CRUSTACEANS OF THE ORDERS EUPHAUSIACEA AND MYSIDACEA FROM THE WESTERN ATLANTIC

By Walter M. Tattersall
Professor of Zoology, University College, Cardiff, Wales

INTRODUCTION

Dr. H. B. Bigelow was good enough to submit to me for examination and report the Euphausiacea and Mysidacea collected in the west Atlantic by the United States Coast Survey steamer *Bache* in January to March, 1914. The collection contained 27 species of Euphausiacea and 11 species of Mysidacea, while from the point of view of numbers it was an extremely large collection.

The itinerary of the cruise of the *Bache*, together with a full account of the oceanographical results obtained, has already been published (Bigelow, 1917*a*), but for the sake of convenience a list of the stations at which Euphausians or Mysids were taken is given on pages 4–6.

The area explored during this cruise has never before been systematically examined for the crustacea here reported on, although a large number of disjointed and scattered records are to be found in literature. Hansen (1915) has given a great many records of Euphausiacea from the west Atlantic, mainly, however, in the northwestern part of the area now under consideration. Ortmann (1893) records certain species from or near to this area, taken during the German Plankton Expedition, and Colosi (1920) adds a few records from the Caribbean Sea. The present collection, however, by linking up hitherto explored areas, adds considerably to our knowledge of the occurrence and distribution of the Euphausiacea in the west Atlantic and, incidentally, and to a lesser degree, of the Mysidacea also.

Only one new species was discovered, a Mysid, *Mysidopsis bigelowi*, from the littoral waters of Chesapeake Bay. The most interesting species taken by the expedition was the Mysidacean, *Paralophogaster glaber* Hansen, hitherto only known from the Pacific Ocean, near the Dutch East Indies, and in the waters off New Zealand. Its discovery in the western Atlantic is therefore most interesting from the point of view of geographical distribution and demonstrates the wide range of this bathypelagic species. Other notable records are those of the larvae of a large species of *Thysanopoda* and of the adults of *Nematobrachion sexspinosus* Hansen, hitherto known from three specimens only.

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3043—26†——1

In attempting to summarize the results obtained by the *Bache*, from the point of view of the crustacea now dealt with, one or two points emerge which may be noted here.

1. Stations 10157–10160 are situated in a faunistic area which is quite sharply marked off from the rest of the area explored.

Station 10157 is a purely littoral station characterized by the presence of the littoral Mysids, *Mysidopsis* and *Neomysis*. Station 10160 is in the coastal waters and station 10158 on the slope where the tropical oceanic water and the coastal water mix. These two stations are characterized by the presence of three Euphausians, *Euphausia krohnii*, *Meganyctiphanes norvegica*, and *Nematoscelis megalops*, the first and last in great abundance. These three species occurred at no other station in the whole area explored and are, moreover, northern or boreal species. At station 10160 only these three species occurred, but at station 10158, which is nearer to the slope, the following additional species were found:

	Specimen
Thysanopoda monacantha	1
Euphausia tenera	4
Euphausia hemigibba	2
Thysanoëssa gregaria	66
Nematoscelis microps	1
Nematobrachion boopis	1

These species are members of the tropical oceanic fauna, and the haul at station 10158 bears out in a striking way the oceanographical results of the cruise, in which station 10158 was found to be in the region of the slope where the coastal and oceanic waters mix. The Euphausian fauna at this station shows abundant evidence of this mixing of the waters, retaining, however, a predominant northern or coastal facies.

The stations 10158 and 10160 are probably on the seaward fringe of the area of distribution of *Meganyctiphanes norvegica*, which would account for its occurrence in such small numbers. The difference in the relative abundance of *E. krohnii* and *N. megalops* at the two stations is probably correlated with the difference in the depth at which the hauls were taken. At station 10160 a haul at 100 meters yielded only 4 *N. megalops* to about 2,000 *E. krohnii*, while at station 10158, where the haul was made at 600 meters, the numbers were 500 and 2,000, respectively.

2. The rest of the area, which may be called the tropical oceanic area, represented by the hauls from stations 10161–10212, appears, at least as far as the Euphausians are concerned, to be a homogeneous uniform faunistic area. It has not been possible to say, from an examination of the hauls, that one or another species is more abundant in and characteristic of any special part of the area. All the species appear, with greater or lesser degrees of abundance, to be generally and widely distributed in this area.

I have tried to analyze the results in order to find out if they provided any information as to the vertical distribution of the Euphausians. It was obvious from the merest glance at many of the hauls that certain genera and species were characteristic of certain zones but it has not been easy to demonstrate this on paper. The explanation of this difficulty probably lies in the fact that the nets used for plankton were open nets and, therefore, in a haul from deep water, a certain number of specimens of upper water forms would be caught during the ascent of the net. It has been impossible to decide how much allowance must be made for this and to eliminate this source of error. One example will suffice to illustrate this point. *Euphausia americana* is clearly an upper water, if not a truly surface, species yet the records reveal its occurrence in small numbers in even the deepest hauls down to 1,800 meters. One other consideration has complicated the question. There is a certain amount of evidence available to suggest that some species of Euphausians at any rate exhibit diurnal movements, rising to the upper waters during hours of darkness and sinking to deeper waters by daylight. I have not been able to take this consideration into account in the following pages. At the same time I think it is possible to suggest with a certain measure of confidence the following general conclusions on the vertical distribution of the species of Euphausians found in the collection.

The species may be classified roughly into the following groups apparently characteristic of particular zones of water:

1. Species which have their maximum of abundance in the upper 100 meters of the sea and are frequently taken actually at the surface:

Euphausia americana.
Euphausia brevis.
Euphausia mutica.
Euphausia tenera.
Euphausia hemigibba.

2. Species which have their maximum of abundance between 100–200 meters and are rarely captured at the surface:

Thysanopoda tricuspidata.
Thysanopoda monacantha.
Stylocheiron carinatum.
Stylocheiron suhmii.
Thysanopoda aequalis.
Euphausia gibboides.
Nematobrachion flexipes.

3. Species which are truly deep water with the maximum of abundance at depths below 200 meters:

Benthcuphausia amblyops.
Thysanopoda microphthalma.
Nematoscelis microps.
Nematoscelis tenella.
Stylocheiron elongatum.
Stylocheiron abbreviatum.
Thysanopoda cornuta.
Thysanoëssa gregaria.
Nematobrachion boopis.
Nematobrachion sexspinosus.
Stylocheiron longicorne.
Stylocheiron maximum.

These tentative suggestions are based on the evidence provided by the present material and are not opposed to anything that was previously known of the vertical distributions of the species concerned.

Data to accompany cited Bache stations, 1914

Stations	Date	Lat. N.	Long. W.	Depth	Salinity (per mill)	Temperature
		° ′	° ′	*Meters*		°C.
Off Chesapeake Bay:						
10157	Jan. 20	36 46	75 38	0	30.01	6.20
				18	33.57	6.75
10158	Jan. 21	36 12	74 25	0	34.94	12.30
				20	34.67	11.45
				100	34.76	11.15
				300	35.19	11.40
				700	35.01	4.78
				1,100	35.01	4.20
				1,800	34.94	3.55
10160	Jan. 26–27	36 12	74 41	0	34.29	9.15
				20	34.29	9.40
				100	35.28	12.00
				200	35.37a	9.45
Line, Chesapeake Bay to Bermuda:						
10161	Jan. 28	35 27	73 14	0	36.38	21.50
				20	36.35	21.50
				100	36.44	21.35
				200	36.44	19.60
				600	35.99	15.20
				1,000	35.25	10.40
				1,800	----------	3.70
10162	Jan. 29	34 41	73 23	0	36.44	19.30
10163½	Jan. 30	33 02	73 38	0	36.44	19.90
10166	----------	32 33	72 14	0	36.45	19.15
10169	Jan. 31–Feb. 1	32 29	71 29	0	36.44	18.95
				20	36.38	19.00
				100	36.44	18.85
				200	36.42	18.83
				600	36.26	15.60
				1,000	----------	10.50
				1,800	35.01	----------
10171	Feb. 2	32 27	69 55	0	36.45	18.95
				20	36.44	19.03
				100	36.45	18.84
				200	36.44	18.65
				600	36.08	16.10
				1,000	35.71	6.70
				1,800	34.99	4.00
10172	Feb. 3	32 26	69 21	0	36.45	18.90
10173	Feb. 4	32 27	68 22	0	36.44	18.85
				20	36.44	18.90
				100	36.42	18.79
				200	36.44	18.10
				600	36.17	16.50
				800	35.64	13.10
				1,000	----------	11.60
				1,400	35.46	5.55
				1,800	34.96	3.90
				3,650	----------	----------
				4,570	34.87	----------
10176	Feb. 5	32 30	65 48	0	36.44	19.20
Off Bermuda:						
10178	Feb. 17–18	32 20	64 21	0	36.42	18.80
10180	Feb. 18–19	31 52	65 14	0	----------	18.10
Line, Bermuda to the Bahamas:						
10182	Feb. 19–20	30 27	66 05	0	36.56	20.12
10184	Feb. 21	29 17	67 07	0	36 56	20.07
10186	Feb. 21–22	29 15	68 35	0	36.47	19.40
10187	Feb. 23	28 59	69 22	0	36.51	19.30
				20	----------	19.23
				100	36.49	19.26
				300	36.47	----------
				600	36.24	16.44
				800	35.70	13.05
				1,000	35.19	9.05
				1,200	35.05	----------
				1,400	34.99	5.08
				1,800	34.99	4.01
10188	Feb. 24	28 51	70 08	0	36.47	19.47
10192	Feb. 26	28 35	73 33	0	36.62	21.58
				4,528	35.03	----------
				4,733	35.03	----------
10194	Feb. 28	28 51	75 13	0	36.53	21.55
10195	----------	29	76 23	0	36.49	21.70

