

A GUIDE TO THE DEVELOPMENTAL STAGES
OF COMMON COASTAL, GEORGES BANK
AND GULF OF MAINE COPEPODS

BY

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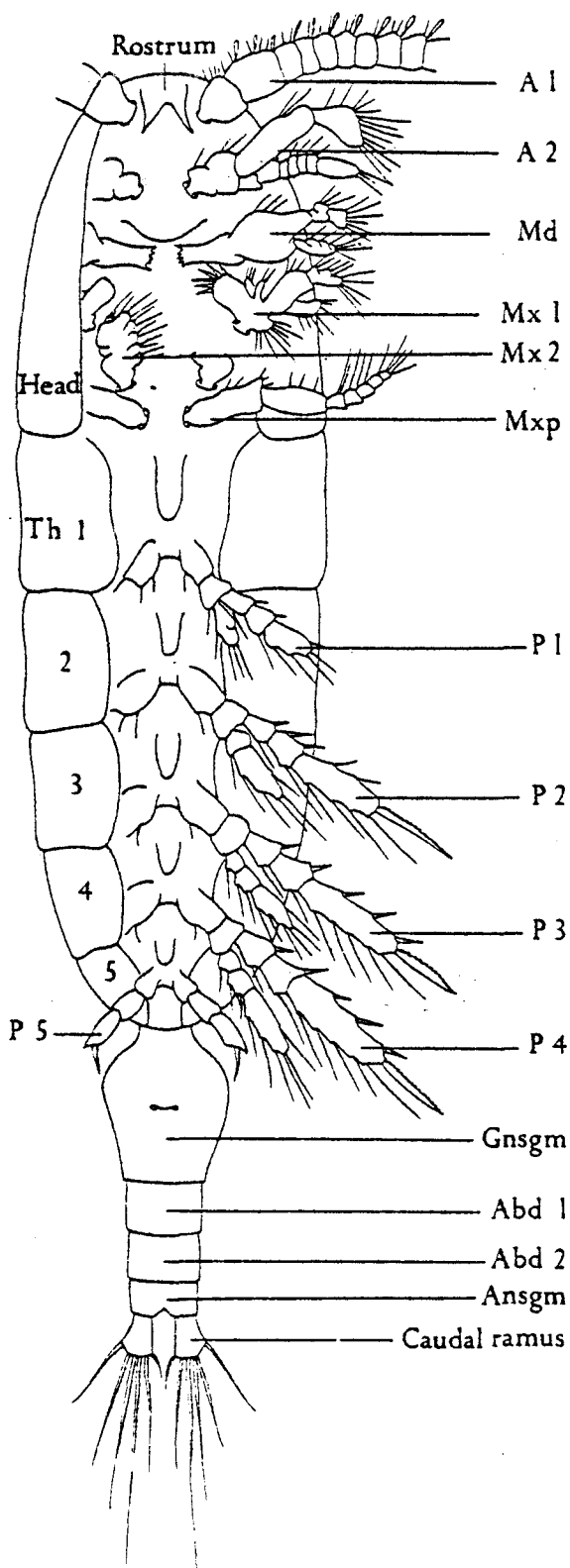
INTRODUCTION

The purpose of this guide is to consolidate widely scattered life history information for fifty common coastal, Georges Bank, and Gulf of Maine area copepods. It is not a comprehensive identification key, but a quick, condensed guide to the developmental stages of these copepods. Included are illustrations, size ranges, and general information about the distinguishing characteristics, geographical distribution, ecology, feeding habits, and life history of these species. For more detailed information the literature cited in each section should be consulted.

Oceanic species are those that occur mainly beyond the continental shelf in the slope water, the Gulf Stream, or the open ocean. Neritic species occur mainly over the continental shelf though their distribution may extend into the slope water and beyond. Littoral species occur in sheltered water where the salinity is 20-30 ‰. Estuarine species prefer water where the daily or weekly salinity change is greater than in strictly littoral areas.

A species will generally appear during summer and fall at the northern limits of its geographical range, and it will appear during winter and spring at the southern limits of its range. Where optimum conditions exist year-round, a species will be present throughout the year.

PLATE I Anatomy of a calanoid copepod.

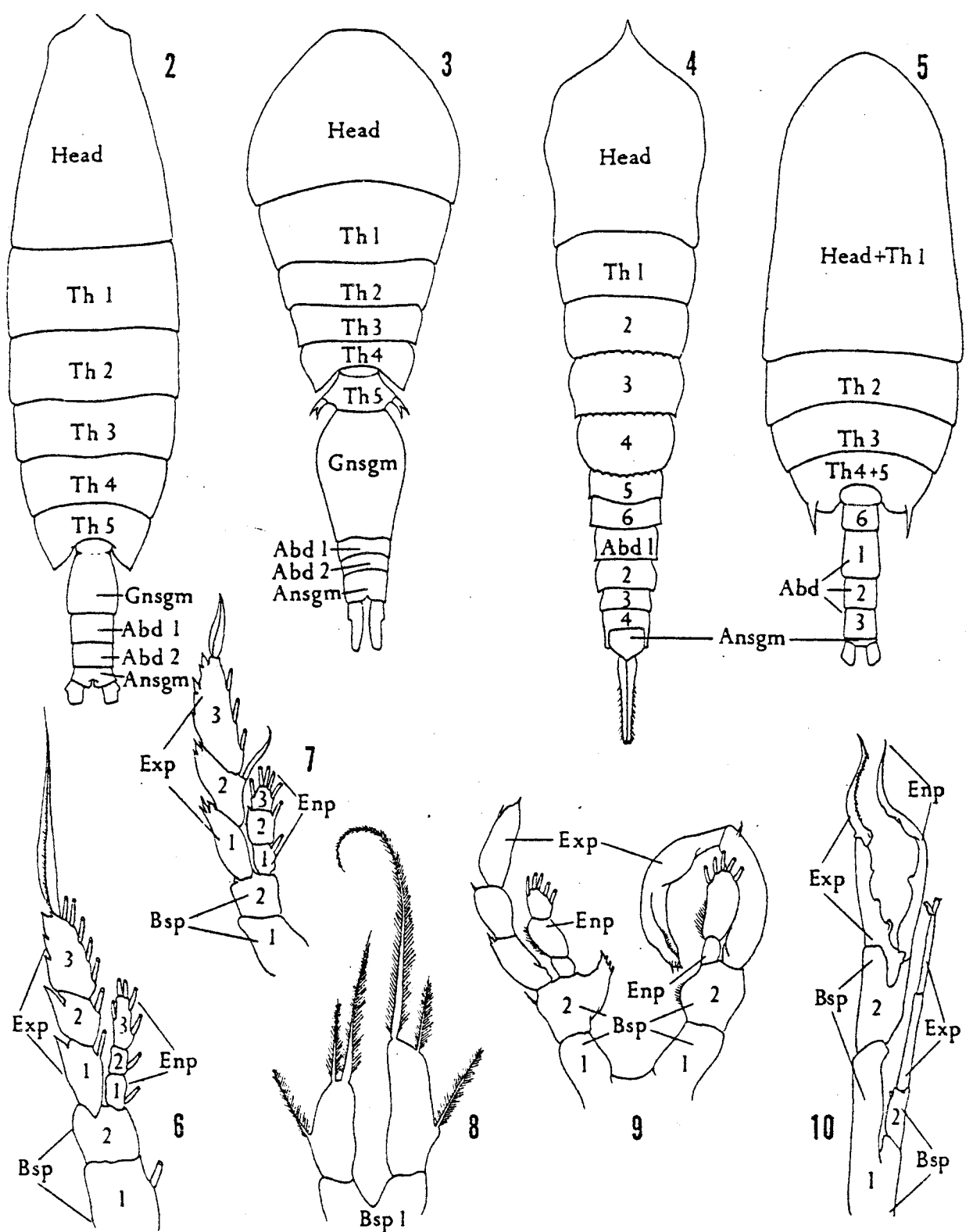


LIST OF ABBREVIATIONS

- A1*, first antenna
A2, second antenna
Abd, abdomen
Ansgm, anal segment
Bsp 1, *bsp 2*, first basipodite, second basipodite
Exp, exopodite
Exp 1, 2, 3, first, second, third segment of exopodite
Enp, endopodite

Enp 1, 2, 3, first, second, third segment of endopodite
Gnsgm, genital segment
Md, mandible
Mx 1, *mx 2*, first maxilla, second maxilla
Mxp, maxilliped
P1, P2 . . . P5, first pereopod, second pereopod . . . fifth pereopod
Th, thorax
Ur, urosome

FIGURE 1.—Diagram of a calanoid copepod, ventral view.



FIGURES 2-10.—2, *Megacalanus princeps* ♀, dorsal.—3, *Oncaea venusta* ♀, dorsal.—4, *Aegisthus aculeatus* ♀, dorsal.—5, *Gaidius tenuispinus* ♂, dorsal.—6, *Rhincalanus*

nasutus ♀, P4.—7, *Lucicutia flavicornis* ♀, P5.—8, *Metridia venusta* ♀, P5.—9, *Lucicutia flavicornis* ♂, P5.—10, *Euchirella pulchra* ♂, P5.

LIST OF ABBREVIATIONS

A1, first antenna
 A2, second antenna
 Abd, abdomen
 Ansgm, anal segment
 Bsp 1, bsp 2, first basipodite, second basipodite
 Exp, exopodite
 Exp 1, 2, 3, first, second, third segment of exopodite
 Enp, endopodite

Enp 1, 2, 3, first, second, third segment of endopodite
 Gnsgm, genital segment
 Md, mandible
 Mx 1, mx 2, first maxilla, second maxilla
 Mxp, maxilliped
 P1, P2 . . . P5, first pereiopod, second pereiopod . . . fifth pereiopod
 Th, thorax
 Ur, urosome

Acartia clausi Giesbrecht

Calanoida: Acartiidae

Distinguishing Characteristics: The outermost caudal bristle on each caudal ramus is thinner and only about half as long as the other caudal bristles. In A. tonsa, the outermost caudal bristle is as heavy and nearly as long as the four middle ones (Conover, 1956). The fifth metasomal segment has a row of 4 to 6 small denticles on the edge. The first two segments of the urosome have a row of similar, but smaller denticles (Sars, 1903).

Geographical Range: A. clausi occurs on both sides of the temperate North Atlantic. It has a more southerly distribution than A. longiremis (Bigelow, 1926). In the area south of Cape Cod, it is confined to inshore waters (Bigelow and Sears, 1939).

Ecology: A. clausi is mainly a neritic species (Bigelow, 1926). It is eurythermal and euryhaline in northern temperate waters, but it only becomes dominant under estuarine conditions (Conover, 1956).

Feeding Habits: A. clausi is an herbivorous copepod (Mullen, 1967).

Life History: A. clausi occurs year-round in the Gulf of Maine, and is a winter-spring species from the Gulf of Maine to Delaware Bay. It occurs as a stray in the Gulf of St. Lawrence and from Delaware Bay to Cape Hatteras (Deevey, 1960). In the Gulf of Maine, A. clausi propagates in early spring and late summer (Bigelow, 1926).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.12	0.14	0.16	0.19	0.23	0.28	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Conway & Minton, 1975)	0.25- 0.42	0.42- 0.51	0.51- 0.65	0.65- 0.76	0.79- 0.84	0.79- 0.93	♀
				0.70- 0.76	0.79- 0.93	0.79- 0.99	♂

Acartia tonsa Dana

Calanoida: Acartiidae

Distinguishing Characteristics: See: A. clausi

Geographical Range: A. tonsa has been reported from the Gulf of St. Lawrence to the Gulf of Mexico (Faber, 1966b). Cape Cod may be the northerly boundary to its presence in any numbers (Bigelow, 1926).

Ecology: A. tonsa is an estuarine and neritic species (Bigelow, 1926). It is eurythermal and is found over a wide range of salinities (Deevey, 1960).

Feeding Habits: A. tonsa is an herbivorous copepod (Mullen, 1967). It has also been found to be omnivorous (Anraku & Omori, 1963).

Life History: A. tonsa is a summer-fall species from Woods Hole to Delaware Bay, and occurs year-round from Delaware Bay to Florida. It occurs as a stray in the Gulf of St. Lawrence and the Gulf of Maine (Deevey, 1960). In Narragansett Bay, the greatest abundance of nauplii occurs from July through October (Faber, 1966b).

Total Length: Female: 1.25-1.5 mm
Male : 1.0-1.15 mm (Wilson, 1932)

PLATE III Adult and copepodite stages of Acartia clausi and Acartia tonsa.

WILSON, 1932.

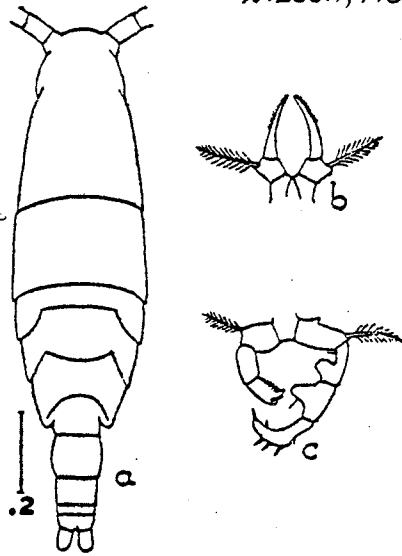


FIGURE 112.—*Acartia clausi*: a, Female, dorsal (after Giesbrecht); b, female, fifth legs; c, male, fifth legs

WILSON, 1932.

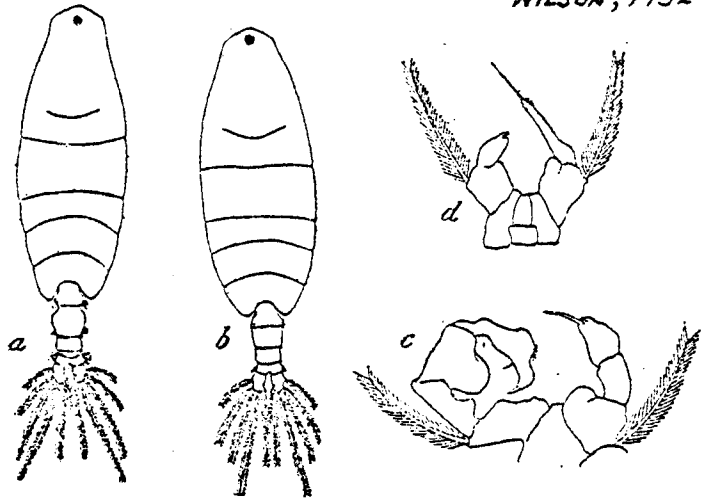


FIGURE 100.—*Acartia tonsa*: a, Male, dorsal; b, female, dorsal; c, male, fifth legs; d, female, fifth legs. (From W. M. Wheeler)

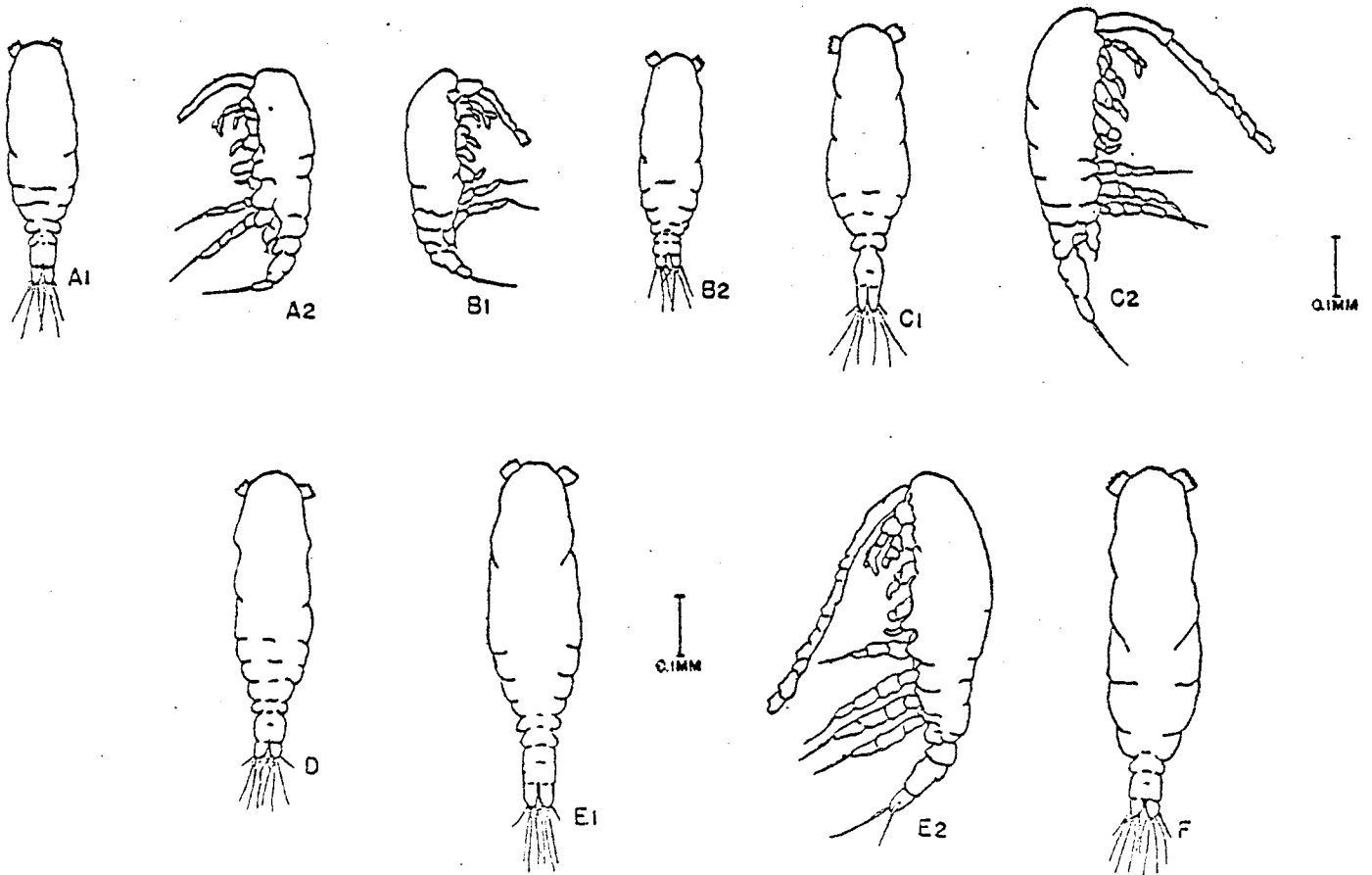
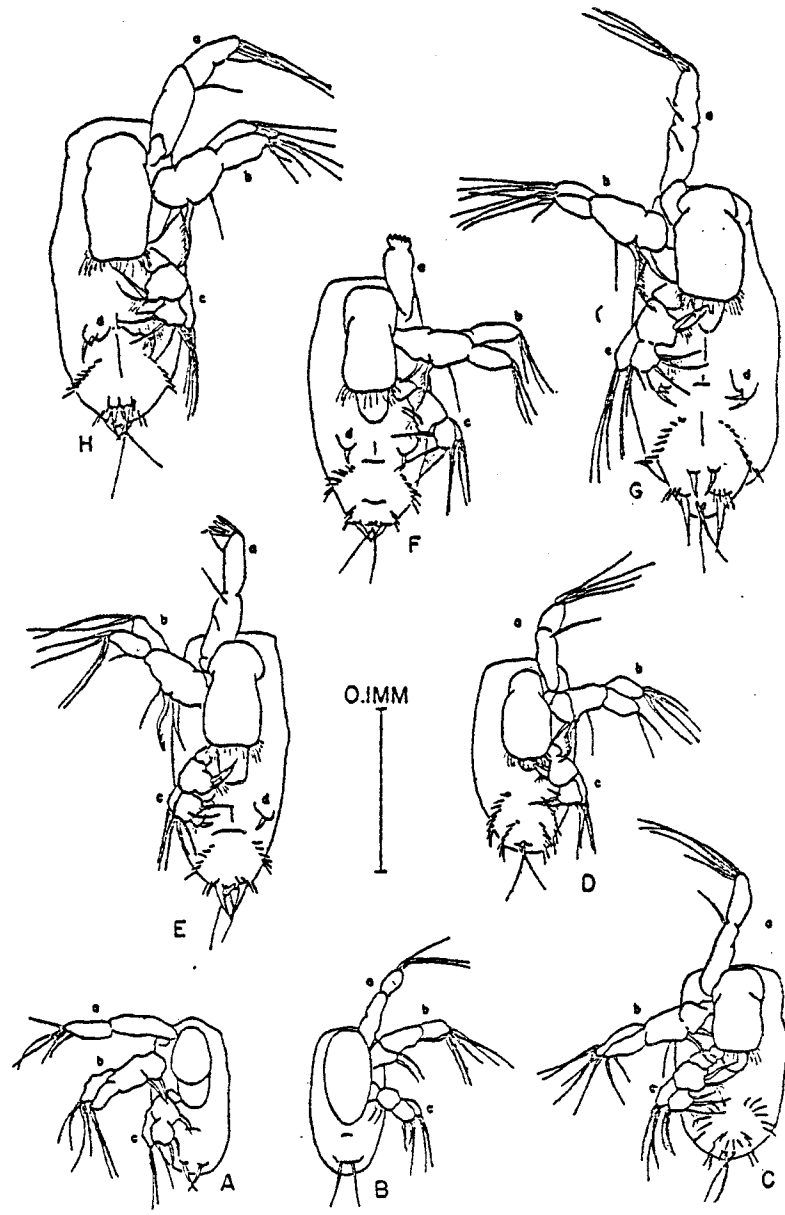


Figure 4. First three copepodid stages of *Acartia clausi* and *A. tonsa*. A1, dorsal view stage I *clausi*; A2, side view stage I *clausi*; B1, dorsal view stage I *tonsa*; B2, side view stage I *tonsa*; C1, dorsal view stage II *clausi*; C2, side view stage II *clausi*; D, dorsal view stage II *tonsa*; E1, dorsal view stage III *clausi*; E2, side view stage III *clausi*; F, dorsal view stage III *tonsa*.

CONOVER, 1956.

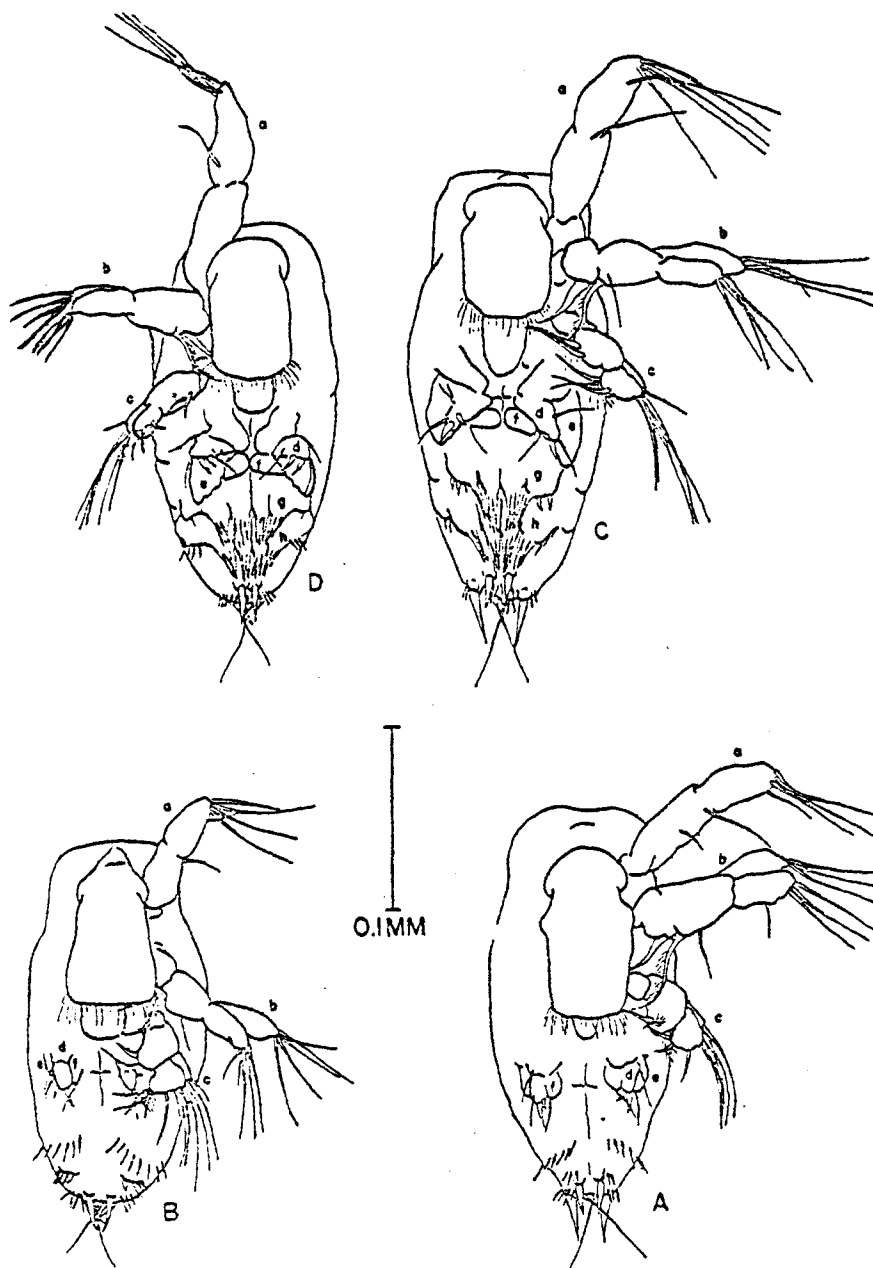
PLATE IV Naupliar stages of Acartia clausi and Acartia tonsa.



CONOVER, 1956.

Figure 1. Naupliar stages I, II, III and IV. A, *clausi* stage I; B, *tonsa* stage I; C, *clausi* stage II; D, *tonsa* stage II; E, *clausi* stage III; F, *tonsa* stage III; G, *clausi* stage IV; H, *tonsa* stage IV. Key to naupliar appendages shown in Figs. 1-3. a, first antenna; b, second antenna; c, mandible; d, first maxilla; e, second maxilla; f, maxilliped; g, first swimming leg; h, second swimming leg.

PLATE V Naupliar stages of Acartia clausi and Acartia tonsa (Continued)



CONOVER, 1956.

Figure 2. Naupliar stages V and VI. A, *clausi* stage V; B, *tonsa* stage V; C, *clausi* stage VI; D, *tonsa* stage VI. See Key in Fig. 1.

Acartia danae Giesbrecht

Calanoida: Acartiidae

Distinguishing Characteristics: A. danae has a short spine on both of the posterior corners of the fifth metasomal segment (Wilson, 1932).

Geographical Range: A. danae has been recorded from the latitude of the Gulf of St. Lawrence to 10°15' N (Owre and Foyo, 1967 from: Willey, 1919; Cervigón, 1963; Grice and Hart, 1962; Legaré, 1964; Owre and Foyo, 1964; and Wilson, 1932, 1936).

Ecology: No information.

Feeding Habits: A. danae is an herbivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.08-1.27 mm
Male : 0.73-0.80 mm (Rose, 1933)

PLATE VI Acartia danae.

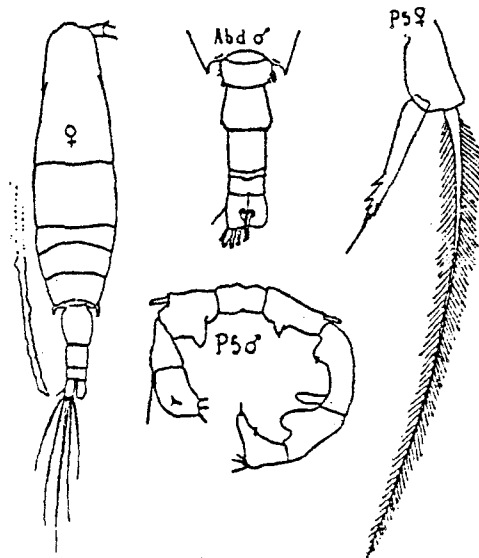


Fig. 349. — Acartia Danae GIESBRECHT, ♀♂;
d'après GIESBRECHT et STEUER.

Acartia longiremis (Lilljeborg)

Calanoida: Acartiidae

Distinguishing Characteristics: Males and females have a delicate spinule on the dorsal face of each lateral lobe of the last segment of the metasome (Sars, 1903).

Geographical Range: A. longiremis is found from the polar basin to Chesapeake Bay (Bigelow, 1926).

Ecology: A. longiremis is a neritic species, although it is less neritic than A. clausi. It is eurythermal and euryhaline (Bigelow, 1926).

Feeding Habits: A. longiremis is an herbivorous copepod (Mullen, 1967).

Life History: A. longiremis attains its maximum abundance in the Gulf of Maine during the warm half of the year (Bigelow, 1926).

Total Length: Female: 0.9-1.1 mm
Male : 0.8-1.0 mm (Wilson, 1932)

PLATE VII Acartia longiremis adult female.

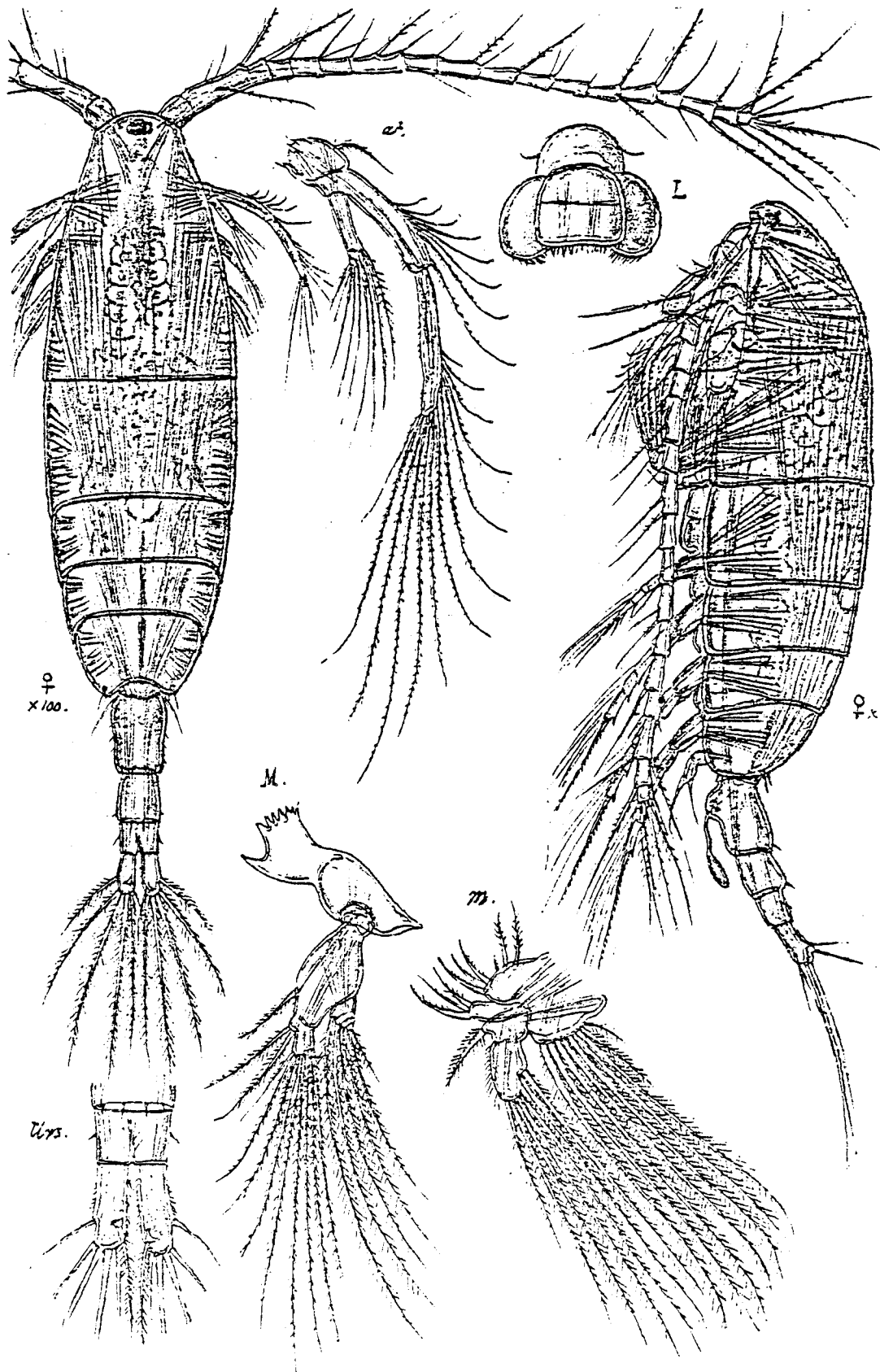
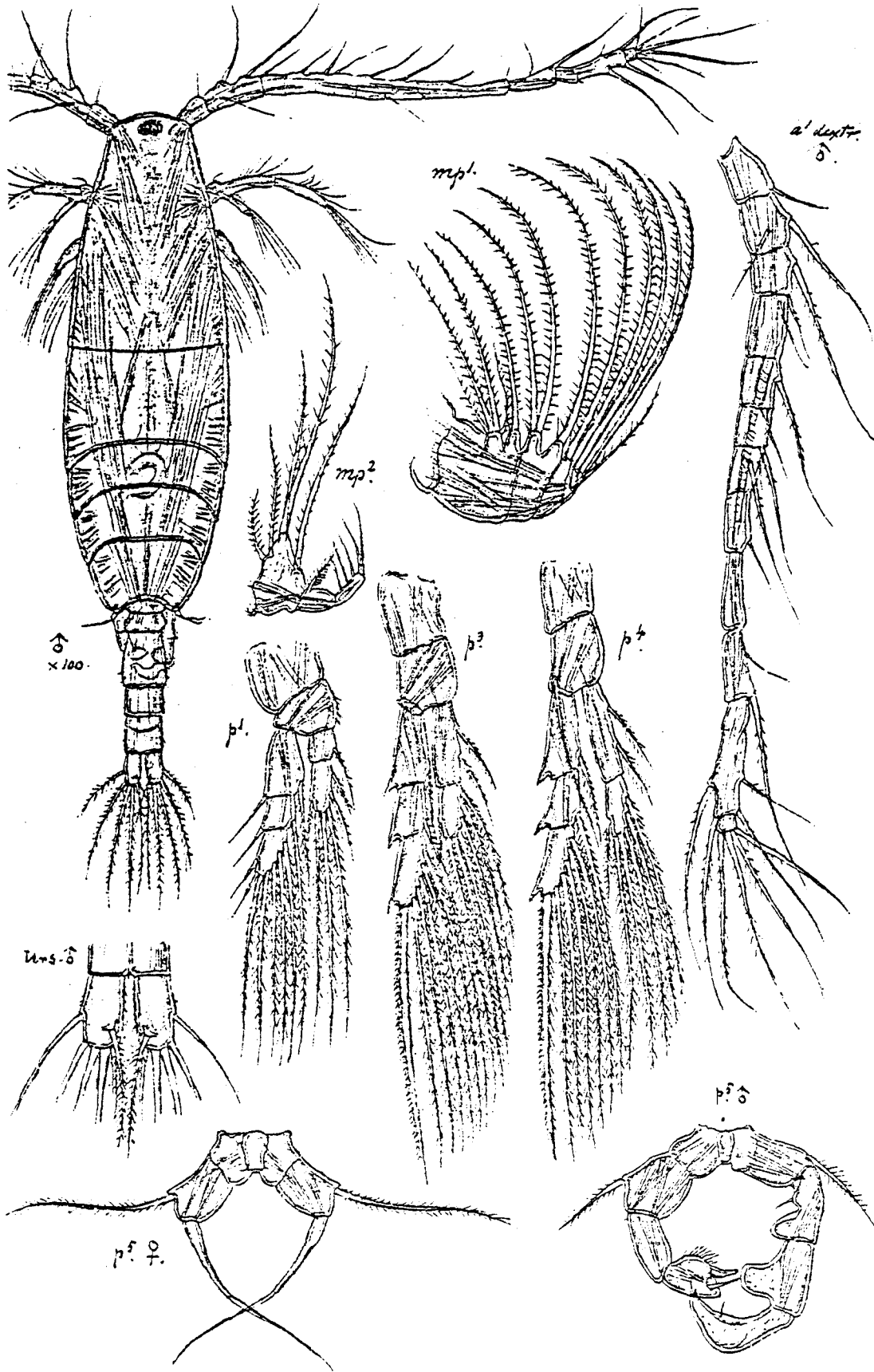


PLATE VIII Acartia longiremis adult male.



