© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

The Cumacea of the Puritan Expedition.

By

W. T. Calman, D. Sc.
British Museum (Natural History).

With plates 27 and 28.

The Cumacea dealt with in this paper were collected by the late Herr F. A. Krupp during the cruise of his yacht Puritan in the neighbourhood of Capri in 1902, and were entrusted to me for examination by the kindness of Dr. Anton Dohrn.

The collections obtained by the Puritan have already formed the subject of a paper by Dr. Lo Bianco (Mitth. Stat. Neapel 1903 16. Bd. pp. 109—278 Taf. 7—9), in which a number of Cumacea are recorded. Of the nineteen species which are there named, some, I understand, were identified by Prof. G. O. Sars and some by Dr. Lo Bianco himself. Certain of the specimens sent to me were accompanied by labels in the handwriting of Prof. Sars and it need hardly be said that I have found no reason to dispute the correctness of the identifications. On the other hand there are on Dr. Lo Bianco's list the following six species of which I can discover no specimens in the collection sent to me:

Leucon nasica Kröyer, *L. fulvus* G. O. Sars, *Campylaspis horrida* G. O. Sars, *C. undata* G. O. Sars, *C. costata* G. O. Sars, *Diastylis spinulosa* Heller.

It is to be regretted that the authority for the identification of these species was not given as some doubt must remain as to their occurrence in the Mediterranean[1].

I have recently reported on a large collection of Cumacea from the West of Ireland (Fisheries Ireland Sc. Invest. 1904 N: 1 (1905)) and it is of interest to compare the results with those set forth in the present paper.

[1] It need hardly be pointed out that *Diastylis serrata* and *Diastyloides serrata* of Dr. Lo Bianco's list (l. c. p. 256) are one and the same species.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Species obtained by the Puritan near Capri. Depth 100—1200 metres.	Species obtained by the Helga off the West of Ireland. Depth 50-382 fath. (about 90-700 metres).
Cyclaspis longicaudata	*Cyclaspis longicaudata.*
	Cyclaspoides Sarsi.
	Vauntompsonia cristata.
Bathycuma brevirostris	*Bathycuma brevirostris.*
Leucon pallidus	*Leucon pallidus.*
- *longirostris.*	
- *siphonatus*	*Leucon siphonatus.*
	Eudorella truncatula.
	- *hispida.*
	Cumella pygmæa.
	- *gracillima.*
Cumella sp.	
Nannastacus unguiculatus . . .	*Nannastacus unguiculatus.*
- *longirostris.*	
Cumellopsis puritani n. sp.	
	Cumellopsis helgæ.
	Platycuma holti.
Procampylaspis armata	*Procampylaspis armata.*
- *bonnieri* n. sp.	
Campylaspis glabra	*Campylaspis glabra.*
	- *nitens.*
- *verrucosa*	- *verrucosa.*
- *sulcata*	- *sulcata.*
	- *rostrata.*
- *macrophthalma.*	
- *vitrea* n. sp.	
- *spinosa* n. sp.	
	Ceratocuma horrida.
	Hemilamprops rosea.
	- *uniplicata.*
Hemilamprops cristata	- *cristata.*
Platyaspis typica	*Platyaspis typica.*
	- *orbicularis.*
	Diastylis cornuta.
	- *Josephinæ.*
	- *echinata.*

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Species obtained by the Puritan near Capri. Depth 100-1200 metres.	Species obtained by the Helga off the West of Ireland. Depth 50-382 fath. (about 90-700 metres).
Diastylis insignis	*Diastylis insignis.*
- *capreensis* n. sp.	
	- *tubulicauda.*
Diastyloides serrata	*Diastyloides serrata.*
	- *biplicata.*
- sp.	
Leptostylis macrura	*Leptostylis macrura.*
	- *longimana.*
Diastylopsis sp.	*Diastylopsis* sp.

It will be seen from this table that, of the 25 species recorded from depths exceeding 100 metres in the Mediterranean, 15 occur at corresponding depths off the West of Ireland. There is little doubt that further collecting will add considerably to the number of species common to both regions. At the same time the amount of collecting which has been done off the Irish coast is sufficient to make it probable that no very common and generally distributed species has been overlooked. It is for this reason that I would attach special importance to the cases of species occurring in the Mediterranean which have not been taken off the Irish coast. Of these, *Leucon longirostris*, which is one of the most abundant species in the present collection, has previously been recorded from off the coast of Portugal and from the entrance to Davis Straits. It has not been found hitherto, however, at depths less than 500 fathoms (about 900 metres) and as the Helga collections examined by me did not extend below 400 fathoms it is possible that its special habitat had not been reached. Apart from this and from the new species, which may be found hereafter to have a wider distribution, the only species occurring in the Puritan but not in the Helga collections are *Nannastacus longirostris* and *Campylaspis macrophthalma.* Neither of these has hitherto been found elsewhere than in the Mediterranean. Both were obtained in comparatively shallow water (100—200 metres) and it is quite probable that they have a less extensive range than have the species from deeper water.

The types of the new species described in this paper have been presented by Dr. Anton Dohrn to the British Museum (Natural History).

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Family **Bodotriidae.**

Cyclaspis longicaudata G. O. Sars.

C. longicaudata, G. O. Sars, Crust. Norway Vol. 3 1899 p. 16, pls. 7 and 8.

No specimens from station 8 were in the collection sent to me. Dr. Lo Bianco however records young specimens from this station, the depth of which, 120 metres, is considerably less than any hitherto recorded for the species. The specimens of both sexes are all immature.

Occurrence. — Stations [8] 17, 18, 23, 26, 39, 44. Depth 120—1100 metres.

Family **Vauntompsoniidae.**

Bathycuma brevirostris (Norman).