Data to accompany cited Bache stations, 1914—Continued

Stations	Date	Lat. N.	Long. W.	Depth	Salinity (per mil)	Temperature
		° ′	° ′	*Meters*		°*C.*
Northeast Providence Channel:						
10196	Mar. 3	25 27	77 16	0	36.58	22.83
				20	----------	22.84
				100	36.56	22.82
				500	35.64	12.93
				1,000	35.03	5.20
				3,400	34.92	2.86
Straits of Florida:						
10198	Mar. 13	23 59	81 50	0	36.11	23.35
				20	36.11	23.06
				100	----------	20.34
				200	----------	13.98
				400	----------	10.36
				900	34.90	7.00
10200	Mar. 18	23 32	81 48	0	35.93	24.78
				20	35.93	24.72
				100	36.26	24.45
				200	36.58	22.34
				400	35.66	13.51
				600	35.03	9.10
				1,000	34.87	8.31
				1,400	----------	4.36
10202	Mar. 19	25 34	79 24	0	36.17	23.35
				20	----------	23.30
				100	36.26	23.23
				200	36.67	21.82
				300	36.44	18.71
				400	36.26	16.63
				500	35.81	14.15
				700	35.53	12.17
10203	Mar. 20	25 34	79 42	0	36.08	24.03
				20	----------	24.03
				100	36.26	23.25
				200	36.53	20.17
				300	35.99	15.95
				400	35.84	14.42
				800	34.85	6.16
20204		25 33	80 03	0	36.17	21.75
				20	36.20	21.83
				100	36.17	21.07
				150	35.36	10.72
10205		27 05	79 52	0	36.02	23.60
				20	36.08	22.88
				60	36.22	22.48
				100	36.04	19.19
				175	35.43	12.25
				250	34.85	6.90
10206	Mar. 21	27 17	79 40	0	36.09	23.75
				20	36.11	23.40
				100	36.26	23.40
				200	36.55	20.13
				300	38.82	14.71
				400	35.10	9.68
				500	----------	8.53
				700	34.85	5.70
10207		27 32	79 21	0	36.17	23.70
				20	36.17	23.60
				100	36.20	23.50
				200	36.56	19.93
				300	36.28	17.61
				400	36.08	15.78
				500	35.79	13.90
North of Bahama Bank:						
10208	Mar. 21	27 46	78 46	0	36.42	22.80
				20	36.44	22.42
				100	36.51	----------
				200	36.53	19.91
				300	36.42	18.78
				500	36.18	16.39
				700	35.37	10.88
				800	35.03	8.26
10209	Mar. 22	27 57	78 15	0	36.44	22.23
				20	36.45	21.52
				100	36.49	20.65
				200	36.49	18.57
				400	36.11	16.11
				500	35.97	----------
				700	35.26	10.08
				800	----------	7.41
				900	35.01	5.98

Data to accompany cited Bache Stations, 1914—Continued

Stations	Date	Lat. N.	Long. W.	Depth	Salinity (per mill)	Temperature
[illegible] h of Bahama Bank—Continued						
		° ′	° ′	*Meters*		°*C.*
10210		27 59	77 25	0	36.42	21.78
				20	36.40	21.80
				100	36.51	21.56
				200	36.55	20.80
				300	36.49	17.44
				450	36.31	17.06
				600	36.00	
				800		10.29
				1,000	35.10	6.04
10211		28 08	76 48	0	36.55	20.98
				20		21.02
				100	36.55	20.85
				300	36.42	17.81
				500	36.22	16.29
				700	35.73	13.38
				850		8.57
				1,000	35.07	6.64
10212	Mar. 23	28 10	76 18	0	36.60	20.75
				20	36.56	20.80
				100	36.56	20.50
				300	36.26	17.77
				500	35.97	14.62
				750	35.10	10.01
				1,000	35.03	5.62
				1,800	35.01	3.67

Order MYSIDACEA

Suborder LOPHOGASTRIDA

Family LOPHOGASTRIDAE

Genus LOPHOGASTER M. Sars

1. LOPHOGASTER TYPICUS M. Sars

Lophogaster typicus ORTMANN, 1906.

Occurrence.—Station 10209, 100–0 m., 1 specimen, immature, 7 mm. long.

Remarks.—Traces of the pectinations on the rostral plate, characteristic of the pelagic post-larval stages of this species, still remain on this specimen. The rostral plate forms a complete hood over the eyes as in the Calyptopis stages of the Euphausiacea. The median spine is longer than the laterals and slightly longer than the antennular peduncle. The antennal scale has five teeth, including the terminal tooth, on the outer margin. The telson has three spines on the lateral margin in addition to the two large spines on each side of the apex, and there are eight teeth on the pectinate apex of the telson. The sternal armature of the abdomen, one very prominent median forwardly directed sharp spine to each segment, is well developed. The postero-lateral free corners of the pleura of the fourth and fifth abdominal somites are acute but scarcely produced. Those of the sixth somite, as well as those marking the apparent division of this somite into two parts, are more produced than those of the fourth and fifth somites but nothing like to the same degree as in *L. spinosus*. Ortmann (1906), in describing the latter species, writes that it differs

from *L. typicus* in possessing a subdorsal spine directed straight backwards on the posterior margin of the sixth abdominal somite, at the base of the telson on each side. These spines are really present in *L. typicus* but are not nearly so well developed or so prominent as in *L. spinosus*.

Distribution.—Ortmann (1906) first made known the occurrence of this species off the coast of North America, recording it from off the coasts of North and South Carolina, the Gulf of Mexico and Key West, though Smith (1881) had earlier noted the presence of *Lophogaster* off the coasts of New England, without naming the species. These are the only records, with which I am acquainted, from this region of the Atlantic Ocean. The *Bache* specimen was captured at a point intermediate between the Carolina stations and Key West of Ortmann's records.

2. LOPHOGASTER SPINOSUS Ortmann

Lophogaster spinosus ORTMANN, 1906, p. 26, pl. 1, figs. 1*a*, 1*b*.—HANSEN, 1910, p. 14.—ZIMMER, 1914, p. 382.

Occurrence.—Station 10195, 100–0 m., 1 young specimen, 9.5 mm. long from the tip of the rostrum to the end of the telson.

Remarks.—Although the specimen is so small, it exhibits all the characters distinctive of the species as compared with *L. typicus*. The median spine of the rostral plate is hardly as long as in the type-specimen and this fact was also noted by Zimmer in young specimens. On the other hand the postero-lateral prolongations of the carapace are proportionally longer than in the type, extending backward almost to the level of the posterior margin of the third abdominal somite. The antennal scale has nine teeth, including the terminal, on the outer margin. The telson has altogether eight pairs of lateral spines, including the large terminal pair, and has five teeth on the pectinate apical portion. The postero-lateral free corners of the third, fourth, fifth, and sixth abdominal pleura are acute and produced into prominent spines, less produced in the third pleura than in the others but in all cases much more produced than in *L. typicus*, in which the pleura of the third somite are without spines.

Distribution.—The type-specimen was taken at 30° 47′ 30″ N., 79° 49′ W., north of the Bahamas. The *Bache* specimen is from a locality rather to the northeast of the Bahamas but not very far from the type-locality. Zimmer, however, has recorded the species from the South Atlantic, midway between South America and South Africa. From the fact that the present specimen was caught in a midwater townet, it seems probable that *L. spinosus*, like *L. typicus*, is pelagic in the post-larval and young stages. In this connection it is to be noted that one of Zimmer's specimens was caught in a townet at only 10 meters. The *Bache* specimen shows no traces of pectinations on the rostral plate or abdominal pleura.