Aetideus armatus (Boeck)

Calanoida: Aetideidae

Distinguishing Characteristics: The males have a single fifth leg on the left side (Brodskii, 1967). The fifth legs are lacking in the females (Wilson, 1932).

Geographical Range: In the Gulf of Maine, A. armatus occurs as a stray from the open Atlantic waters (Bigelow, 1926).

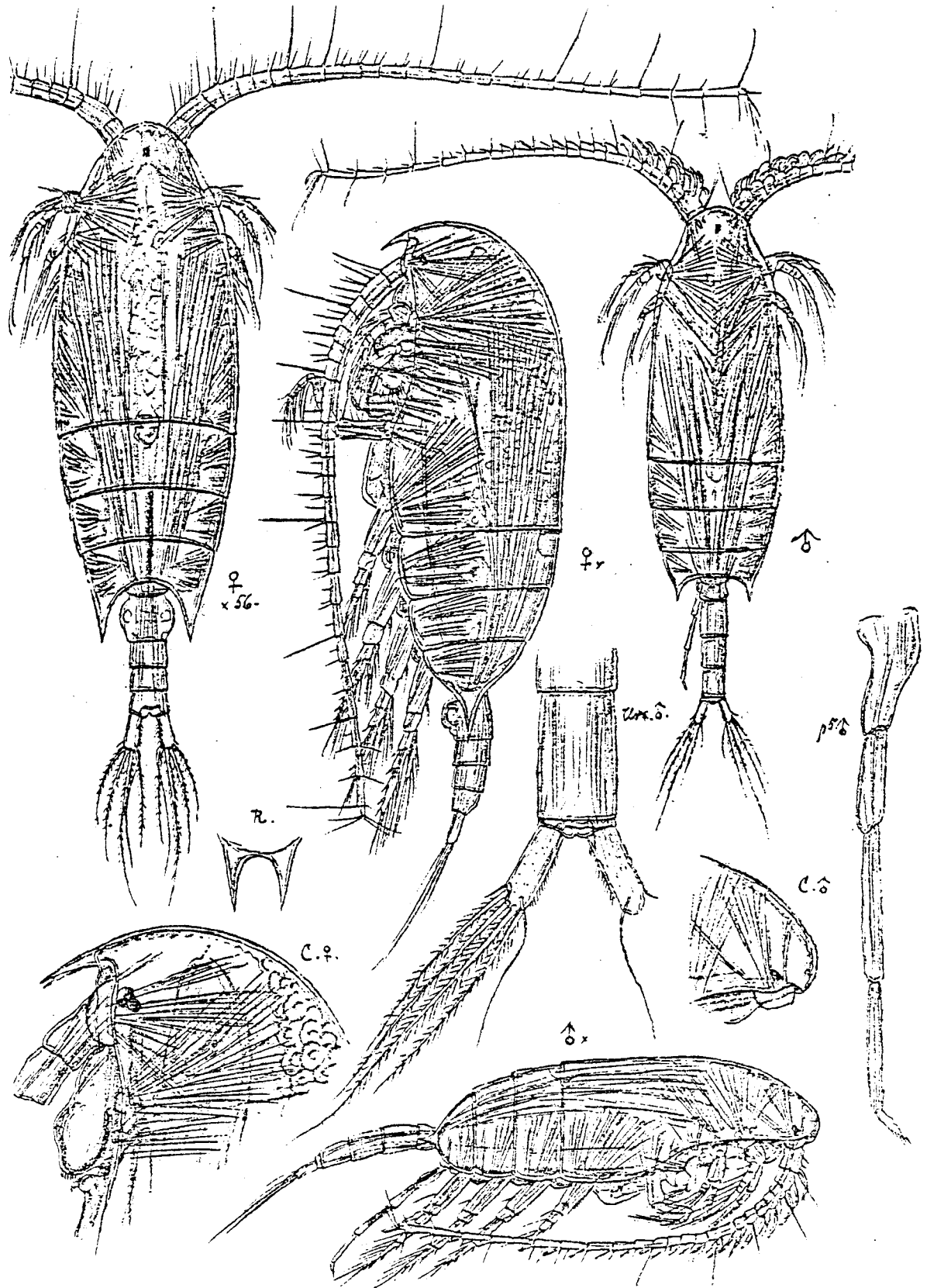
Ecology: A. armatus is an oceanic copepod (Farran, 1911). It is not to be found regularly in water of a salinity below 35^o/∞ (Scott, 1911).

Feeding Habits: A. armatus is an omnivorous copepod (Arashkevich, 1969).

Life History: No information.

Total Length: Female: 1.8 mm
Male : 1.25-1.45 mm (Wilson, 1932)

PLATE IX *Aetideus armatus*



Alteutha depressa Baird

Harpacticoida: Peltidiidae

Distinguishing Characteristics: The body of A. depressa is strongly depressed and widest at the center. The epimeral plates of the first three segments of the metasome are acutely produced behind. The anterior antennae are distinctly nine-articulated (Sars, 1911).

Geographical Range: No information.

Ecology: A. depressa is a littoral species (Wilson, 1932). It occurs in depths varying from 11 to 37 meters on a sandy or gravelly bottom (Sars, 1911).

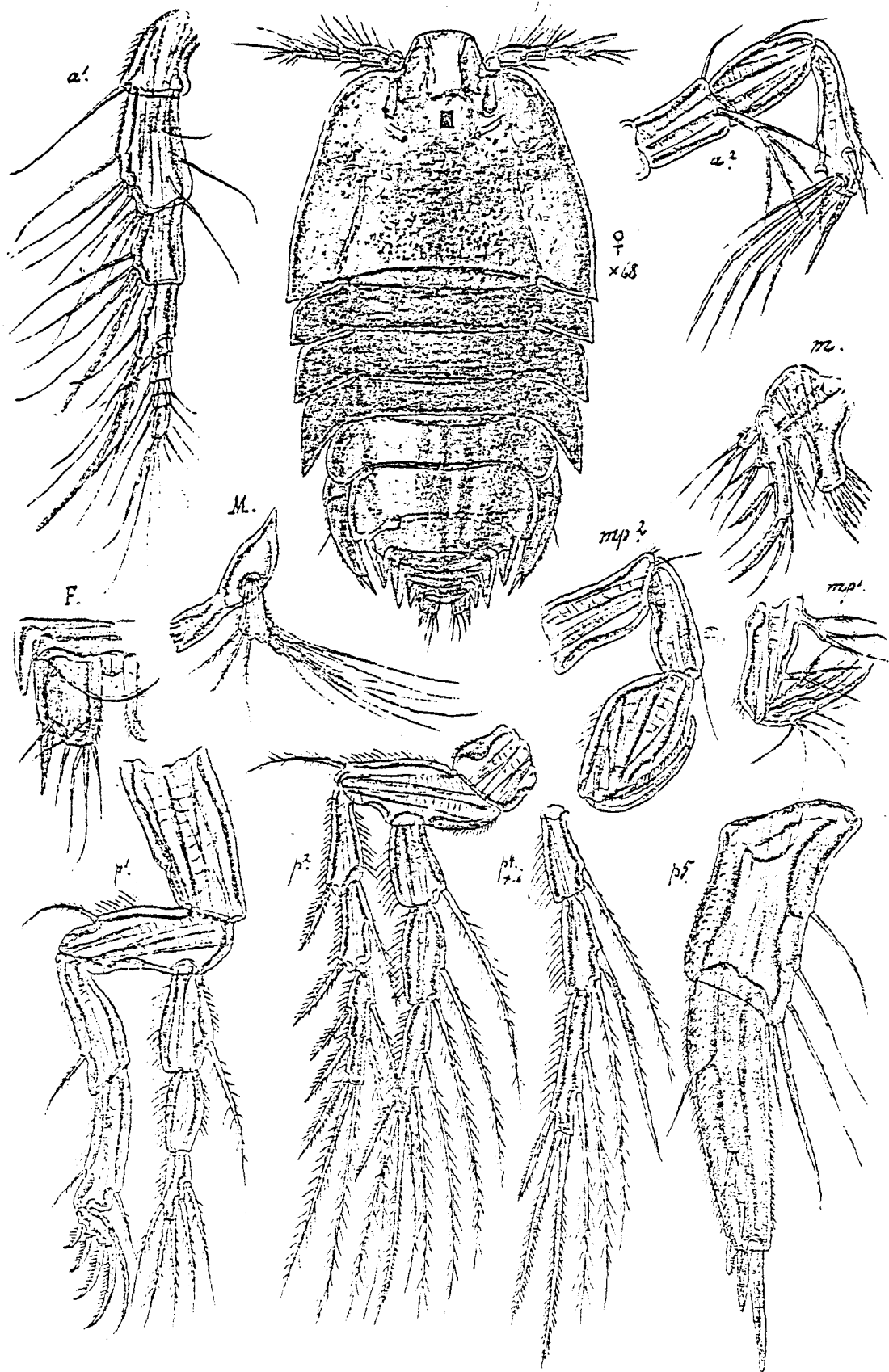
Feeding Habits: No information.

Life History: No information.

Egg: 0.11 mm diameter

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Brian, 1922)	0.11	0.13	0.17	0.22	---	---
<u>COPEPODITE</u>						
Total Length (mm) (Brian, 1922)	0.30	0.34	0.40	0.47	0.65	0.70- 0.80

PLATE X Alteutha depressa



Calanus finmarchicus (Gunner)

Calanoida: Calanidae

Distinguishing Characteristics: In the females, the shape of the serrated line on the inner margins of the first basal joint of the fifth legs is slightly concave to slightly convex. In C. helgolandicus, the line is strongly concave (Vervoort, 1951a).

Geographical Range: In the North Atlantic, C. finmarchicus is distributed over the whole area north of about 55°N (Farran, 1911).

Ecology: In the Gulf of Maine, C. finmarchicus is more oceanic than neritic (Bigelow, 1926). It is eurythermal (Bigelow, 1926) and stenohaline (Jeffries and Johnson, 1973).

Feeding Habits: C. finmarchicus is an herbivorous copepod (Mullen, 1967).

Life History: C. finmarchicus occurs year-round from the Gulf of St. Lawrence to Woods Hole, and is a winter-spring species from Woods Hole to Delaware Bay (Devvey, 1960). It is most abundant in summer in the Gulf of Maine (Sherman, 1965), and it is most abundant from April to early August from Cape Cod to Chesapeake Bay (Bigelow and Sears, 1939). In the Gulf of Maine and the Bay of Fundy, propagation begins in spring through autumn. The developmental period is ten weeks. Mortality is highest among maturing adults (Fish, 1936a).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.22	0.27	0.40	0.48	0.55	0.61	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Conway & Minton, 1975)	0.56- 0.67	0.73- 0.90	1.01- 1.18	1.29- 1.55	1.74- 2.03	1.86- 2.44 1.97 2.15	♀ ♂

PLATE XI Calanus finmarchicus adult female.

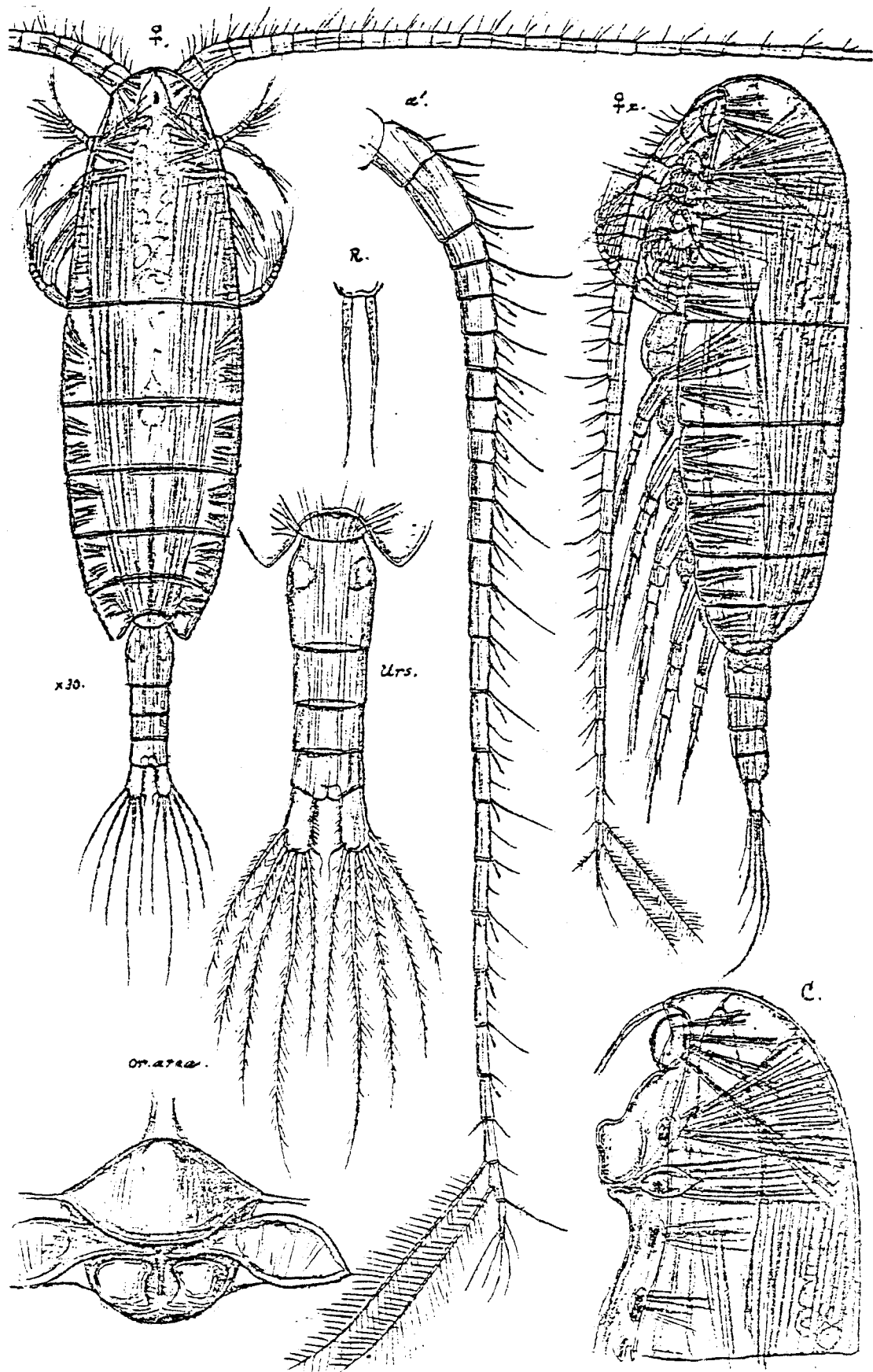


PLATE XII Calanus finmarchicus adult male.

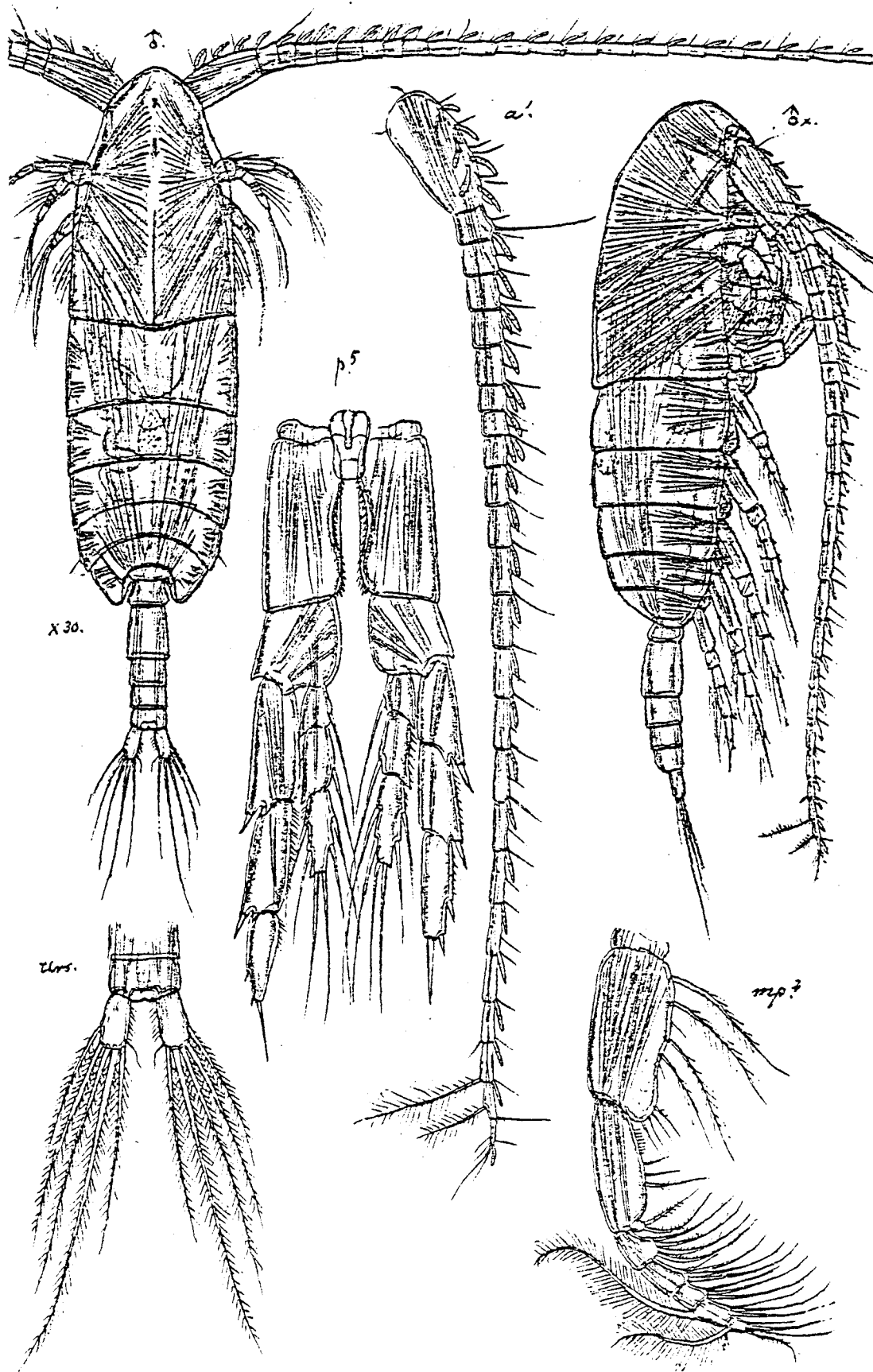
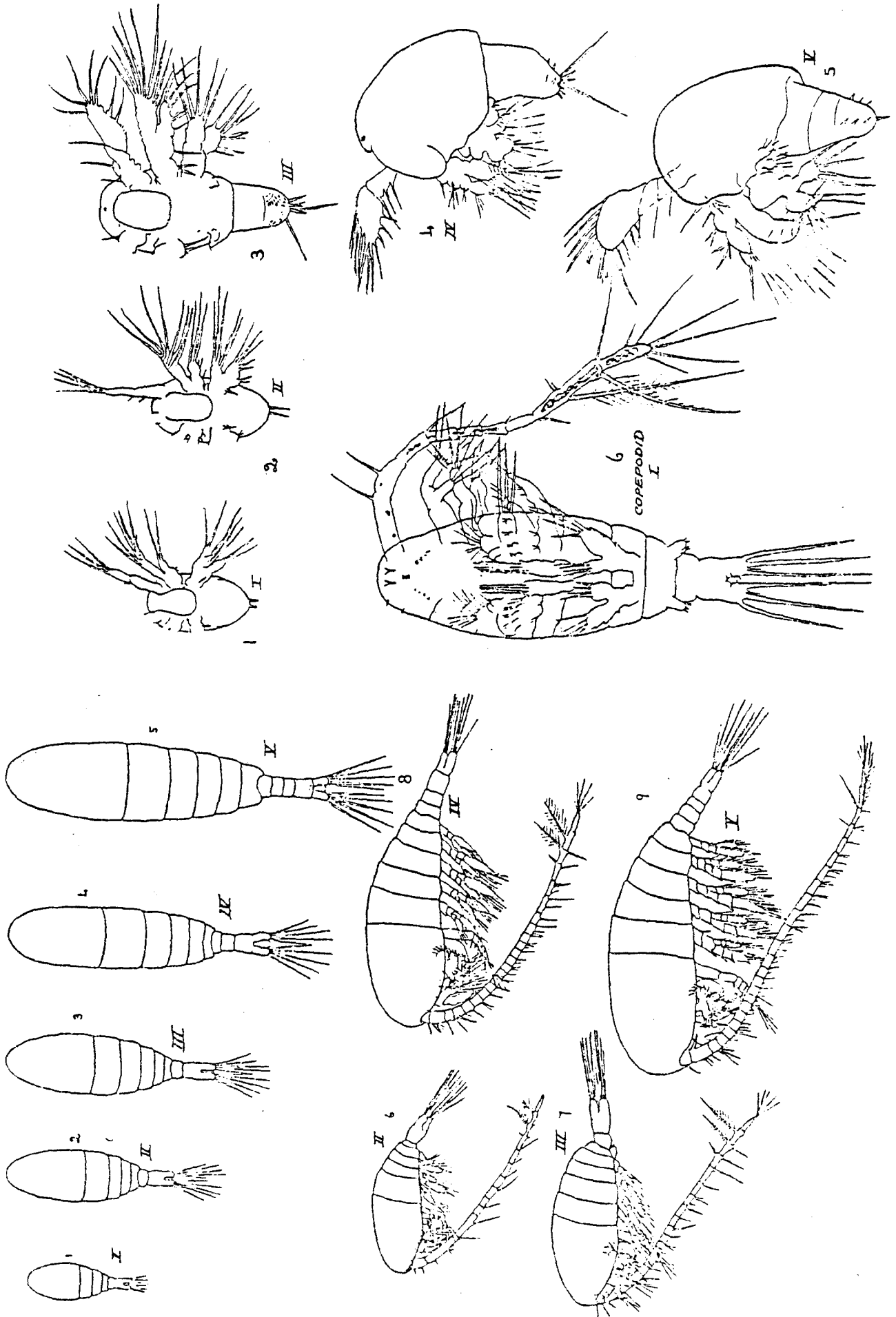


PLATE XIII Copepodite and naupliar stages of Calanus finmarchicus.



Calanus helgolandicus (Claus)

Calanoida: Calanidae

Distinguishing Characteristics: See: C. finmarchicus

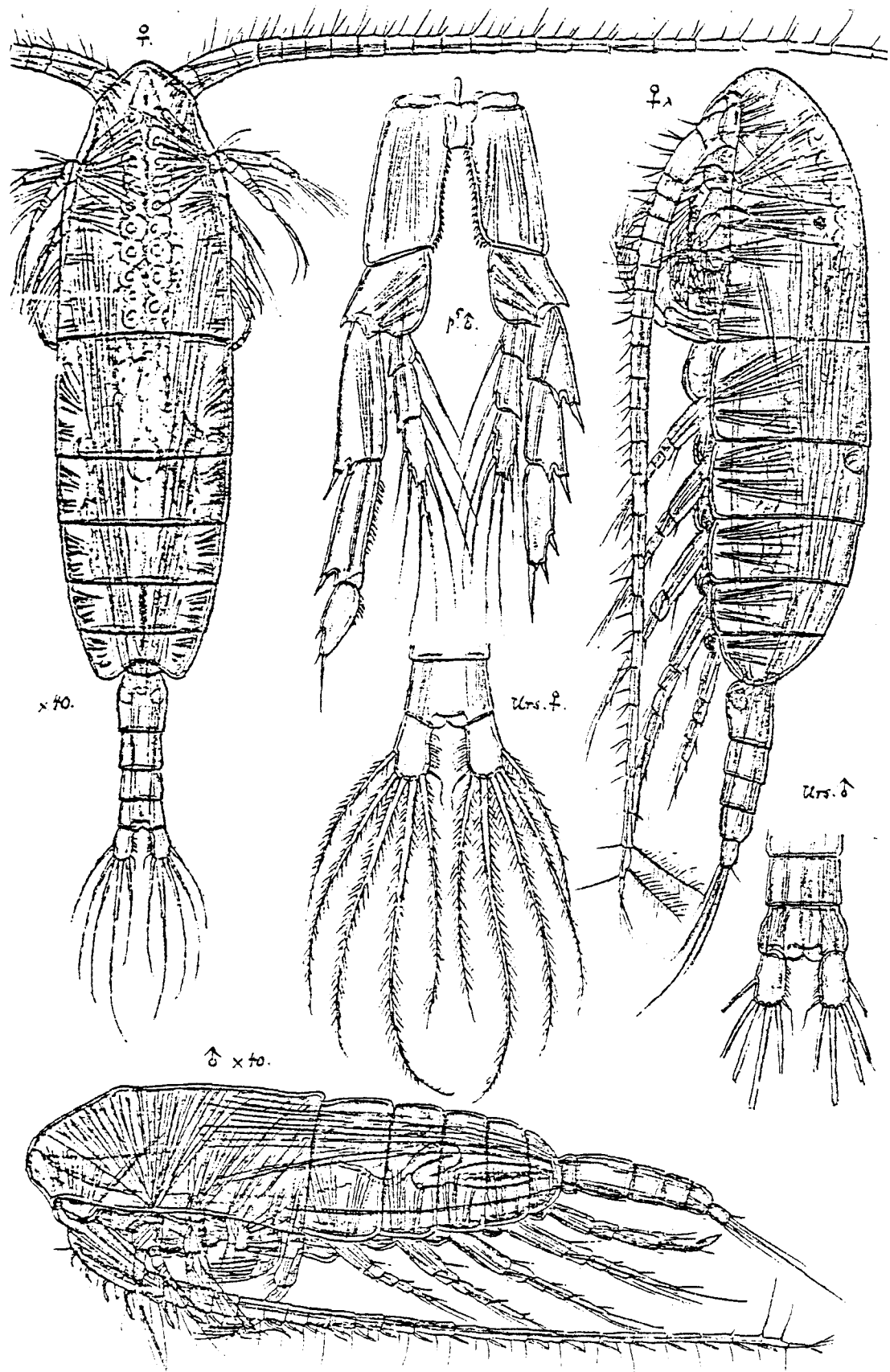
Geographical Range: In the temperate North Atlantic, C. helgolandicus is found from 60° to 20°N. It also extends westward across the North Atlantic Drift to the Labrador Grand Banks (Fleminger and Hulsemann, 1977).

Ecology: C. helgolandicus is an oceanic copepod (Brodskii, 1967).

Feeding Habits: C. helgolandicus is an herbivorous copepod (Mullen, 1967).

Life History: No information

Total Length: Female: 2.75-3.25 mm
Male : 2.50-2.80 mm (Wilson, 1932)



Calanus hyperboreus Kröyer

Calanoida: Calanidae

Distinguishing Characteristics: C. hyperboreus is larger than C. finmarchicus, and the lateral borders of the fifth metasomal segments are acutely pointed (Vervoort, 1951a).

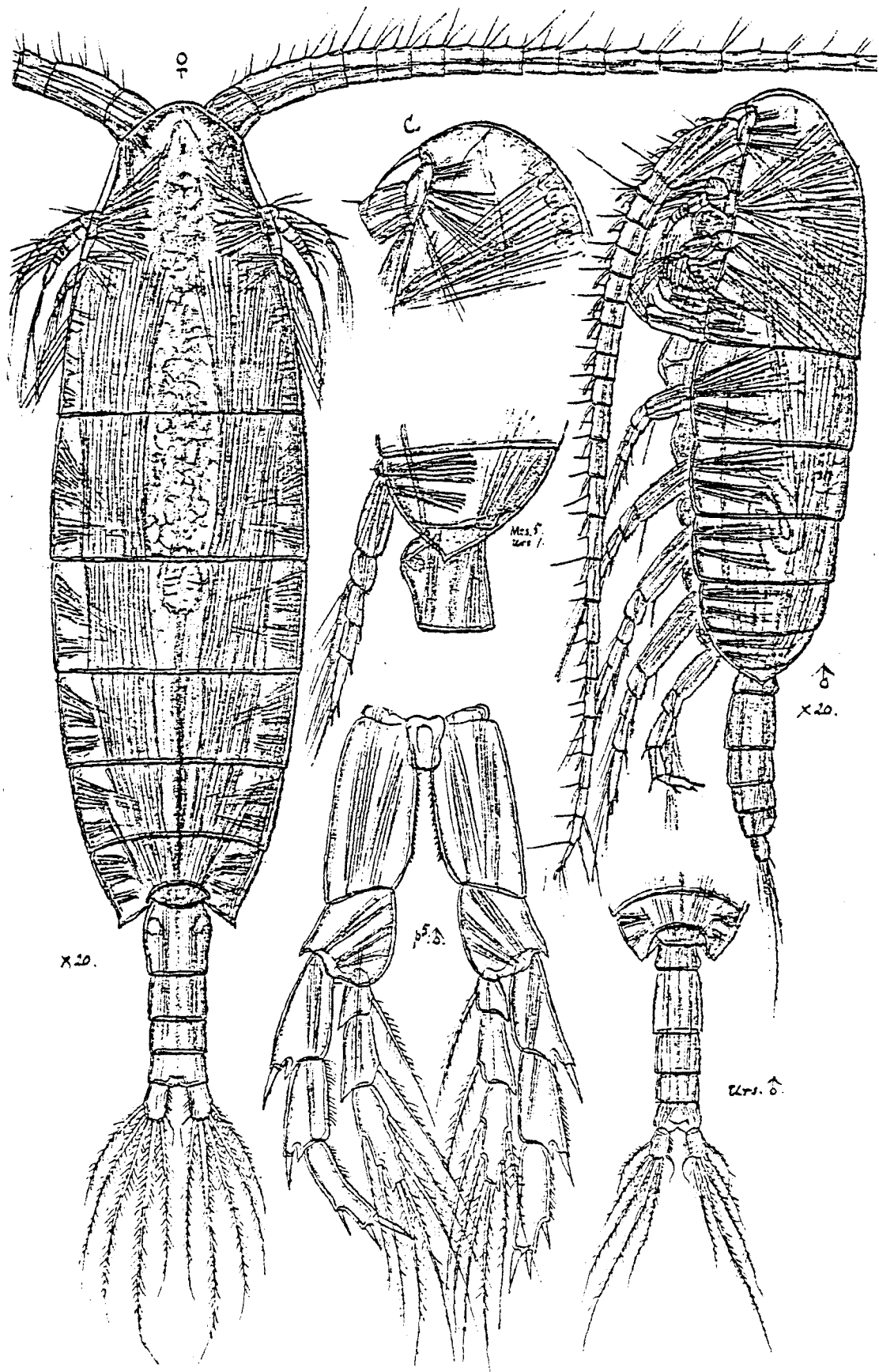
Geographical Range: C. hyperboreus is an Arctic species. Georges Bank and Cape Cod mark the southerly limit of its occurrence as anything more than a stray (Bigelow, 1926).

Ecology: C. hyperboreus is an oceanic copepod, occurring in greatest numbers in temperatures from 1-5°C (Bigelow, 1962).

Feeding Habits: C. hyperboreus is an herbivorous copepod (Arashkevich, 1969).

Life History: In the Gulf of Maine and the offshore waters to the east of Cape Cod, the breeding season for C. hyperboreus is from November through February (Conover, 1965). Its numbers increase from February to May and then decrease during June, in the Gulf of Maine (Bigelow, 1926).

Total Length: Female: 7.0-10.0 mm
Male : 6.0- 7.0 mm (Wilson, 1932)



Calanus tenuicornis Dana

Calanoida: Calanidae

Distinguishing Characteristics: In C. tenuicornis, the furcal rami are large, each with one very small seta on the outer edge (Vervoort, 1951a).

Geographical Range: C. tenuicornis has been reported between 40°58'N and 10°30'N (Long Island to the Caribbean) in the western North Atlantic (Grice & Hart, 1962).

Ecology: C. tenuicornis is an oceanic species (Vervoort, 1951a).

Feeding Habits: C. tenuicornis is an herbivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.8 mm
Male : 1.5-1.8 mm (Rose, 1933)

PLATE XVI Calanus tenuicornis.

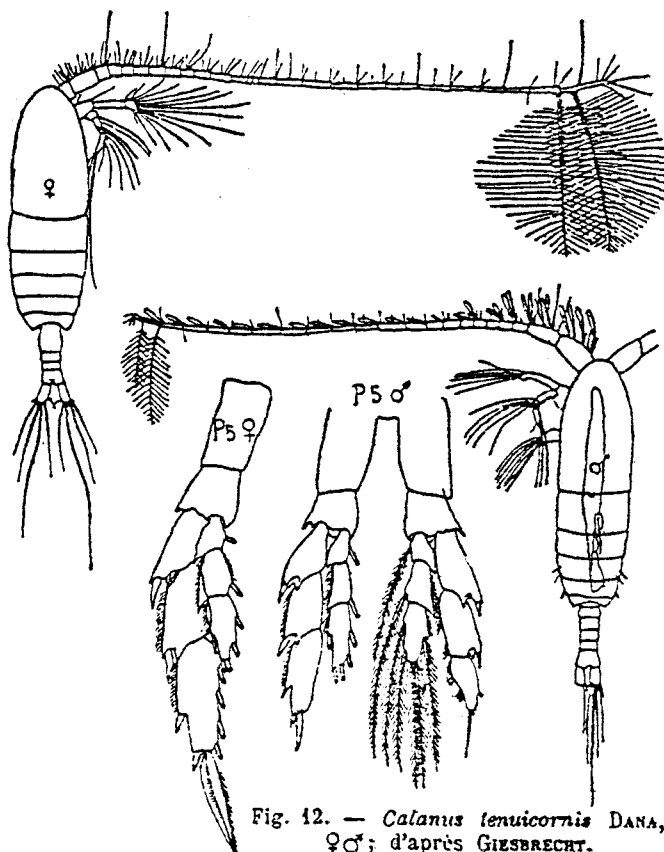


Fig. 12. — Calanus tenuicornis DANA, ♀♂; d'après GIESBRECHT.

ROSE, 1933

Calocalanus pavo (Dana)

Calanoida: Paracalanidae

Distinguishing Characteristics: The caudal rami are parallel to the body axis, and are armed with plumose setae (Wilson, 1932).

Geographical Range: C. pavo is widely distributed in temperate and tropical waters (Owre and Foyo, 1967). It has been found over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: C. pavo is an oceanic species (Colton, Temple and Honey, 1962). It occurs mainly in the upper water levels (Owre and Foyo, 1967).

Feeding Habits: C. pavo is an herbivorous copepod (Itoh, 1970).

Life History: No information.

Total Length: Female: 0.8-1.25 mm
Male : 1.0-1.15 mm (Wilson, 1932)

PLATE XVII Calocalanus pavo.