Leucon brevirostris, Norman, Ann. Mag. N. H. (5) Vol. 3 1879 p. 71.

Vaunthompsonia caeca, Bonnier, Ann. Univ. Lyon Tome 26 1896, p. 536, pl. 28 fig. 3.

Bathycuma brevirostris, Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 18.

All the specimens are immature. The largest, a female, measures a little over 8 mm. in length.

Occurrence. — Stations 17, 18, 26, 39, 44. Depth 950—1100 metres.

Family **Leuconidae.**

Leucon pallidus G. O. Sars.

L. pallidus, G. O. Sars, Crust. Norway Vol. 3 1900 p. 33 pl. 25; Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 19.

Four immature specimens agreeing with those from the West of Ireland which I have referred to this species.

Occurrence. — Station 29. Depth 100 metres.

Leucon longirostris G. O. Sars (Pl. 27, figs. 1—8).

L. longirostris, G. O. Sars, Svenska Vet. Akad. Handl. 9. Bd. 1871 No. 13 p. 42 fig. 75. Norman, Ann. Mag. N. H. (5) Vol. 3 1879 p. 69.

Description of sub-adult female (fig. 1). Total length 5,7 mm.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Carapace (including pseudo-rostrum) about $3^1/_2$ times in total length, the dorsal crest horizontal posteriorly, strongly curved downwards in front and armed in its anterior two-thirds with about seven stout curved teeth, well separated and diminishing in size posteriorly. Pseudorostrum (fig. 2) more than $^1/_3$ of total length of carapace, straight, tapering to an acute point and directed slightly upwards. The lower margin bears two or three more or less distinct teeth near the base. Antero-lateral margin nearly straight with a narrow but deep antennal notch above which bears three or four stout teeth. Antero-lateral angle not produced but bearing a strong tooth, followed by a series of successively diminishing teeth on the lower margin. The pleural plate of the penultimate thoracic somite is produced into a sharp curved tooth posteriorly, and there is a pair of curved teeth on the sternal surface of the last thoracic somite (not one as stated by Norman) a little in front of the insertion of the last pair of legs (fig. 3). The abdomen is about equal in length to the cephalothoracic region.

The antennules (fig. 4) have the outer flagellum composed of three segments, the first equal in length to the last segment of the peduncle and the terminal one very small. The inner flagellum is unsegmented and is equal in length to the first segment of the outer. It bears several long and rather stout setæ at the tip.

There is a row of strong teeth on the lower surface of the basis of the first legs. Uropods (fig. 5) a little shorter than the last two somites together, the peduncle longer by one quarter than the last somite, carrying about five spines on its inner edge. Endopod one-third longer than the peduncle, the proximal segment more than three times as long as the distal. Fifteen spines on inner edge of proximal and five on distal segment besides the stout terminal spine. One long and several short setæ on outer margin. Exopod a little longer than first segment of endopod, bearing setæ on both margins and a group on the apex.

Adult male (fig. 6). Total length 6,0 mm. Carapace $^1/_4$ of total length, the dorsal crest unarmed. Pseudorostrum (fig. 7) $^1/_5$ of total length of carapace, horizontal and obliquely truncate. The lower angle bears one or two teeth. Antero-lateral margin straight and vertical, without antennal notch, with two teeth above near base of pseudorostrum. Tooth on antero-lateral angle followed by a series of serrations on anterior part of lower margin.

The pleural plate of the penultimate thoracic somite is not

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

produced posteriorly, but the sternal surface of the last somite bears two curved teeth as in the female. The outer flagellum of the antennules is composed of four segments. As in the female the inner flagellum is equal in length to the first segment of the outer.

Uropods (fig. 8) considerably longer than the last two somites together, peduncle about one-third longer than the last somite with about nine long spines and setæ on its inner edge. Endopod nearly one-half longer than peduncle, the proximal segment four times as long as the distal. There are very numerous spines of varying length on the inner edge and a few on the outer edge. Exopod not quite as long as the first segment of endopod.

Remarks. — This species was described by Sars from a fragmentary and immature male specimen. Norman added some details from a female specimen, probably also immature. The females and young in the present collection resemble closely Sars' very characteristic figure and some of the specimens sent to me bore labels in Prof. Sars' handwriting. There can, therefore, be no question as to the identification, although Sars' description of the inner ramus of the antennule as "rudimentær og knudeformig" is at variance with the characters of the specimens examined by me.

Occurrence. — Stations 17, 18, 26, 30, 39, 44, 57. Depth 950—1200 metres.

Distribution. — Off coast of Portugal, 550 fathoms (Sars); at entrance of Davis Straits, 1750 fathoms (Norman).

Leucon siphonatus Calman (Pl. 27 fig. 9).

L. siphonatus, Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 19, pl. 1 figg. 2—4.

This species, which was described from a single immature female obtained off the West of Ireland, is represented by a number of specimens including adults of both sexes in the present collection. Unfortunately nearly all the specimens are in poor condition and I am therefore unable to add much of importance to the description already given. The Mediterranean specimens are much smaller than that from Ireland. A female with brood-pouch well developed measures only 2.7 mm., while the type-specimen, though immature, is 3.85 mm. in length. The structural differences however are so slight that there can hardly be any hesitation in referring them to the same species. The Naples specimens have generally two teeth in place of one on the dorsal edge of the carapace close to the base

©Biologiezentrum Linz; download unter www.biologiezentrum.at; www.zobodat.at

of the pseudorostrum, the teeth on the anterior margin, above the antennal notch, are longer than in the type-specimen, and those on the lower edge of the pseudorostrum are apparently not always present. The most important difference, however, is in the proportions of the antennule. In the younger specimens this appendage agrees fairly well with the figure and description already given. In those approaching maturity, however, and in the adult female (fig. 9) it is much more slender, with the last segment of the peduncle longer by about $^1/_3$ than the preceding and a little longer than the external flagellum. The branchial siphon is in some cases protruded to a greater length than in the type-specimen, sometimes to considerably more than the length of the carapace. At the tip of the endopod of the uropods what was described as a "long slender spine" is in reality a stout, plumose seta and, in addition to the spine at the base of this seta, the distal segment of the endopod has three spines on its inner edge.