Genus PARALOPHOGASTER Hansen

3. PARALOPHOGASTER GLABER Hansen

Paralophogaster glaber HANSEN, 1910, p. 16, pl. 1, figs. 2*a*–2*n*.—TATTERSALL, 1923, p. 279.

Occurrence

Station	Depth	Specimen	Length	Station	Depth	Specimen	Length
	M.		*Mm.*		*M.*		*Mm.*
10163½	500–0	1	12	10206	400–0	2	12
10173	200–0	1	6	10208	700–0	1	12
10195	100–0	1	9	10209	700–0	1	12

Remarks.—This is the most interesting of the species in the present collection. The type specimens were described from the *Siboga* collections made in the waters around the East Indies and I have since recorded the species from the waters off New Zealand. Its capture, therefore, by the *Bache* in the waters of the western North Atlantic must be regarded as one of the most important results of that expedition. In spite of the wide separation in the geographical position of the localities of capture, I can find no reasonable ground for separating the Atlantic specimens from the East Indian and New Zealand species. Such points of difference as I have been able to discover may be summarized as follows: (1) The rostral plate is more distinctly tridentate than shown by Hansen, with the lateral teeth more prominent and more on a level with the median tooth; (2) the antennal scale is apparently slightly shorter in my specimens than as described and figured by Hansen. It is only three and a half times as long as broad and projects beyond the distal end of the antennular peduncle for only one-third of its length. In Hansen's specimens the scale was four times as long as broad and extended beyond the antennular peduncle for one-half of its length; (3) the telson has only three short and two long spines on each margin, with only three spinules between the two large spines. In Hansen's specimens there were four short and two long spines and six or seven spinules between the long spines.

The *Bache* specimens are all immature and this fact may account for some, at any rate, of these differences, more particularly the last one. The agreement, almost to the most minute detail, however, between the appendages of the west Atlantic specimens and those described by Hansen, is so very striking and the differences noted above are so much more of degree than of actual form, that I feel compelled, for the present at any rate, to regard the East Indian and west Atlantic specimens as belonging to one widely distributed species.

Distribution.—East Indian Seas (Hansen); off New Zealand (Tattersall).

Family EUCOPIIDAE

Genus EUCOPIA Dana

4. EUCOPIA UNGUICULATA (Willemoes-Suhm)

Occurrence.—Station 10166, 1100–0 m., 1 specimen.

Remarks.—I can find no previous record of this species from the area explored by the *Bache* or indeed from the northwest Atlantic anywhere in close proximity to the coast of America.

Suborder MYSIDA

Family MYSIDAE

Subfamily SIRIELLINAE

Genus SIRIELLA Dana

5. SIRIELLA THOMPSONII (H. Milne-Edwards)

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10161	Surface	5	10200	Surface	2
10161	100–0 m	2	10200	75–0 m	2
10163½	Surface	5	10203	Surface	2
10173	do	1	10205	do	1
10176	do	1	10206	do	2
10180	do	11	10208	do	3
10186	25–0 m	1	10208	100–0 m	1
10186	85–0 m	1	10209	Surface	1
10194	Surface	20	10209	100–0 m	2
10194	50–0 m	2	10211	Surface	2
10194	600–0 m	6	10212	300–0 m	1

Remarks.—This widely distributed surface species has been recorded previously from the area explored by the *Bache* by Ortmann (1893) and from the Caribbean Sea by Colosi (1920). It is of interest to note that 13 of the 22 gatherings in which it was taken were made at the surface and all but two in water of 100 meters or less.

Subfamily GASTROSACCINAE

Genus ANCHIALINA, Norman

6. ANCHIALINA TYPICA (Kröyer)

Anchialina typica Hansen, 1910, p. 52, pl. 7, figs. 2*a*–2*k*.

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10161	100–0 m	2.	10195	100–0 m	3.
10178	Surface	1 male.	10203	75–0 m	1 female.
10182	1,800–0 m	1 male.	10208	Surface	1 male.
10192	100–0 m	1 male.	10208	100–0 m	1 female.

Remarks.—This species has not previously been recorded from the area explored by the *Bache*, but Hansen has noted its occurrence in the waters of the Danish West Indies and St. Thomas, immediately to the south, and Colosi has recorded it from the Caribbean Sea.

Subfamily MYSINAE

Genus KATERYTHROPS Holt and Tattersall

7. KATERYTHROPS OCEANAE Holt and Tattersall

Occurrence.—Station 10166, depth 1,100–0 m., 2 males; station 10211, depth 500–0 m., 1 immature specimen.

Remarks.—This species has not been recorded previously from the area under notice.

Genus EUCHAETOMERA G. O. Sars

8. EUCHAETOMERA TYPICA G. O. Sars

Occurrence.—Station 10173, depth 200–0 m., 3 specimens; station 10187, depth 200–0 m., 1 female.

Remarks.—This widely distributed species has not actually been recorded before from the *Bache* area, but is known from the more southerly and tropical parts of the Atlantic.

9. EUCHAETOMERA TENUIS G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10173	200–0 m	1 female.	10209	700–0 m	1 female.
10200	500–0 m	1 female.	10211	500–0 m	2 females.

Remarks.—Previously known from this area from the collections made by the Plankton Expedition (Ortmann).

Genus MYSIDOPSIS, G. O. Sars

10. MYSIDOPSIS BIGELOWI, new species

Holotype.—Cat. No. 59115, U.S.N.M.

Occurrence.—Station 10157, surface, few immature males and females.

Description.—*Carapace* produced between the eyes into a short low triangular rostral plate with a bluntly pointed apex; anterolateral corners rounded.

Eyes of moderate size, cornea occupying less than half of the whole eye in dorsal view; no fingerlike process on the outer dorsal portion of the eyestalk.

Antennal scale five times as long as broad, narrowly lanceolate in shape, setose all round, without a distal joint, apex bluntly rounded, extending beyond the peduncle of the antennules by about one-quarter to one-third of its length, a prominent spine on the outer distal corner of the joint from which the scale springs; the distal joint of the antennal peduncle only slightly more than half as long as the preceding joint, the whole peduncle extending to about two-thirds of the antennal scale.

Maxillulae with a definite shoulder on the outer margin of the outer plate proximal to which are a few minute spinules; inner plate with two setae.

Maxillae with the proximal lobe narrow; distal lobe divided into two parts by a short furrow; palp long, distal joint narrowly oval, nearly twice as long as broad and twice as long as the proximal joint; exopod long and narrow, setae present only on its outer margin and the distal setae much longer than the proximal.

First thoracic limbs of the normal form characteristic of the genus with the second and third joints of the endopod fused; the limbs are rather shorter and stouter than in the European species of the genus especially with regard to the sixth joint; seventh joint not longer than broad; dactylus stout and straight.

Second thoracic limbs with the endopod relatively enormously developed, much more robust than in any known species of the genus and as far as the present material goes, more robust in the female than in the male; this relative development of the limbs is attained mainly by the large size of the sixth joint which is one-quarter longer than the fifth and four times as long as broad; it is widest just distal to the middle and from this point the joint narrows considerably, the distal portion of the inner margin being slightly concave and armed with numerous spiniform setae; the outer distal margins are also armed with numerous setae; the seventh joint is about one-fourth of the length of the sixth and terminates in a strong somewhat curved nail; the outer margin is convex and the inner margin concave and fringed also with spiniform setae; the inner face of this joint is armed with numerous very strong setae which are barbed on one side only; the concave inner margin of the seventh joint folds down against the distal portion of the inner margin of the sixth joint to form a kind of subchela to the limb; in the male specimens, which are, however, immature, the second thoracic limbs have the same general form as in the female just described but appear to be less robust and the subchelate appearance of the limbs is less well marked.

Remaining thoracic limbs with the sixth joint of the endopod divided into two subjoints by a transverse suture; seventh joint very short and terminating in a long slender nail.

Abdomen with the sixth somite one and two-thirds time as long as the fifth.

Pleopods in the only males available, which are immature, are all distinctly biramous.

Telson as long as the sixth abdominal somite, one and a third times as long as broad at the base and three times as long as the breadth at the apex, entire and broadly linguiform in shape with the apex broadly rounded; lateral margins with about twelve short stout spines distributed along the whole length; apex armed with three

pairs of long strong spines, the inner pair equal in length to one-third of the telson, the next pair slightly shorter and the outer pair only one-fifth of the telson in length; no plumose setae on the apex.