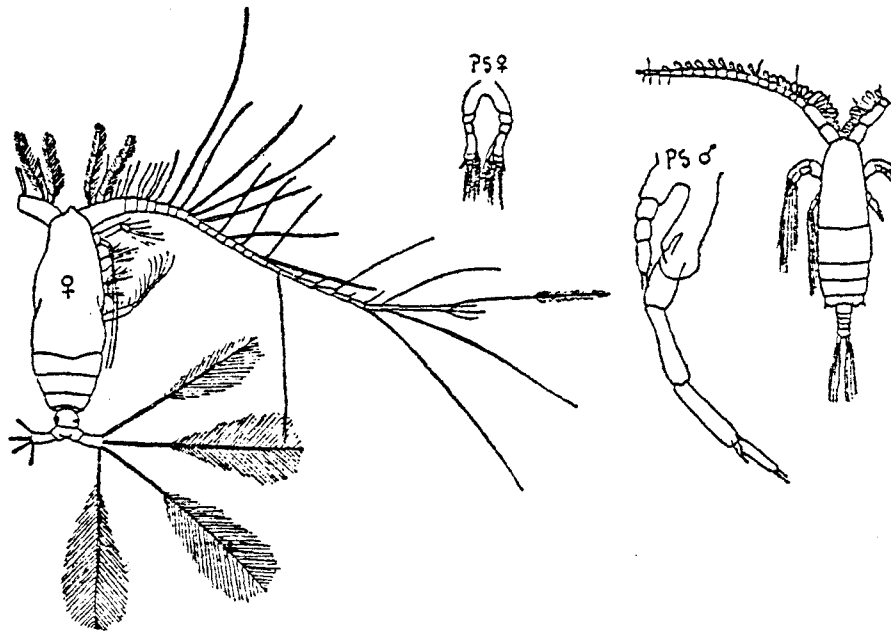


Fig. 29. — Calocalanus pavo DANA, ♀♂; d'après GIESBRECHT.

ROSE, 1933

Candacia armata Boeck

Calanoida: Candaciidae

Distinguishing Characteristics: The frontal margin between the bases of the antennae is squarely truncated. The fifth metasomal segment is produced into broad spines, and the urosome is asymmetrical. The chitin of the posterior margins of the metasomal segments, the pointed corners of the fifth segment, the genital orifice, the setae of the exopods, and sometimes the endopods, of the swimming legs, and the eighteenth and nineteenth segments of the first antennae are blackish brown of varying intensity (Wilson, 1932).

Geographical Range: C. armata is found in the Atlantic from 75°N to 25°N (Grice, 1963).

Ecology: C. armata is an oceanic species (Colton, Temple and Honey, 1962).

Feeding Habits: C. armata is a carnivorous copepod (Mullen, 1967).

Life History: No information

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Bernard, 1965)	0.20	0.23	0.27	0.31	0.34	0.36
<u>COPEPODITE</u>						
Total Length (Wilson, 1932)	--	--	--	--	--	2.5- 2.75 ♀ 2.25- 2.6 ♂

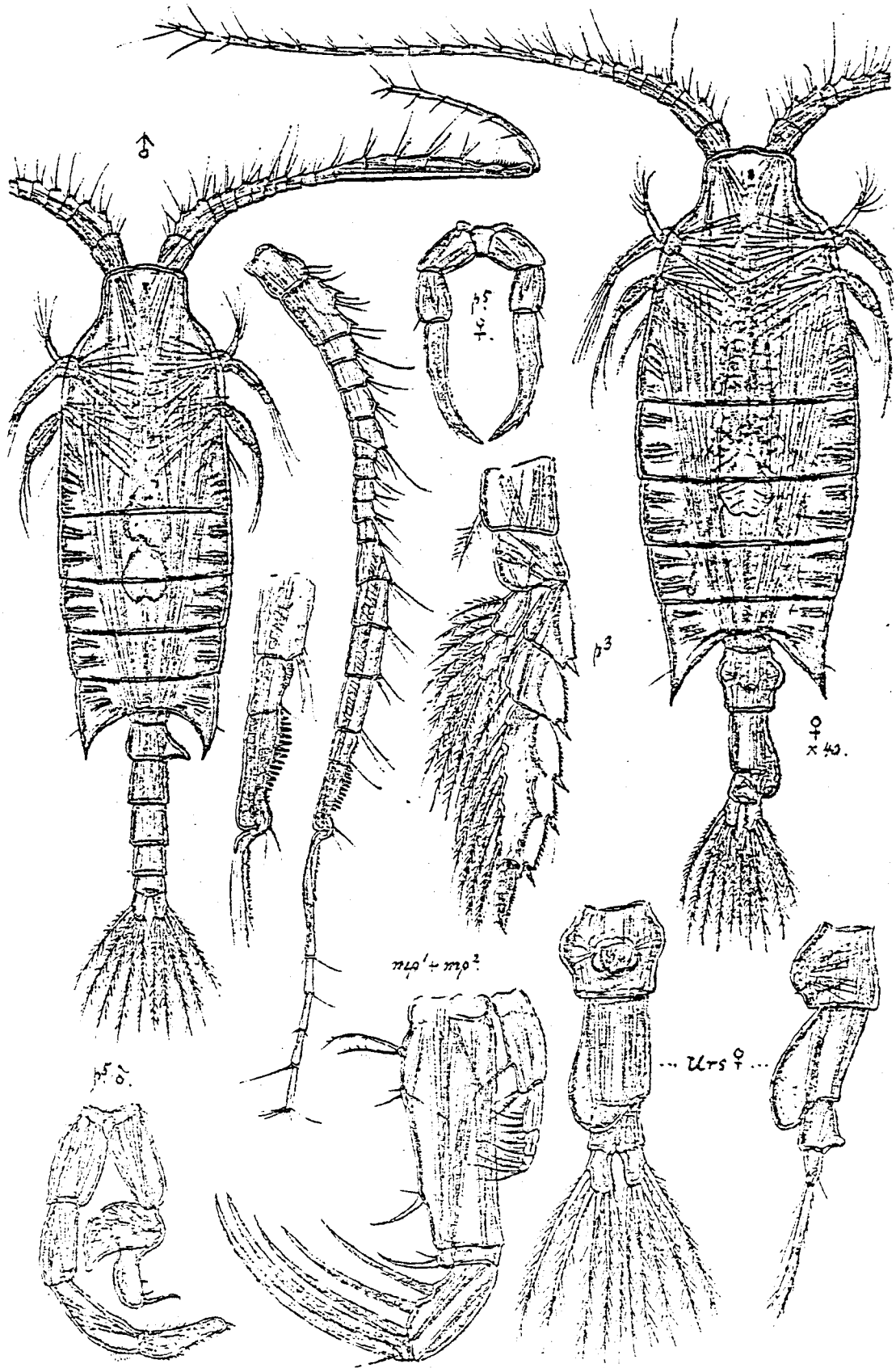
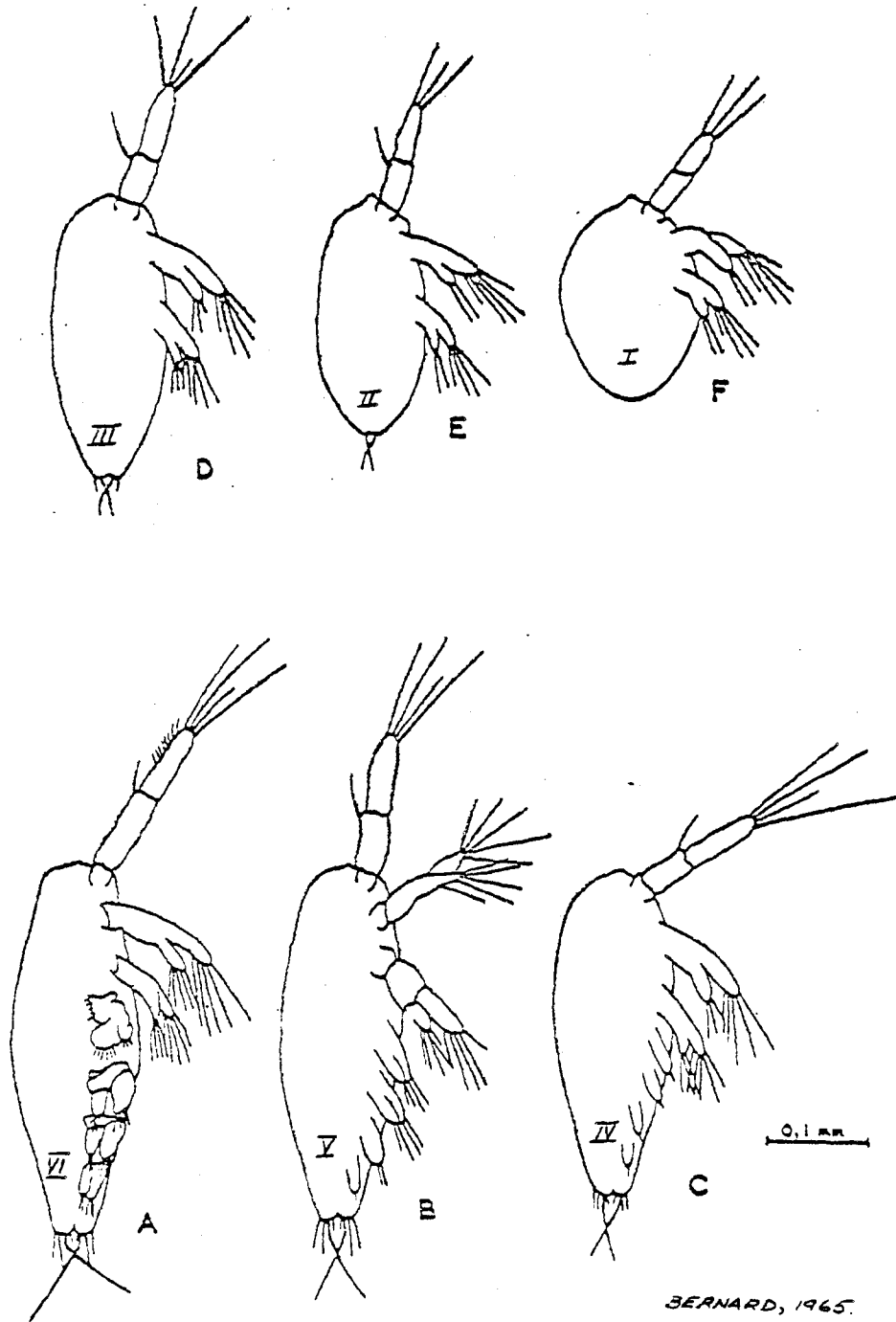


PLATE XIX Naupliar stages of Candacia armata.



Centropages bradyi Wheeler

Calanoida: Centropagidae

Distinguishing Characteristics: The posterior corners of the last metasomal segment are rounded, without spines. Each caudal ramus has a peglike process on the ventral surface at the distal margin between the two outer setae (Wilson, 1932).

Geographical Range: C. bradyi is found in the temperate North Atlantic (Brodskii, 1967). In the Gulf of Maine, it is to be expected only as a straggler from warmer waters offshore (Bigelow, 1926).

Ecology: C. bradyi is an oceanic species (Colton, Temple and Honey, 1962).

Feeding Habits: C. bradyi is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 2.0-2.35 mm
Male : 2.0-2.25 mm (Wilson, 1932)

PLATE XX Centropages bradyi.



Fig. 246. — *Centropages Bradyi* WHEELER, ♀♂; d'après ESTERLY et CANDEIAS.

ROSE, 1933

Centropages hamatus (Lilljeborg)

Calanoida: Centropagidae

Distinguishing Characteristics: In C. hamatus, the first antennae are without spine-like protrusions. In C. typicus, there are spine-like protrusions on the first antennae (Conway and Minton, 1975). In the females of C. hamatus, the right spine on the fifth metasomal segment is turned outward rather than backward, and there is a recurved spine on the ventral surface of the urosome in front of the genital orifice. In the females of C. typicus, both spines on the fifth metasomal segment are turned backward, and the genital segment has four stiff spines rather than a hook. In the males of C. hamatus, the right antenna is not swollen as much as in C. typicus, and the chela on the fifth leg is less powerfully developed than in C. typicus (Wilson, 1932).

Geographical Range: C. hamatus is found in the North Atlantic area between the latitudes of 40°N and 70°N (Farran, 1911). It is a boreal and temperate species, which occurs primarily in sheltered and inshore waters (Deevey, 1960).

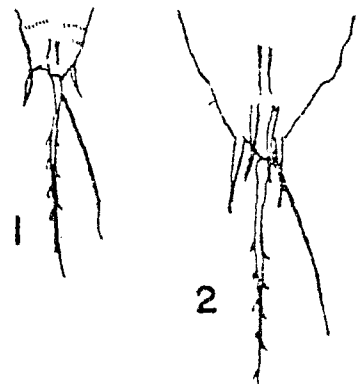
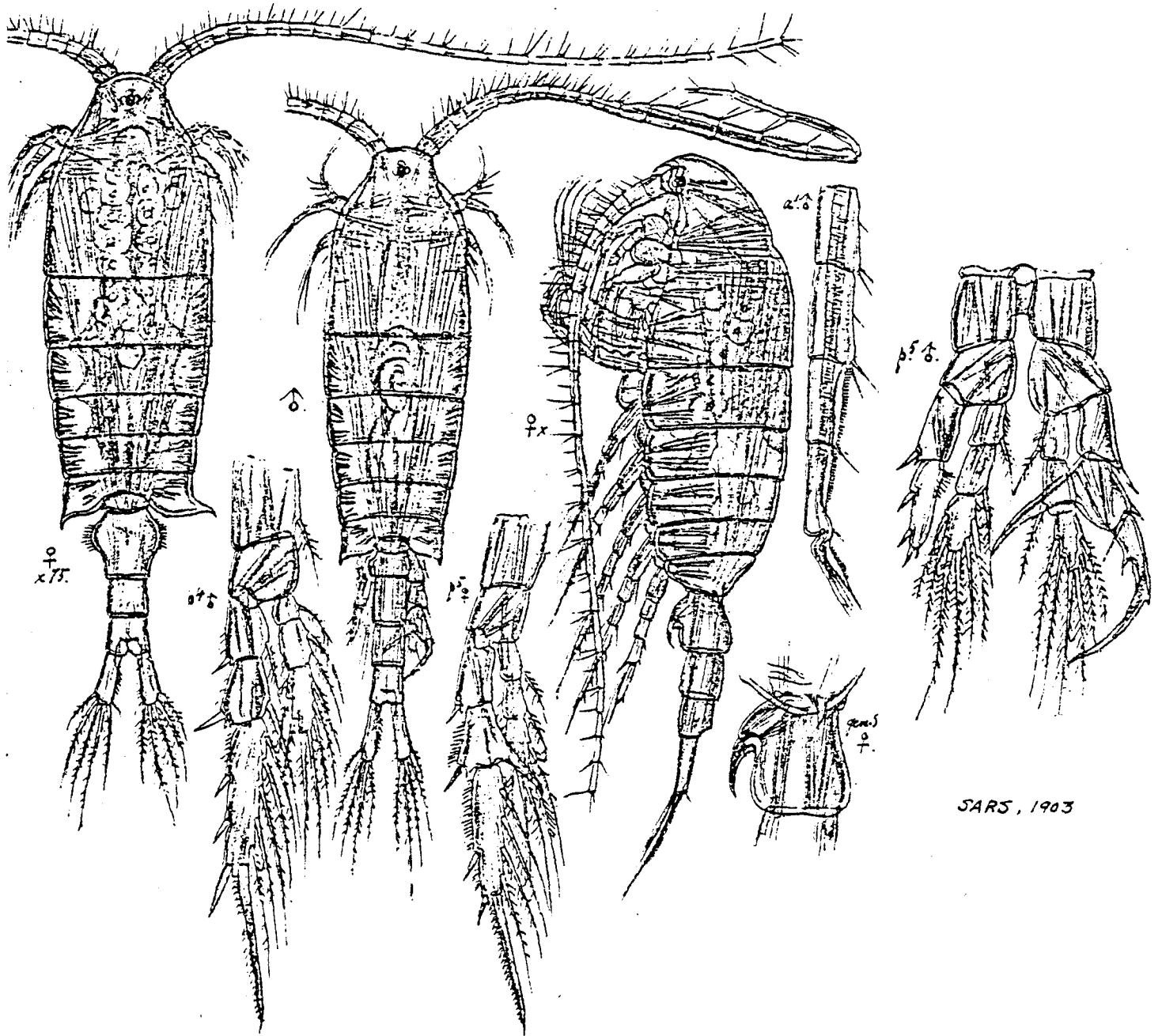
Ecology: C. hamatus is a littoral and neritic species (Bigelow and Sears, 1939). It is eurythermal and euryhaline, although in southern New England waters, it is not abundant at salinities below 30‰ (Deevey, 1960). C. hamatus is more euryhaline than C. typicus (Bigelow and Sears, 1939).

Feeding Habits: C. hamatus is an omnivorous copepod (Mullen, 1967).

Life History: C. hamatus occurs as a stray in the Gulf of St. Lawrence, and is a summer-fall species from the Gulf of Maine to Woods Hole. It is a winter-spring species from Woods Hole south (Deevey, 1960). The maximum numbers of C. hamatus on the continental shelf occur in June and July (Bigelow and Sears, 1939). The generation time for C. hamatus is two months (Bigelow, 1926).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm)	--	--	--	--	--	--	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm)	0.28-	0.39-	0.48-	0.60-	0.84-	0.96-	♀
(Conway & Minton, 1975)	0.34	0.42	0.63	0.72	1.01	1.27	
				0.63-	0.78-	0.90-	♂
				0.66	0.96	1.08	

PLATE XXI Adult and naupliar stages of Centropages hamatus.



a |-----|
0.1 mm

FABER, 1966 a

Centropages typicus Kröyer

Calanoida: Centropagidae

Distinguishing Characteristics: See: C. hamatus

Geographical Range: Cape Sable, Nova Scotia marks the most northerly and easterly limit to its regular occurrence along the North American coast line (Bigelow, 1926).

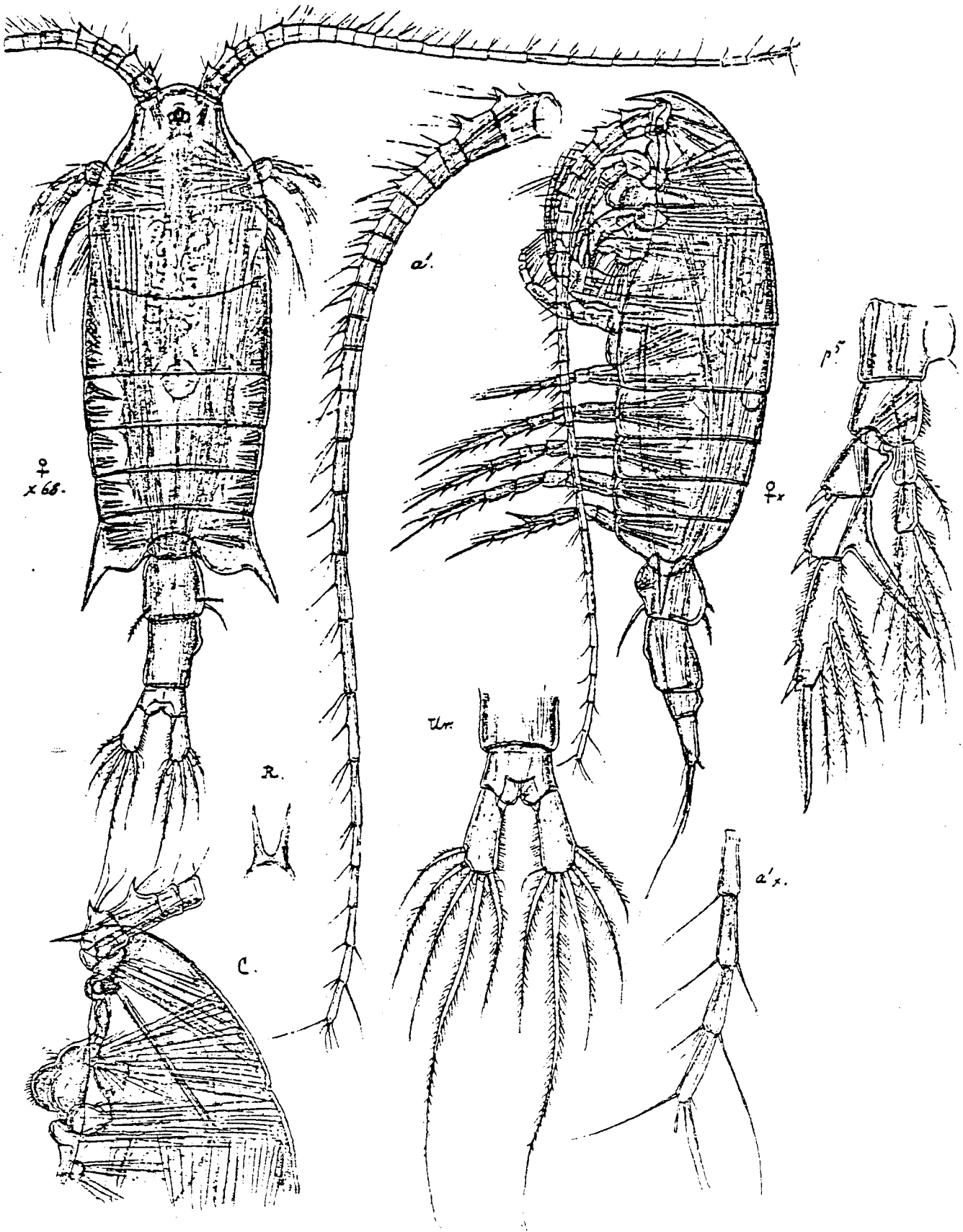
Ecology: C. typicus is a neritic species (Deevey, 1960). It is eurythermal (Bigelow, 1926), and stenohaline (Jeffries and Johnson, 1973).

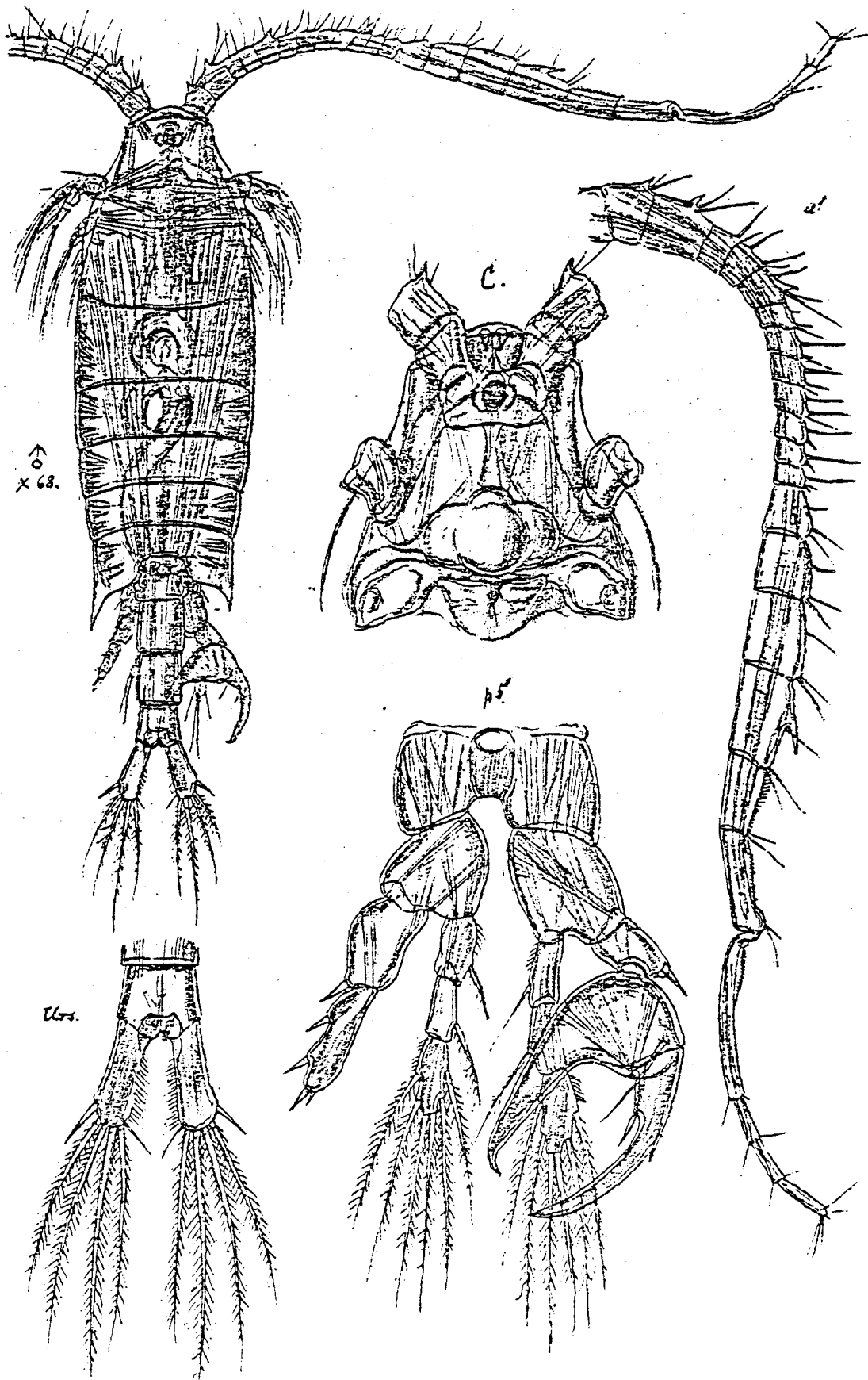
Feeding Habits: C. typicus is an omnivorous copepod (Mullen, 1967).

Life History: C. typicus is found year-round from Cape Cod to Chesapeake Bay, and possibly to Cape Hatteras. It is a summer-fall species in the Gulf of Maine, and a winter-spring species from Chesapeake Bay to Cape Hatteras (Deevey, 1960). In the Gulf of Maine, local abundance increases during late summer and autumn. C. typicus has a generation time of two months (Bigelow, 1926).

EGG .070 mm diameter

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Ogilvie, 1953)	0.106	0.15	0.18	0.19	0.22	0.29
<u>COPEPODITE</u>						
Cephalothorax Lgth. (mm) (Lawson & Grice, 1970)	0.29	0.38	0.50	0.65	0.88	1.20 ♀
					0.82	1.05 ♂





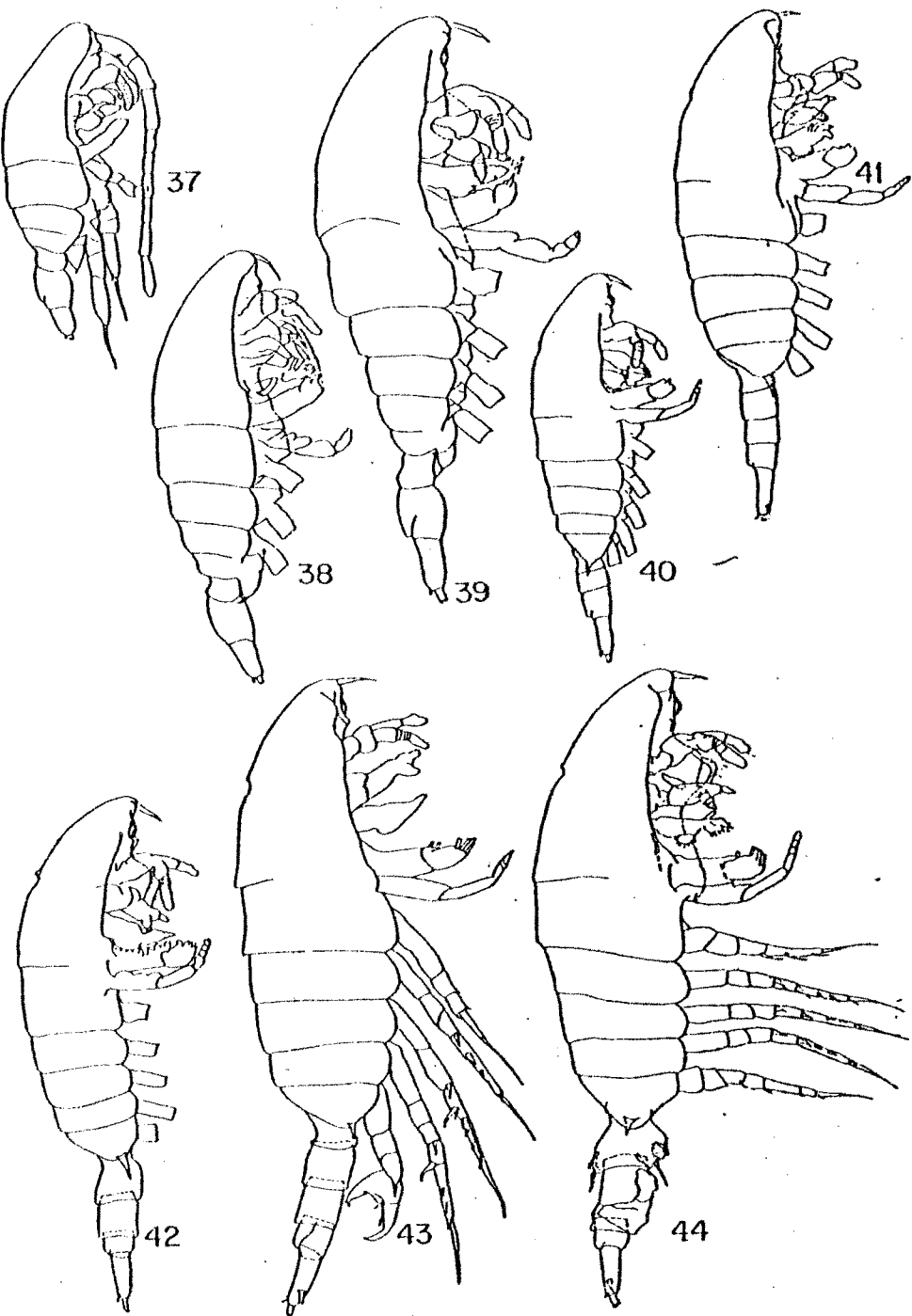
↑
x 68.

C.

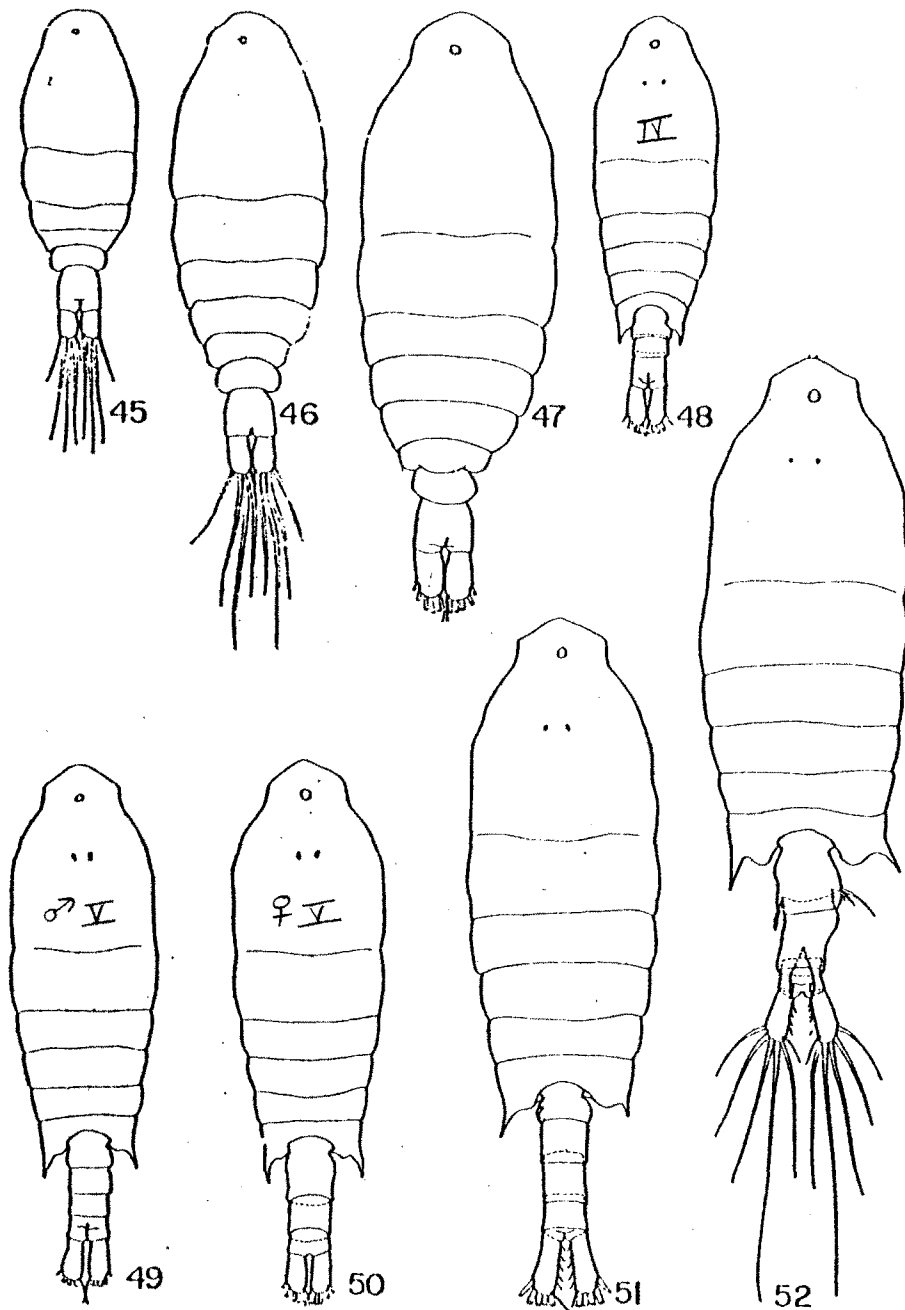
a1

l2

lrs.