The adult male specimens are unfortunately fragmentary. No teeth appear on the dorsal edge of the carapace nor on the lower edge of the pseudorostrum. Save for the absence of the antennal notch, the armature of the antero-lateral margin of the carapace seems not to differ greatly from that of the female.

In referring to *L. tenuirostris*, Sars, as the only species agreeing with the present one in having a large inner ramus on the antennule, I overlooked ZIMMER's *L. septemdentatus* (Hamburger Magalhaensische Sammelreise, Cumacea 1902 p. 3) which however is distinguished by the widely open antennal notch and other characters. As has been shown above *L. longirostris* Sars must now be added to the same group of species.

Occurrence. — Stations 8, 17, 18, 26, 29, 44. Depth 100—1100 metres.

Family **Nannastacidae.**

Cumella sp.

Two female specimens which, though nearly or fully adult measure only about 1,75 mm. in total length, occurred at Station 29. They appear to differ in certain characters from all the described species of the genus, but as neither of them is in a very good state of preservation I have not thought it advisable to attempt to diagnose the species.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Occurrence. — Station 29. Depth 100 metres.

Nannastacus unguiculatus Spence Bate.

N. unguiculatus, G. O. Sars, Arch. Math. Nat. 4. Bd. 1879 p. 109, pls. 55—57.

Four female specimens are referred to this species, but as they are extremely dirty and otherwise in poor condition their exact agreement in all details with each other or with the published descriptions cannot be asserted. One of them at least has the spines on the surface of the carapace more numerous and longer and all of them have the antero-lateral angle less produced than in Sars' figure.

Occurrence. — Station 25. Depth 200 metres.

Nannastacus longirostris G. O. Sars.

N. longirostris, G. O. Sars, Arch. Math. Nat. 4. Bd. 1879 p. 119, pls. 58, 59.

A single male specimen of this peculiar species was obtained. It agrees well with Sars' figures in almost all characters visible without dissection but the antennules are considerably longer and more slender.

Occurrence. — Station 29. Depth 100 metres.

Distribution. — Spezia, 6—10 fathoms (Sars).

Cumellopsis Puritani n. sp. (pl. 27 figs. 10—12).

Five specimens in the present collection resemble very closely the species which I have described under the name *C. helgæ* (Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 28) but present differences which seem to forbid, for the present, their identification with that species. The type specimens of *C. helgæ* are an adult female and an immature male, while the present form is represented by adult and immature males. Comparing the immature specimens of the two the following are the chief differences to be observed. The size of the Mediterranean specimens is much less, the largest immature male measuring 2.7 mm. against 4.7 mm. in the Irish specimens and the adult male (fig. 10) about 3.6 mm. while the sub-adult female formerly described measures 5.8 mm. The longitudinal depression on the side of the carapace is bounded below by a sharply marked ridge or fold which is conspicuous even in the youngest specimens. In the type-specimens of *C. helgæ* this ridge is represented by a low rounded swelling which only at its anterior

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

end, close to the antero-lateral corner, becomes sharply defined. The antennal notch is more widely open than in the specimen formerly figured but this is doubtless a sexual character. The antero-lateral angle is less acute in the present specimens, but this character also varies with age and sex and is moreover subject to great apparent alteration with a slight change in the position in which the specimen is viewed. The antennules, antennæ and legs are all a little more slender than in the immature male from which these appendages were figured. The antennal flagella are not complete in any of the specimens but their appearance suggests that they do not attain the length of the body. The sides of the abdominal somites are not grooved for their reception. The uropods (fig. 12) have the peduncle shorter and the rami longer than in the Irish specimens. Thus while in immature males of both forms the uropods are longer by about $^1/_6$ than the last two somites together, in the Mediterranean specimen the endopod is nearly equal to the peduncle (24 : 27) but in the Irish specimen it is not $^2/_3$ of that length (16 : 27). In the adult male the endopod is nearly $^3/_4$ of the length of the peduncle. In the shape and proportions of the segments of the other appendages no noteworthy differences from the types of *C. helgæ* appear to exist.

Occurrence. — Station 17, 18, 39, 44. Depth 950—1100 metres.

Procampylaspis.

This genus was founded by Bonnier for the reception of two forms which he regarded as distinct species, *P. armata* and *P. echinata.* I have already suggested (Fisheries Ireland Sc. Invest. 1904 N: 1 [1905] p. 33) that these two species must be united, the first being described from a young male and the second from an adult male specimen. A new species occurs in the present collection and is described below.

Procampylaspis armata Bonnier (pl. 27 figs. 13—20).

P. armata, Bonnier, Ann. Univ. Lyon Tome 26 1896, Campagne du Caudan p. 541 pl. 29 fig. 1 [Immature ♂].

P. echinata, Bonnier, l. c. p. 544, pl. 29 fig. 2 [Adult ♂].

Description of immature female (figs. 13, 14). Total length 3.5 mm.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Carapace over $^2/_5$ of the total length, slightly compressed, oval in outline as seen from above. Seen from the side the dorsal outline is moderately arched and the short pseudorostrum is sharply turned upwards and nearly vertically truncated. The antennal notch is small but distinct and the antero-lateral corner is produced into a small blunt tooth, not broadly rounded as in Bonnier's figure. The dorsal surface is not keeled but immediately behind the middle of its length it bears a strong median tooth.