Inner uropods one and a half times as long as the telson with five spines on the inner lower margin in the region of the statocyst; outer uropods slightly longer than the inner.

Length of immature specimens of both sexes, 7 mm.

Remarks.—This species may be distinguished by the combination of characters afforded by the unjointed antennal scale, the powerfully developed endopod of the second thoracic limbs and the form of the telson and its armature. Only one other described species of the genus, *M. acuta* Hansen, possesses an unjointed antennal scale. In all the other species the scale has a small distal portion separated off by a distinct suture. In *M. acuta*, however, the terminal portion of the scale is acutely pointed and thus differs markedly from the present form in this respect. In the general form of the telson, *M. bigelowi* agrees very closely with *M. kempii* Tattersall. These two species have a form of telson and telsonic armature quite distinct from those of any of the remaining species. In *M. kempii* there are four pairs of stout spines at the apex and in *M. bigelowi* only three. *M. kempii*, however, differs from *M. bigelowi* in having a distinct distal joint to the antennal scale, in the much less robust endopod to the second thoracic limbs and in the fact that the sixth joint of the endopods of the remaining thoracic limbs is three-jointed.

Genus NEOMYSIS Czerniavsky

11. NEOMYSIS AMERICANA (S. I. Smith)

Occurrence.—Station 10157, surface, abundant.

Distribution.—This common American species has been recorded from several localities on the eastern coast of America from Massachusetts to New Jersey, but I can not trace any previous record from so far south as the present one which is from off the coast of Virginia. It is, however, doubtless abundant in the shallower waters along the greater part of the coast.

Order EUPHAUSIACEA

Family EUPHAUSIIDAE

Genus BENTHEUPHAUSIA G. O. Sars

12. BENTHEUPHAUSIA AMBLYOPS (G. O. Sars)

Occurrence.—Station 10182, 1800–0 meters, 1 specimen, 10 mm. long.

Remarks.—The single specimen is still post-larval and presents a character not hitherto known in the genus, namely, the posterior half of the lower free margin of the carapace is serrate. Serrations

on various parts of the cuticle of Euphausians are not infrequent during the larval and post-larval stages. They are most frequently found on the anterior margin of the carapace and on the rostral plate. In some larvae which I attributed to *Euphausia longirostris* Hansen, however, serrations on the lower free margins of the carapace were present (Tattersall, 1924). The serrations on the present specimen of *Bentheuphausia amblyops* are, I take it, the last remains of a similar armature.

Distribution.—Hansen (1915) recorded two specimens of this species from localities in the West Atlantic off the coasts of America, about 7–10° north of the place at which the *Bache* specimen was captured. These records are the only ones with which I am acquainted from the immediate vicinity of the area explored by the *Bache*.

Genus THYSANOPODA H. Milne-Edwards

13. THYSANOPODA TRICUSPIDATA H. Milne-Edwards

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	5	10192	100–0 m	2
10166	100–0 m	3	10194	50–0 m	5
10169	50–0 m	2	10200	75–0 m	30
10171	75–0 m	2	10200	500–0 m	2
10173	Surface	1	10203	75–0 m	2
10182	1800–0 m	1	10203	150–0 m	1
10184	50–0 m	1	10206	400–0 m	2
10186	25–0 m	1	10209	100–0 m	10
10186	75–0 m	1	10209	700–0 m	1
10188	75–0 m	1	10211	500–0 m	1

Analysis of above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	1	1	400	3	1	20
25	2	1	1	500	4	2	3
50	5	3	8	600	1	0	0
75	8	5	36	700	2	1	1
100	9	3	15	750	1	0	0
150	3	2	6	1,000	3	0	0
175	1	0	0	1,100	1	0	0
200	3	0	0	1,400	1	0	0
300	1	0	0	1,800	3	1	1

Remarks.—This species was generally distributed in the oceanic area, but was never very abundant in any haul. The majority of the specimens were caught between 50–150 meters which would appear to be the zone of its maximum abundance. Only one specimen was taken actually at the surface and only two at less depths than 50 meters, while seven were caught in nets fishing at greater depths than 150 meters. There is a good deal of scattered evidence that this species is a surface form during hours of darkness, particularly in the imma-

ture form (Tattersall, 1924). I have no information as to the times at which the hauls of the *Bache* were made, but the evidence provided by the above records of this species would suggest that they were made during daylight. It therefore seems possible to suggest that *T. tricuspidata* is an epiplanktonic species, with a maximum occurrence at about 100 meters during the hours of daylight, rising to the surface at night.

14. THYSANOPODA MONACANTHA Ortmann

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
	Meters			*Meters*	
10158	600–0	1	10203	75–0	2
10161	100–0	1	10203	150–0	4
10162	150–0	1	10206	400–0	3
10187	200–0	1	10207	400–0	1
10192	100–0	2	10208	100–0	20
10195	100–0	2	10209	100–0	9
10198	175–0	2	10211	500–0	1
10200	75–0	129	10212	300–0	1
10200	500–0	1	10212	500–0	1
10202	75–0	4			

Remarks.—With the single exception of the specimen captured at Station 10158, 600 meters, this species was confined to the oceanic area. None occurred at a greater depth than 500 meters (with the exception noted) and none nearer the surface than 75 meters. As far as these records go, it was most abundant between 75 and 100 meters. All the specimens captured at 75 meters were less than half grown, the largest measuring 17 mm.; but complete adult specimens of 32 mm occurred at 100 meters.

15. THYSANOPODA AEQUALIS Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
	Meters			*Meters*	
10161	100–0	50	10186	25–0	15
10162	150–0	128	10186	85–0	(2)
10163½	400–0	31	10188	75–0	56
10163½	500–0	3	10192	100–0	27
10166	100–0	45	10192	1,000–0	10
10166	1,100–0	9	10194	50–0	65
10169	50–0	200	10194	100–0	2
10171	75–0	22	10195	100–0	250
10172	1,000–0	4	10200	75–0	7
10172	1,800–0	8	10200	500–0	3
10173	100–0	32	10202	75–0	12
10173	200–0	41	10203	75–0	15
10176	750–0	6	10203	150–0	14
10176	1,800–0	1	10204	150–0	1
10178	(1)	1	10206	400–0	24
10178	50–0	9	10208	100–0	65
10180	75–0	9	10208	700–0	26
10182	75–0	22	10209	100–0	68
10182	1,400–0	3	10209	700–0	17
10182	1,800–0	4	10210	1,000–0	1
10184	50–0	46	10211	500–0	14

[1] Surface. [2] Many.

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	1	1	400	3	2	55
25	2	1	15	500	4	3	20
50	5	4	320	600	1	0	0
75	8	8	[1] 500	700	2	2	43
100	9	8	539	750	1	1	6
150	3	3	143	1,000	3	3	15
175	1	0	0	1,100	1	1	9
200	3	1	41	1,400	1	1	3
300	1	0	0	1,800	3	3	13

[1] Approximate.

Remarks.—This species was captured only in the tropical oceanic area in which it appears to be widely and abundantly distributed. It is clearly not a surface form, only one specimen occurring in 18 surface hauls examined. It reaches its maximum abundance between 50 and 150 meters, more than 80 per cent of the specimens coming from between these depths, but it occurred regularly down to the deepest layers examined, though in reduced numbers.

16. THYSANOPODA MICROPHTHALMA G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
	Meters			*Meters*	
10166	1,100–0	1	10182	1,800–0	3
10172	1,000–0	1	10192	1,000–0	1
10173	200–0	7	10200	500–0	2

Remarks.—Apparently widely but sparingly distributed throughout the oceanic area and confined to the deeper layers, at any rate in the adult condition. The specimens from 200 and 500 meters were all less than half grown, the largest measuring 15 mm. Fully adult specimens were captured at 1,000 meters.

17. THYSANOPODA CORNUTA? Illig

Occurrence.—Station 10166, 1,100–0 m., 3; station 10172, 1,000–0 m., 1; station 10172, 1,800–0 m., 1.

Remarks.—These larvae measure from 8–13 mm. and show many points of resemblance to those described and figured by Hansen (1912, p. 224, pl. 6, figs. 1*a*–1*e*) and Zimmer (1914, p. 419, pl. 26, figs. 55–58). The similarity is close enough to suggest that they belong to the genus *Thysanopoda* and to the group containing the species *T. cornuta* and *T. egregia*, the position assigned to their larvae by both Hansen and Zimmer.

The largest specimen measures 13 mm. in length and differs from Hansen's specimen measuring 14.5 mm. in the following points:

(1) The presence of a very large and powerful spine on the lateral margins of the carapace posterior to the center.

(2) The median spine of the rostral plate is much more produced.