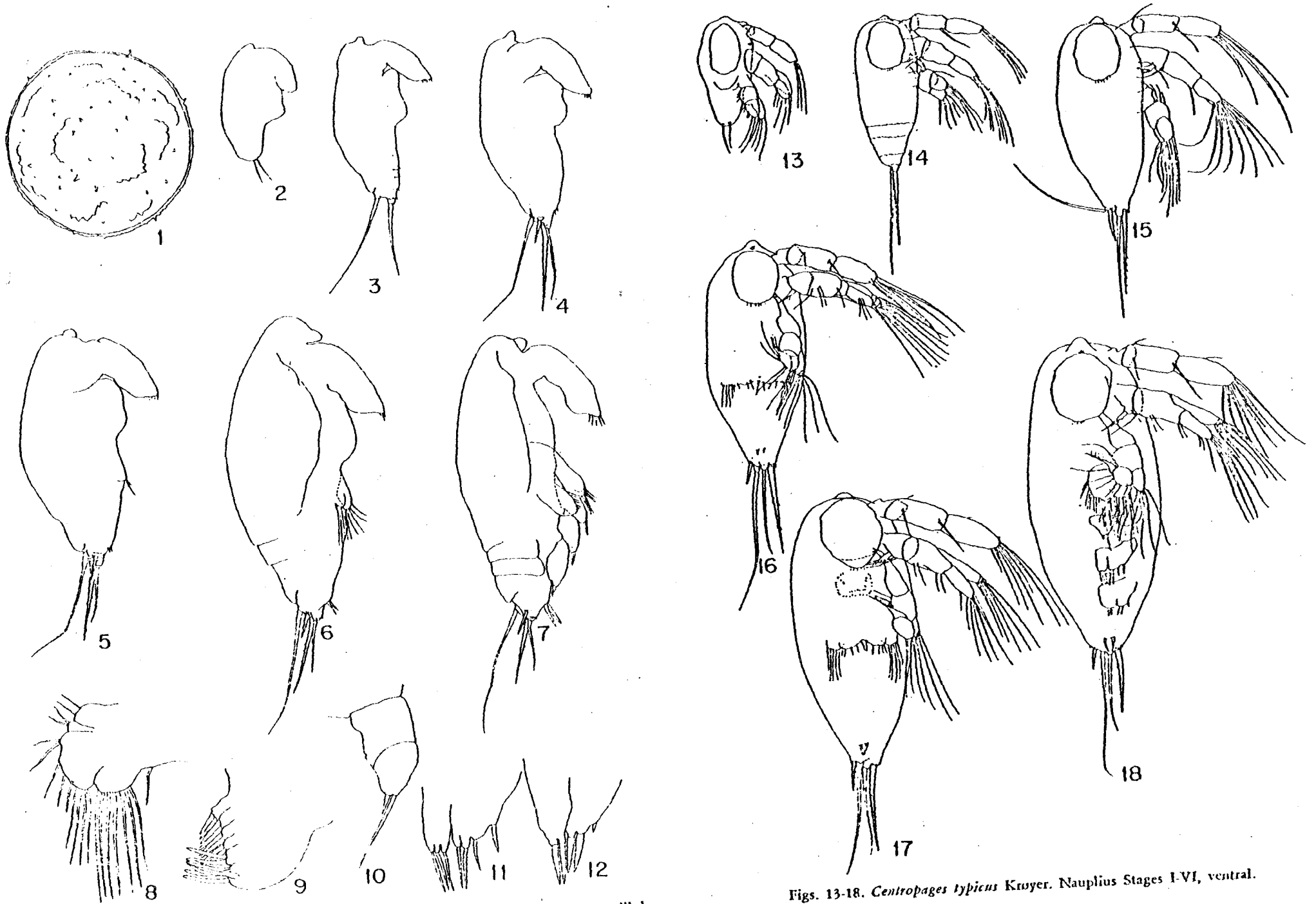


Figs. 37-44. *Centropages typicus* Krøyer. 37-40, Copepodid Stages I-IV, lateral; 41, Copepodid Stage V, male, lateral; 42, Copepodid Stage V, female, lateral; 43, adult male, lateral; 44, adult female, lateral. Not all figures drawn to same scale.



Figs. 45-52. *Centropages typicus* Krøyer. 45-48, Copepodid Stages I-IV, dorsal; 49, Copepodid Stage V, male, dorsal; 50, Copepodid Stage V, female, dorsal; 51, adult male, dorsal; 52, adult female, dorsal. Not all figures drawn to same scale.

PLATE XXV Naupliar stages of Centropages typicus.



Figs. 1-12. *Centropages typicus* Krøyer. 1, egg; 2-7, Nauplius Stages I-VI, lateral; 8, maxillule, Nauplius Stage VI; 9, maxilla, Nauplius Stage VI; 10, maxilliped, Nauplius Stage VI; 11, bud of first foot, Nauplius Stage VI; 12, bud of second foot, Nauplius Stage VI.

Figs. 13-18. *Centropages typicus* Krøyer. Nauplius Stages I-VI, ventral.

Clausocalanus arcuicornis (Dana)

Calanoida: Pseudocalanidae

Distinguishing Characteristics: A deep angular incision on the distal margin of the second basal joint of the second and third pair of legs is characteristic of the genus (Brodskii, 1967).

Geographical Range: C. arcuicornis has been reported in the western North Atlantic from the Gulf of St. Lawrence to 10°15'N (Owre and Foyo, 1967 from: Willey, 1919 and Cervigón, 1963). It has been found over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: C. arcuicornis is characteristic of warm water oceanic areas (Farran, 1911).

Feeding Habits: C. arcuicornis is an herbivorous copepod (Itoh, 1970).

Life History: No information.

Total Length: Female: 1.15-1.6 mm
Male : 1.10-1.2 mm (Wilson, 1932)

PLATE XXVI Clausocalanus arcuicornis.

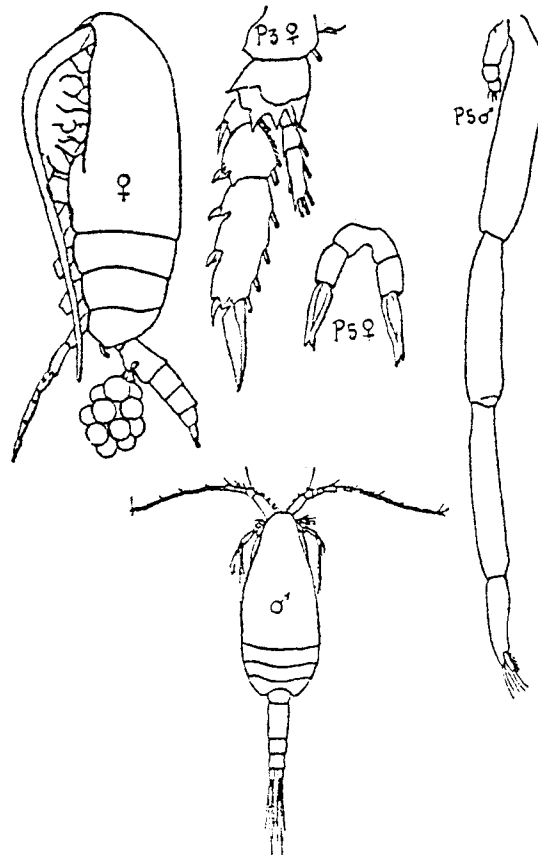


Fig. 37. — *Clausocalanus arcuicornis* DANA ♀♂;
d'après GIESBRECHT.

Clytemnestra rostrata (Brady)

Harpacticoida: Clytemnestridae

Distinguishing Characteristics: The body of C. rostrata is very much flattened dorso-ventrally, and all of the segments of the metasome except the fifth have angular projections in the posterior corners (Davis, 1949).

Geographical Range: C. rostrata is found in the north, south and tropical Atlantic Ocean (Davis, 1949).

Ecology: C. rostrata is a pelagic rather than a littoral species (Wilson, 1932).

Feeding Habits: No information.

Life History: No information.

Total Length: Female: 0.5-0.87 mm
Male : 0.4-0.7 mm (Wilson, 1932)

PLATE XXVII Clytemnestra rostrata.

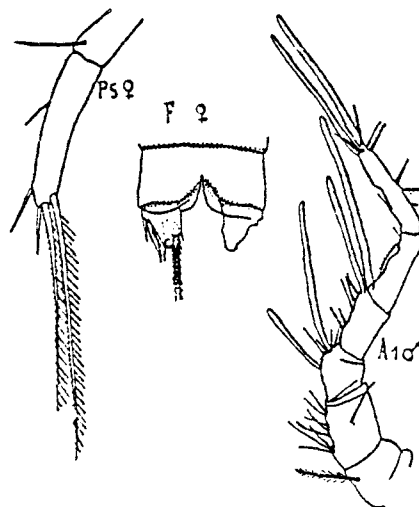


Fig. 371. — Clytemnestra rostrata BRADY,
♀♂; d'après GIESBRECHT.

ROSE, 1933

Corycaeus speciosus Dana

Cyclopoida: Corycaeidae

Distinguishing Characteristics: The length of the caudal rami, the length of the tappets on the third metasomal segment, and the two large corneal lenses on the forehead are distinguishing characteristics (Wilson, 1932).

Geographical Range: C. speciosus has been reported from the western North Atlantic between 42°N and 10°15'N (Owre and Foyo, 1967 from: Wilson, 1932 and Cervigón, 1964).

Ecology: C. speciosus is an epipelagic species (Owre and Foyo, 1967).

Feeding Habits: C. speciosus is probably carnivorous (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.85-2.15 mm
Male : 0.75-0.85 mm (Wilson, 1932)

PLATE XXVIII Corycaeus speciosus.

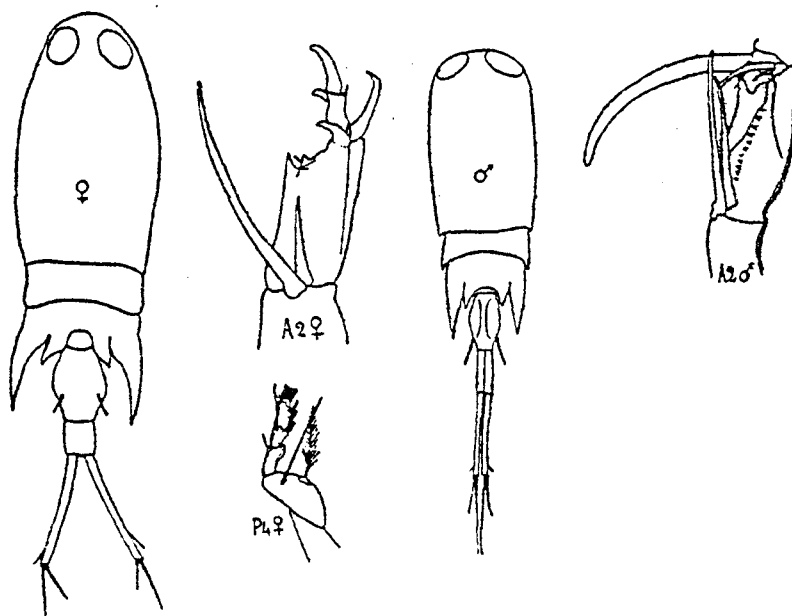


Fig. 422. — *Corycaeus speciosus* DANA, ♀♂; d'après M. DAHL.

ROSE, 1933

Eucalanus elongatus (Dana)

Calanoida: Eucalanidae

Distinguishing Characteristics: The fifth pair of legs are absent in the females, and the fifth legs are always uniramous in the males. The thorax and abdomen are without spines (Brodskii, 1967). See: Rhincalanus.

Geographical Range: E. elongatus is found widely distributed in the warmer southern areas and in the warmer ocean streams (Johnson, 1942). It is a stray in the Gulf of Maine from the warmer and saltier Atlantic waters outside the continental shelf (Bigelow, 1926).

Ecology: E. elongatus is characteristic of the warm areas of the open ocean (Farran, 1911).

Feeding Habits: E. elongatus is an herbivorous copepod (Arashkevich, 1969).

Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Johnson, 1942)	0.214- 0.260	0.270- 0.330	0.430- 0.550	0.620- 0.740	0.745- 0.890	0.920- 1.029	
<u>COPEPODITE</u>							
Total Length (mm) (Johnson, 1942)	1.30-	2.00-	2.90-	3.58- 3.81	4.90- 5.16	5.90- 6.30	♀
(Wilson, 1932)	1.58	2.18	3.00	3.41- 3.70	4.51- 4.82	3.75- 5.00	♂

PLATE XXIX Eucalanus elongatus adults.

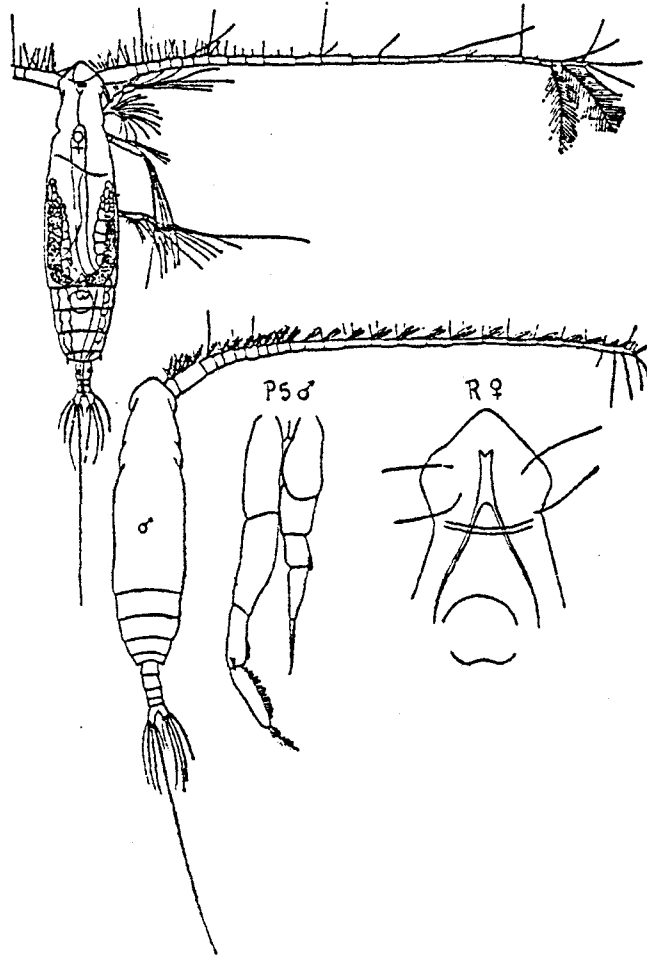


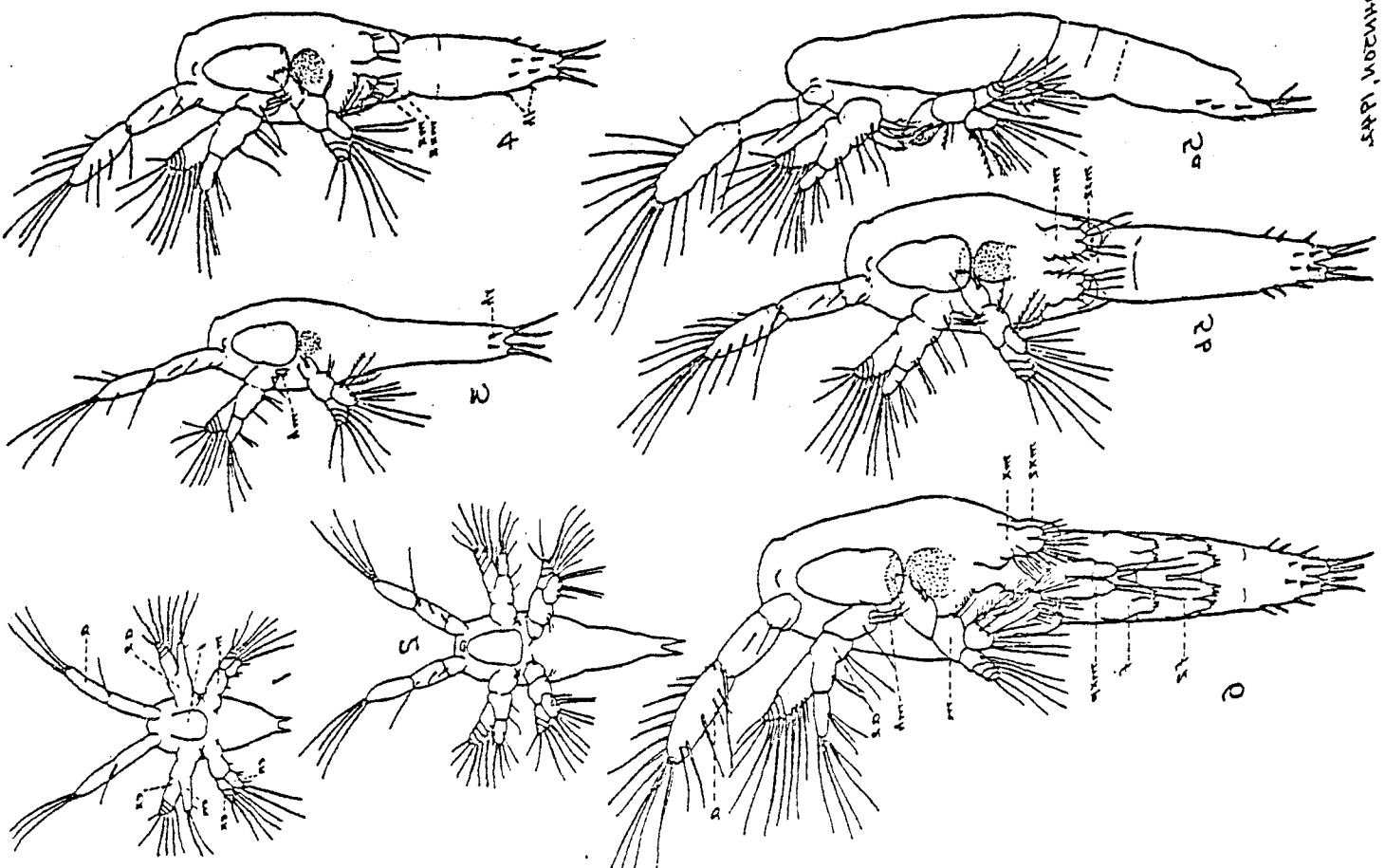
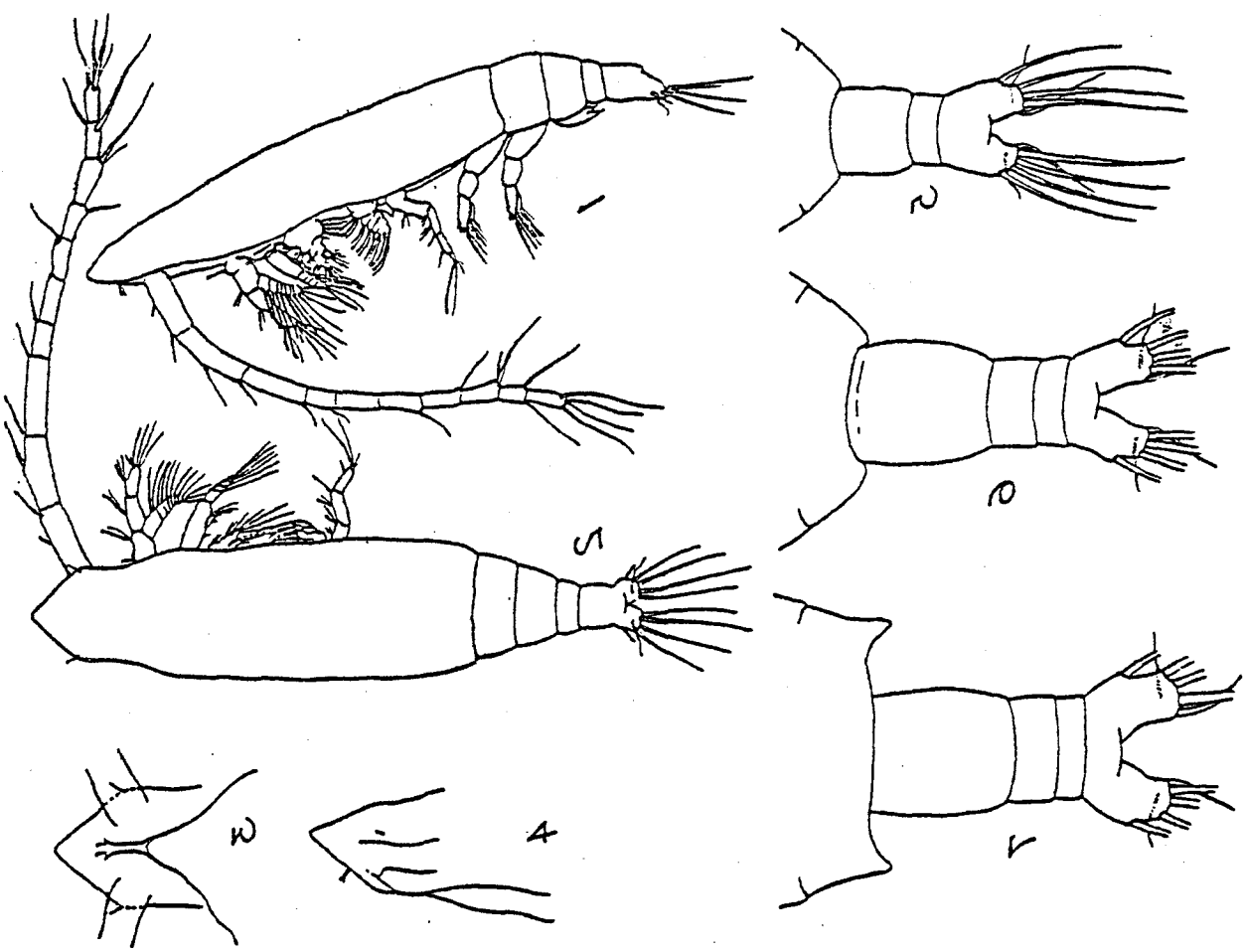
Fig. 17. — *Eucalanus elongatus* DANA, ♀♂; d'après GIESBRECHT.

ROSE, 1933

JOHNSON, 1945

- FIG. 1. Posterior portion of body, adult female variety *plagiatus*.
- FIG. 2. Posterior portion of body, adult female variety *gungii*.
- FIG. 3. Posterior portion of body, copepodid stage V, female variety *gungii*.
- FIG. 4. Head, copepodid stage II, lateral.
- FIG. 5. Head, copepodid stage I, dorsal.
- FIG. 6. Copepodid stage I, lateral.

Enceljanus gongolus var. *gungii* and *plagiatus*
EXPLANATION OF PLATE III



Euchaeta marina (Prestandrea)

Calanoida: Euchaetidae

Distinguishing Characteristics: E. marina is characterized by the sharp apical process on the head, by the asymmetry of the genital segment in the female, and by the form of the fifth legs in the male (Wilson, 1932).

Geographical Range: In the western North Atlantic, E. marina has been reported from the Gulf of St. Lawrence to 10°15'N (Owre and Foyo, 1967 from: Willey, 1919 and Cervigon, 1963). It occurs in the Great South Channel between Georges Bank and Cape Cod, the Eastern Channel between Georges and Browns Banks, and the southern part of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: E. marina is an oceanic bathypelagic species (Brodskaa, 1967).

Feeding Habits: E. marina is a carnivorous copepod (Arashkevich, 1969).

Life History: No information.

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Bernard, 1965)	0.30	0.48	0.49	0.52	0.53	0.56
<u>COPEPODITE</u>						2.25-
Total Length (Wilson, 1932)	--	--	--	--	--	4.0 ♀
						3.0- 3.25 ♂

PLATE XXXI Euchaeta marina.

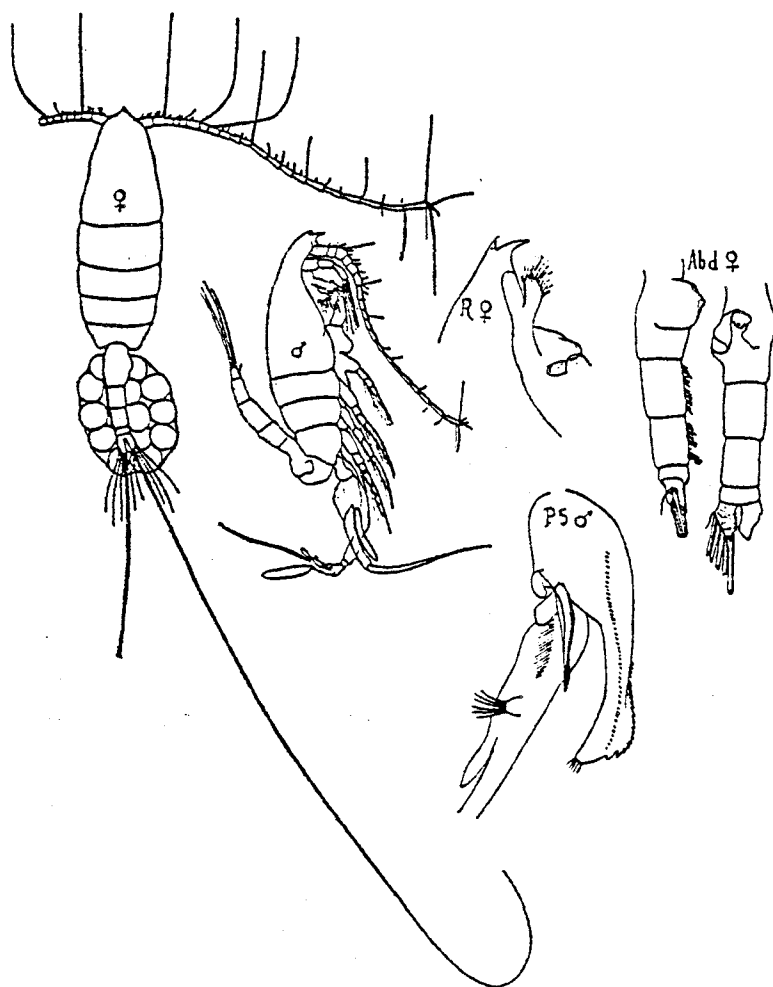


Fig. 93. — *Euchaeta marina* PRESTANDREA, ♀♂; d'après GIESBRECHT.

ROSE, 1933

PLATE XXXII Naupliar stages of Euchaeta marina.

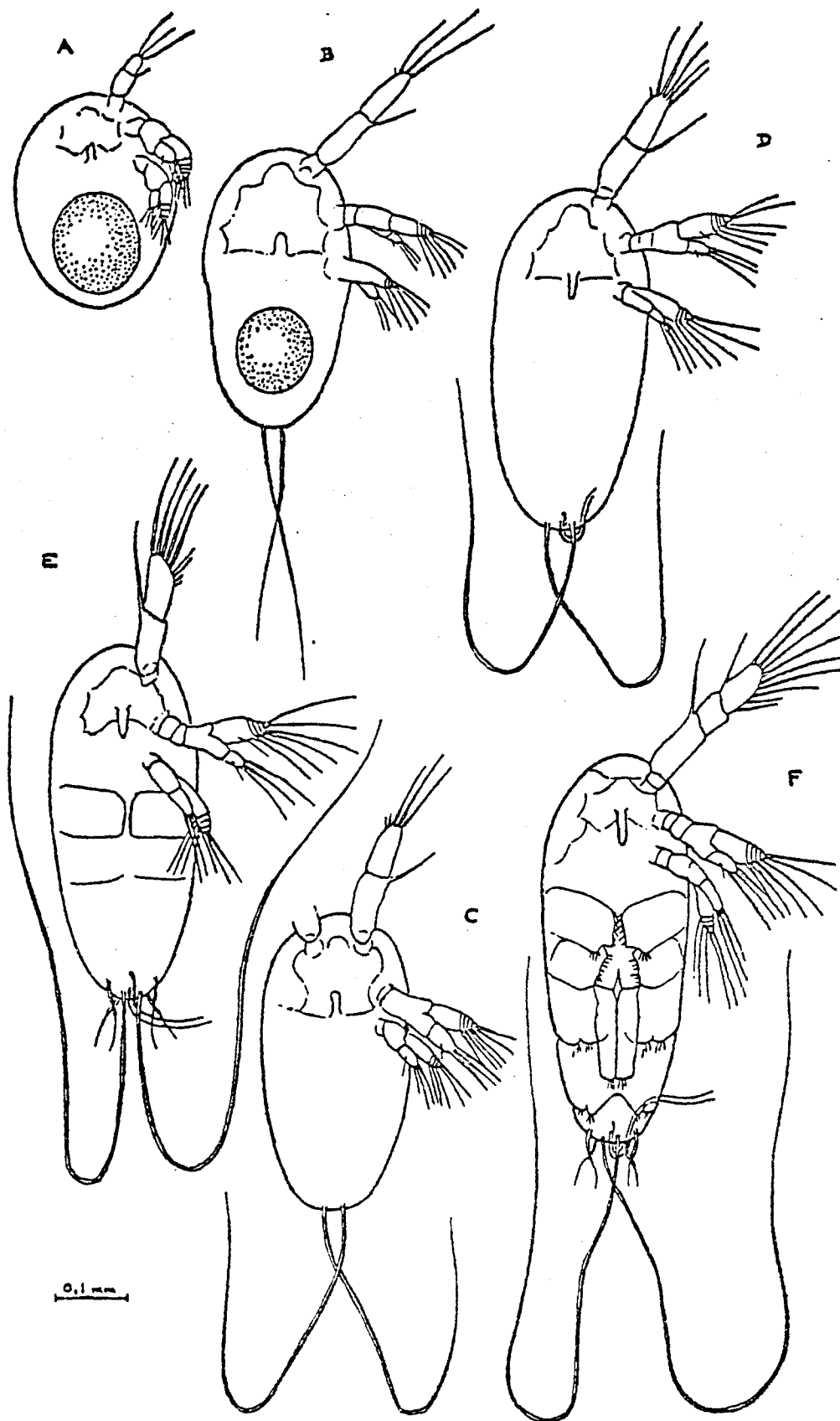


FIG. 1. — Stades naupliens de *Euchaeta marina* :
a) st. I - b) st. II - c) st. III - d) st. IV - e) st. V - f) st. VI

Euchaeta norvegica Boeck

Calanoida: Euchaetidae

Distinguishing Characteristics: In the females, the urosome is about half the length of the metasome. The genital segment has a large and thick ventral protuberance. In the males, the fifth legs are considerably longer than the urosome (Sars, 1903).

Geographical Range: E. norvegica is widespread in the Gulf of St. Lawrence and in the deep oceanic triangle between the Scotian and Newfoundland Banks. It is characteristic of the continental slope as far south as Delaware Bay (Bigelow, 1926).

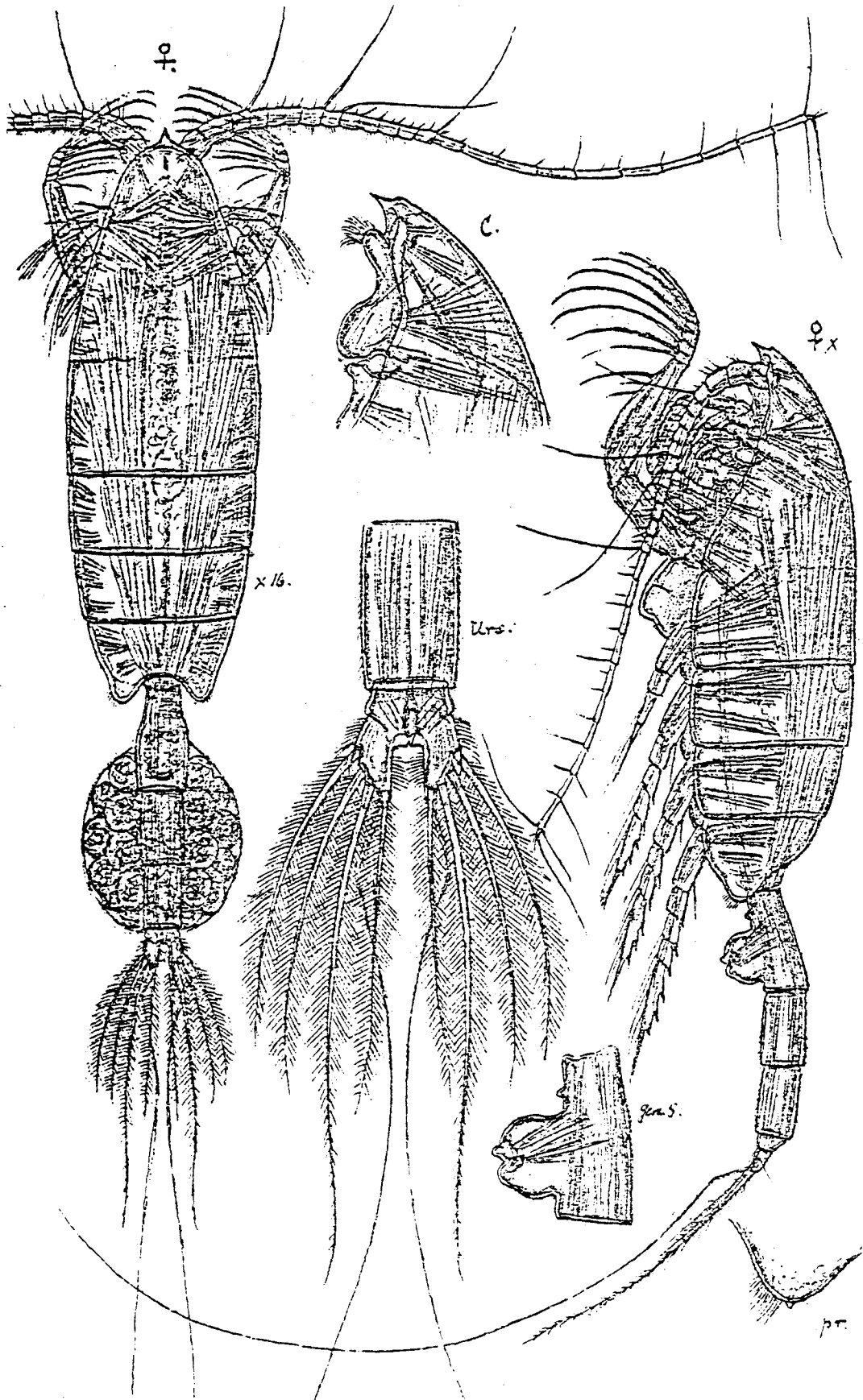
Ecology: E. norvegica is an oceanic species, generally found below 100 meters (Bigelow, 1926). Its optimum temperature is less than 8°C, and it is found in comparatively high salinities (33-34 ppm) (Bigelow, 1926).

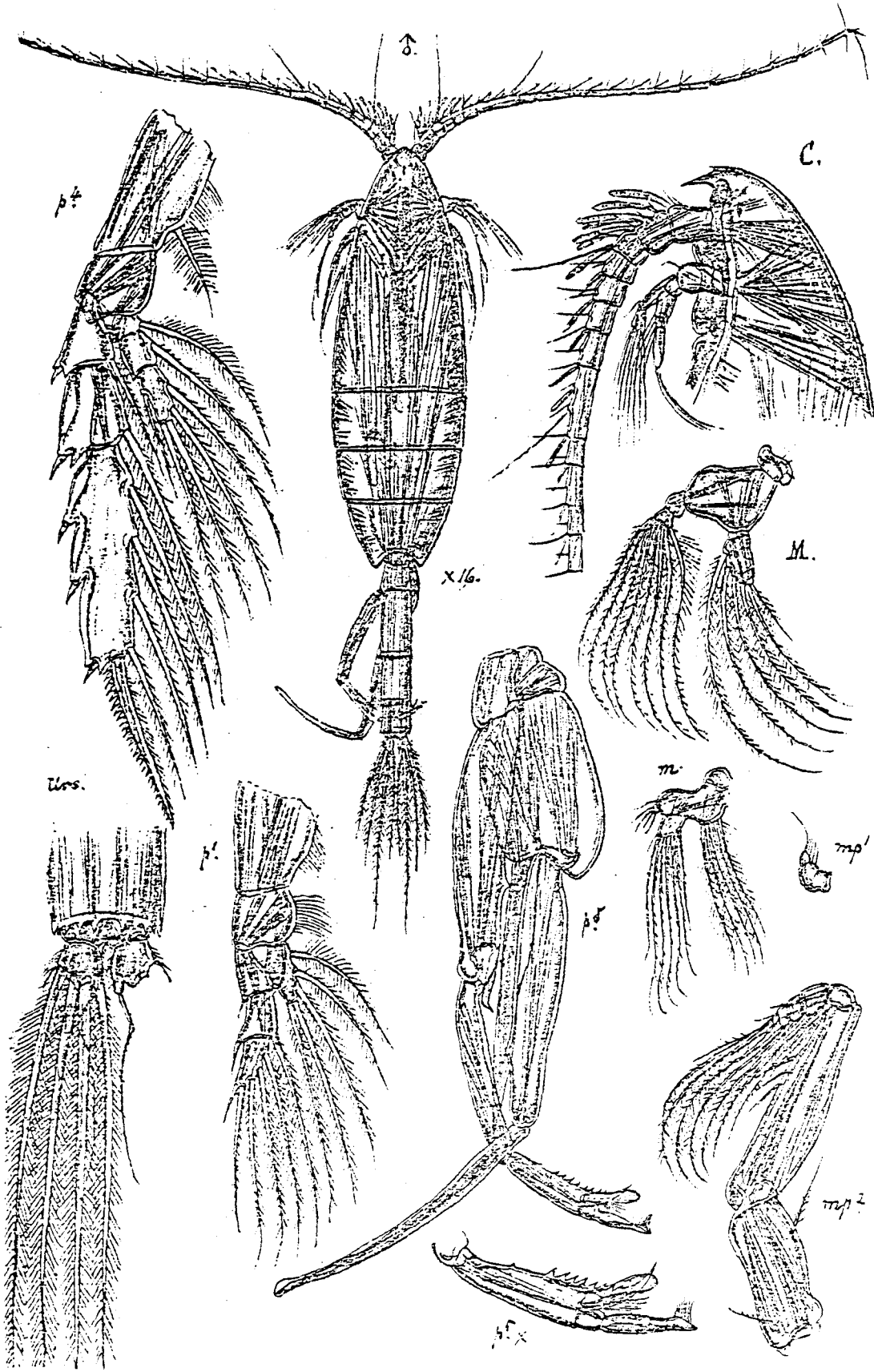
Feeding Habits: E. norvegica is a carnivorous copepod (Mullen, 1967).

