the antennular peduncle, apex obliquely truncated, the denticle on the outer edge distinctly developed. Telson shorter than the two last segments together, rather narrow, slightly tapering, apical incision small, angulate, terminal lobes acuminate, and each armed with a strong apical spine. Inner lamella of the uropods considerably surpassing the telson, with only few slender spines at the inner margin; outer lamella somewhat shorter, with only two small spines in the middle of the outer margin, placed close together. Length of adult female: 10 mm.

*Hab.* Off entrance to Port Philip, Bass Strait (Stat. 161), 38 fms. 3 specimens.



Gen. 6. **Mysidopsis** G. O. Sars 1864.

"Beretning om en i Sommeren 1863 foretagen zoologisk Reise".

49. *Mysidopsis(?) incisa* n. sp.

Form of body rather elongated and narrow. Carapax very small, leaving the two last segments of the cephalothorax uncovered, frontal margin only very slightly projecting in the middle, without forming any distinct rostrum. Postabdomen cylindric, scarcely tapering posteriorly, last segment somewhat longer than the preceding. Eyes very large, pyriform, the cornea deeply emarginated above: Antennal scale rather small, only surpassing the antennular peduncle by its outer third part, narrowly lanceolate, apex obtusely pointed, both margins and apex setiferous. Telson somewhat shorter than the last segment, broad at the base, and rather tapering in its exterior part, lateral margins spinous, apex deeply incised, the incision occupying more than  $\frac{1}{4}$  of the length of the telson, rounded at the bottom, margins densely serrated, terminal lobes very narrow, the apical spines not longer than the laterals. Length 8 mm.

*Hab.* Off entrance to Port Philip, Bass Strait (Stat. 161), 38 fms. 1 single imperfect specimen, adult female.

*Remarks.* It may be, that this form, of which only a much mutilated specimen is in the collection, does not belong to the genus *Mysidopsis*; but to judge from the characters to be examined without dissection, I cannot refer it to any other known genus of *Mysidæ*.

Gen. 7. **Siriella** Dana 1852.

United States Exploring Expedition, Vol. 13, Part 1.

(*Cynthia* Thompson, not Savigny).

50. *Siriella Thompsonii* Edwards.

*Cynthia* sp. V. Thompson, Zool. Researches, pg. 55, pl. VI.

*Cynthia Thompsonii*, Milne Edwards, Histoire naturelle des Crustacés, Tome II, pg. 462.

*Cynthia inermis*, Krøyer, Naturhist. Tidsskrift, 2. Række, Bd. 1, pg. 44, pl. II, fig. 6, a—q.

*Siriella Edwardsii*, Claus, Zeitschrift für wiss. Zool., Bd. XVIII, Heft. 2, pg. 271, pl. XVIII.

*Hab.* North- and South-Atlantic, Pacific, at many different places; surface.

*Remarks.* I cannot doubt, that all the forms, described under the different names referred to above, belong to one and the same species, and that this is the one, first described by V. Thompson as *Cynthia*. It is a widely distributed pelagic species.

51. *Siriella gracilis* Dana.

*Siriella gracilis*, Dana, United States Explor. Exped., Vol. XIII. *Crustacea*, pg. 658, pl. 44, fig. 1, a—g.

*Hab.* Pacific ocean, Arafura sea, Celebes sea; surface.

Gen. 8. **Euchætomera** n.

*Generic characters.* Carapax deeply emarginated posteriorly, rostral projection slight. Eyes of somewhat irregular shape, the cornea being contracted in the middle. Antennular peduncle of moderate size, and in the male provided with a distinct hairy lobe beneath the flagella. Antennal scale relatively short, with the outer margin naked, and produced in a conspicuous spine, inner margin and apex with very long and strong setæ. Legs rather elongated, and provided with strong setæ, terminal portion 3-articulated, apical claw well marked. Marsupial poche in the female of the same structure as in *Mysis*. Pleopods in the female simple, but rather large, laterally extended, and provided with very strong marginal setæ; in the male biramous and natatory. Telson unusually short, lamelliform, rounded, apex truncated, and provided in the middle with two very long ciliated setæ. Uropods with much elongated and narrow lamellæ, clothed all around the margins with very long and strong setæ. Auditory organ at the base of the inner lamella distinctly developed.

*Remarks.* This new genus may readily be known by the very short lamelliform telson, somewhat agreeing in form with the same in the genus *Erythrops*, as well as by the very strong setæ on the legs, pleopoda, uropoda and antennal scales. The two species, characterised below, have not been quite satisfactorily examined, owing

to their being mounted on glass-slides in narrow cells, whereby the body has been partly crushed and deformed.

52. *Euchætomera typica* n. sp.

Form of body apparently rather short and robust. Carapax with a distinct, but short pointed rostral projection. Last post-abdominal segment slightly longer than the preceeding. Eyes not very large, and separated by a distinct interstice. Antennal scale surpassing the antennular peduncle by about its third part, oblong, apex obliquely truncated, the spine of the outer edge remarkably strong and slightly pointing outward. Telson quite as broad as long, lateral margins armed with 6 strong denticles on each side. Outer lamella of the uropods surpassing the inner by almost its third exterior part, very narrow, and somewhat flexuous at the base. Length of adult female: 14 mm.

*Hab.* North Pacific (Stat. 244, 246, 252); surface. 3 specimens.

53. *Euchætomera tenuis* n. sp.

Form of body apparently much more slender than in the last species. Rostral projection very slight. Last postabdominal segment much longer than any of the preceeding. Eyes rather large and placed close together, almost contiguous. Antennal scale very narrow, sublinear, slightly arcuated, apex obliquely truncated, the spine on the outer edge much smaller than in *E. typica*. Legs very slender. Telson without any marginal denticles, apex narrowly truncated. Uropods almost as in *E. typica*. Length: 8 mm.

*Hab.* South Pacific, off the coast of Chili; surface. A single specimen, female.

Gen. 9. **Promysis** Dana 1859.

United States Expl. Exped. Vol. XIII. *Crustacea*.

54. *Promysis* (?) *pusilla* n. sp.

Form of body rather short and stout. Carapax apparently covering the whole anterior division of the body, with a very marked cervical

sulcus, rostral projection very slight. Postabdominal segments somewhat depressed; last of them considerably longer than any of the preceding. Eyes of moderate size, claviform, the cornea evenly rounded. Antennular peduncle rather strong, with the last joint as long as the two others together. Antennal scale small, much shorter than the antennular peduncle, obliquely truncated at the apex, outer margin naked and produced in a short spine. Legs rather feeble, with the terminal portion short, 3-articulate. Telson elongated and narrow, lateral margins spinous, apex slightly incised in the middle(?). Lamellæ of the uropods subequal in length, and provided with very long setæ. Length of adult female only 3 mm.

*Hab.* Celebes sea (at Stat. 199). 2 specimens, both ovigerous females.

*Remarks.* As both specimens of this form have been mounted in Canada balsam on a glass slide, I have not been enabled to make any closer investigation of the present species, and therefore only preliminarily refer it to the genus *Promysis* of Dana, believing that it cannot be properly referred to any other known genus of Mysidæ.

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