In the first of these points it agrees with the larvae described by Zimmer, which are, however, much smaller in size, measuring 5.5–10 mm. The lateral spine on the carapace is probably a larval character but it is difficult to believe that the difference in size of this spine in my own and Hansen's specimens can be explained entirely by the small difference in total length. It rather suggests that the two larvae belong to separate species.

In the second of the above points my larvae differ from those described by both Hansen and Zimmer, which are in substantial agreement in the form of the rostral plate. The figures which accompany this report will bring out the extent of this difference and it is only necessary to add that the rostral plate is of very much the same form in the smallest as well as the largest specimen.

I can not see any trace of ripple markings on the carapace such as are described and figured by Zimmer in his larvae and my specimens show a further point of difference in that there is no long spine on the dorso-lateral angle of the last abdominal somite, but the epimeral plate is acutely pointed at the postero-lateral angle. In other respects, allowing, of course, for the different degree of development of the appendages due to differing age, my specimens agree fairly well with those of Hansen and Zimmer. Particularly characteristic of my specimens is the clumsy external form and the unjointed narrowly conical flagella of the antennules and antennae. All the specimens are from very deep water.

Genus MEGANYCTIPHANES Holt and Tattersall

18. MEGANYCTIPHANES NORVEGICA (M. Sars)

Occurrence.—Station 10158, 600–0 m., 1 specimen; station 10160, 100–0 m., 12 specimens.

Remarks.—The two stations at which this species occurred are in the coastal region, 10160 in purely coastal waters, 10158 in the region of mixture between coastal and Gulf Stream water. The fact that *M. norvegica* occurred only at these two stations confirms what was previously known of its distribution on the Atlantic coasts of America, where it is conclusively a coastal and not an oceanic Gulf Stream form.

Genus EUPHAUSIA Dana

19. EUPHAUSIA KROHNII (Brandt)

Occurrence.—Station 10158, 600–0 m., 2,000 specimens; station 10160, 100–0 m., many.

Remarks.—The distribution of this species in the area explored by the *Bache* is interesting. It occurred in the same two hauls as *Meganyctiphanes norvegica* and in no others, being replaced in the purely oceanic waters by the closely allied species *E. americana.* The enormous abundance of *E. krohnii* at these two stations coupled with its complete absence in all the other points suggests that possibly it, like *M. norvegica,* should be regarded as a coastal and slope form rather than as an oceanic species. This, however, is not in agreement with previous records, for the species has frequently been recorded from waters which are purely oceanic. Many of Hansen's records (1915) from the west Atlantic off the American coast are from the oceanic water outside the continental shelf. Perhaps the true explanation is that *E. krohnii* is not so much a coastal and slope form as a boreal species representing a northern element in the plankton off the American coast. Its wide distribution in the northern parts of the North Atlantic from America to the European Atlantic slope off Norway and the British Isles supports this view. Its main distribution is, in fact, very similar to that of *M. norvegica* but the latter extends much nearer into the coastal waters on both sides of the Atlantic.

20. EUPHAUSIA AMERICANA Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10161	Surface	20	10198	Surface	1
10161	100–0 m	10	10198	175–0 m	10
10162	Surface	1	10200	Surface	320
10162	150–0 m	20	10200	75–0 m	28
10163½	400–0 m	3	10200	500–0 m	5
10166	100–0 m	41	10202	75–0 m	21
10166	1,100–0 m	2	10203	Surface	Several.
10169	50–0 m	2	10203	75–0 m	Few.
10171	75–0 m	3	10203	150–0 m	11
10173	Surface	7	10204	150–0 m	2
10173	100–0 m	3	10205	Surface	41
10176	50–0 m	3	10205	200–0 m	1
10176	750–0 m	6	10206	Surface	34
10176	1,800–0 m	3	10206	400–0 m	15
10178	50–0 m	4	10207	100–0 m	2
10180	Surface	4	10208	do	7
10180	75–0 m	1	10208	700–0 m	9
10182	1,800–0 m	2	10209	Surface	45
10186	25–0 m	2	10209	100–0 m	7
10188	75–0 m	1	10209	700–0 m	17
10192	100–0 m	6	10210	1,000–0 m	2
10194	50–0 m	Few.	10211	Surface	Many.
10194	600–0 m	1	10211	500–0 m	5
10195	100–0 m	50			

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	11	[1] 1,000	400	3	2	18
25	2	2	22	500	4	2	10
50	5	4	30	600	1	1	1
75	8	5	54	700	2	2	26
100	9	8	126	750	1	1	6
150	3	3	33	1,000	3	1	2
175	1	1	10	1,100	1	1	2
200	3	1	1	1,400	1	0	0
300	1	0	0	1,800	3	2	5

[1] Approximate.

Remarks.—Although this species occurred in hauls from the greatest depth investigated, it must be regarded essentially as a surface form, over 80 per cent of the specimens being caught with surface nets.

21. EUPHAUSIA BREVIS Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10161	Surface	6	10192	100–0 m	1
10161	100–0 m	Few.	10192	1,000–0 m	3
10162	Surface	28	10194	Surface	14
10162	150–0 m	268	10194	50–0 m	Few.
10163½	Surface	100	10194	100–0 m	2
10163½	400–0 m	27	10194	600–0 m	35
10163½	500–0 m	4	10195	100–0 m	70
10166	100–0 m	87	10196	Surface	Several.
10166	1,100–0 m	6	10200	do	320
10169	50–0 m	7	10200	75–0 m	10
10171	75–0 m	53	10200	500–0 m	2
10172	1,860–0 m	9	10202	75–0 m	5
10173	Surface	56	10203	Surface	4
10173	100–0 m	11	10203	150–0 m	2
10173	200–0 m	25	10204	do	1
10176	50–0 m	6	10206	400–0 m	2
10176	750–0 m	6	10207	do	1
10176	1,860–0 m	4	10208	100–0 m	13
10178	50–0 m	21	10208	700–0 m	9
10180	Surface	51	10209	Surface	9
10180	75–0 m	52	10209	100–0 m	17
10182	Surface	1	10209	700–0 m	23
10182	75–0 m	25	10210	1,000–0 m	1
10182	1,400–0 m	7	10211	Surface	Many.
10182	1,800–0 m	30	10211	500–0 m	12
10184	50–0 m	33	10212	300–0 m	1
10186	25–0 m	Many.	10212	500–0 m	3
10188	75–0 m	38			

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	12	800	400	3	3	30
25	2	1	100	500	4	4	21
50	5	5	87	600	1	1	35
75	8	6	183	700	2	2	32
100	9	8	220	750	1	1	6
150	3	3	271	1,000	3	2	4
175	1	0	0	1,100	1	1	6
200	3	1	25	1,400	1	1	7
300	1	1	1	1,800	3	3	43

Remarks.—This species is widely distributed in the tropical oceanic area and was found at all depths up to 1,800 meters. It is, however, essentially an upper water form, abundant at the surface but more equally and generally distributed in the upper 200 meters than *E. americana*.

22. EUPHAUSIA MUTICA Hansen

Occurrence

Stations	Depth	Specimens	Stations	Depth	Specimens
10161	Surface	12	10195	100–0 m	30
10161	100–0 m	Few.	10196	Surface	Several.
10162	150–0 m	17	10198	do	10
10163½	Surface	2	10198	175–0 m	33
10163½	400–0 m	3	10200	Surface	50
10166	100–0 m	3	10200	75–0 m	12
10169	50–0 m	6	10202	do	3
10171	75–0 m	5	10203	Surface	Several.
10173	Surface	5	10203	75–0 m	2
10173	100–0 m	3	10203	150–0 m	2
10176	Surface	3	10205	Surface	7
10176	50–0 m	1	10206	do	24
10180	Surface	10	10208	100–0 m	3
10180	75–0 m	10	10208	700–0 m	4
10182	Surface	1	10209	Surface	Many.
10186	25–0 m	1	10209	100–0 m	7
10186	85–0 m	Several.	10209	700–0 m	13
10188	75–0 m	5	10211	Surface	15
10194	50–0 m	Few.	10211	500–0 m	5
10194	100–0 m	1	10212	do	1

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	14	250	400	3	1	3
25	2	1	1	500	4	2	6
50	5	3	27	600	1	0	0
75	8	7	67	700	2	2	17
100	9	7	67	750	1	0	0
150	3	2	19	1,000	3	0	0
175	1	1	33	1,100	1	0	0
200	3	0	0	1,400	1	0	0
300	1	0	0	1,800	3	0	0

Remarks.—This species appears to be generally distributed in the tropical oceanic area, but is not so abundant as either *E. americana* or *E. brevis*. It occurs frequently at the surface but is also distributed evenly throughout the upper 200 meters. Below this depth it is comparatively rare and occurred in no haul from a greater depth than 700 meters.