Life History: E. norvegica spawns throughout the year in the Gulf of Maine (Bigelow, 1926).

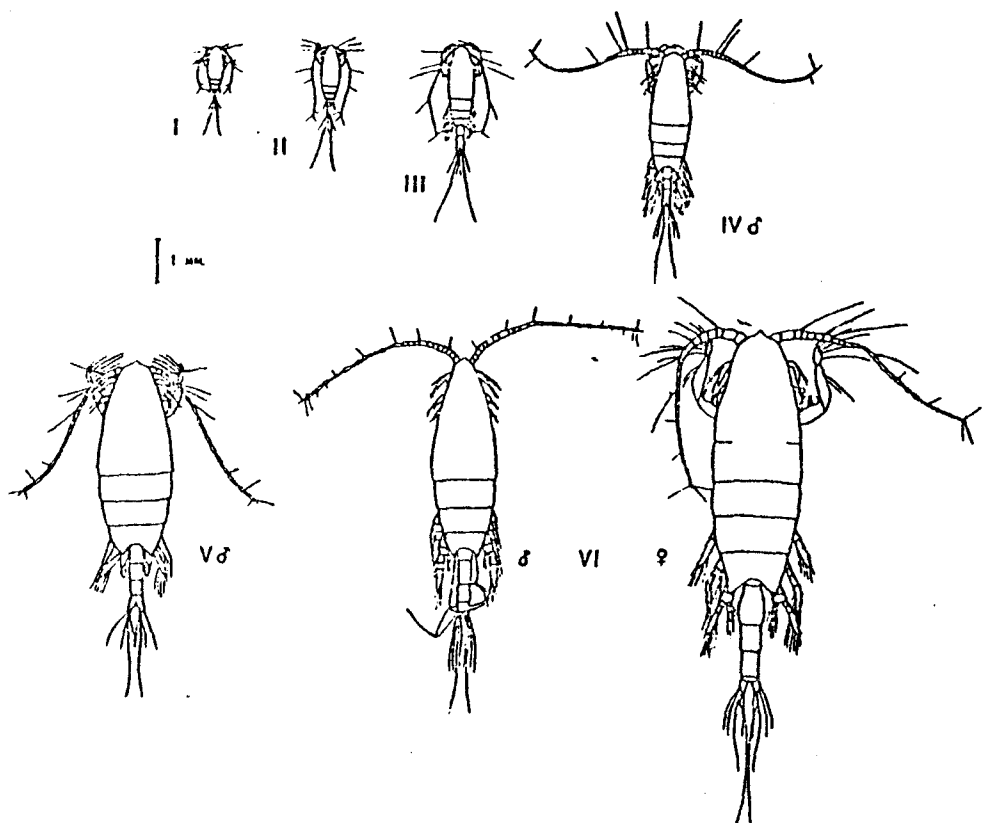
EGG 0.4 mm diameter

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Nicholls, 1934)	0.55	0.60	0.64	0.68	0.73	0.78	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Nicholls, 1934)	0.9	1.3	1.8	2.9	4.3	6.1	♀
				2.8	4.2	4.4	♂

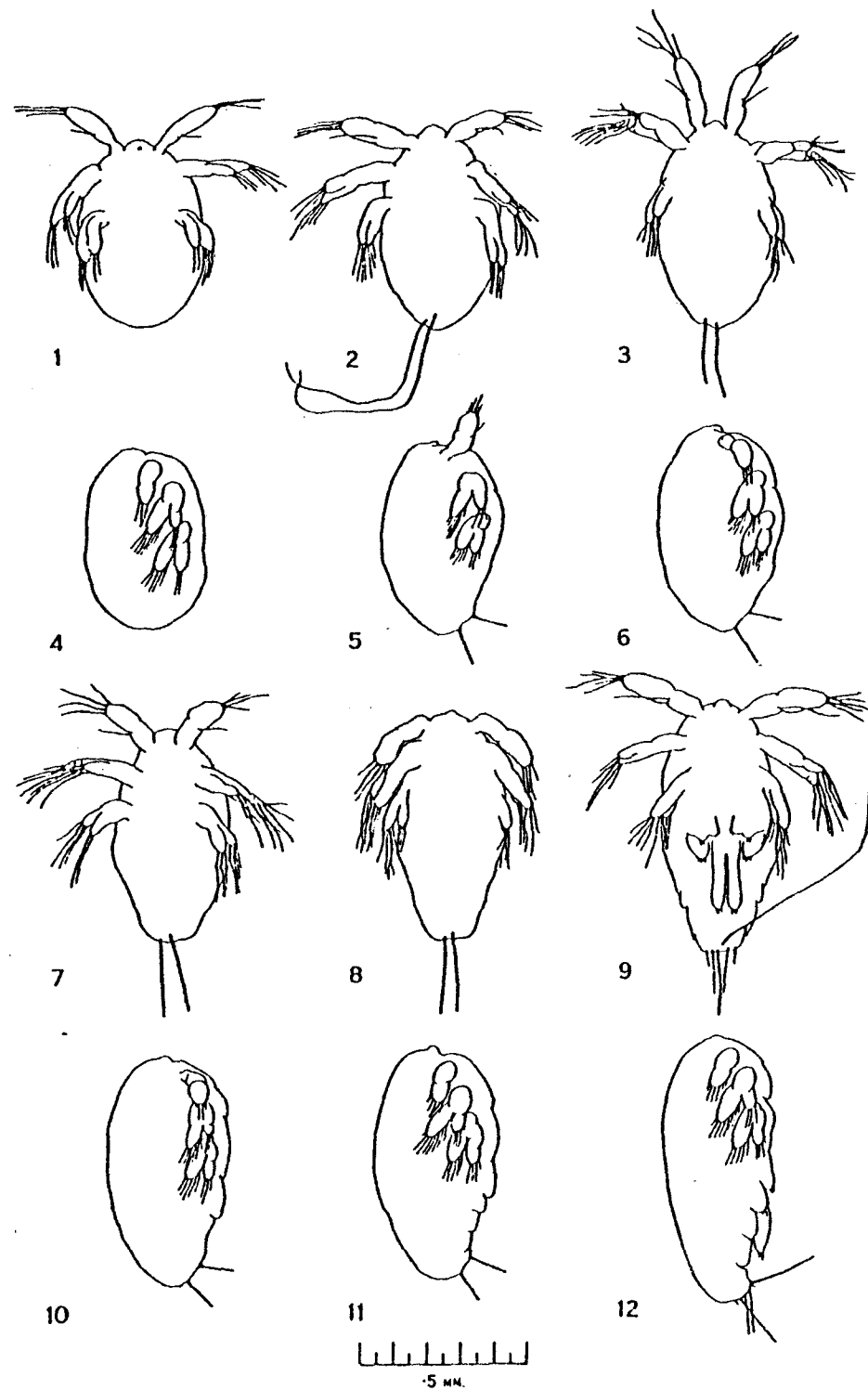




Copepodite and naupliar stages of *Euchaeta norvegica*.



TEXT-FIG. 5.—The copepodite stages of *Euchaeta norvegica* in dorsal view, showing the relative size. The females of Stages IV and V have been omitted as they are approximately the same size as the corresponding males. The characteristic appearance of the living copepod is shown in IV ♂.



TEXT-FIG. 2.—The six nauplii of *Euchaeta norvegica*. Figs. 1-3 and 7-9 in ventral view; figs. 4-6 and 10-12 the same in lateral view.

Euchirella rostrata (Claus)

Calanoida: Aetideidae

Distinguishing Characteristics: In the females, the basipod of the fourth leg has a row of six or seven flattened spines, and the fifth legs are lacking. The males have biramous fifth legs (Wilson, 1932).

Geographical Range: E. rostrata is widespread in the temperate North Atlantic. It is found along the continental slope (Scott, 1911).

Ecology: E. rostrata is an oceanic species (Bigelow, 1926). It is found in moderately deep water, and occasionally at the surface during the night (Vervoort, 1952b).

Feeding Habits: E. rostrata is an omnivorous copepod (Arashkevich, 1969).

Life History: No information.

Total Length: Female: 2.95-3.1 mm,
Male : 2.5 mm (Brodskiï, 1967)

PLATE XXXVI Euchirella rostrata.

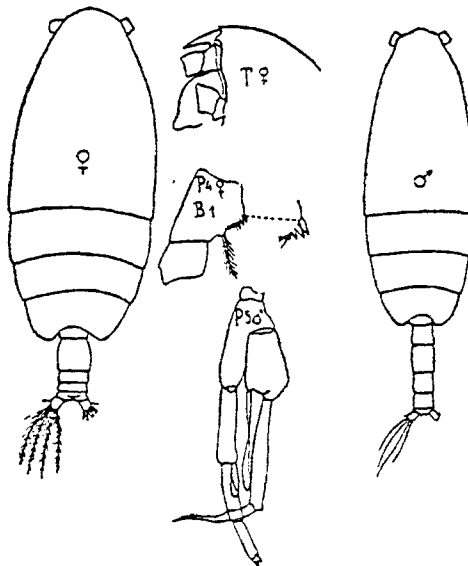
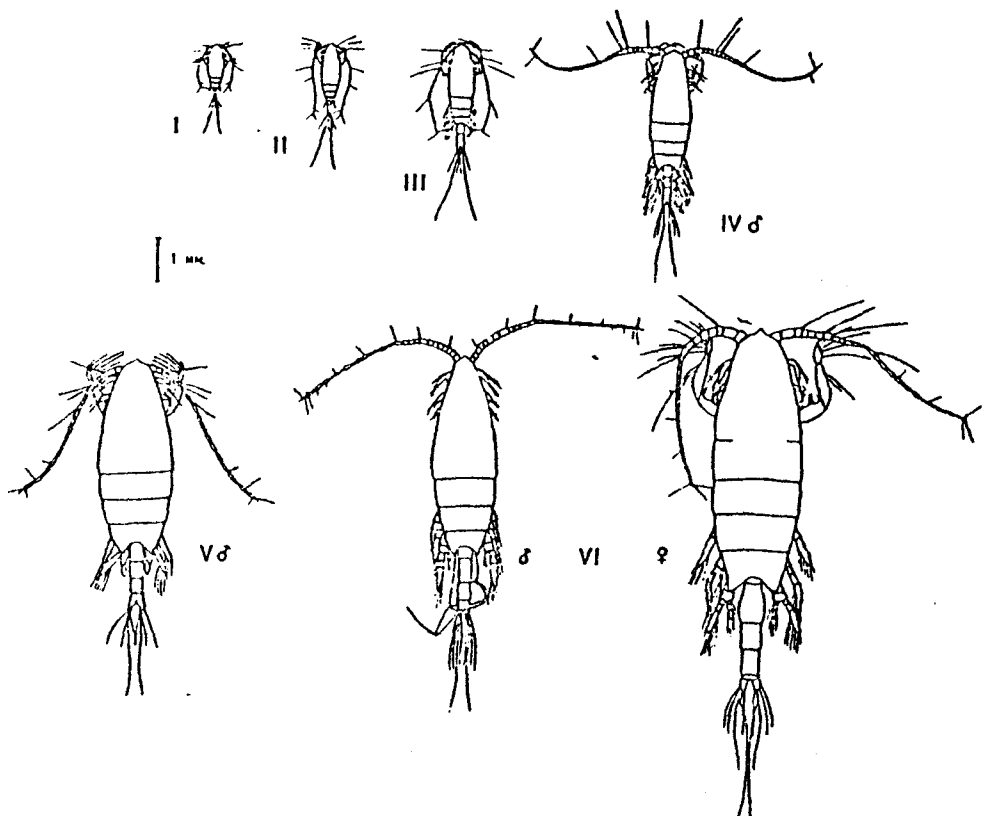


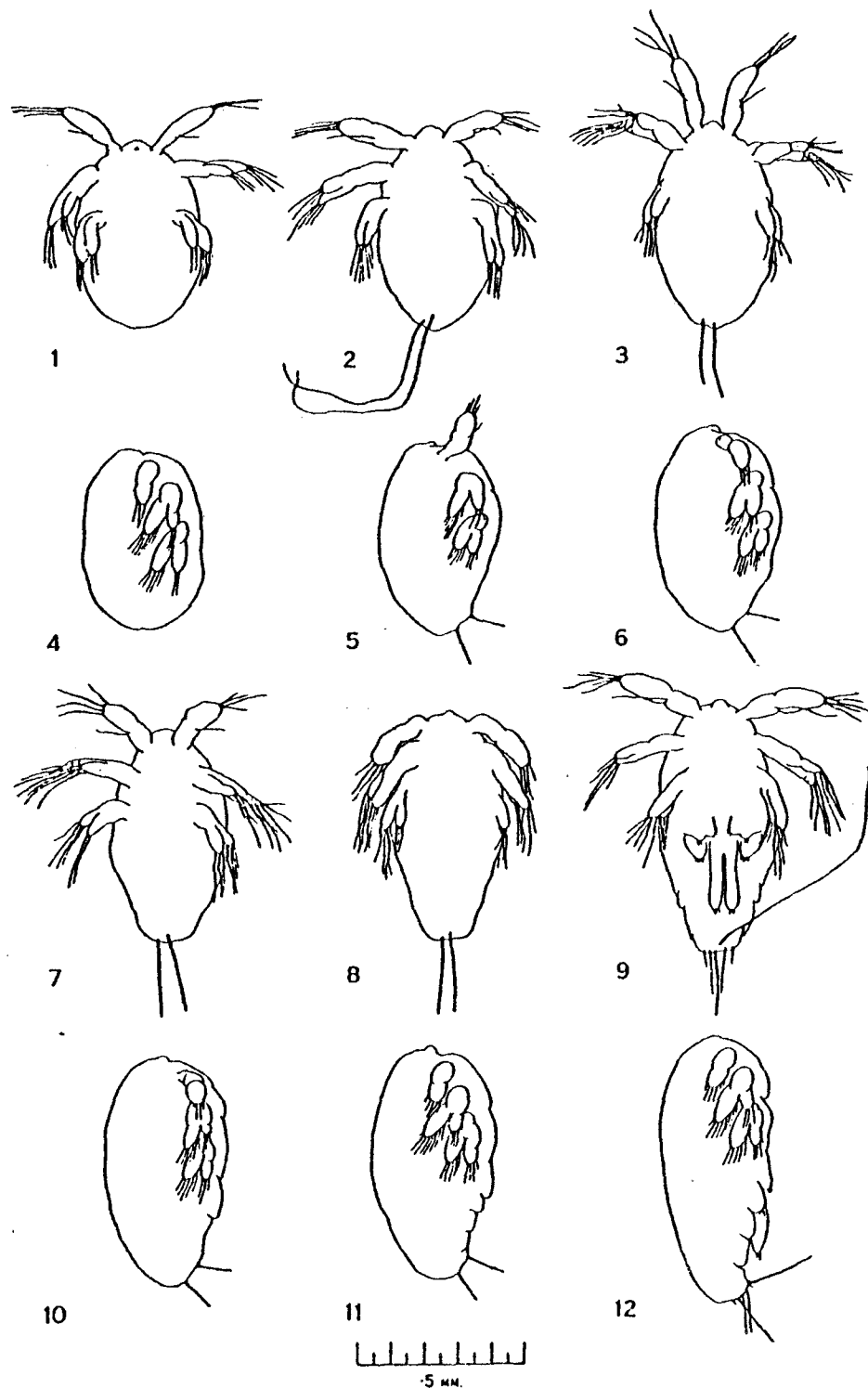
Fig. 77. — *Euchirella rostrata* CLAUS; ♀♂;
d'après G. O. SARS.

ROSE, 1933

Copepodite and naupliar stages of *Euchaeta norvegica*.



TEXT-FIG. 5.—The copepodite stages of *Euchaeta norvegica* in dorsal view, showing the relative size. The females of Stages IV and V have been omitted as they are approximately the same size as the corresponding males. The characteristic appearance of the living copepod is shown in IV ♂.



TEXT-FIG. 2.—The six nauplii of *Euchaeta norvegica*. Figs. 1-3 and 7-9 in ventral view; figs. 4-6 and 10-12 the same in lateral view.

Euchirella rostrata (Claus)

Calanoida: Aetideidae

Distinguishing Characteristics: In the females, the basipod of the fourth leg has a row of six or seven flattened spines, and the fifth legs are lacking. The males have biramous fifth legs (Wilson, 1932).

Geographical Range: E. rostrata is widespread in the temperate North Atlantic. It is found along the continental slope (Scott, 1911).

Ecology: E. rostrata is an oceanic species (Bigelow, 1926). It is found in moderately deep water, and occasionally at the surface during the night (Vervoort, 1952b).

Feeding Habits: E. rostrata is an omnivorous copepod (Arashkevich, 1969).

Life History: No information.

Total Length: Female: 2.95-3.1 mm,
Male : 2.5 mm (Brodskaa, 1967)

PLATE XXXVI Euchirella rostrata.

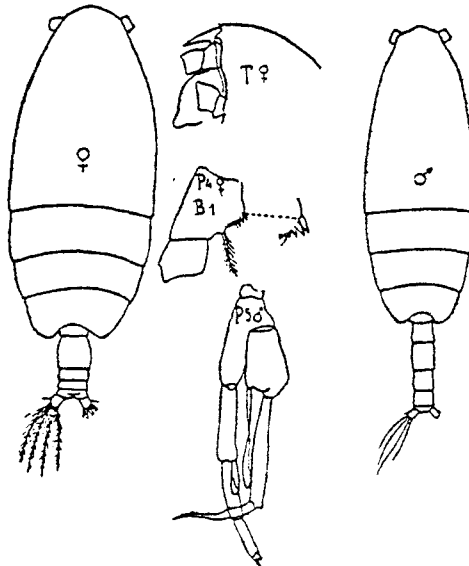


Fig. 77. — *Euchirella rostrata* CLAUS; ♀♂;
d'après G. O. Sars.

ROSE, 1933

Eurytemora americana Williams

Calanoida: Temoridae

Distinguishing Characteristics: The form of the fifth legs, the wings on the fifth metasomal segment of the females, and the long caudal rami are the most distinguishing characteristics (Wilson, 1932).

Geographical Range: E. americana is found from Cape Cod to Chesapeake Bay (Deevey, 1960).

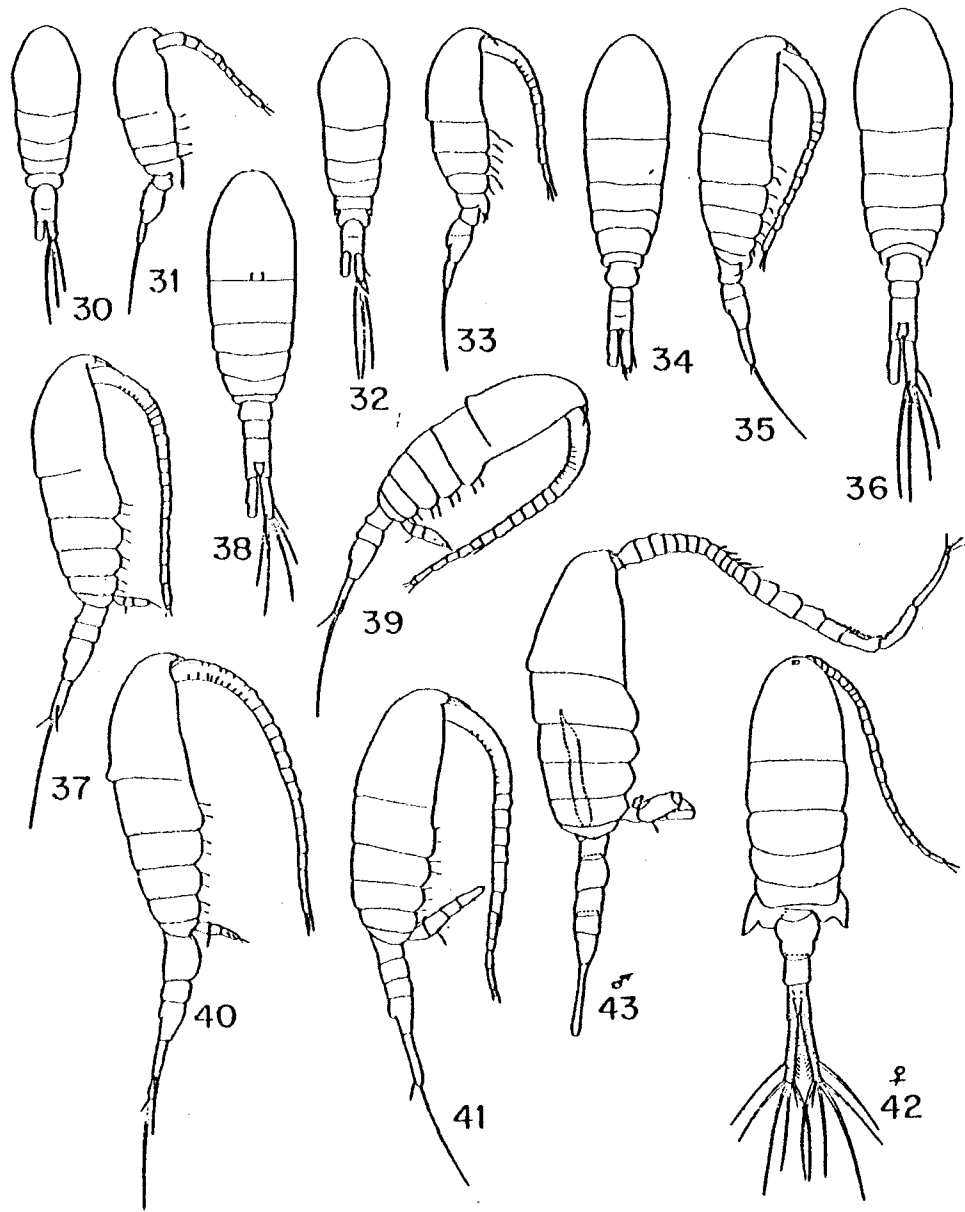
Ecology: E. americana is a brackish water species (Deevey, 1960).

Feeding Habits: E. americana is an omnivorous copepod (Itoh, 1970).

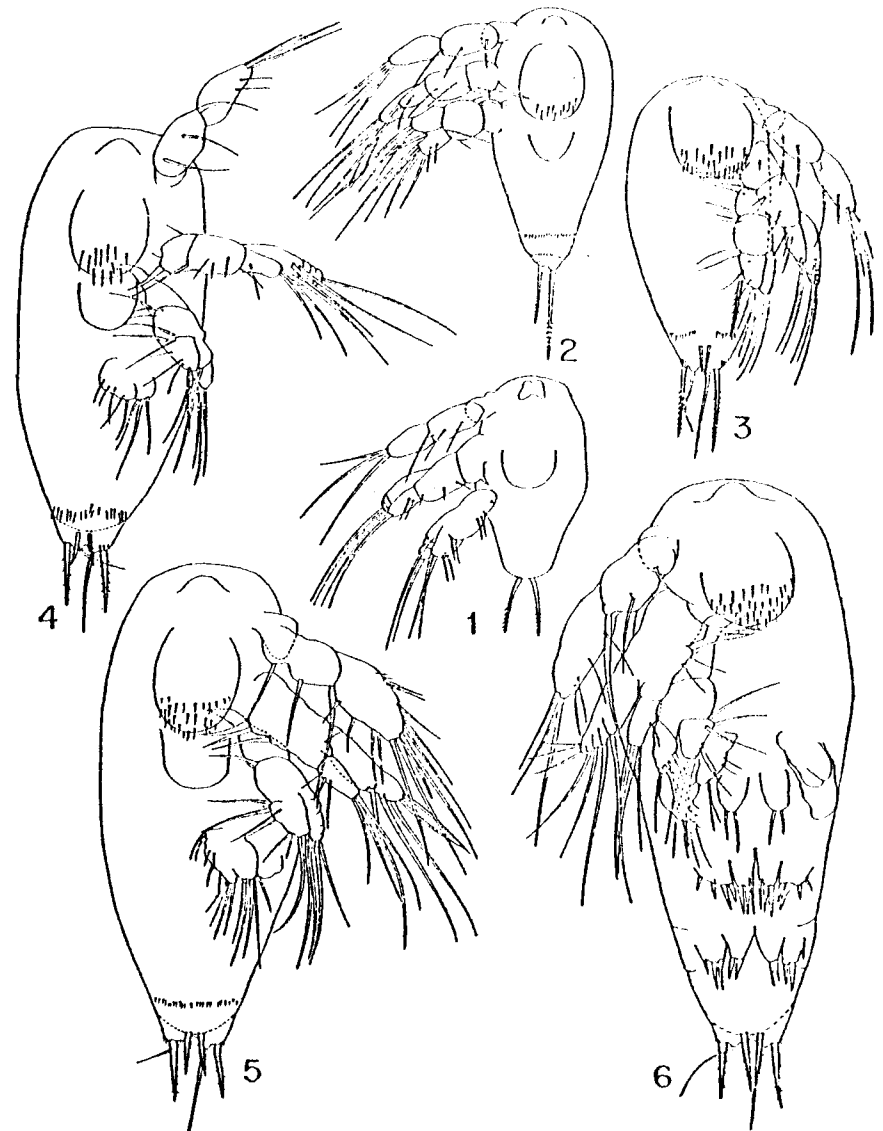
Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Grice, 1971)	0.12	0.16- 0.18	0.20	0.24- 0.26	0.30- 0.31	0.36	
<u>COPEPODITE</u>							
Total Length (Grice, 1971)	0.56- 0.59	0.62- 0.68	0.74- 0.84	0.88- 0.98	1.04- 1.18	1.20- 1.40	♀
						1.24- 1.30	♂

PLATE XXXVII Adult, copepodite, and naupliar stages of *Eurytemora americana*.



Figs. 30-43. *Eurytemora americana* Williams. 30, Copepodid Stage I, dorsal; 31, lateral; 32, Copepodid Stage II, dorsal; 33, lateral; 34, Copepodid Stage III, dorsal; 35, lateral; 36, Copepodid Stage IV, female, dorsal; 37, female, lateral; 38, Copepodid Stage IV, male, dorsal; 39, male, lateral; 40, Copepodid Stage V, female, lateral; 41, Copepodid Stage V, male, lateral; 42, adult female, dorsal; 43, adult male, lateral.



Figs. 1-6. *Eurytemora americana* Williams. Nauplius Stages I-VI, ventral view.

Eurytemora herdmani Thompson and Scott

Calanoida: Temoridae

Distinguishing Characteristics: The winglike processes at the corners of the fifth metasomal segment and the form of the fifth legs are the most distinguishing characteristics (Wilson, 1966).

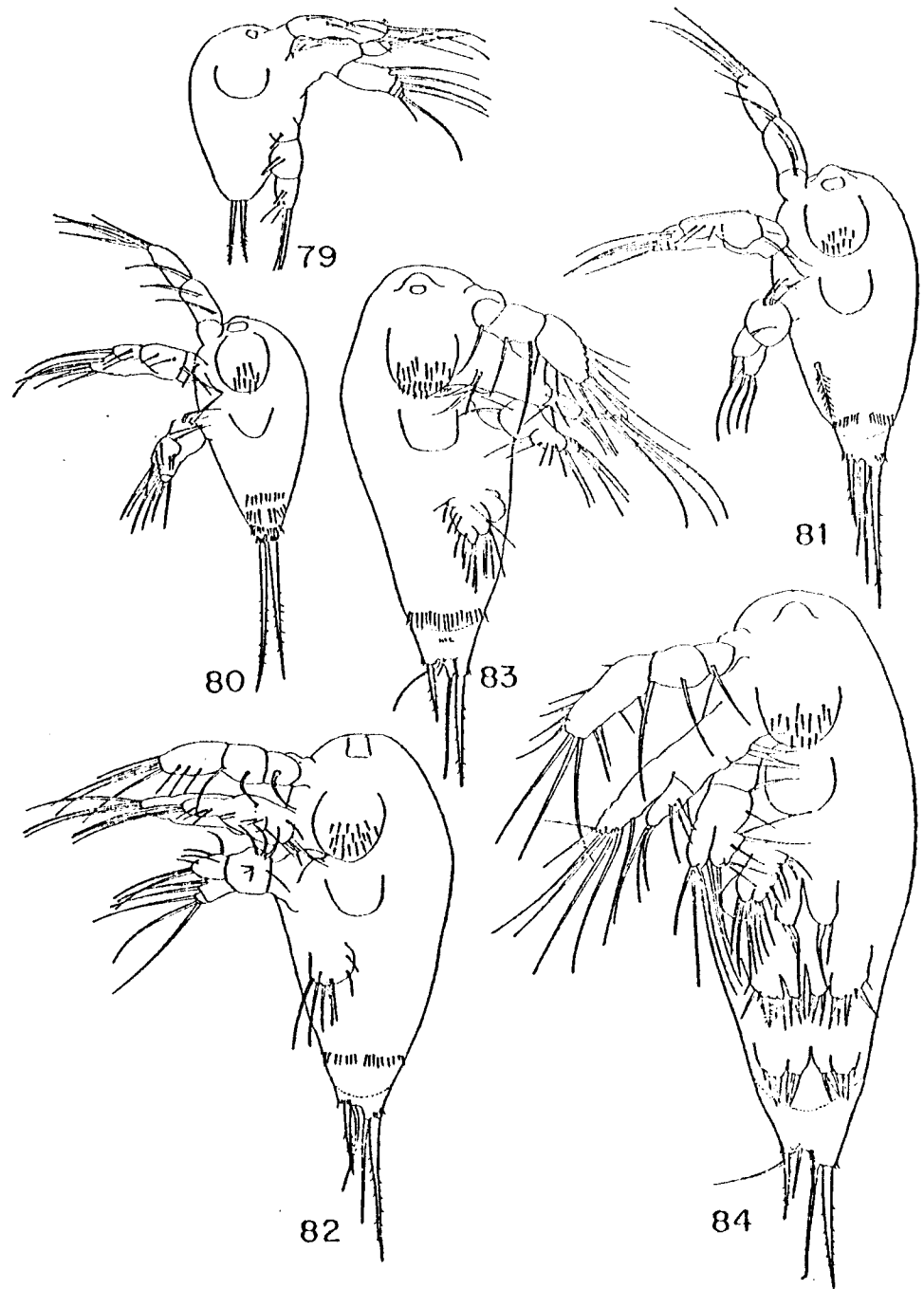
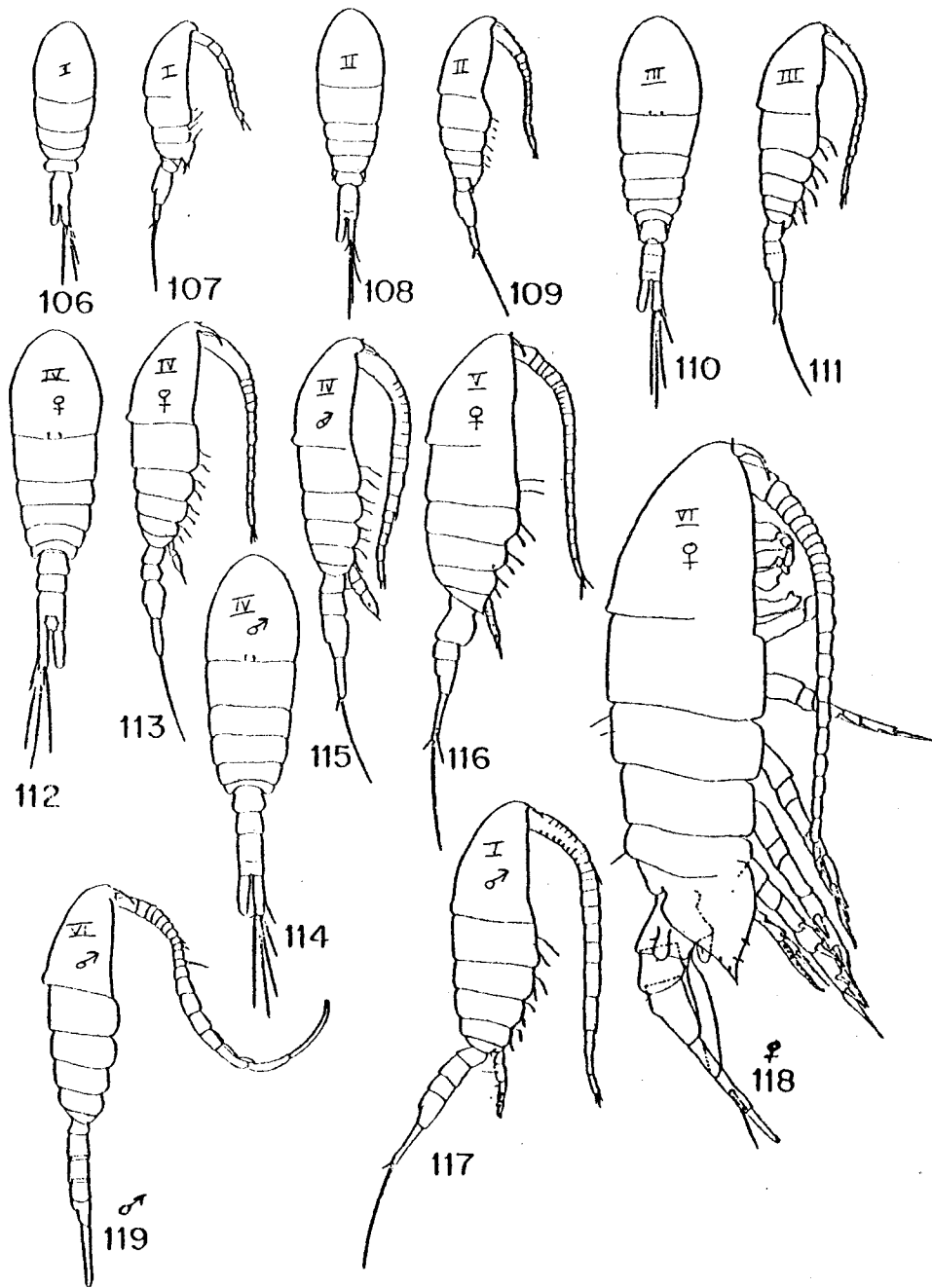
Geographical Range: E. herdmani has a wide geographical distribution in certain coastal and estuarine waters along the northeastern and northwestern coasts of North America (Johnson, 1966).

Ecology: E. herdmani is a neritic species. It is characteristic of estuarine situations and brackish water (Bigelow, 1926).

Feeding Habits: E. herdmani is an omnivorous copepod (Itoh, 1970).

Life History: During the summer and early autumn, it is at its maximum abundance in the Gulf of Maine (Bigelow, 1926). The nauplii are present in Narragansett Bay from May through July, and are most abundant in May (Faber, 1966b).