There is no eye but a narrow ocular lobe with parallel sides extends nearly to the end of the pseudorostrum. Seen from the side it is elevated above the dorsal outline towards the tip where it carries a pair of small tubercles.

The carapace is rather thin and transparent, with a faintly marked vermiculate texture.

The first leg-bearing somite is completely exposed. On the dorsal surface its posterior edge is raised into a transverse lamina produced and curving forwards in the middle line where it forms a bifid tooth overlapping the hind margin of the carapace. The second somite is produced into a similar tooth not so prominent and not curved forwards. The pleural plates of the thoracic somites are unarmed, except for a few small granules. The last two somites are granular on the dorsal surface.

The abdominal somites are all, except the last, beset with granules, especially on the dorsal and ventral surfaces. The penultimate somite (fig. 14) is hardly inflated anteriorly. The peduncle of the uropods (fig. 14) is about equal in length to the last two somites together and is twice the length of the endopod. The latter bears three rather long spines on its inner edge and a strong terminal spine with a small spinule external to its base. The exopod is shorter than the endopod and has a long and slender terminal spine.

Adult female. Only a single ovigerous female is in the collection and it is in a condition too bad for description or figuring. The somites of the abdomen however differ from those in immature specimens in being nearly smooth.

Adult male (figs. 16, 17) total length 4 mm.

Carapace a little less than $^2/_5$ of the total length, less deep than in the female. The antennal notch is shallow and widely open and the antero-lateral corner is hardly produced. The median dorsal tooth is much less prominent than in the female, and in

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

addition to it there is on the dorsal surface near the hind margin of the carapace a pair of small teeth. On each side of the carapace, a little way above the lower edge a row of about six teeth runs forward from the hind margin for about $^1/_4$ of the length of the carapace. The ocular lobe (fig. 18) resembles that of the female. The texture of the carapace is coarsely cellular, as figured by Bonnier in *P. echinata*. The first and second leg-bearing somites are not produced into dorsal teeth as they are in the female but there is a pair of tubercles on the dorsal surface of each of the somites from the second to the fifth. The pleural plates of the last four somites are expanded and each is armed with a marginal row of spiniform teeth.

The first five abdominal somites are granulated on the dorsal surface, the granules becoming spiniform laterally where a very distinct row above and a less distinct one below define on each somite a lateral groove apparently for the reception of the antennal flagellum. The last segment of the antennal peduncle (fig. 19) is nearly twice as long as the preceding.

The peduncle of the uropods (fig. 20) is longer by nearly $^1/_2$ than the last two somites together and has on its inner edge a series of plumose setæ increasing in length towards the distal end. The endopod is a little less than half the length of the peduncle with eight spines on its inner edge. The terminal spine is slender. The exopod is shorter than the endopod.

Young males agree in general characters with the female described above. The carapace shows a fine vermiculate texture.

Remarks. — The females and young males described above agree with Bonnier's figures and description of his *P. armata* with sufficient closeness to leave little doubt of their identity with his species. That the adult males belong to the same species is almost certain, and their identification with Bonnier's *P. echinata* is highly probable, though there are some important differences from Bonnier's account. He describes the surface of the carapace as presenting "ni poils ni épine d'aucune sorte" and he figures the upper surface without any trace of an ocular lobe. In view of the great difficulty of observing such characters in specimens coated as they often are with mud I think the differences may be neglected at least until specimens agreeing more closely with Bonnier's account are discovered. The case is somewhat complicated however by the aberrant characters of the specimens from the West of Ireland which I have

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

referred to this species (Fisheries Ireland Sc. Invest. 1904 N: 1 [1905] p. 33). The Irish specimens are smaller in size and the texture of the carapace in adults and young of both sexes is coarsely "cellular" as in the adult males described above. The median dorsal spine in all the specimens which have preserved it unbroken is bifid at the tip while in the few perfect Mediterranean specimens it is simple. I can observe no other differences, but the Irish specimens are coated with mud and not in a favourable state for examination. For the present they may be referred to the same species.

Occurrence. — Stations 18, 25, 26, 39, 44, 57. Depth 200—1100 metres.

Procampylaspis Bonnieri n. sp. (pl. 27 fig. 21—27).

Description of adult Female (fig. 21 and 22), total length 2.3 mm.

Carapace a little more than $^2/_5$ of total length, inflated, narrowed in front as seen from above. Seen from the side the dorsal outline is moderately arched, with a slight depression near the posterior end. The pseudorostrum is a little longer and more acute than in *P. armata*. The antero-lateral corner is serrated with three or four fine teeth. There are no teeth or spines on the surface of the carapace. There is no distinct ocular lobe. The cephalic lobe is produced into a small triangular median process in front of which the lateral plates meet for the whole length of the pseudorostrum.

The first and second leg-bearing somites are produced dorsally into bifid laminar teeth like those of *P. armata*, that of the second somite however being curved forwards like the first. The pleural plates of the thoracic somites are expanded, rounded and unarmed.

The abdominal somites are smooth. The penultimate somite (fig. 23) is widest at about its anterior third, narrowing in front and behind.

The peduncle of the uropods (fig. 23) is equal in length to the last two somites together and is $1^1/_2$ times as long as the endopod. The latter bears three spines on its inner edge and the terminal spine is long and curved. The exopod is little more than $^3/_4$ the length of the endopod.

Adult male (figs. 24 and 25), total length 2.3 mm. Resembling in general form the male of *P. armata*. The posterior part of the

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

dorsal surface of the carapace is occupied by a group of rather large curved spines (about 10) not quite symmetrically arranged on each side of the middle line. On each side a little way above the lower margin of the carapace a closely set row of spines extends from the antero-lateral corner to the hind margin. There are a pair of small spines at the tip of the pseudorostrum above. There is no ocular lobe except for a very small pointed median process on the front of the cephalic lobe.