23. EUPHAUSIA TENERA Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10158	600–0 m	4	10195	100–0 m	17
10161	100–0 m	50	10196	Surface	15
10162	150–0 m	61	10198	175–0 m	2
10163½	Surface	3	10200	Surface	1,200
10163½	400–0 m	1	10200	75–0 m	148
10163½	500–0 m	1	10200	500–0 m	8
10166	100–0 m	35	10202	75–0 m	60
10169	50–0 m	10	10203	Surface	3
10171	75–0 m	20	10203	75–0 m	16
10172	1,800–0 m	4	10203	150–0 m	36
10173	Surface	1	10204	150–0 m	1
10173	100–0 m	2	10205	Surface	41
10173	200–0 m	3	10206	400–0 m	4
10176	750–0 m	3	10208	100–0 m	31
10180	Surface	4	10208	700–0 m	5
10180	75–0 m	2	10209	Surface	1
10186	85–0 m	8	10209	100–0 m	15
10188	75–0 m	1	10209	700–0 m	24
10192	1,000–0 m	2	10211	Surface	Many.
10194	Surface	2	10211	500–0 m	10
10194	50–0 m	12	10212	----do	2
10194	600–0 m	14			

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	10	1,300	400	3	2	5
25	2	0	0	500	4	4	21
50	5	3	82	600	1	1	14
75	8	6	195	700	2	2	29
100	9	6	203	750	1	1	3
150	3	3	98	1,000	3	1	2
175	1	1	2	1,100	1	0	0
200	3	1	3	1,400	1	0	0
300	1	0	0	1,800	3	1	4

Remarks.—The vertical distribution of this species is very similar to that of *E. brevis;* it is abundant at the surface but fairly generally distributed in the upper 200 meters.

24. EUPHAUSIA HEMIGIBBA Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10158	600–0 m	2	10186	25–0 m	10
10161	Surface	14	10186	85–0 m	Many.
10161	100–0 m	50	10188	75–0 m	28
10162	Surface	2	10192	100–0 m	5
10162	150–0 m	302	10192	1,000–0 m	7
10163½	Surface	21	10194	50–0 m	45
10163½	400–0 m	19	10194	100–0 m	2
10163½	500–0 m	1	10194	600–0 m	1
10166	100–0 m	197	10195	100–0 m	250
10166	1,000–0 m	9	10196	Surface	18
10169	50–0 m	300	10198	175–0 m	8
10171	75–0 m	51	10200	Surface	130
10172	1,800–0 m	3	10200	75–0 m	34
10173	Surface	3	10200	500–0 m	5
10173	100–0 m	86	10202	75–0 m	28
10173	200–0 m	16	10203	do	12
10176	50–0 m	3	10203	150–0 m	13
10176	750–0 m	18	10206	400–0 m	9
10176	1,800–0 m	2	10208	100–0 m	51
10178	50–0 m	19	10208	700–0 m	10
10180	Surface	3	10209	Surface	3
10180	75–0 m	59	10209	100–0 m	23
10182	Surface	15	10209	700–0 m	17
10182	75–0 m	27	10211	Surface	11
10182	1,800–0 m	20	10211	500–0 m	9
10184	50–0 m	25			

Analysis of the above records

Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens	Depth of net	Total number of hauls	Number of hauls in which species occurred	Total number of specimens
Meters				*Meters*			
0	18	10	220	400	3	2	28
25	2	1	10	500	4	3	15
50	5	5	392	600	1	1	1
75	8	8	289	700	2	2	27
100	9	8	670	750	1	1	18
150	3	2	315	1,000	3	2	16
175	1	1	8	1,100	1	0	0
200	3	1	16	1,400	1	0	0
300	1	0	0	1,800	3	3	25

Remarks.—This species is widely and generally distributed in the tropical oceanic area. While occurring frequently at the surface it appears to reach its maximum abundance at about the 100 meter line and to be mainly an epiplanktonic form.

25. EUPHAUSIA GIBBOIDES Ortmann

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	2	10195	100–0 m	6
10163½	400–0 m	2	10198	175–0 m	2
10166	100–0 m	2	10200	500–0 m	1
10169	50–0 m	1	10202	75–0 m	4
10173	200–0 m	4	10203	150–0 m	5
10184	50–0 m	1	10206	400–0 m	1
10186	85–0 m	1	10208	700–0 m	1

Remarks.—This species is the rarest of the members of the genus captured by the *Bache*. The numbers are too few to enable any generalizations to be made, but it is significant that no specimens were taken at the surface. The species appears to be most frequently caught between 75 and 150 meters and none were caught at a greater depth than 700 meters.

Genus THYSANOËSSA Brandt

26. THYSANOËSSA GREGARIA G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10158	600–0 m	66	10176	50–0 m	1
10162	150–0 m	1	10176	750–0 m	42
10163½	400–0 m	10	10176	1,800–0 m	109
10163½	500–0 m	3	10178	Surface	31
10166	100–0 m	14	10180	75–0 m	2
10166	1,100–0 m	17	10208	700–0 m	32
10173	200–0 m	275	10209	700–0 m	29
10176	Surface	1	10211	500–0 m	113

Remarks.—This species appears to be widely and generally distributed throughout the tropical oceanic area, but is a deeper water form than any of the species of *Euphausia*, and, accordingly, was captured in fewer hauls. It occurred in only 6 out of 46 hauls made at depths of less than 200 meters, but in 9 out of 23 hauls at depths from 200 to 1,800 meters. It is interesting to note that it was caught at the surface on two occasions.

Genus NEMATOSCELIS G. O. Sars

27. NEMATOSCELIS MEGALOPS G. O. Sars

Occurrence.—Station 10158, 600–0 m., 500 specimens; station 10160, 100–0 m., 4 specimens.

Remarks.—This species again is a northern or boreal species and was not taken in the tropical oceanic area. It occurred with *Meganyctiphanes norvegica* and *Euphausia krohnii* and this distribution in the waters of the western Atlantic agrees well with previous observation (Bigelow, 1914 (2) and 1917). Its relative abundance to *E. krohnii* at the two depths at which these species occurred is indicative of its greater abundance in deeper water. At 100 meters only four specimens were found among several hundreds of *E. krohnii*, while at 600 meters 500 specimens were caught with about 2,000 of *E. krohnii*. This bears out the relative vertical distribution of the two species noted by Bigelow (1917) from station 10233 over the continental slope off Nova Scotia.

28. NEMATOSCELIS MICROPS G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10158	600–0 m	1	10194	600–0 m	3
10162	150–0 m	47	10195	100–0 m	4
10163½	400–0 m	14	10198	150–0 m	3
10163½	500–0 m	2	10200	75–0 m	1
10166	1,100–0 m	1	10200	500–0 m	13
10169	50–0 m	8	10203	150–0 m	1
10172	1,000–0 m	1	10205	200–0 m	8
10173	100–0 m	1	10206	Surface	3
10173	200–0 m	61	10206	400–0 m	30
10176	750–0 m	16	10208	700–0 m	22
10176	1,800–0 m	9	10209	700–0 m	27
10182	1,800–0 m	12	10210	1,000–0 m	1
10188	75–0 m	3	10211	500–0 m	30
10192	1,000–0 m	9			

Remarks.—This species has a vertical distribution very similar to that of *T. gregaria*. It occurred in only 8 out of 46 hauls made at less than 200 meters, but in 17 out of 23 hauls made at greater depths. It appears to reach its maximum distribution between 200–700 meters. It is interesting to note that it was caught at the surface on one occasion.

29. NEMATOSCELIS TENELLA G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	19	10192	1,000–0 m	2
10163½	400–0 m	7	10194	600–0 m	4
10166	1,100–0 m	5	10200	500–0 m	2
10172	1,800–0 m	3	10206	400–0 m	5
10173	200–0 m	27	10208	100–0 m	1
10176	750–0 m	3	10208	700–0 m	9
10176	1,800–0 m	3	10209	700–0 m	18
10182	1,800–0 m	2	10210	1,000–0 m	1
10192	100–0 m	1	10211	500–0 m	7

Remarks.—This species is widely but sparingly distributed in the tropical oceanic area. It is a more distinctly deepwater form than even *N. microps*. It was never taken at the surface or indeed at any depth less than 100 meters and in only 3 out of 46 hauls made at less than 200 meters. On the other hand it occurred in 15 out of 23 hauls made at depths from 200–1,800 meters.

Genus NEMATOBRACHION Calman

30. NEMATOBRACHION BOOPIS (Calman)

Occurrence.—Station 10158, 600–0 m., 1 specimen; station 10195, 100–0 m., 1 specimen.