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Grice, 1971)	0.10- 0.12	0.16- 0.18	0.20- 0.24	0.24- 0.28	0.28- 0.32	0.36- 0.38
<u>COPEPODITE</u>						
Total Length (Grice, 1971)	0.48- 0.56	0.60- 0.68	0.72- 0.82	0.92- 1.00	1.02- 1.12	1.14- 1.34 ♀
						1.16- 1.28 ♂



Figs. 106-119. *Eurytemora herdmani* Thompson & Scott. 106, Copepodid Stage I, dorsal; 107, lateral; 108, Copepodid Stage II, dorsal; 109, lateral; 110, Copepodid Stage III, dorsal; 111, lateral; 112, Copepodid Stage IV, female, dorsal; 113, lateral; 114, Copepodid Stage IV, male, dorsal; 115, lateral; 116, Copepodid Stage V, female, lateral; 117, Copepodid Stage V, male, lateral; 118, adult female, lateral; 119, male, lateral.

Figs. 79-84. *Eurytemora herdmani* Thompson & Scott. Nauplius Stages I-VI, ventral view.

Eurytemora hirundoides Nordquist

Calanoida: Temoridae

Distinguishing Characteristics: The form of the fifth legs is the most distinguishing characteristic (Wilson, 1932).

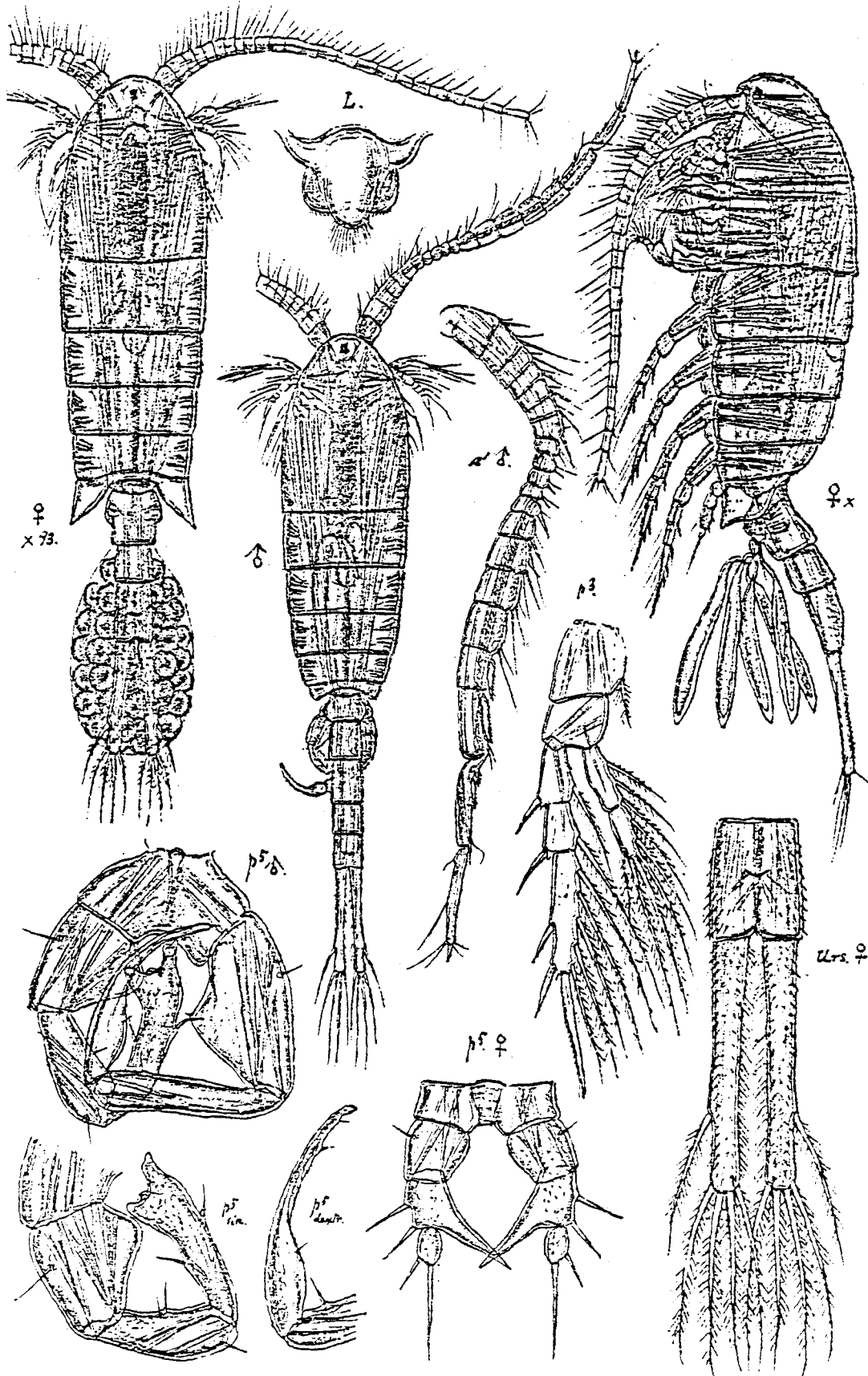
Geographical Range: E. hirundoides has been collected widely in the North Atlantic region (Nova Scotia, the Woods Hole region, Narragansett Bay, and Chesapeake Bay) (Davis, 1943).

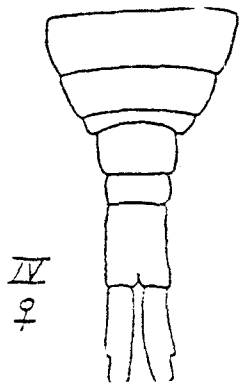
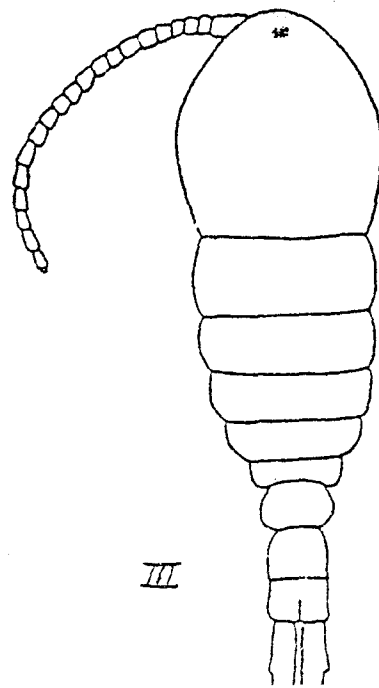
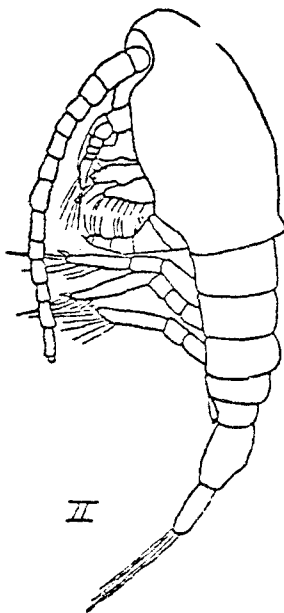
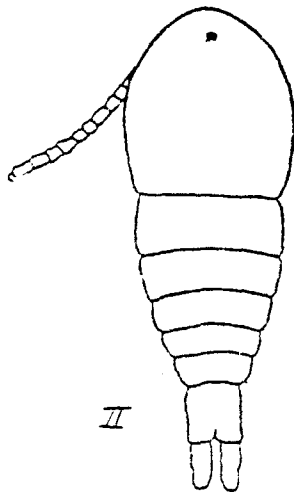
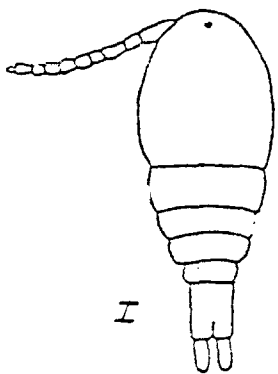
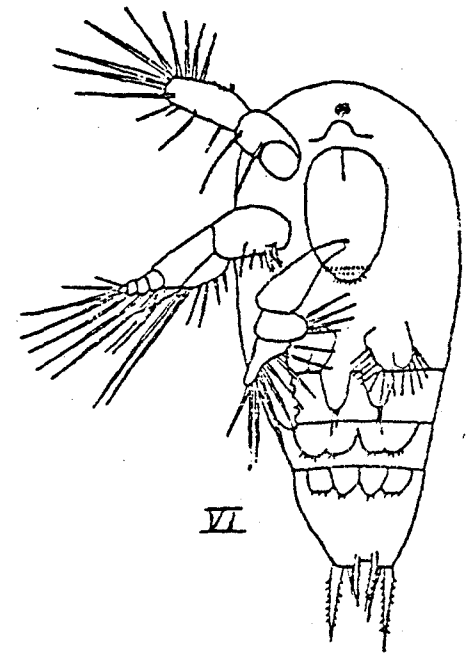
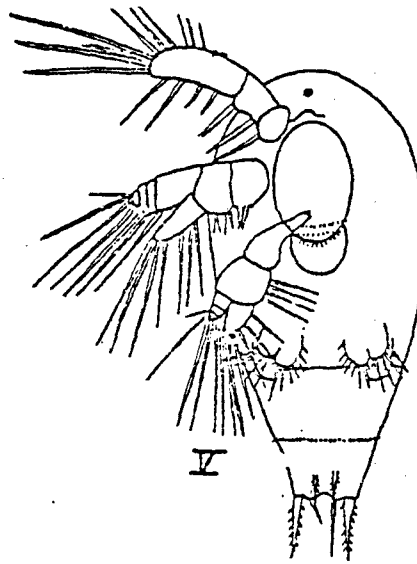
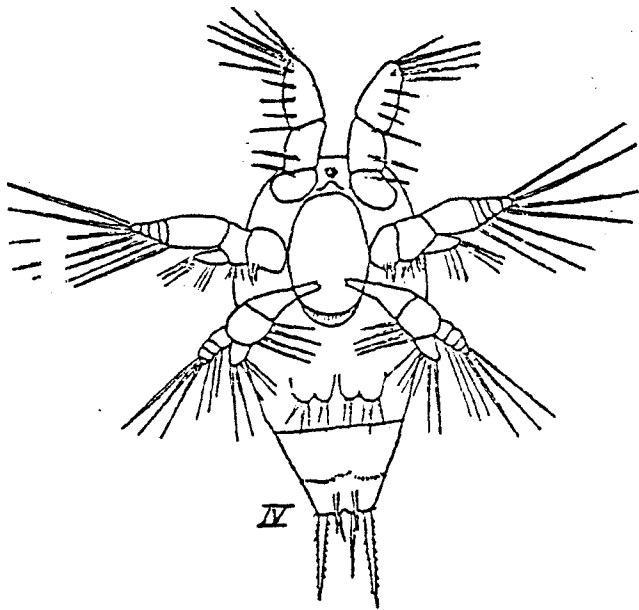
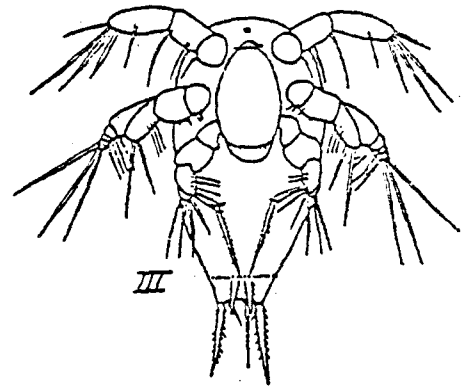
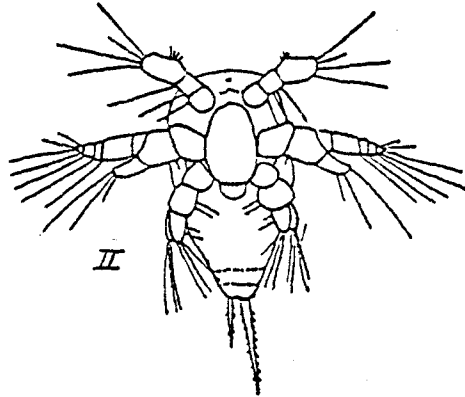
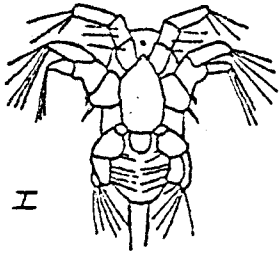
Ecology: E. hirundoides is a neritic species (Brodskii, 1967) and is characteristic of brackish to fresh water (Davis, 1943).

Feeding Habits: E. hirundoides is an omnivorous copepod (Itoh, 1970).

Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Davis, 1943)	0.098- 0.104	0.128- 0.146	0.146- 0.183	0.195- 0.220	0.244- 0.262	0.301- 0.366	
<u>COPEPODITE</u>							
Total Length (Davis, 1943)	0.439- 0.549	0.555- 0.671	0.830- 0.933	1.037- 1.220	1.257- 1.525	1.482- 1.708	♀
				0.854- 0.994	1.135- 1.287	1.403- 1.647	♂





Halithalestris croni Krøyer

Harpacticoida: Thalestridae

Distinguishing Characteristics: H. croni can be recognized by its large size and by the very long divergent caudal rami (Wilson, 1932).

Geographical Range: H. croni is widely distributed in the North Atlantic. Its range extends over the Gulf of Maine including the coastal basin out to the eastern part of Georges Bank and the continental slope (Bigelow, 1926).

Ecology: H. croni is a pelagic species (Wilson, 1932).

Feeding Habits: No information.

Life History: No information.

Total Length: Female: 2.2-2.45 mm
Male : 1.7-2.00 mm (Wilson, 1932)

PLATE XLI Halithalestris croni.

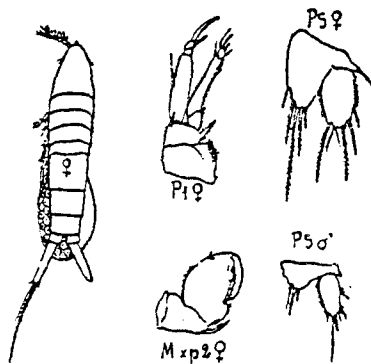


Fig. 368. — *Halithalestris Croni*
KRØYER, ♀♂; d'après Sars et Brady.

ROSE, 1933

Labidocera aestiva Wheeler

Calanoida: Pontellidae

Distinguishing Characteristics: The asymmetry of the lobes on the fifth metasomal segment of the male and the fifth legs in both sexes are the most easily recognized characteristics. The head has one pair of dorsal cuticular lenses (Wilson, 1932).

Geographical Range: L. aestiva is found on the Atlantic coast from Florida to the Gulf of St. Lawrence (Gibson and Grice, 1977).

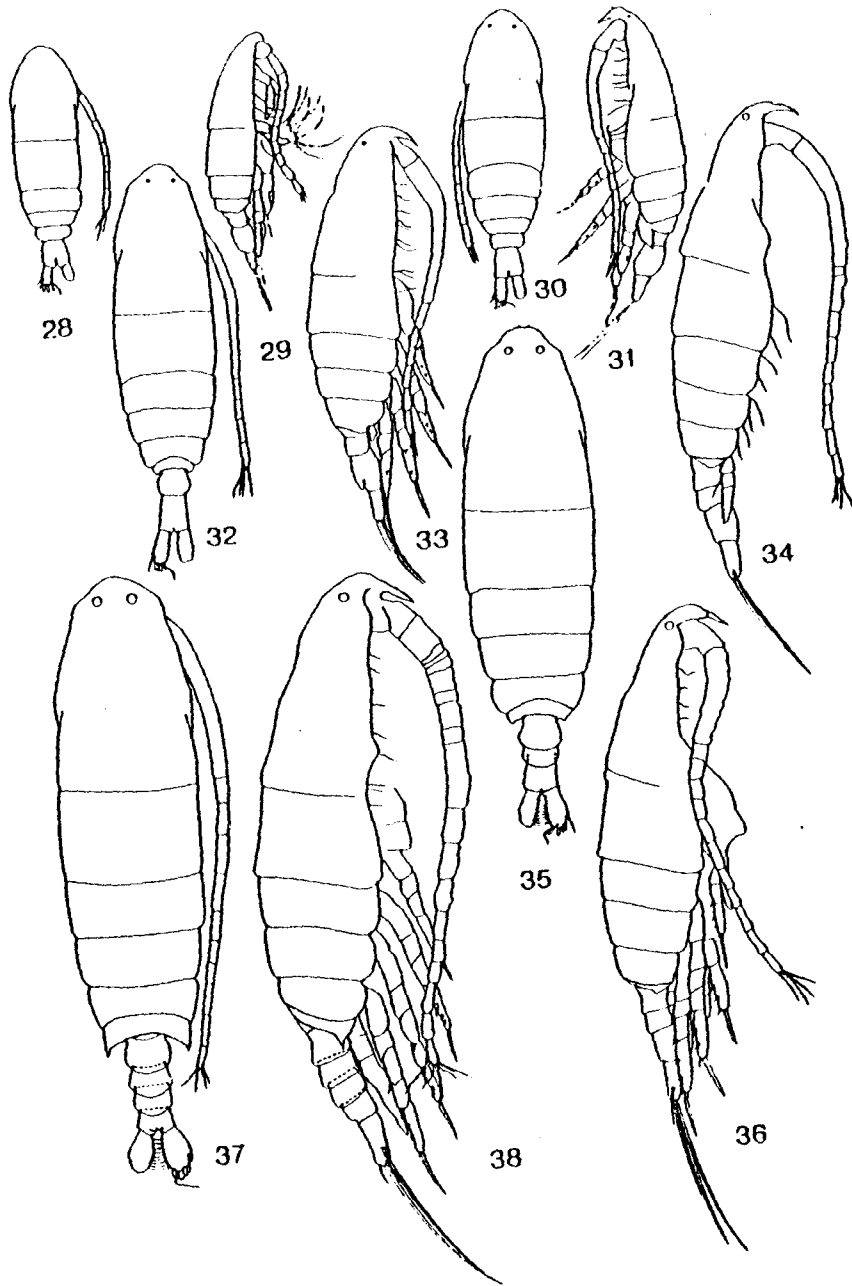
Ecology: L. aestiva is an estuarine and neritic species (Gibson and Grice, 1977). It has been found at temperatures from 5.85°C to 26.65°C, and it is euryhaline (Deevey, 1960).

Feeding Habits: L. aestiva is a carnivorous copepod (Anraku and Omori, 1963).

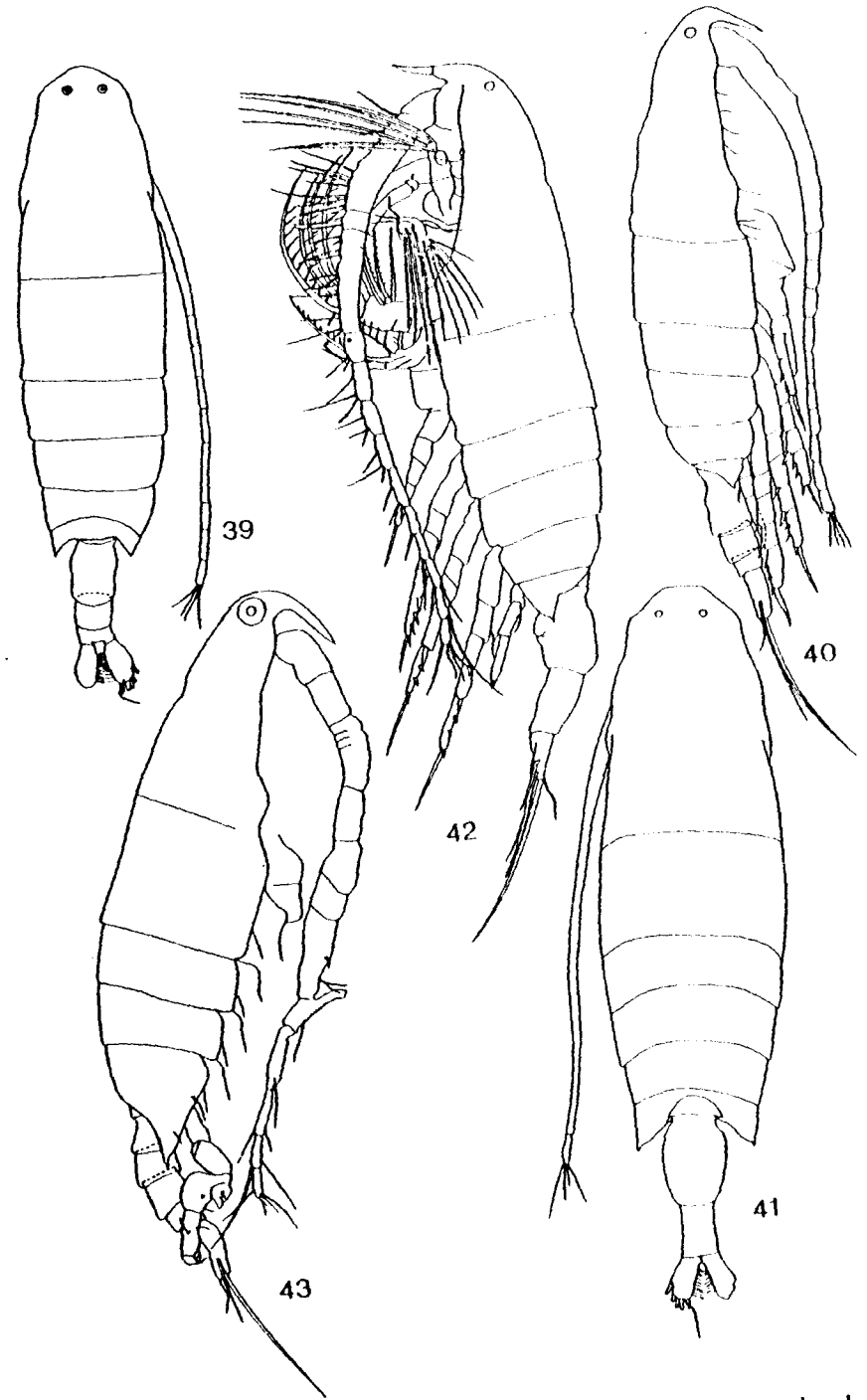
Life History: L. aestiva occurs regularly from early summer to early winter from Cape Cod to Chesapeake Bay (Deevey, 1960). The nauplii of L. aestiva are found in Narragansett Bay from July into November (Faber, 1966b). The developmental time from nauplii to adults is 14 to 25 days (Gibson and Grice, 1977).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Gibson & Grice, 1977)	0.14- 0.17	0.21- 0.22	0.28- 0.32	0.32- 0.34	0.38- 0.42	0.46- 0.48	
<u>COPEPODITE</u>							
Total Length (Gibson & Grice, 1977)	0.66- 0.70	0.79- 0.80	0.92- 1.16	1.28- 1.44	1.52- 1.74	1.95- 2.32	♀
						1.80 2.30	♂

Adult and copepodite stages of
Labidocera aestiva.

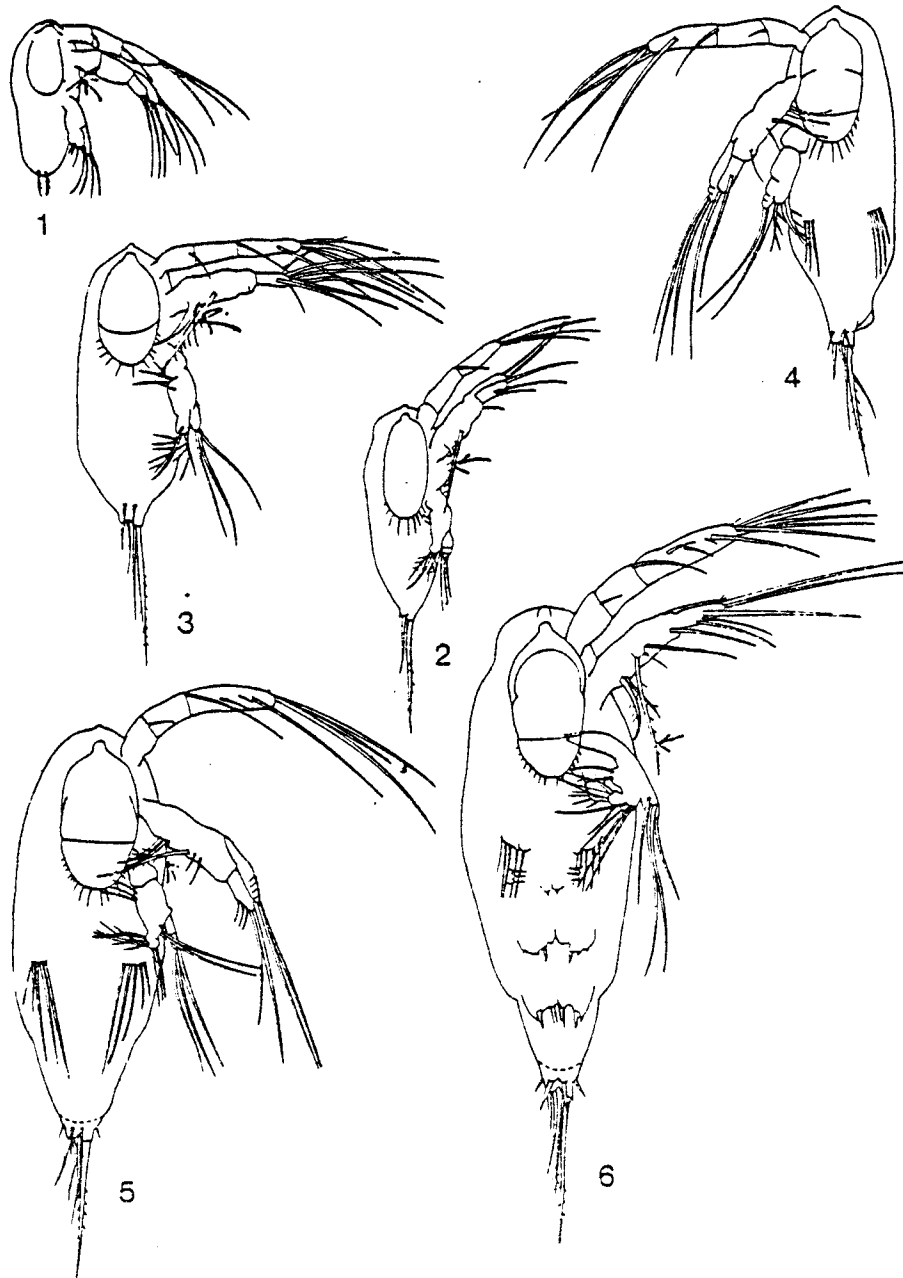


Figs. 28-38. *Labidocera aestiva* Wheeler. 28, Copepodid Stage I, dorsal; 29, lateral; 30, Copepodid Stage II, dorsal; 31, lateral; 32, Copepodid Stage III, dorsal; 33, lateral; 34, Copepodid Stage IV, dorsal; 35, female, lateral; 36, male, lateral; 37, Copepodid Stage V, male, dorsal; 38, female, dorsal; 35, female, lateral; 36, male, lateral.



Figs. 39-43. *Labidocera aestiva* Wheeler. 39, Copepodid Stage V, female, dorsal; 40, female, lateral; 41, adult female, dorsal; 42, adult female, lateral; 43, adult male, lateral.

PLATE XLIII Naupliar stages of Labidocera aestiva.



Figs. 1-6. *Labidocera aestiva* Wheeler. 1, Nauplius I; 2, Nauplius II; 3, Nauplius III; 4, Nauplius IV; 5, Nauplius V; 6, Nauplius VI.

GIBSON & GRICE, 1977

Macrosetella gracilis (Dana)

Harpacticoida: Macrosetellidae

Distinguishing Characteristics: M. gracilis can be recognized by the long first antennae and by the very long apical caudal setae (Wilson, 1932).

Geographical Range: In the western North Atlantic, M. gracilis has been recorded between 42°58'N and 10°15'N (Owre and Foyo, 1967 from: Rose, 1929 and Cervigón, 1963).

Ecology: M. gracilis is a pelagic species (Wilson, 1932).

Feeding Habits: No information.

Life History: No information.

Total Length: Female: 1.4-1.5 mm
Male : 1.16-1.3 mm (Wilson, 1932)

PLATE XLIV Macrosetella gracilis.

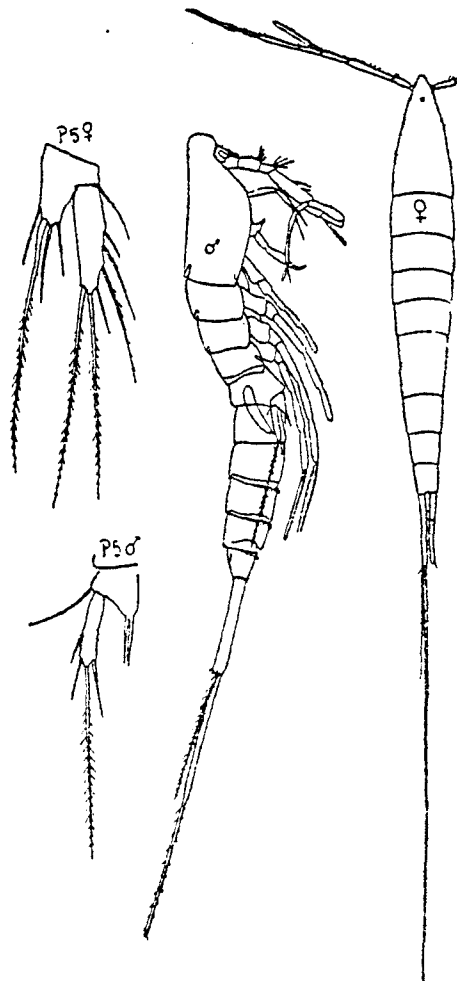


Fig. 367. — Macrosetella gracilis DANA, ♀♂;
d'après GIESBRECHT.

ROSE, 1933

Mecynocera clausii I. C. Thompson

Calanoida: Eucalanidae

Distinguishing Characteristics: M. clausii has exceptionally long first antennae (Wilson, 1932).

Geographical Range: In the western North Atlantic, M. clausii has been recorded between approximately 42°00'N and 8°04'N (Owre and Foyo, 1967 from: Wilson, 1932, 1950).

Ecology: M. clausii is an oceanic species (Colton, Temple and Honey, (1962).

Feeding Habits: M. clausii is an herbivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.0-1.15 mm
Male : 0.75-0.9 mm (Wilson, 1932)

PLATE XLV Mecynocera clausii.

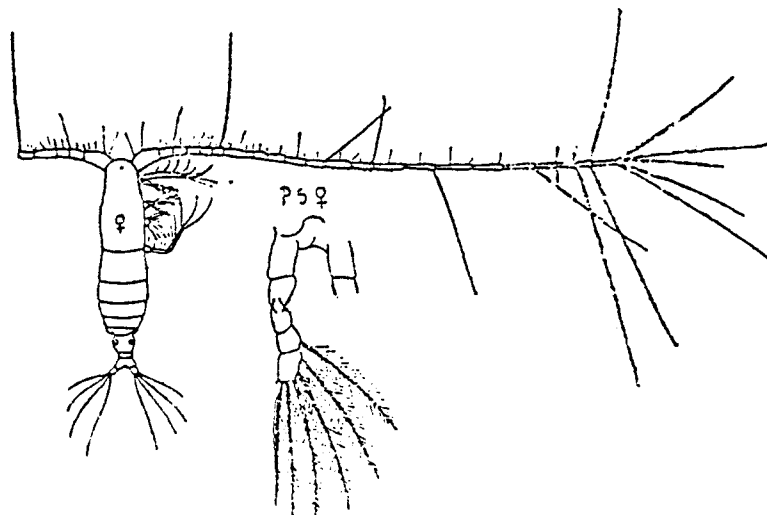


Fig. 24. — *Mecynocera Clausi* J. C. THOMPSON, ♀; d'après GIESBRECHT.

ROSE, 1933

Metridia longa (Lubbock)

Calanoida: Metridiidae

Distinguishing Characteristics: In Metridia, the urosome is about two-thirds the length of the metasome. From the earliest stages, there are the rudiments of hooks at the base of the first segment of the endopod of the second swimming feet. These become more defined with each successive stage (Conway and Minton, 1975).

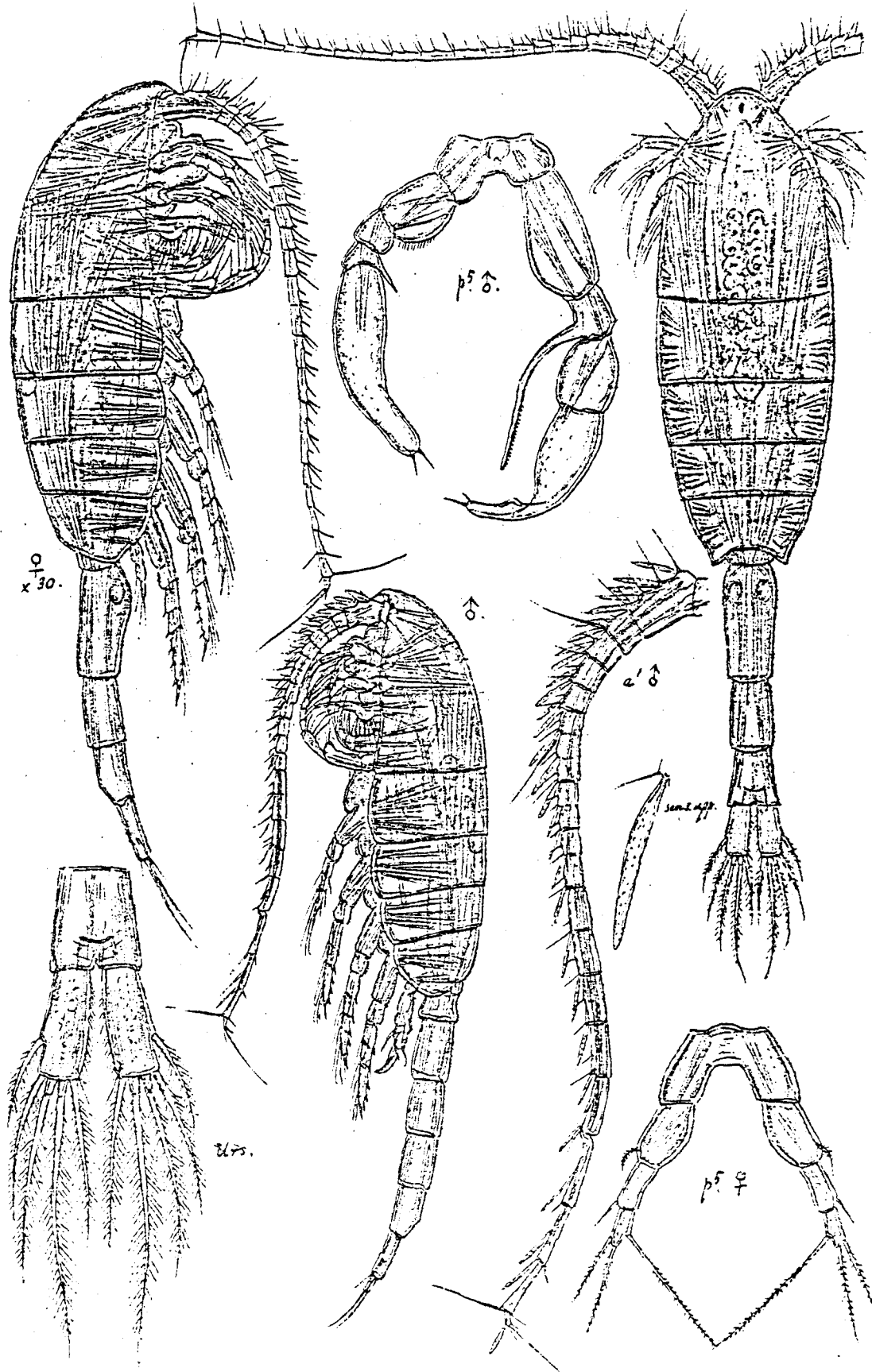
Geographical Range: M. longa is a true Arctic species. It is widespread in the Gulf of St. Lawrence, and is found in the Gulf of Maine and over the continental shelf south of Martha's Vineyard (Bigelow, 1926).