The texture of the carapace is coarsely cellular.

There is a pair of dorsal spines on each of the last three thoracic somites. The pleural plates of the last four somites are expanded and armed with marginal teeth. The abdominal somites are smooth and each of the first four bears near the anterior end a pair of straight spines sloping forwards on the dorsal surface and a pair of small sharp spines on each side. The outline of the fifth (fig. 27) somite is similar to that of the female. The last two segments of the antennal peduncle (fig. 26) are subequal in length.

The peduncle of the uropods (fig. 27) is equal to or a very little longer than the last two somites together and has a series of short setæ on its inner edge. The endopod is $^2/_3$ of the length of the peduncle and has six spines on its inner edge. The exopod is about $^4/_5$ of the length of the endopod. Young specimens of both sexes agree in general characters with the female.

Remarks. — This species is distinguished from the preceding in both sexes by the absence of the ocular lobe, by the slight but characteristic and constant difference in the outline of the penultimate somite and by the relatively longer rami of the uropods. In the female the absence of the dorsal spine of the carapace and in the male the different armature of the carapace and abdomen are well marked distinctive features. The appendages agree, except in some trifling details, with those of *P. armata.*

Occurrence. — Stations 17, 18, 26, 30, 39, 44. Depth 950—1200 metres.

Campylaspis glabra G. O. Sars.

C. glabra, G. O. Sars, Arch. Math. Nat. 4. Bd. 1879 p. 77, pls. 44—47; id. Crust. Norway Vol. 3 1900 p. 86, pl. 58.

The specimens referred to this species are, for the most part, immature. Even nearly adult specimens however are smaller than the Mediterranean specimens recorded by Prof. Sars, a female with

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

developing brood pouch measuring 2.25 mm. and an apparently adult male 3.0 mm. in total length.

Occurring. — Stations 8, 25, 29, 39. Depth 100—1100 metres.

Campylaspis verrucosa G. O. Sars.

C. verrucosa, G. O. Sars, Crust. Norway Vol. 3 1900 p. 90, pl. 63; Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 35.

Among numerous small and immature specimens resembling closely those which I have recorded from the West of Ireland were two females with developed brood-pouch (one of them identified by Prof. Sars) and an apparently adult male. The larger of the two females is not quite 4.5 mm. in total length and the male is a little smaller. Sars gives the length of Norwegian specimens as 5.5 mm. for females and 6.5 for males.

Occurrence. — Stations 17, 18, 25, 26, 30, 39, 44. Depth 200—1200 metres.

Campylaspis sulcata G. O. Sars.

C. sulcata, G. O. Sars, Crust. Norway Vol. 3 1900 p. 86, pl. 59.

Occurrence. — Stations [9 and] 25. Depth 130—200 metres.

Campylaspis macrophthalma G. O. Sars.

C. macrophthalma, G. O. Sars, Arch. Math. Nat. 4. Bd. 1879 p. 87, pls. 48, 49.

A young female specimen was identified by Prof. Sars, and it agrees well with his figure and description quoted above. There is, on the anterior part of the carapace, external to the fronto-lateral suture, and just above the transverse ridge connecting the lateral keels, a very distinct tubercle hardly indicated by Prof. Sars, and the posterior ends of the upper keels do not turn forward as they seem to do in his figure.

The single male specimen which I suppose to belong to this species is in bad condition and therefore I do not attempt to figure it. It resembles rather closely Sars' figure of the male of *C. undata* (Crust. Norway Vol. 3 pl. 59) but appears to differ in the greater length of the ocular lobe, which reaches nearly to the end of the pseudorostrum.

Occurrence. — Stations 9 and 25. Depth 130—200 metres.

Distribution. — Messina, 20 fathoms (Sars).

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Campylaspis vitrea n. sp. (pl. 28 figs. 28—34).

Description of sub-adult Female (figs. 28 and 29). Total length 4.7 mm.

The carapace considerably exceeds half the total length and is much elevated posteriorly. As in *C. macrophthalma* Sars the side of the carapace bears two oblique keels, which, however, are here elevated into laminar crests. At about $^1/_4$ the length of the carapace from its hinder margin the upper lateral keels are connected with each other across the dorsal surface by a straight transverse keel and from the junction on each side a short keel running downwards and backwards joins the lower lateral keel. The transverse keel and the two short connecting keels form three sides of a roughly quadrangular area sloping downwards and backwards, the posterior side of which is formed by a ridge running just above the hinder margin of the carapace and forming, when viewed from above, two broadly rounded lobes divided by a median notch. Anteriorly the upper lateral keels curve inwards towards the pseudorostrum without forming any distinct angle as they do in *C. macrophthalma*. The short vertical ridge which in the species named connects the two lateral ridges anteriorly is present, though less prominent than the others. The posterior quadrangular area mentioned above and the areas between the lateral keels on each side are distinctly concave. The portion of the dorsal surface in front of the transverse keel is nearly flat and does not rise above the upper lateral keel as seen from the side. There is no eye and the ocular lobe is represented by a short and narrow process in front of which the pseudorostral plates meet for about $^1/_6$ of the length of the carapace. The pseudorostrum is long, rather acutely pointed as seen from the side, with the dorsal outline slightly convex. The antennal notch is obsolete and the antero-lateral angle obtuse. All the keels of the carapace are finely serrated.

The first three leg-bearing somites have transverse crests dorsally; the last two have each a pair of cristiform teeth on the dorsal surface.

The abdominal somites (fig. 30) are ornamented with thin longitudinal ridges or crests which are finely and somewhat irregularly serrate. The first four somites have paired dorsal, lateral and ventro-lateral ridges. On the fifth somite the arrangement of

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

the ridges is more complex, those on the anterior half of the somite conforming to the plan of the preceding somites while the posterior half has only a median dorsal and a pair of ventro-lateral ridges. The last somite has a short median dorsal and a pair of lateral ridges.