Remarks.—This species is apparently much rarer in the western Atlantic than it is in the waters off the European Continent, its place in the former area being taken by the next species.

31. NEMATOBRACHION FLEXIPES (Ortmann)

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	34	10188	75–0 m	5
10163½	400–0 m	11	10194	50–0 m	1
10166	100–0 m	4	10195	100–0 m	17
10171	75–0 m	3	10198	175–0 m	13
10172	1,800–0 m	2	10200	75–0 m	1
10173	100–0 m	8	10203	do	1
10173	200–0 m	33	10206	Surface	1
10180	75–0 m	34	10206	400–0 m	4
10182	75–0 m	1	10209	700–0 m	3
10184	50–0 m	2	10211	500–0 m	4
10186	85–0 m	5	10212	do	1

Remarks.—All the specimens have a spine on the lateral margin of the carapace. This confirms my previous observations on this point and Hansen's definition of the genus will require modification in this respect. The species appears to be widely if sparingly distributed throughout the tropical oceanic area. It is most abundant in the upper 200 meters, 153 out of 178 specimens in this collection or 86 per cent being captured between 200 meters and the surface. Only one specimen was actually taken at the surface and only five at 50 meters. The species therefore appears to be an epiplanktonic form with a maximum distribution between 50 and 200 meters.

32. NEMATOBRACHION SEXSPINOSUS (Hansen)

Occurrence.—Station 10166, 1100–0 m., 1 female, 27 mm.; station 10192, 1000–0 m., 1 male, 23 mm.

Remarks.—Both specimens have a well-developed spine on the lateral margin of the carapace near the posterior end, in this respect agreeing with *N. flexipes*. In addition to the characters enumerated by Hansen as distinguishing these two species it may be mentioned that *N. sexspinosus* possesses a prominent supraocular spine on the lateral margins of the rostral plate immediately over the eye.

N. sexspinosus is among the rarest of Euphausians. Only three specimens have been previously recorded, two from the tropical East Pacific and one from the temperate North Atlantic (Hansen, 1911 and 1912). In all cases the specimens were captured in deep water.

Genus STYLOCHEIRON G. O. Sars

33. STYLOCHEIRON CARINATUM (G. O. Sars)

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10161	Surface	1	10188	75–0 m	13
10161	100–0 m	20	10192	100–0 m	33
10162	Surface	1	10192	1,000–0 m	3
10162	150–0 m	248	10194	Surface	2
10163½	400–0 m	13	10194	50–0 m	34
10163½	500–0 m	1	10194	100–0 m	26
10166	100–0 m	64	10194	600–0 m	10
10166	110–0 m	2	10195	100–0 m	100
10169	50–0 m	50	10198	175–0 m	5
10171	75–0 m	1	10200	75–0 m	317
10172	1,800–0 m	1	10200	500–0 m	10
10173	100–0 m	20	10202	75–0 m	25
10173	200–0 m	29	10203	75–0 m	16
10176	750–0 m	10	10203	150–0 m	19
10176	1,800–0 m	6	10205	200–0 m	3
10178	Surface	1	10206	400–0 m	10
10178	50–0 m	20	10207	100–0 m	5
10180	Surface	2	10208	do	44
10180	75–0 m	35	10208	700–0 m	17
10182	75–0 m	12	10209	100–0 m	84
10182	1,400–0 m	4	10209	700–0 m	18
10182	1,800–0 m	4	10210	1,000–0 m	2
10184	50–0 m	51	10211	500–0 m	8
10186	85–0 m	63	10212	300–0 m	1
10187	200–0 m	10	10212	500–0 m	80

Analysis of the above records

Depth of net	Number of hauls	Number of hauls in which species occurred	Number of specimens	Depth of net	Number of hauls	Number of hauls in which species occurred	Number of specimens
Meters				*Meters*			
0	18	5	7	400	3	2	23
25	2	0	0	500	4	3	99
50	5	4	145	600	1	1	10
75	8	8	482	700	2	2	35
100	9	9	576	750	1	1	10
150	3	2	267	1,000	3	2	5
175	1	1	5	1,100	1	1	2
200	3	3	52	1,400	1	1	4
300	1	1	1	1,800	3	3	11

Remarks.—This species is obviously very widely and generally distributed in the tropical oceanic area. It occurred in 72 per cent of the hauls examined and at all depths from the surface down to 1,800 meters. It is, however, clearly an upper water form, rarely taken at the surface and most abundant between 50 and 200 meters with a maximum at about the 100-meter line

34. STYLOCHEIRON ELONGATUM G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10163½	400–0 m	9	10200	500–0 m	7
10172	1,800–0 m	2	10206	400–0 m	6
10176	750–0 m	3	10208	700–0 m	11
10176	1,800–0 m	5	10209	do	7
10182	do	4	10211	500–0 m	9
10194	600–0 m	10	10212	do	3
10260	75–0 m	1			

Remarks.—This species is comparatively rare but widely distributed in the tropical oceanic area. It is a deep-water form, only a single specimen occurring in 46 hauls taken above 400 meters, while it occurred in 50 per cent of the hauls taken below that depth. Its maximum of distribution seems to lie between 400 and 700 meters.

35. STYLOCHEIRON SUHMII G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	46	10186	85–0 m	4
10163½	400–0 m	4	10188	75–0 m	4
10163½	500–0 m	1	10194	600–0 m	3
10166	100–0 m	13	10200	75–0 m	4
10171	75–0 m	2	10203	150–0 m	1
10173	200–0 m	13	10205	200–0 m	3
10182	Surface	1	10208	700–0 m	1
10182	75–0 m	2	10209	100–0 m	1
10182	1,400–0 m	1	10209	700–0 m	7
10182	1,800–0 m	2	10211	500–0 m	1

Remarks.—This species is widely distributed in the tropical oceanic area, but never very abundantly. It occurred in about an equal number of hauls above and below the 200-meter line, but whereas 104 specimens were taken between 200 meters and the surface, only 20 specimens occurred below that depth. It is most abundant between 100 and 200 meters.

36. STYLOCHEIRON LONGICORNE G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	5	10192	50–0 m	1
10163½	400–0 m	4	10194	600–0 m	11
10163½	500–0 m	1	10200	500–0 m	4
10166	1,100–0 m	4	10206	400–0 m	17
10172	1,800–0 m	2	10207	do	1
10173	200–0 m	87	10208	700–0 m	2
10176	750–0 m	4	10209	do	16
10176	1,800–0 m	4	10210	1,000–0 m	1
10178	50–0 m	1	10211	500–0 m	17
10182	Surface	8	10212	do	3
10187	200–0 m	16			

Remarks.—This species has a distribution in the area explored very similar to that of *S. suhmii*. It is, however, rather more abundant than the latter and appears to have its maximum of abundance in somewhat deeper water. It occurred in only 4 out of 46 hauls made at less than 200 meters, but in 17 out of 23 hauls between 200 and 1,800 meters. It is most abundant between 200 and 500 meters.

37. STYLOCHEIRON ABBREVIATUM G. O. Sars

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10162	150–0 m	54	10200	500–0 m	4
10163½	400–0 m	6	10203	150–0 m	3
10163½	500–0 m	1	10205	200–0 m	4
10166	100–0 m	3	10206	400–0 m	10
10166	1,100–0 m	2	10207	do	4
10173	200–0 m	33	10208	100–0 m	5
10176	750–0 m	2	10208	700–0 m	6
10182	1,400–0 m	1	10209	100–0 m	2
10182	1,800–0 m	1	10209	700–0 m	2
10187	200–0 m	9	10210	1,000–0 m	1
10192	1,000–0 m	1	10211	500–0 m	17
10195	100–0 m	10	10212	do	1

Remarks.—The distribution of this species in the tropical oceanic area is practically the same as that of *S. longicorne*. It was not taken at depths of less than 100 meters and appears to be most abundant between 100 and 500 meters.

38. STYLOCHEIRON MAXIMUM Hansen

Occurrence

Station	Depth	Specimens	Station	Depth	Specimens
10163½	500–0 m	1	10200	500–0 m	1
10166	1,100–0 m	1	10206	400–0 m	3
10187	200–0 m	1	10208	700–0 m	5
10192	1,000–0 m	2	10209	do	5

Remarks.—This species is widely distributed but comparatively rare in the area explored. It is a deep-water form, all the specimens being taken below 200 meters.