Ecology: M. longa is an oceanic species (Brodskii, 1967). It occurs more regularly at the deeper levels than at the surface off the American coast (Bigelow, 1926).

Feeding Habits: M. longa is an omnivorous copepod (Arashkevich, 1969).

Life History: In the Gulf of Maine, M. longa is most abundant during the late autumn, winter and early spring (Bigelow, 1926).

Total Length: Female: 4.0-4.5 mm
Male : 3.5-4.0 mm (Wilson, 1932)



Metridia lucens Boeck

Calanoida: Metridiidae

Distinguishing Characteristics: See: M. longa. M. lucens is much smaller than M. longa (Wilson, 1932).

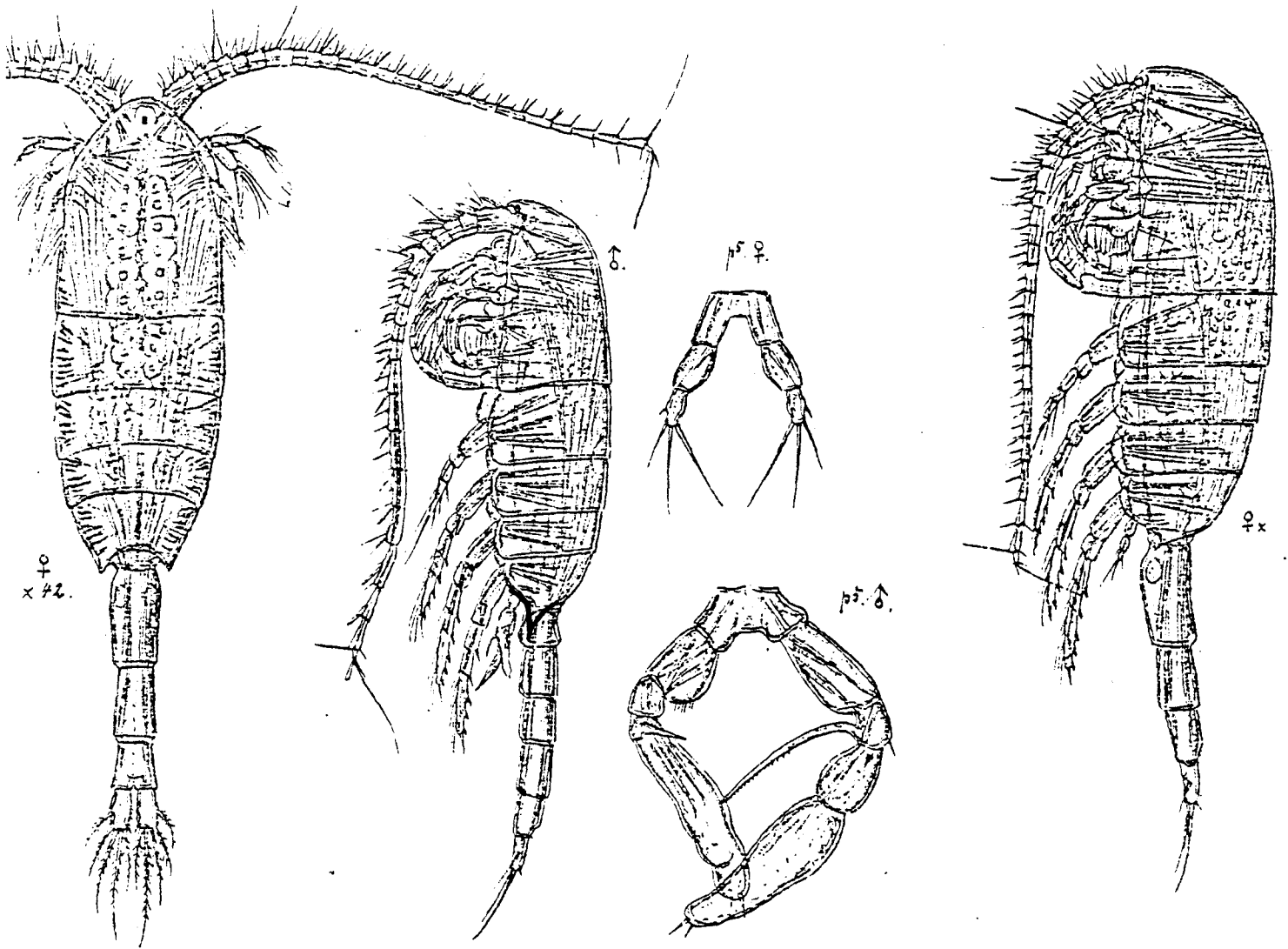
Geographical Range: M. lucens has a more southerly distribution than M. longa. It is widely distributed over the temperate and boreal parts of the North Atlantic (Bigelow, 1926).

Ecology: M. lucens is an oceanic species (Farran, 1911). It is found from the surface down to 2000 meters (Farran, 1911), but it is most abundant in the zone from 50 to 100 meters (Bigelow, 1926).

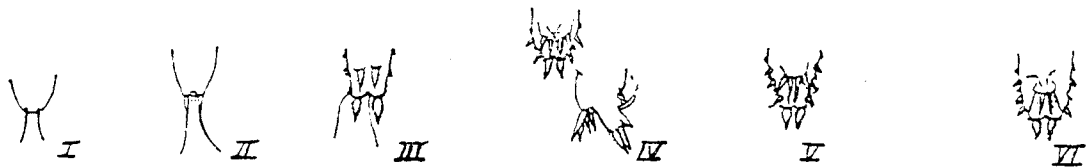
Feeding Habits: M. lucens is an omnivorous copepod (Mullen, 1967).

Life History: M. lucens is found on Georges Bank in late winter and spring (Bigelow, 1926). It is most abundant in summer in the Gulf of Maine (Sherman, 1963).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.19	0.21	0.27	0.34	0.41	0.46	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (Conway & Minton, 1975)	0.42	0.51- 0.59	0.67- 0.79	0.87- 0.96	1.29- 1.35	1.49- 1.80	♀
				0.82- 0.93	1.07- 1.21	1.13	♂



JARS, 1903



OGILVIE, 1956

Microcalanus pusillus Sars

Calanoida: Pseudocalanidae

Distinguishing Characteristics: M. pusillus is one of the smallest calanoid copepods. The metasome is deep and short. As in Pseudocalanus, the terminal spine on the exopod of all but the first swimming feet is serrated (Conway and Minton, 1975).

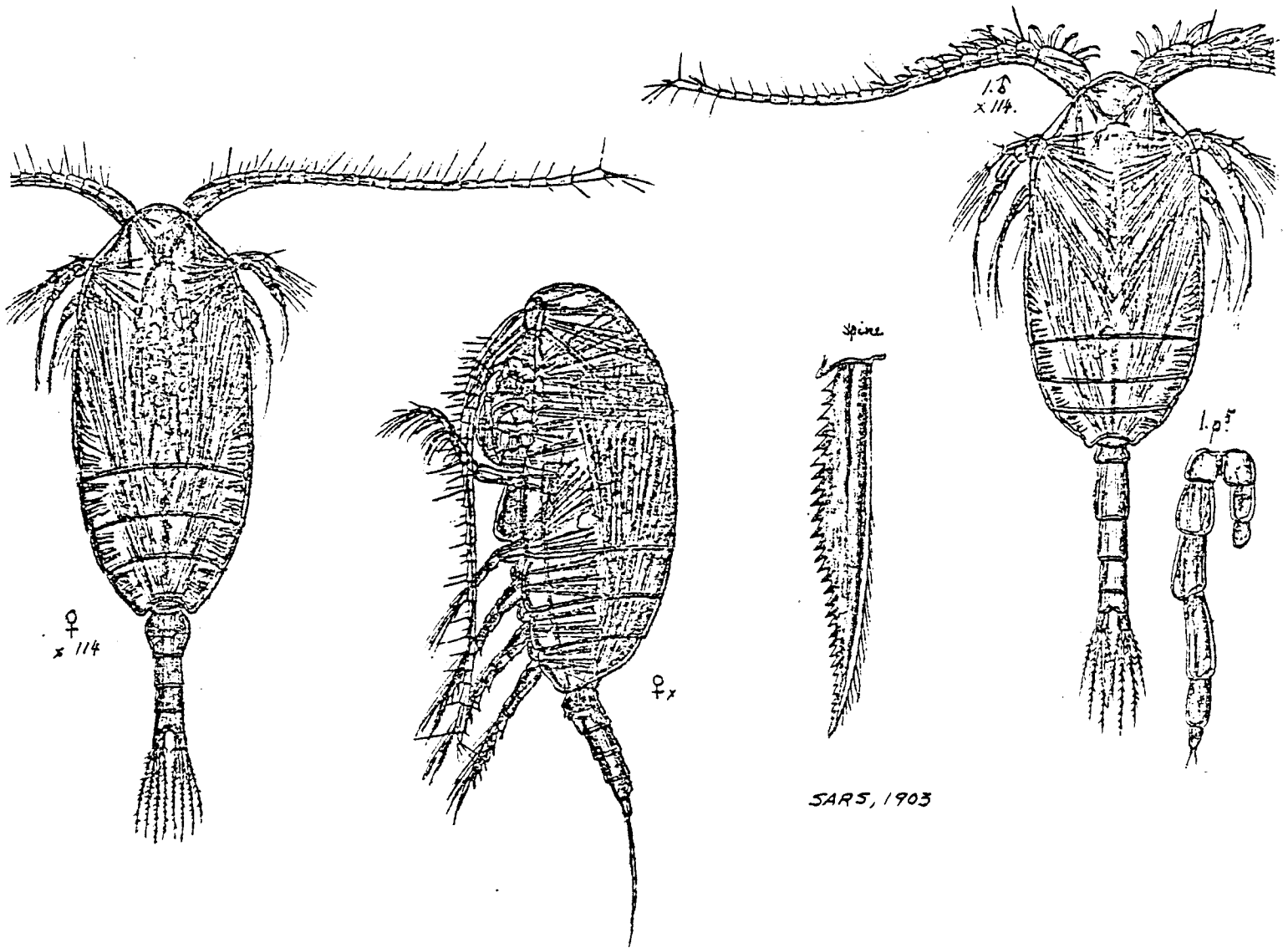
Geographical Range: M. pusillus is found in the northern parts of the Atlantic (Brodskii, 1967).

Ecology: No information.

Feeding Habits: No information.

Life History: No information.

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Ogilvie, 1953)	0.08	0.09	0.13	0.16	0.18	0.21
<u>COPEPODITE</u>						
Cephalothorax Lgth. (Conway & Minton, 1975)	0.20	0.23- 0.34	0.31- 0.34	0.37- 0.39	0.42- 0.51	0.48- 0.56
				0.34- 0.51	0.45- 0.51	0.48- 0.51



Nannocalanus minor (Claus)

Calanoida: Calanidae

Distinguishing Characteristics: N. minor has a broadly rounded fifth metasomal somite which partly overlaps the genital segment (Vervoort, 1951a).

Geographical Range: N. minor has been reported between 43°02'N and 10°15'N in the western North Atlantic (Grice and Hart, 1962).

Ecology: N. minor is an oceanic copepod (Colton, Temple and Honey, 1962).

Feeding Habits: N. minor is an herbivorous copepod (Arashkevich, 1969).

Life History: No information.

Total Length: Female: 1.75-2.0 mm
Male : 1.7-1.8 mm (Wilson, 1932)

PLATE XLIX Nannocalanus minor.

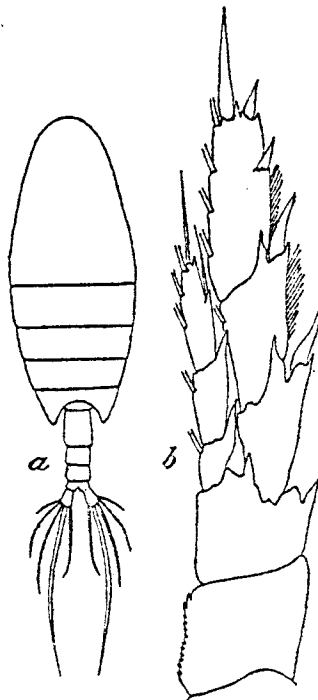


FIGURE 9.—Calanus minor: a, Female, dorsal; b, fifth leg

WILSON, 1932

Oithona similis Claus

Cyclopoida: Oithonidae

Distinguishing Characteristics: The urosome is at least three-fourths the length of the metasome. The arrangement of spines on the outer border of the exopod segment of the first four pairs of legs is characteristic, and is as follows: 1,1,2; 1,0,1; 1,0,1; 0,0,1 (Davis, 1949).

Geographical Range: O. similis has a worldwide distribution (Farran, 1911). Its distribution on the American coast appears to be largely centered north of Cape Cod (Fish, 1936b).

Ecology: O. similis is an oceanic species (Shuvalov, 1965). It is eurythermal and euryhaline (Farran, 1911).

Feeding Habits: O. similis is an herbivorous copepod (Mullen, 1967).

Life History: Propagation takes place from March through September in the Gulf of Maine. O. similis has a developmental period of 6 to 8 weeks. Mortality is greatest during the naupliar stages (Fish, 1936b).

STAGE	I	II	III	IV	V	VI
<u>NAUPLIUS</u>						
Total Length (mm) (Gibbons & Ogilvie, 1933)	0.115	0.130	0.140	0.165	0.190	0.215
<u>COPEPODITE</u>						
Cephalothorax Lgth. (mm) Conway & Minton, 1975)	0.16-	0.19-	0.27-	0.30-	0.34-	0.37- 0.66 ♀
	0.30	0.37	0.45	0.52	0.59	0.37- 0.59 ♂

PLATE L

Adult and naupliar stages of
Oithona similis.

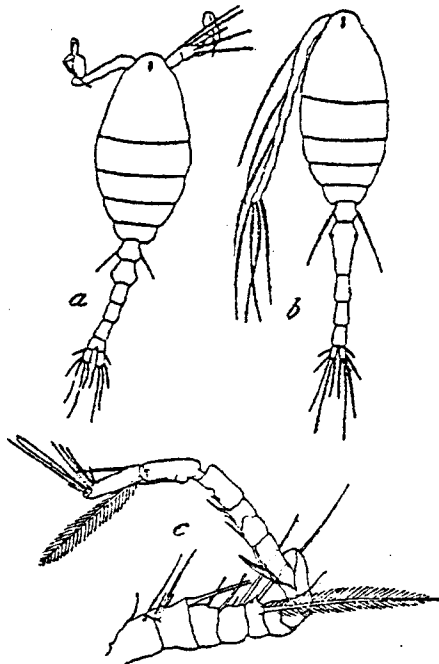
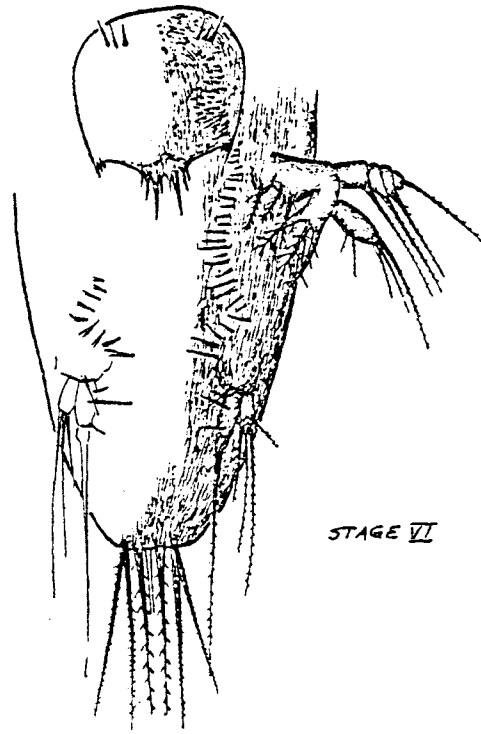


FIGURE 189.—*Oithona similis*: a, Male, dorsal;
b, female, dorsal; c, male, first antenna.
(From W. M. Wheeler)

WILSON, 1932



STAGE VI

GIBBONS & OGILVIE, 1933

Oithona spirostris Claus

Cyclopoida: Oithonidae

Distinguishing Characteristics: The females have a strong spiniform rostrum, which is absent in the males (Sars, 1918).

Geographical Range: O. spirostris has been reported between 42°N and 10°15'N (Owre and Foyo, 1967 from: Wilson, 1932 and Cervigon, 1963).

Ecology: O. spirostris is an oceanic species (Sars, 1918).

Feeding Habits: O. spirostris is an herbivorous copepod (Mullen, 1967).

Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Gibbons & Ogilvie, 1933)	0.13	0.15	0.17	0.20	0.23- 0.235	0.265- 0.270	
<u>COPEPODITE</u>							
Total Length (mm) (Wilson, 1932)	--	--	--	--	--	1.25- 1.4	♀
						0.75- 0.85	♂

PLATE LI Adult and naupliar stages of
Oithona spinirostris.

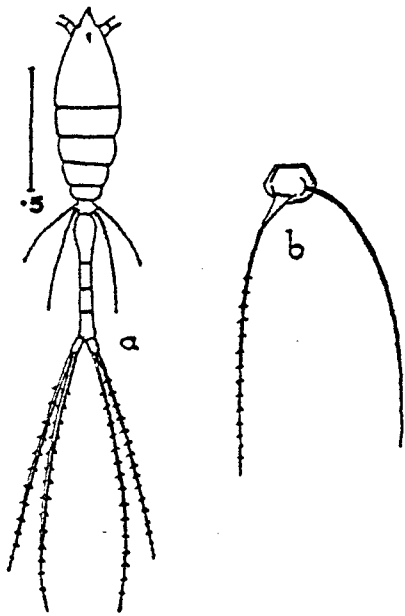
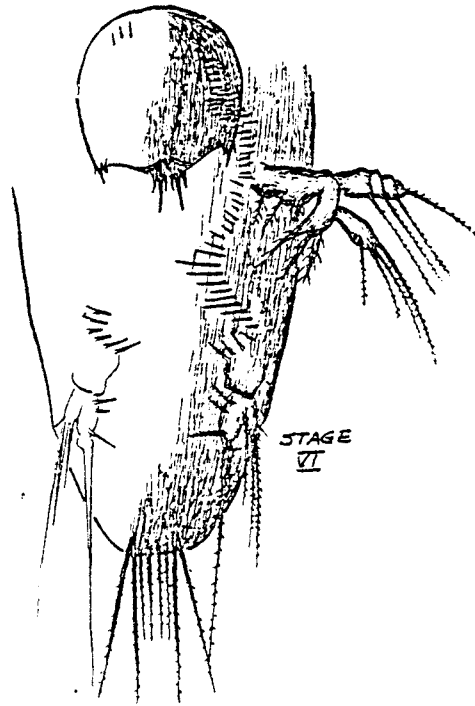


FIGURE 188.—*Oithona spinirostris*: a, Female, dorsal; b, female, fifth leg

WILSON, 1932



GIBBONS & OGILVIE, 1933

Oncaea venusta Philippi

Cyclopoida: Oncaeidae

Distinguishing Characteristics: The greatest width of the metasome is far in front of the center. The genital segment in the males is much enlarged (Wilson, 1932).

Geographical Range: O. venusta has been reported from 42°N to 8°04'N (Owre and Foyo, 1967 from: Wilson, 1932, 1950).

Ecology: O. venusta is a pelagic species (Wilson, 1932).

Feeding Habits: O. venusta is probably carnivorous (Mullen, 1967).

Life History: No information.

Total Length: Females: 1.1-1.27 mm
Males : 0.8-0.95 mm (Wilson, 1932)

PLATE LII Oncaea venusta.

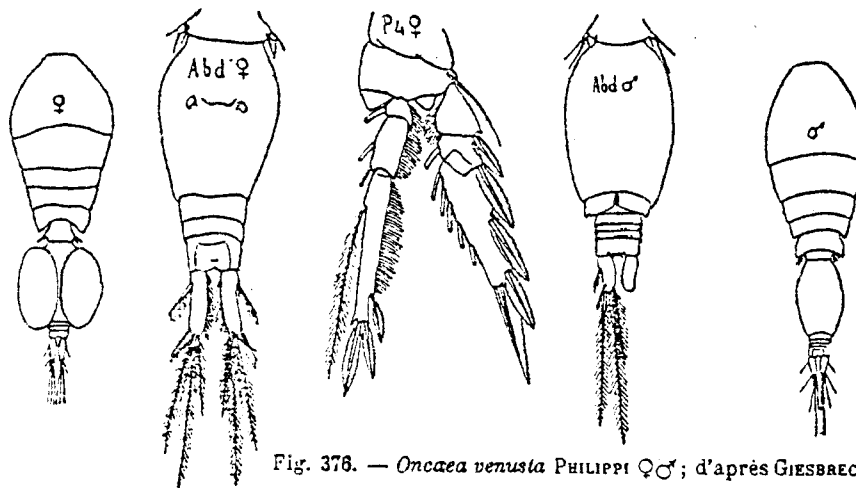


Fig. 378. — *Oncaea venusta* PHILIPPI ♀♂; d'après GIESBRECHT.

ROSE, 1933

Paracalanus crassirostris (Dahl)

Calanoida: Paracalanidae

Distinguishing Characteristics: P. crassirostris has no rostral filaments, which are present in P. parvus. P. crassirostris is much smaller than P. parvus (Lawson and Grice, 1973).

Geographical Range: Along the North American coast, P. crassirostris occurs from Cape Cod to the Gulf of Maine (Faber, 1966b).

Ecology: P. crassirostris is an estuarine and neritic species. It is eurythermal and euryhaline (Lawson and Grice, 1973).

Feeding Habits: P. crassirostris is an herbivorous copepod (Arashkevich, 1969).

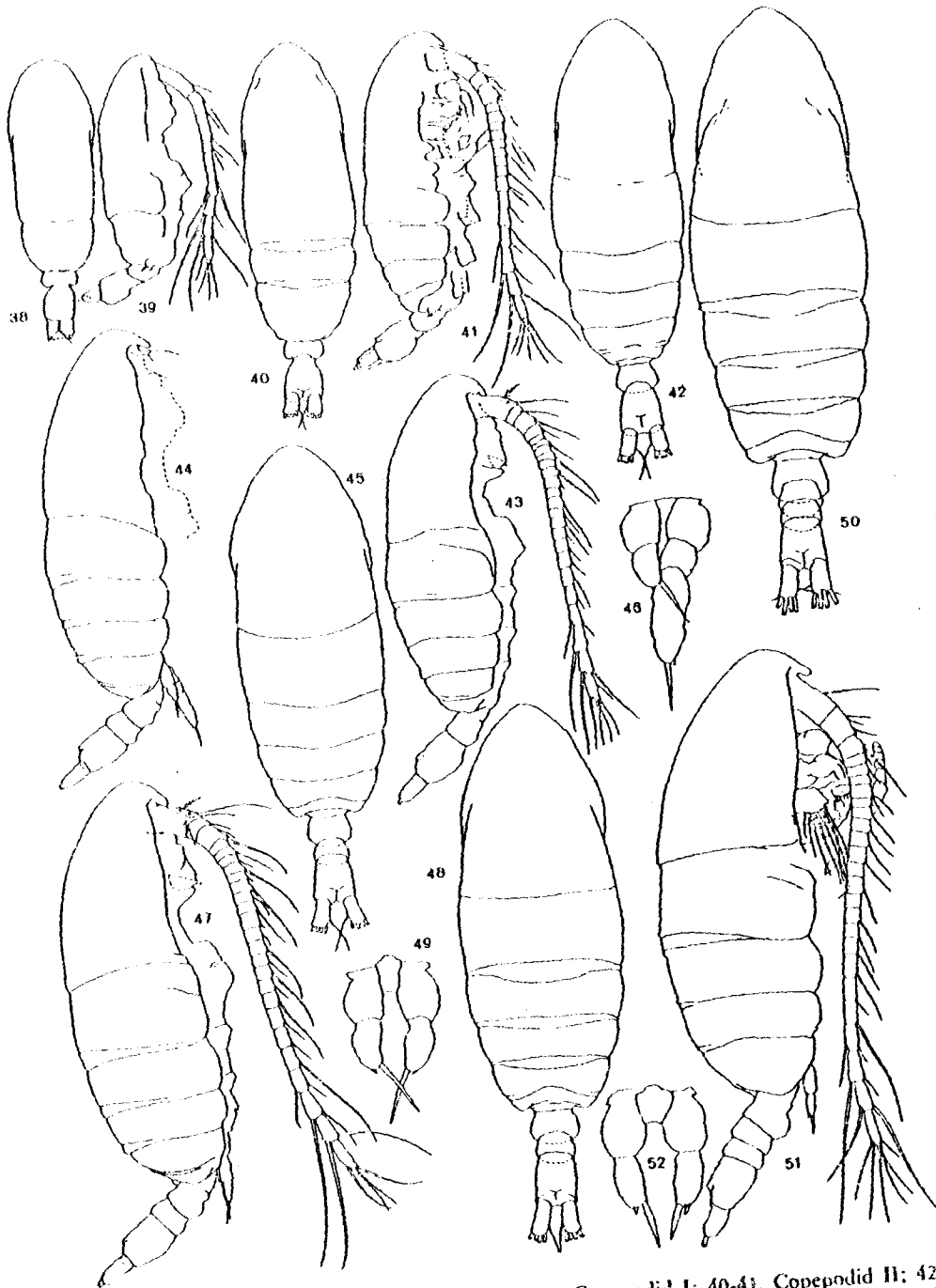
Life History: The nauplii of P. crassirostris are found in Narragansett Bay from August into December. Maximum numbers are present in August (Faber, 1966b).

EGG 0.06 mm diameter

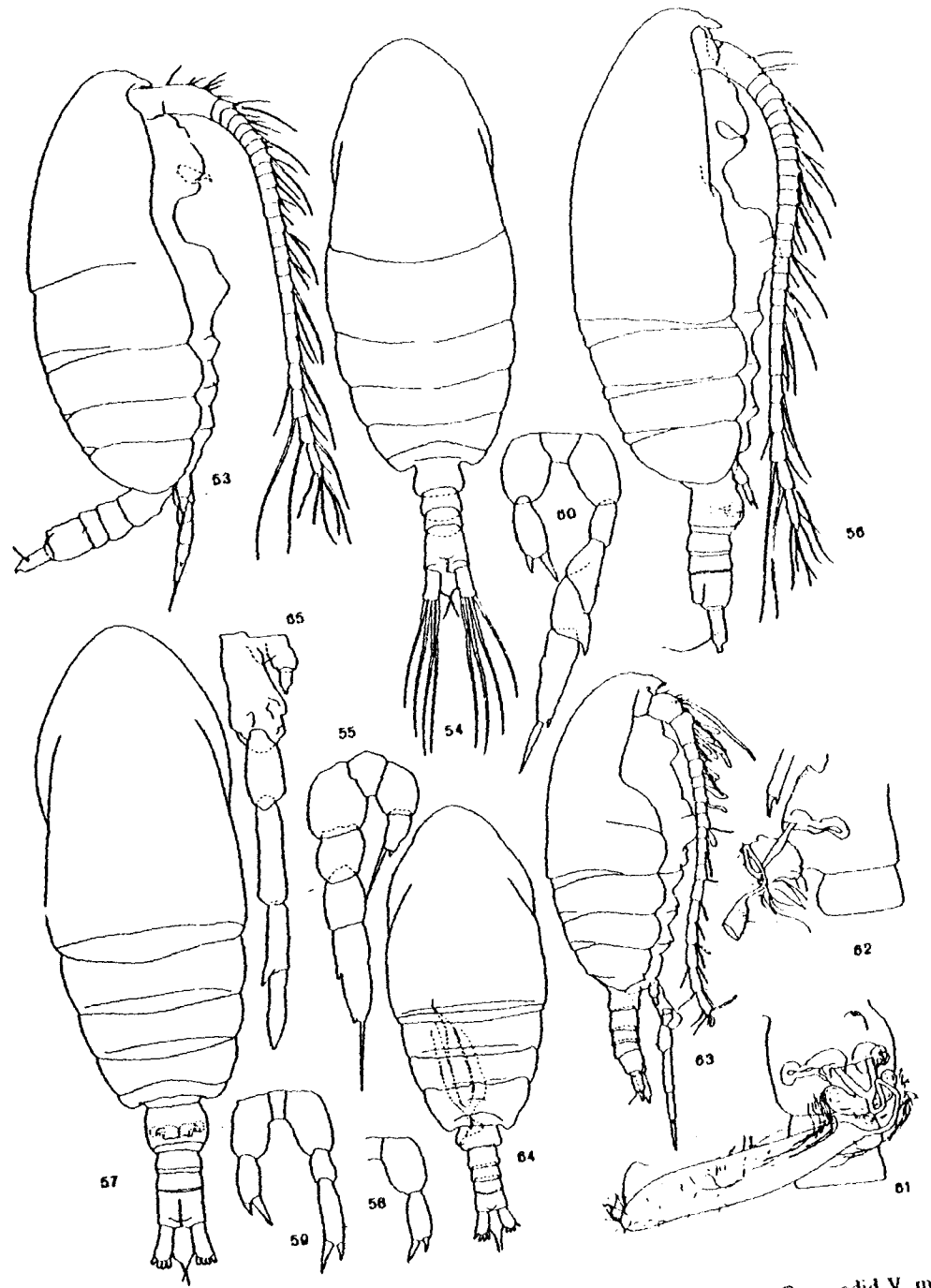
STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Lawson & Grice, 1973)	0.08	0.09	0.12	0.15	0.18	0.20	
<u>COPEPODITE</u>							
Total Length (mm) (Lawson & Grice, 1973)	0.26	0.34	0.40	0.43	0.47	0.56	♀
						0.46	♂

PLATE LIII

Adult and copepodite stages of
Paracalanus crassirostris.

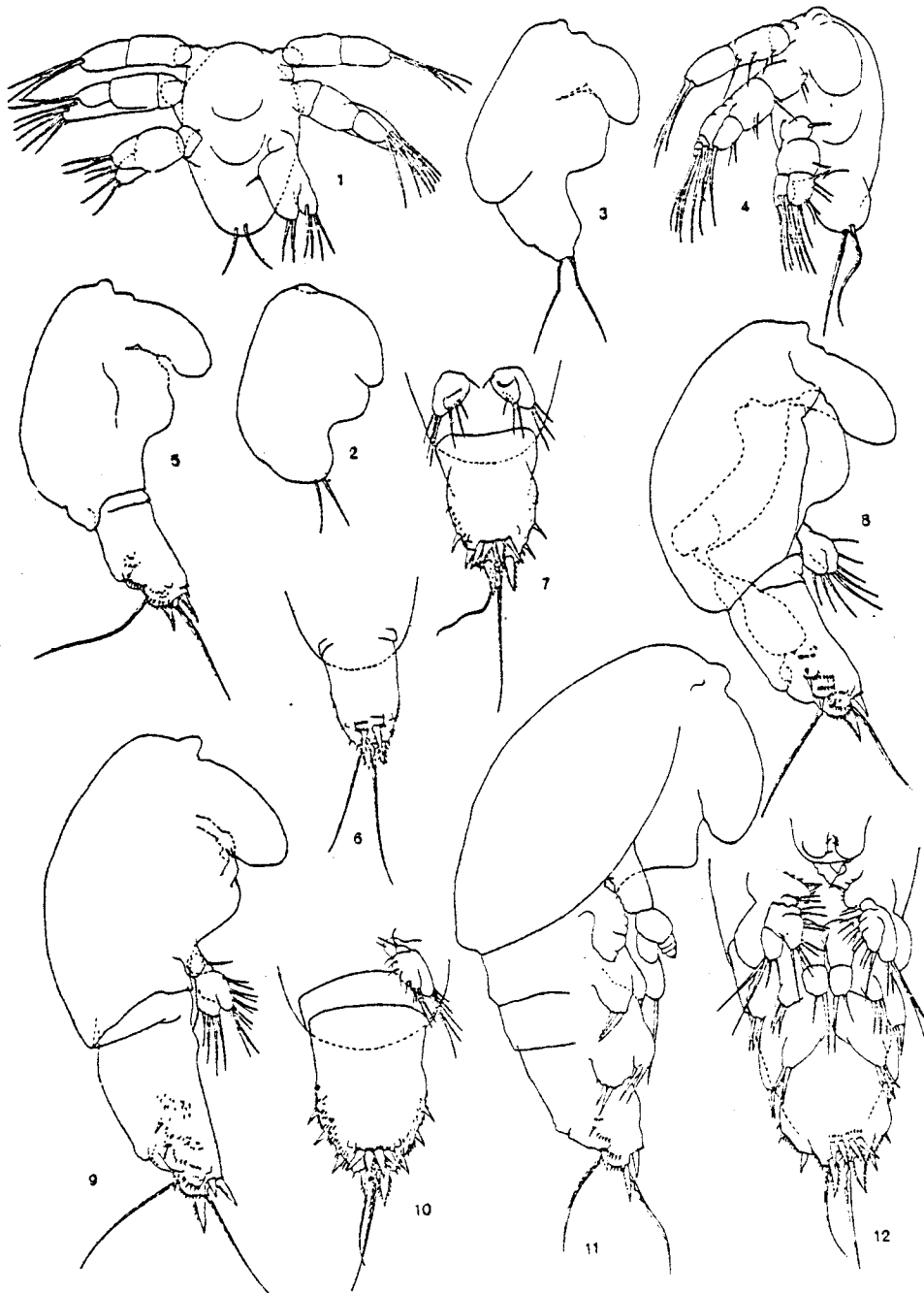


Figs. 38-52. *Paracalanus crassirostris* Dahl, 1894. 38-39, Copepodid I; 40-41, Copepodid II; 42-43, Copepodid III; 44-45, Copepodid IV, male; 46, Copepodid IV, male, fifth foot; 47-48, Copepodid IV, female; 49, Copepodid IV, female, fifth foot; 50-51, Copepodid V, female; 52, Copepodid V, female, fifth foot.



Figs. 53-65. *Paracalanus crassirostris* Dahl, 1894. 53-54, Copepodid V, male; 55, Copepodid V, male, fifth foot; 56-57, adult female; 58, adult female, fifth foot, abnormal; 59, adult female, fifth feet, abnormal; 60, adult female, fifth foot, abnormal; 61-62, spermatophore attached to genital segment; 63-64, adult male; 65, adult male, fifth foot. (Fig. 60 from specimen collected in Woods Hole Harbor; all other figures drawn from specimens reared in the laboratory.)

PLATE LIV Naupliar stages of Paracalanus crassirostris.



Figs. 1-12. *Paracalanus crassirostris* Dahl, 1894. 1-2, Nauplius I; 3-4, Nauplius II; 5-6, Nauplius III; 7-8, Nauplius IV; 9-10, Nauplius V; 11-12, Nauplius VI.

Paracalanus parvus Claus

Calanoida: Paracalanidae

Distinguishing Characteristics: The Paracalanidae can be distinguished from the Pseudocalanidae by the lack of serration on the terminal spine on the exopod of the swimming feet (Conway and Minton, 1975).