The appendages differ very little from those of *C. macrophthalma* as figured by Sars. The antennules have the second segment of the peduncle distinctly longer than the third. The first legs (fig. 31) do not reach the antero-lateral angle of the carapace, but their distal segments are relatively a little longer than in *C. macrophthalma*. The second legs (fig. 32) are distinguished by the great length of the terminal segment which is about $^1/_3$ of the whole length of the limb. The remaining legs (fig. 33) are a little longer and more slender than are those of *C. macrophthalma* but do not differ in the relative proportions of the segments.

The uropods (fig. 34) are longer than in *C. macrophthalma*, the peduncle being more than $2^1/_2$ times the length of the last somite and a little more than twice the length of the sub-equal rami.

The integument over the whole of the body and limbs is very thin and semitransparent allowing the outlines of the internal organs to be seen.

Male. A single young male shows no marked differences in external characters from the females described above.

Remarks. — This species resembles *C. macrophthalma* but is at once distinguished from that species by the different form of the carapace, especially by the transverse ridge on the posterior part, and by the ornamentation of the abdominal somites as well as by the thin and semitransparent integument.

Occurrence. — Stations 18, 26, 39. Depth 950—1100 metres.

Campylaspis spinosa n. sp. (pl. 28 figs. 35—43).

Description of sub-adult Female (figs. 35 and 36). Total length 3.1 mm.

The carapace is little more than half the total length and is not very strongly arched above. The pseudorostrum is sharply upturned, its upper margin as seen from the side nearly at right angles to the sloping anterior part of the dorsal surface of the carapace. There is no eye and the ocular lobe is reduced to a narrow process reaching nearly to the tip of the pseudorostrum.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

The antennal notch is obsolete and the lower margin curves upwards to the pseudorostrum with hardly an indication of the antero-lateral angle. The whole surface of the carapace is set with small spines, rather widely spaced, while on the dorsal surface on each side is a longitudinal row of about eight strong spines extending from the posterior margin on to the side of the pseudorostrum. There are about six very long setæ on the dorsal surface. The anterior part of the lower margin bears a series of curved spines. The first leg-bearing somite is exposed only on the dorsal surface. The following thoracic somites like those of the abdomen bear each a pair of spines on the dorsal surface. The fifth abdominal somite has a median dorsal spine about the middle of its length and the sixth, which is distinctly broader than the preceding, has three spines on the dorsal surface. The antennules (broken off in the specimen figured) are rather long and stout, but appear to resemble those of *C. rubicunda* as figured by Sars.

The mouth-parts resemble those of *C. rubicunda* very closely but the molar process of the mandible is a little longer and more slender, the palp of the maxillulæ carries two setæ, and the maxillæ have six setæ. The branchial apparatus is considerably reduced, only three lobules being visible. The second maxillipeds (fig. 38) differ from those of all species of the genus hitherto described in having the ischium distinct; the terminal segment carries three strong spines. Third maxillipeds (fig. 39) have strong teeth on the margins of most of the segments, the merus is not expanded, hardly broader than the succeeding segment and equal to the two succeeding segments in length. The plumose setæ on the end of the merus extend to the tip of the limb.

The first legs (fig. 40) are moderately slender, the merus considerably less than half the total length. The second legs (fig. 41) have the merus less than $^1/_3$ of the total length, the carpus serrated on the outer edge and the dactylus equal in length to the two preceding segments. The remaining legs (fig. 42) are rather stout. In the third and fifth pairs the carpus bears two and in the fourth three long setæ.

The uropods (fig. 43) are slender and about equal in length to the last four somites. The peduncle is more than twice the length of the last somite, its margins not distinctly serrate. The exopod is very slightly longer than the endopod and about half the length of the peduncle. The endopod is armed with four spines which,

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

as well as the terminal spine of the exopod, are long, slender, and serrate or plumose.

Male. A male specimen 3.7 mm. long which I refer to this species is not in sufficiently good condition to be figured. The carapace is less deep than in the female, the pseudorostrum more horizontal and the spines on the surface of the carapace mostly reduced to tubercles. The spines on the dorsal surface of the abdominal somites however are even longer than in the female.

Remarks. This species differs remarkably from all the described species of the genus in the spinose armature of the carapace. Nevertheless the structure of the mouthparts shows it to be a true *Campylaspis*, though it appears to be exceptional in having the ischium of the second maxillipeds distinct and in the imperfect development of the branchial apparatus.

Occurrence. — Stations 18, 26, 44. Depths 950— 1100 metres.

Family **Lampropidae.**

Hemilamprops cristata G. O. Sars.

H. cristata, G. O. Sars, Crust. Norway Vol. 3 1900 p. 25, pl. 18.

Four specimens are referred to this species. They are all very young and are badly preserved.

Occurrence. — Station 25. Depth 200 metres.

Family **Platyaspidae.**

Platyaspis typica G. O. Sars.

P. typica, G. O. Sars, Crust. Norway Vol. 3 1900 p. 27, pls. 19, 20; Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 (1905) p. 42.

As I have already noted, these specimens show more distinctly than do those from the West of Ireland the double dorsal keel on the posterior thoracic and anterior abdominal somites.

Occurrence. — Stations 17, [18], 39, 44. Depth 950-1100 metres.

Family **Diastylidae.**

Diastylis insignis G. O. Sars.

D. insignis, G. O. Sars, Svenska Vet. Akad. Handl. 9. Bd. No. 13 1871 p. 34, pl. 14.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

The specimens which I have referred to this species are very agmentary and there may be some little doubt as to the identi-cation. Dr. Lo Bianco has recorded the species from Station 57, n the evidence of a specimen which may have been better preserved an any of those seen by me[1].