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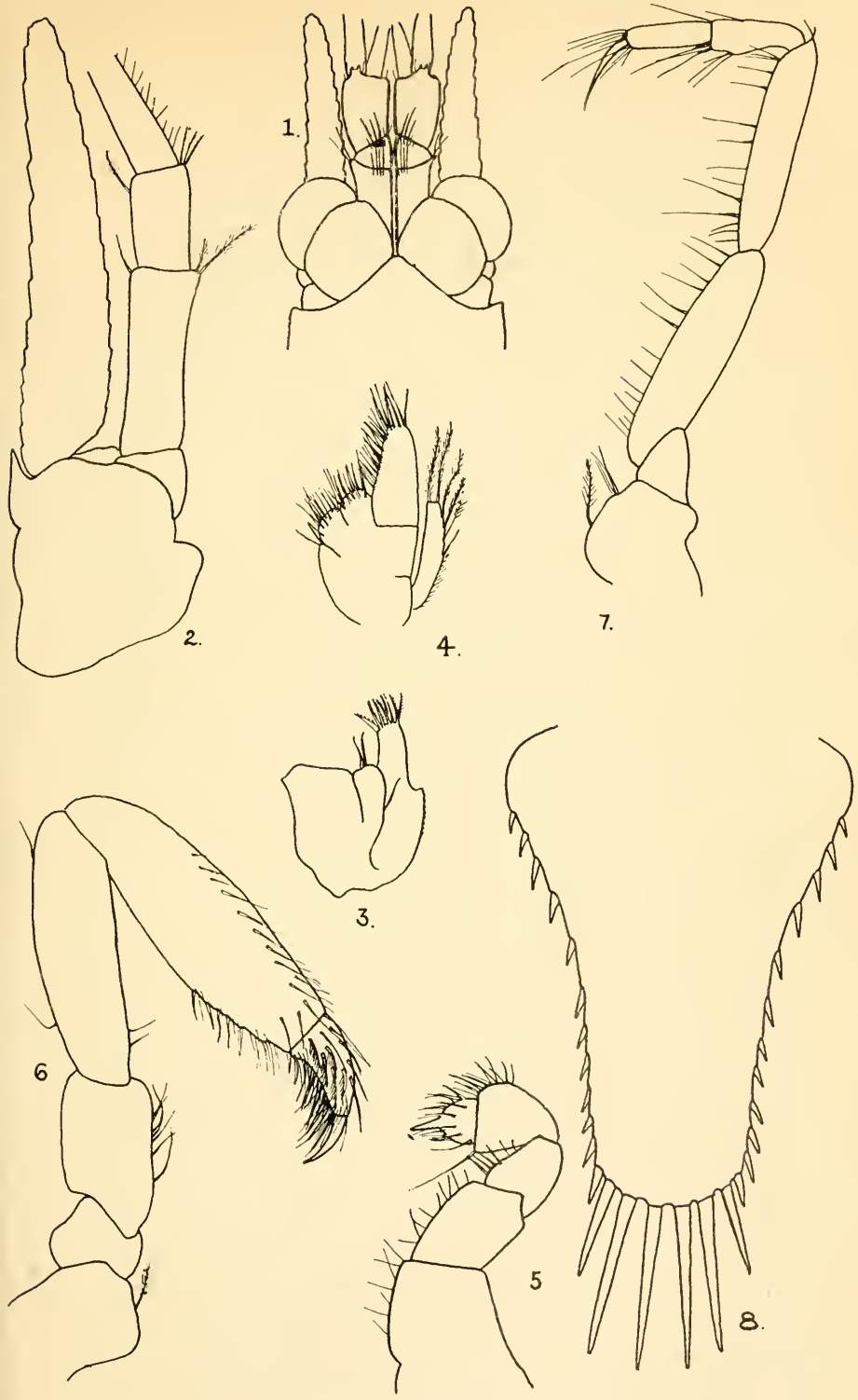
EXPLANATION OF THE PLATES

Plate 1

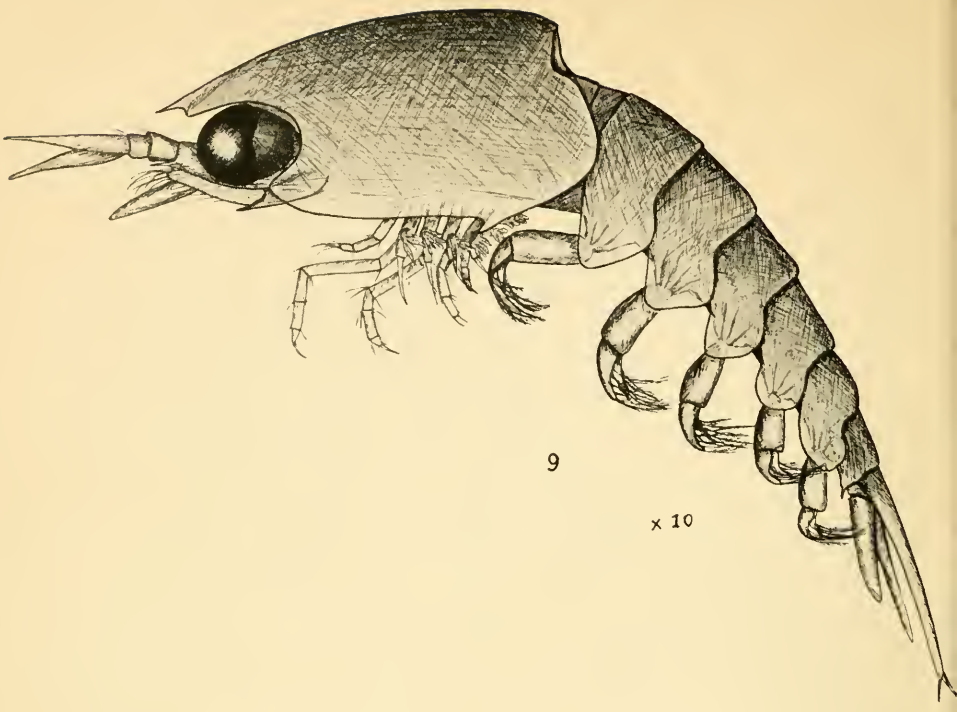
Mysidopsis bigelowi, new species

Fig. 1. Anterior end, dorsal view. × 33.
2. Antennal scale and peduncle. × 65.
3. Maxillula. × 65.
4. Maxilla. × 65.
5. Endopod of first thoracic limb. × 65.
6. Endopod of second thoracic limb. × 65.
7. Endopod of third thoracic limb. × 65.
8. Telson. × 100.



MYSIDOPSIS BIGELOWI, NEW SPECIES

FOR EXPLANATION OF PLATE SEE PAGE 30



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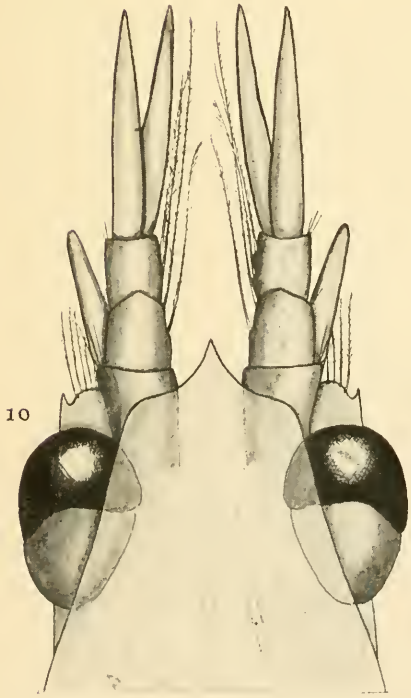

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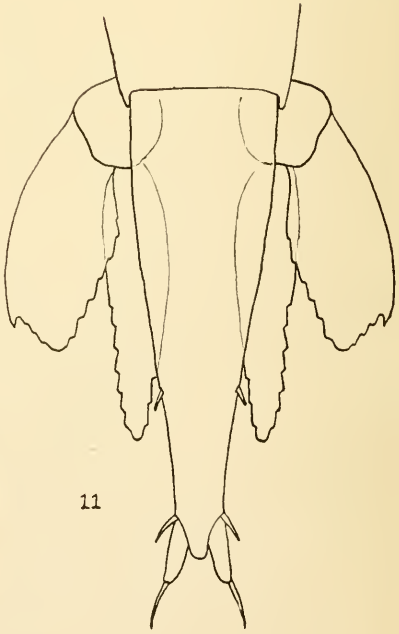

11

YOUNG SPECIMEN OF THYSANOPODA

FOR EXPLANATION OF PLATE SEE PAGE 31

Plate 2

Thysanopoda, young specimens (*?cornuta* Illig)

Fig. 9. Lateral view of specimen 13 mm. × 10.
10. Dorsal view of anterior end of the same specimen. × 10.
11. Telson and uropods of the same specimen. × 25.