Occurrence. — Stations 26, 39, 57. Depths 1000-1100 metres.

Diastylis capreensis n. sp. (pl. 28 figs. 44, 45).

Description of young Female (fig. 44). Total length 5.2 mm.

The carapace is less than $^1/_3$ of the total length, inflated, ith the dorsal surface strongly arched and declivous anteriorly. he pseudorostrum is moderately long, horizontal and acute. There no eye. The surface of the carapace carries a number of long pines varying a little in arrangement in different specimens and ot always symmetrical on the two sides. They are arranged on e dorsal surface in two longitudinal rows which diverge widely nteriorly. The largest of these spines are a pair placed on the ighest point of the dorsal surface and one on each side just behind e base of the rostrum. In addition there are a few spines on the nterior part of the side of the carapace. The lower margin is ccupied by a series of teeth becoming spiniform anteriorly.

The last thoracic somite has the postero-lateral angles produced nto spiniform teeth projecting downwards, and has two pairs of enticles on the dorsal surface. The first abdominal somite has one air and the last two somites have several denticles on the dorsal urface.

The telson (fig. 45) is shorter than the last three somites ogether. The pre-anal tubular part is nearly twice as long as the ost-anal. The latter has concave sides converging to a narrow pex bearing a pair of minute spines. There are no lateral spines r teeth.

The antennules have the distal segment of the peduncle onsiderably longer than the preceding. The first legs are broken n all the specimens examined. The basis has some small teeth n its lower surface. The second leg has a strong spine proceeding om the inner surface of the ischium.

---

[1] In my paper on Irish Cumacea (Fisheries Ireland Sc. Invest. 1904 N: 1 905] pp. 12, 44). I accidentally omitted to notice that this species had been ecorded from the Mediterranean.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

The next two pairs of legs are moderately stout and a little more than $^2/_3$ of the length of the carapace. The basis is less than half the length of the leg and bears, close to its proximal end, a rudimentary unjointed exopod in the form of a curved, conical papilla. The last thoracic somite is without appendages in all the specimens examined.

The peduncle of the uropods (fig. 45) is shorter than the telson and less than $1^1/_2$ times the length of the exopod. The endopod is slightly less than $^2/_3$ the length of the exopod and is divided into three segments.

Remarks. In having the pre-anal part of the telson very distinctly longer than the post-anal the species described above agrees with *Diastylis longipes*, *D. josephinæ*, *D. erinaceus* and *D. insignis* of Sars, *D. costata* of Bonnier, *D. cingulata* of Calman, and also with the *Leptostylis longicaudata* and *Diastylopsis* (?) *dubia* of Bonnier. From all these species it is separated by the long spines of the carapace. It is unlikely that the absence of the last pair of legs will prove to be a permanent character of the species (cf. Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 [1905] p. 40) and it is possible that the presence of rudimentary exopods on the third and fourth legs is also a character of immaturity, or, at all events, is unreliable as a generic distinction (Bonnier, Ann. Univ. Lyon Tome 26 Campagne du Caudan, p. 561). I have therefore placed the species, for the present, in the genus *Diastylis*. It is possible that this may be the species recorded by Sig. Lo Bianco as *D. spinulosa* Heller.

Occurrence. — Stations 39 and 44. Depth 1000—1100 metres.

Diastyloides serrata G. O. Sars.

D. serrata, G. O. Sars, Crust. Norway Vol. 3 1900 p. 61, pl. 45.

Occurrence. — Stations 17, 18, 26, 29, 39, 44. Depth 100—1100 metres.

Diastyloides sp.

A species of this genus which appears to be new is represented only by immature and mutilated specimens. It is closely allied to *D. serrata*, from which however it differs in the shorter and blunter rostrum and in the presence of a pair of denticles on the dorsal surface of the frontal lobe of the carapace.

Occurrence. — Stations 8 and 29. Depth 100 and 120 metres.

©Akademie d. Wissenschaften Wien; download unter www.biologiezentrum.at; www.zobodat.at

Leptostylis macrura G. O. Sars.

L. macrura, G. O. Sars, Crust. Norway Vol. 3 1900 p. 69, pl. 49.

Three males and one female of this species were found.

Occurrence. — Station 25. Depth 200 metres.

Diastylopsis sp.

A number of specimens, most of which are immature, apparently belong to the undescribed species of this genus already recorded from the West of Ireland (Calman, Fisheries Ireland Sc. Invest. 1904 N: 1 [1905] p. 48).

Occurrence. — Stations 17, 29, 39, 44. Depth 100—1100 metres.

Explanation of Figures.

Plate 27.

Fig. 1. *Leucon longirostris*, sub-adult Female, from the side. × 21.
Fig. 2. Anterior portion of carapace and pseudorostrum.
Fig. 3. Last two thoracic somites and basal portions of the legs.
Fig. 4. Antennule.
Fig. 5. Last somite and uropod.
Fig. 6. *Leucon longirostris*, adult Male, from the side. × 21.
Fig. 7. Anterior portion of carapace and pseudorostrum.
Fig. 8. Last somite and uropod.
Fig. 9. *Leucon siphonatus*, Antennule of adult female.
Fig. 10. *Cumellopsis Puritani*, adult Male, from the side (appendages omitted). × 29.
Fig. 11. Cephalothoracic region from above.
Fig. 12. Last somite and uropod.
Fig. 13. *Procampylaspis armata*, immature Female, from the side (appendages omitted). × 22.
Fig. 14. The same, from above.
Fig. 15. Last two somites and uropod.
Fig. 16. Adult Male, from the side (appendages omitted). × 22.
Fig. 17. The same, from above.
Fig. 18. Anterior part of carapace, with ocular lobe and pseudorostrum, from above.
Fig. 19. Sub-adult male, Peduncle of antenna.
Fig. 20. Adult male, last two somites and uropod.
Fig. 21. *Procampylaspis Bonnieri*, adult Female, from the side (appendages omitted). × 37.
Fig. 22. The same, from above.
Fig. 23. Last two somites and uropod.
Fig. 24. Adult Male, from the side (appendages omitted). × 37.

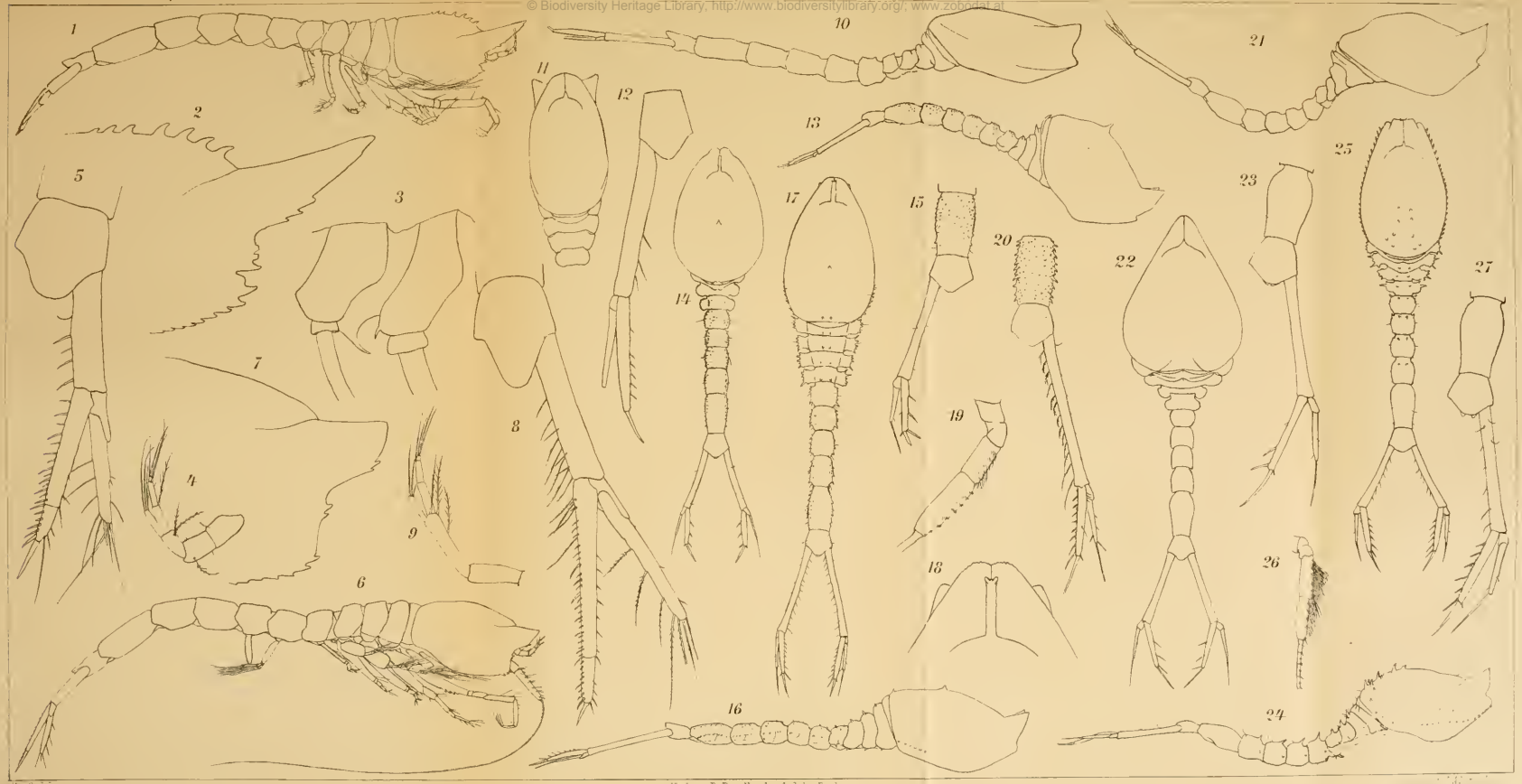
© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

Fig. 25. The same, from above.
Fig. 26. Peduncle of antenna.
Fig. 27. Last two somites and uropod.

Plate 28.

Fig. 28. *Campylaspis vitrea*, sub-adult Female, from the side. × 22.
Fig. 29. The same, from above.
Fig. 30. Last three somites, *a* from above, *b* from the side.
Fig. 31. First leg.
Fig. 32. Second leg.
Fig. 33. *a* Third leg, *b* Fifth leg.
Fig. 34. Uropod.
Fig. 35. *Campylaspis spinosa*, sub-adult Female, from the side. × 27.
Fig. 36. The same from above.
Fig. 37. First maxilliped.
Fig. 38. Second maxilliped.
Fig. 39. Third maxilliped.
Fig. 40. First leg.
Fig. 41. Second leg.
Fig. 42. *a* Third, *b* fourth, *c* fifth leg.
Fig. 43. Last somite and uropod.
Fig. 44. *Diastylis capreensis*, young Female, from the side. × 24.
Fig. 45. Last somite, telson and uropod.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at



Verlag v. R. Friedländer & Sohn, Berlin.

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

© Biodiversity Heritage Library, http://www.biodiversitylibrary.org/; www.zobodat.at

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Mittheilungen aus der Zoologischen Station zu Neapel

Jahr/Year: 1906

Band/Volume: 17

Autor(en)/Author(s): Calman W. T.

Artikel/Article: The Cumacea of the Puritan Expedition. 411-432