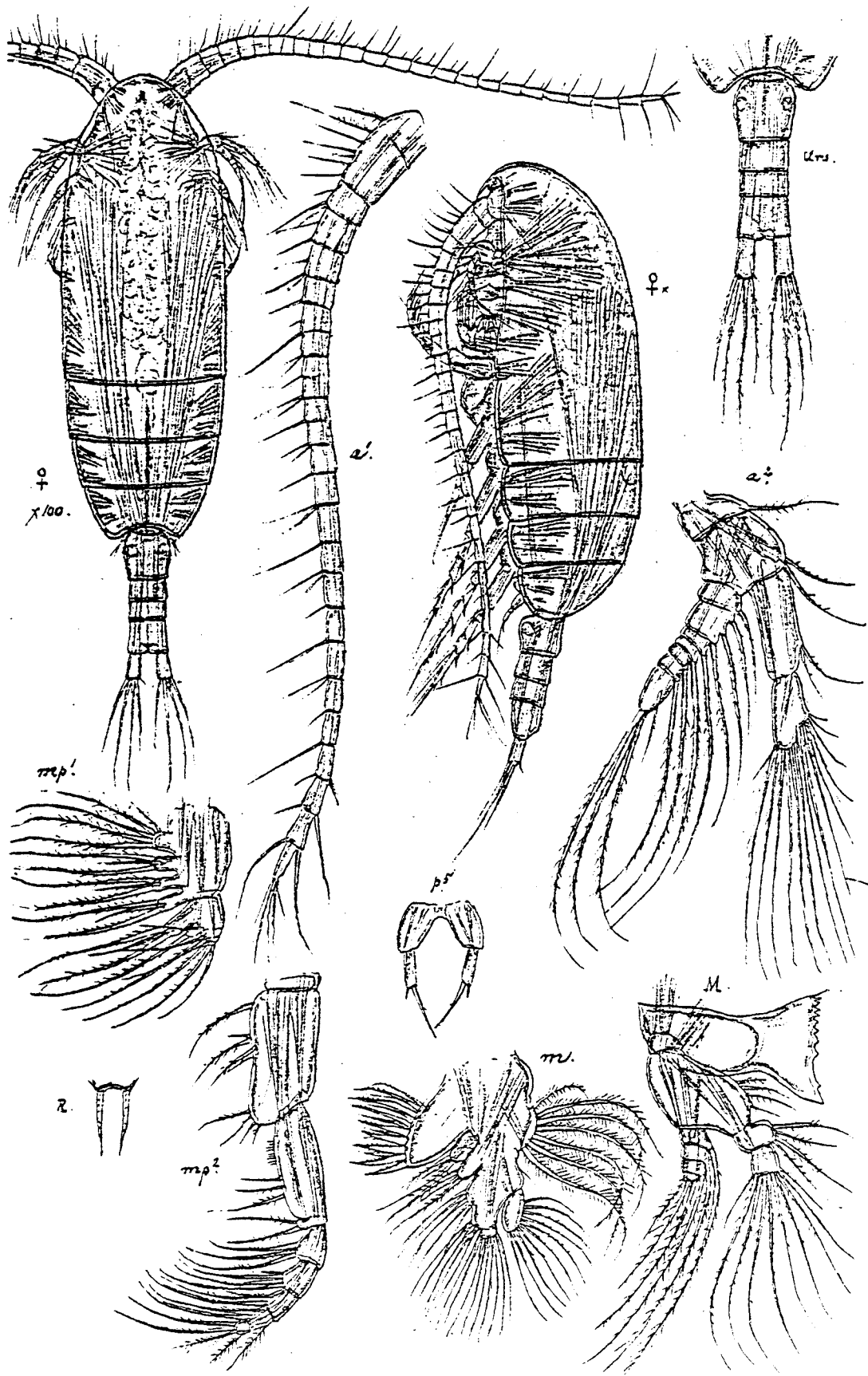
Geographical Range: P. parvus is cosmopolitan in temperate and tropical seas (Bigelow, 1926).

Ecology: P. parvus is neritic and oceanic. Its chief abundance is at depths of less than 100 meters. It is eurythermal and euryhaline (Bigelow, 1926).

Feeding Habits: P. parvus is an herbivorous copepod (Mullen, 1967).

Life History: P. parvus is a summer-fall species from the Gulf of Maine to Delaware Bay. It is found year-round from Delaware Bay to Florida (Deevey, 1960).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.09	0.105	0.16	0.21	0.24	0.25	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Conway & Minton, 1975)	0.25- 0.30	0.34- 0.37	0.37- 0.44	0.44- 0.53	0.52- 0.67	0.64- 0.75	♀
				0.49- 0.60	0.50- 0.78	0.73	♂



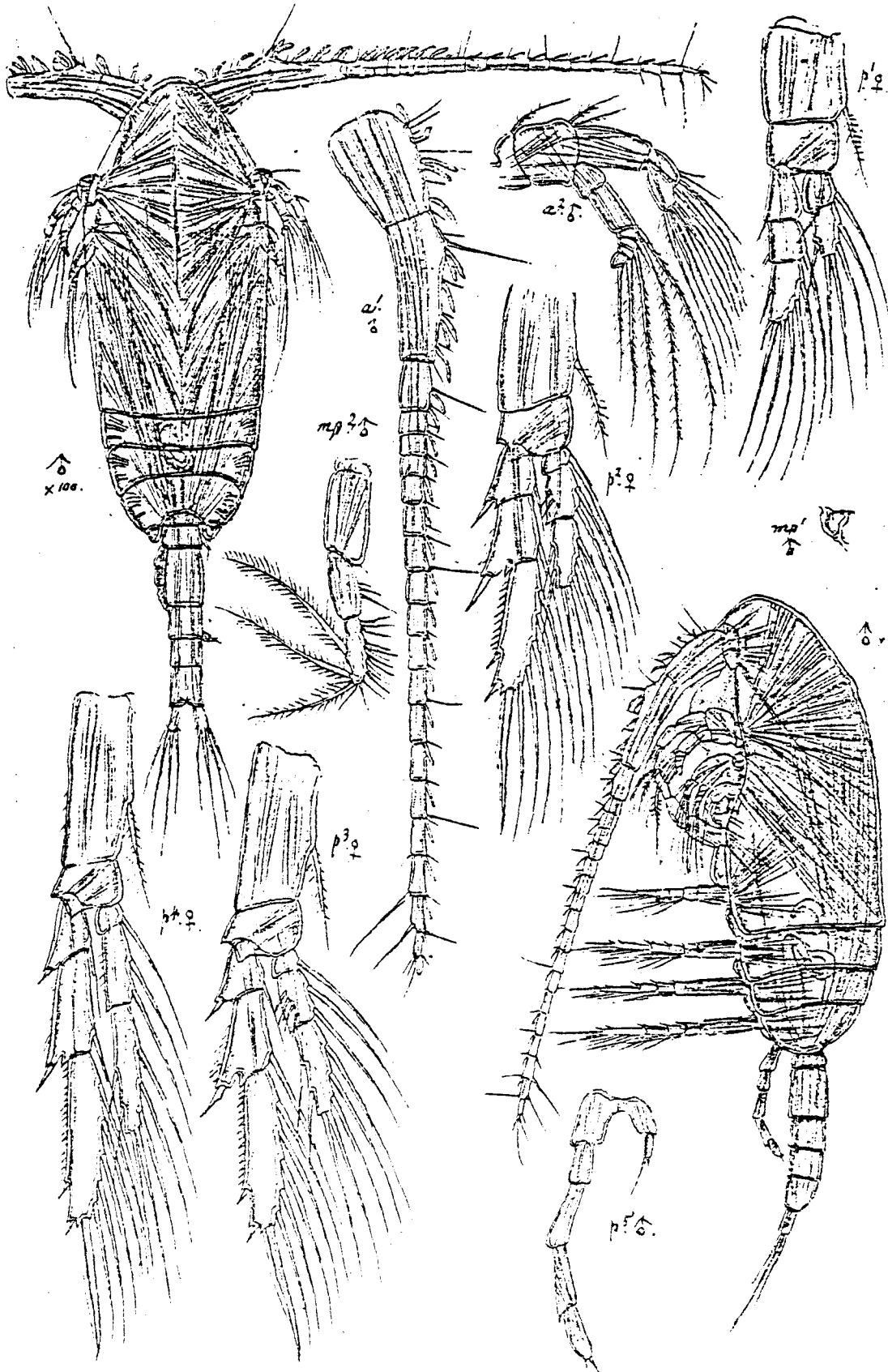
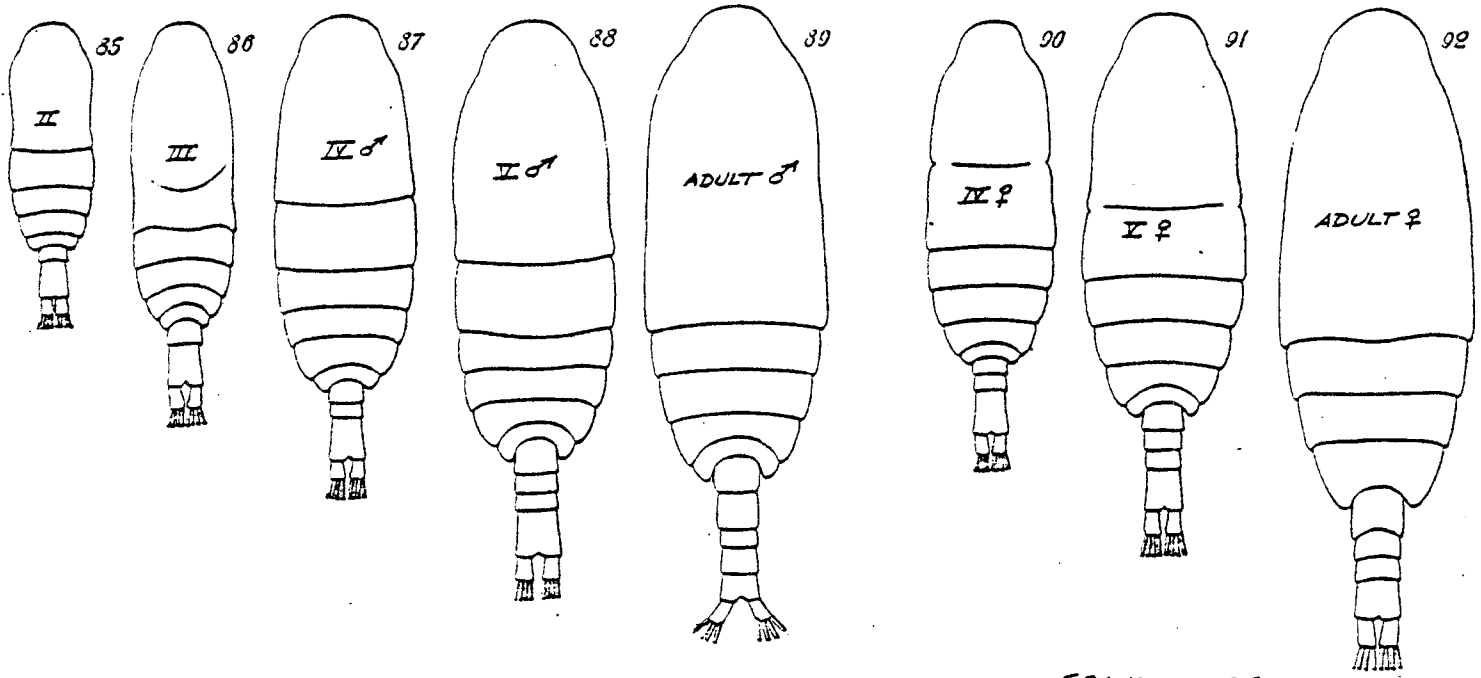
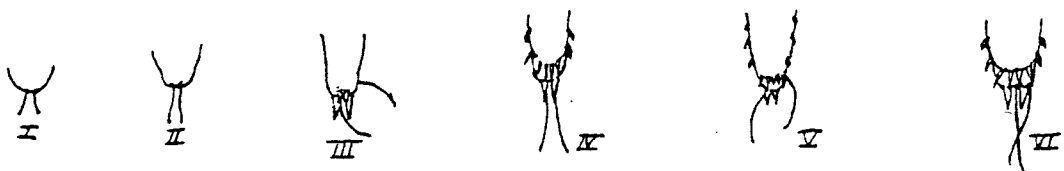


PLATE LVII Copepodite and naupliar stages of Paracalanus parvus.



GRANDORI, 1912



OGILVIE, 1956

Pleuromamma abdominalis (Lubbock)

Calanoida: Metridiidae

Distinguishing Characteristics: The proximal joints of the first antennae have two large and several small denticles on the anterior margin (Brodskii, 1967).

Geographical Range: P. abdominalis is widespread in tropical and temperate oceans (Bigelow, 1926). It occurs over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: P. abdominalis is a true oceanic species (Scott, 1911).

Feeding Habits: P. abdominalis is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 2.4-4.36 mm
Male : 2.68-4.3 mm (Brodskii, 1967)

PLATE LVIII Pleuromamma abdominalis.

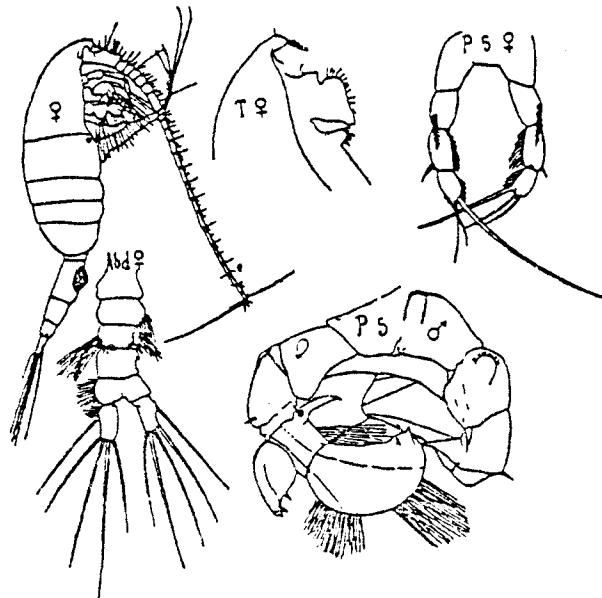


Fig. 206. — *Pleuromamma abdominalis* LUBBOCK, ♀♂; d'après G. O. Sars.

ROSE, 1933

Pleuromamma borealis (Dahl)

Calanoida: Metridiidae

Distinguishing Characteristics: The form of the fifth legs is the most distinguishing characteristic (Brodiskii, 1967).

Geographical Range: P. borealis is found in the Atlantic from 60°N to 55°S (Brodiskii, 1967).

Ecology: P. borealis is an oceanic bathypelagic species found at a depth of 200 to 1000 meters (Brodiskii, 1967).

Feeding Habits: P. borealis is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.67-2.46 mm
Male : 1.47-2.13 mm (Brodiskii, 1967)

PLATE LIX Pleuromamma borealis.

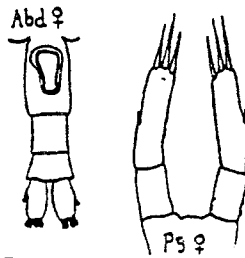


Fig. 209. — *Pleuromamma borealis* DAHL, ♀;
d'après FARRAN.

ROSE, 1933

Pleuromamma gracilis (Claus)

Calanoida: Metridiidae

Distinguishing Characteristics: The form of the fifth legs is the most distinguishing characteristic (Wilson, 1932).

Geographical Range: P. gracilis is widespread in tropical and temperate oceans (Bigelow, 1926). It has been found over the Great South Channel between Georges Bank and Cape Cod, the Eastern Channel between Georges and Browns Banks, and the southern part of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: P. gracilis is a true oceanic species (Scott, 1911). It is bathypelagic, mainly at depths from 100 to 500 meters (Brodskii, 1967).

Feeding Habits: P. gracilis is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.5-2.0 mm
Male : 1.5-1.85 mm (Wilson, 1932)

PLATE LX Pleuromamma gracilis.

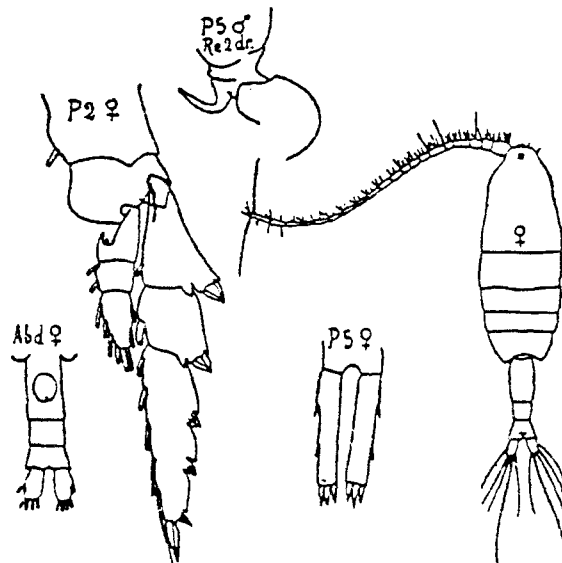


Fig. 208. — Pleuromamma gracilis CLAUD, ♀♂;
d'après GIESBRECHT.

ROSE, 1933

Pleuromamma robusta (Dahl)

Calanoida: Metridiidae

Distinguishing Characteristics: The large size and the form of the fifth legs are distinguishing characteristics (Wilson, 1932).

Geographical Range: P. robusta is widespread in tropical and temperate oceans (Bigelow, 1926). It has been found over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: P. robusta is a true oceanic species. It is found from the surface down to about 1500 meters (Scott, 1911).

Feeding Habits: P. robusta is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 4.0-4.5 mm
Male : 3.0-3.5 mm (Wilson, 1932)

Pleuromamma gracilis (Claus)

Calanoida: Metridiidae

Distinguishing Characteristics: The form of the fifth legs is the most distinguishing characteristic (Wilson, 1932).

Geographical Range: P. gracilis is widespread in tropical and temperate oceans (Bigelow, 1926). It has been found over the Great South Channel between Georges Bank and Cape Cod, the Eastern Channel between Georges and Browns Banks, and the southern part of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: P. gracilis is a true oceanic species (Scott, 1911). It is bathypelagic, mainly at depths from 100 to 500 meters (Brodskii, 1967).

Feeding Habits: P. gracilis is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 1.5-2.0 mm
Male : 1.5-1.85 mm (Wilson, 1932)

PLATE LX Pleuromamma gracilis.

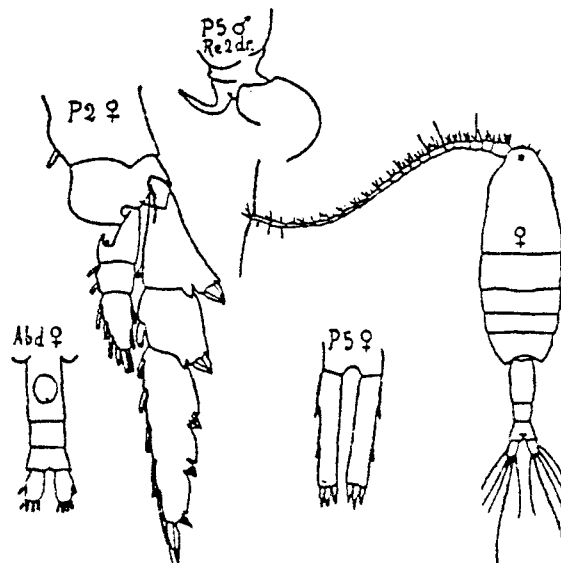


Fig. 208. — Pleuromamma gracilis CLAUS, ♀♂;
d'après GIESBRUCHT.

ROSE, 1933

Pleuromamma robusta (Dahl)

Calanoida: Metridiidae

Distinguishing Characteristics: The large size and the form of the fifth legs are distinguishing characteristics (Wilson, 1932).

Geographical Range: P. robusta is widespread in tropical and temperate oceans (Bigelow, 1926). It has been found over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

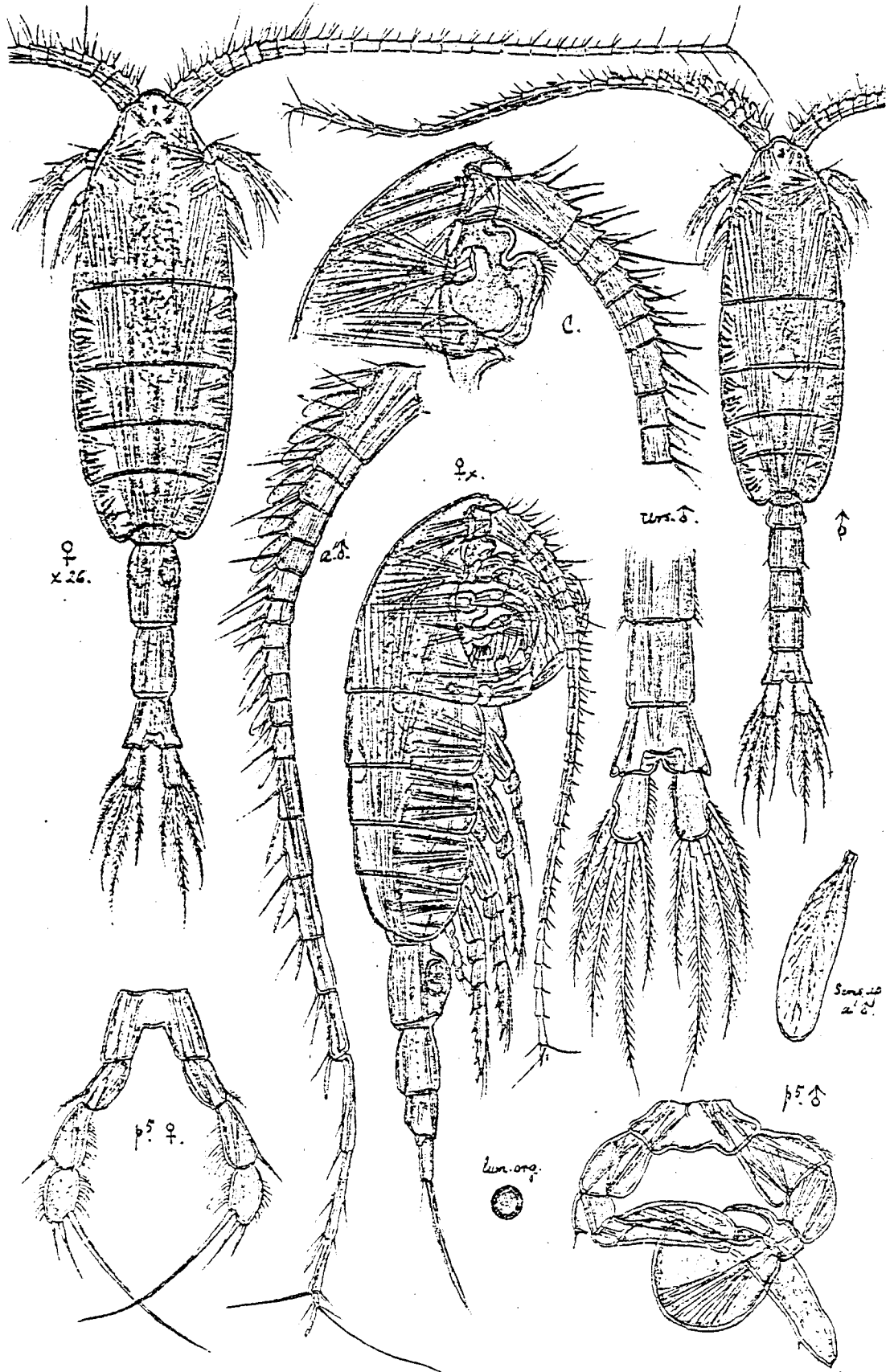
Ecology: P. robusta is a true oceanic species. It is found from the surface down to about 1500 meters (Scott, 1911).

Feeding Habits: P. robusta is an omnivorous copepod (Mullen, 1967).

Life History: No information.

Total Length: Female: 4.0-4.5 mm
Male : 3.0-3.5 mm (Wilson, 1932)

PLATE LXI Pleuromamma robusta.



Pseudocalanus minutus Kröyer

Calanoida: Pseudocalanidae

Distinguishing Characteristics: In the Pseudocalanidae, the terminal spine on the exopod of all swimming feet but the first is serrated. In the Paracalanidae, this character is not found. Fifth legs are lacking in P. minutus females (Conway and Minton, 1975).

Geographical Range: P. minutus is a northern species. It is widespread in the North Atlantic and in the Arctic, where it is circumpolar (Bigelow, 1926). It is found as far south as Cape Hatteras (Faber, 1966b).

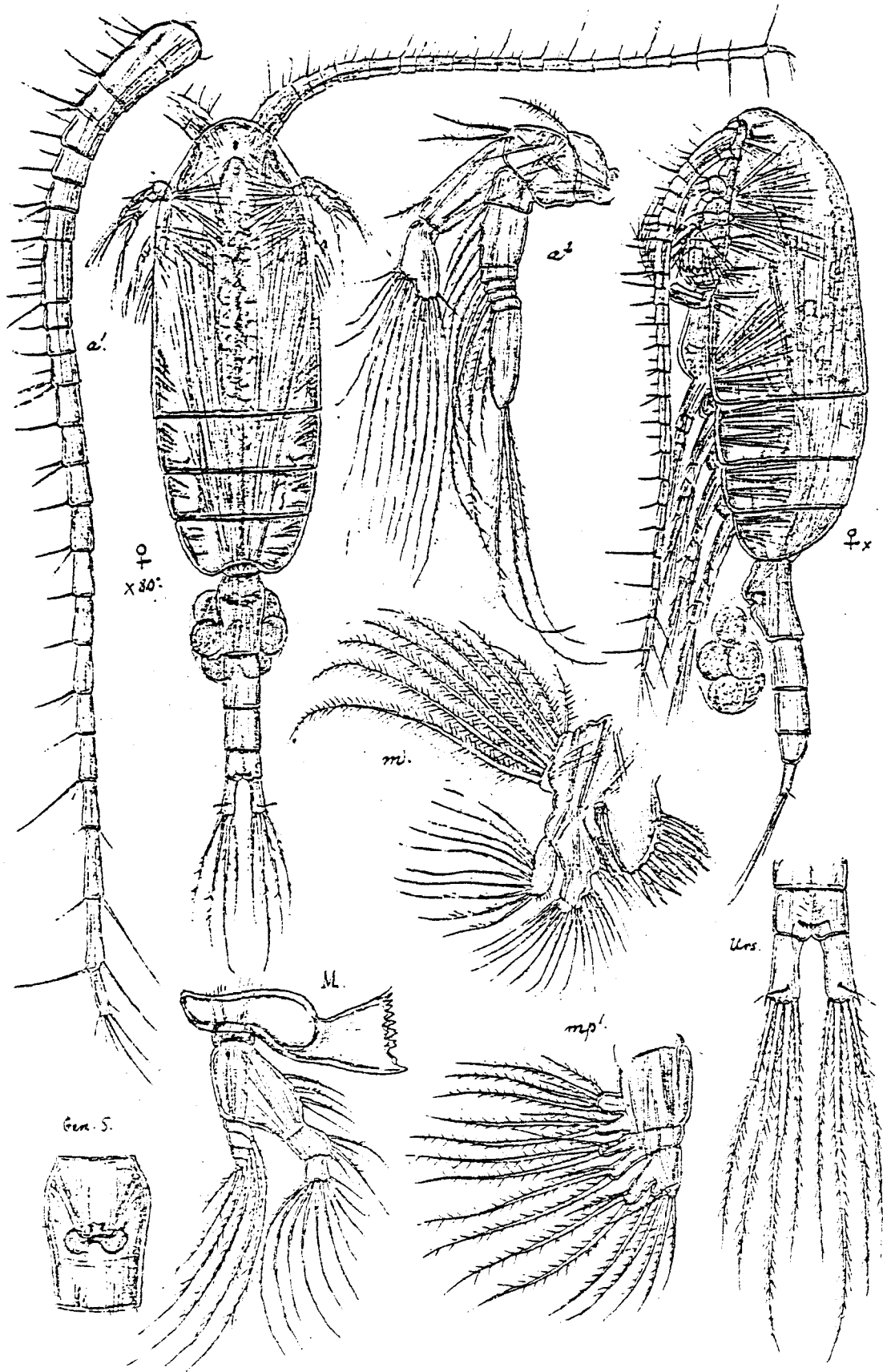
Ecology: P. minutus is neritic and oceanic (Fish, 1936c). Its chief abundance is above 200 meters. It is eurythermal and euryhaline (Bigelow, 1926).

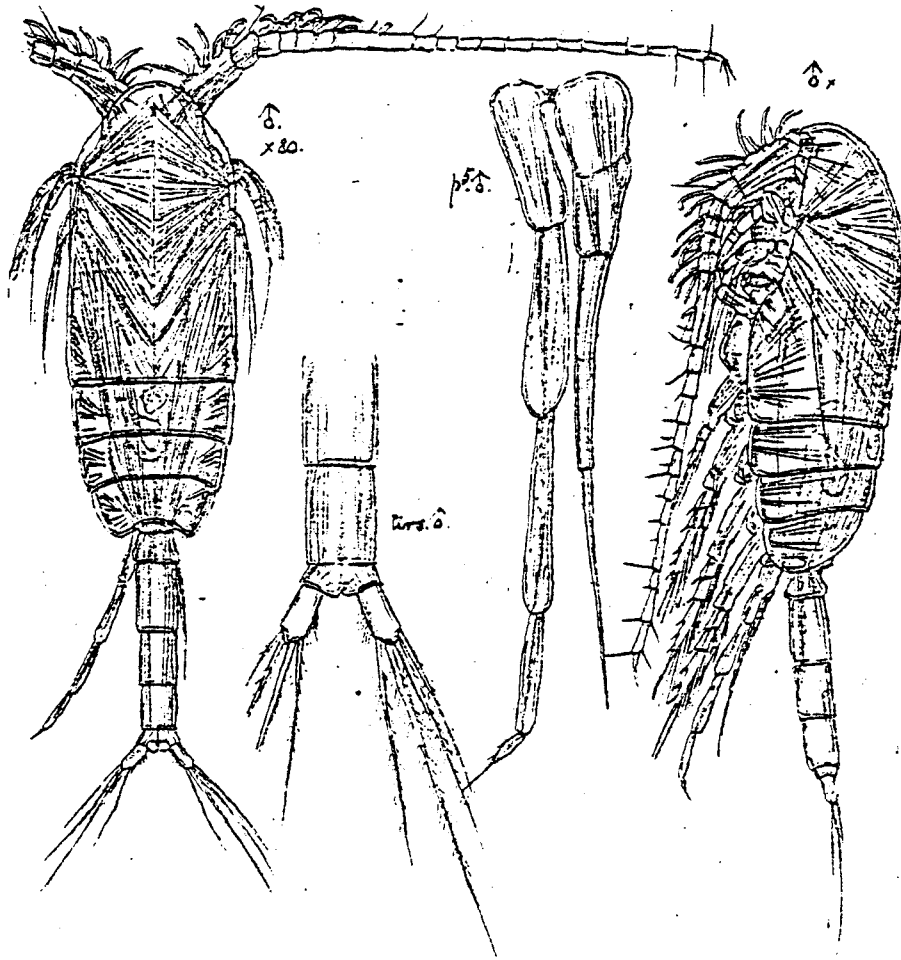
Feeding Habits: P. minutus is an herbivorous copepod (Mullen, 1967).

Life History: P. minutus occurs year-round from the Gulf of St. Lawrence to Cape Cod. It is a winter-spring species from Cape Cod to Chesapeake Bay (Deevey, 1960). Propagation begins in March and continues through September in the Gulf of Maine. P. minutus has a developmental period of 8 weeks. Mortality is highest among the naupliar stages (Fish, 1936c). It is most abundant in summer in the Gulf of Maine (Sherman, 1963).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.176	0.187	0.26	0.33	0.38	0.44	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Conway & Minton, 1975)	0.31-	0.48-	0.59-	0.65- 0.79	0.79- 0.93	0.65- 1.15	♀
	0.45	0.53	0.70	0.67- 0.84	0.73- 0.90	0.73- 0.84	♂

PLATE LXII Pseudocalanus minutus adult female.





SARS, 1903



OBILVIE, 1956

Pseudodiaptomus coronatus Williams

Calanoida: Diaptomidae

Distinguishing Characteristics: This species can be recognized by the form of the fifth legs, and the asymmetry of the urosome in the females (Wilson, 1932).

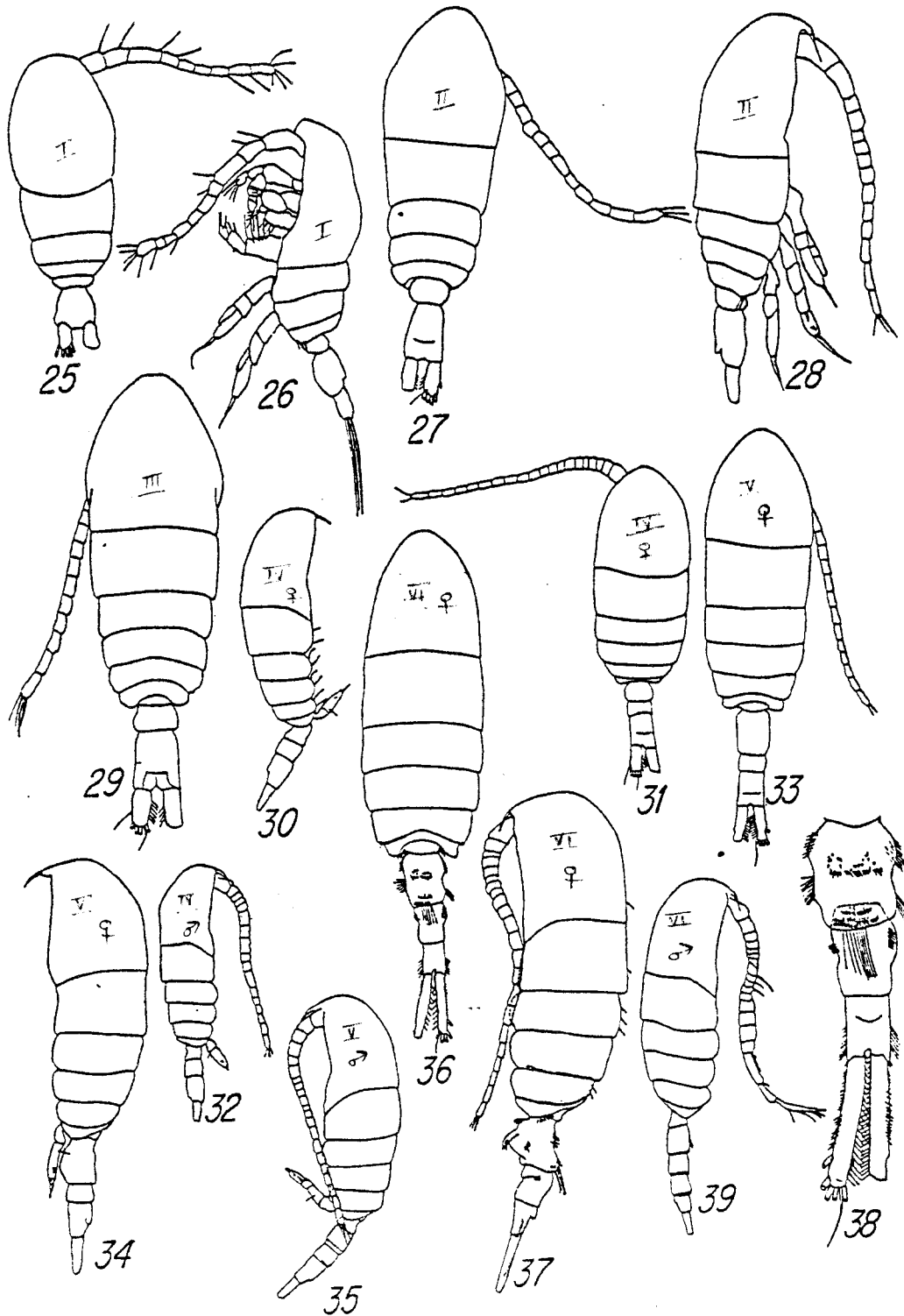
Geographical Range: Along the North American coast, P. coronatus has been reported from the Gulf of St. Lawrence to the Gulf of Mexico (Faber, 1966b).

Ecology: P. coronatus is predominantly estuarine and coastal (Grice, 1969). It has been found at temperatures from -0.65° to 25.3°C, and it is euryhaline (Deevey, 1960).

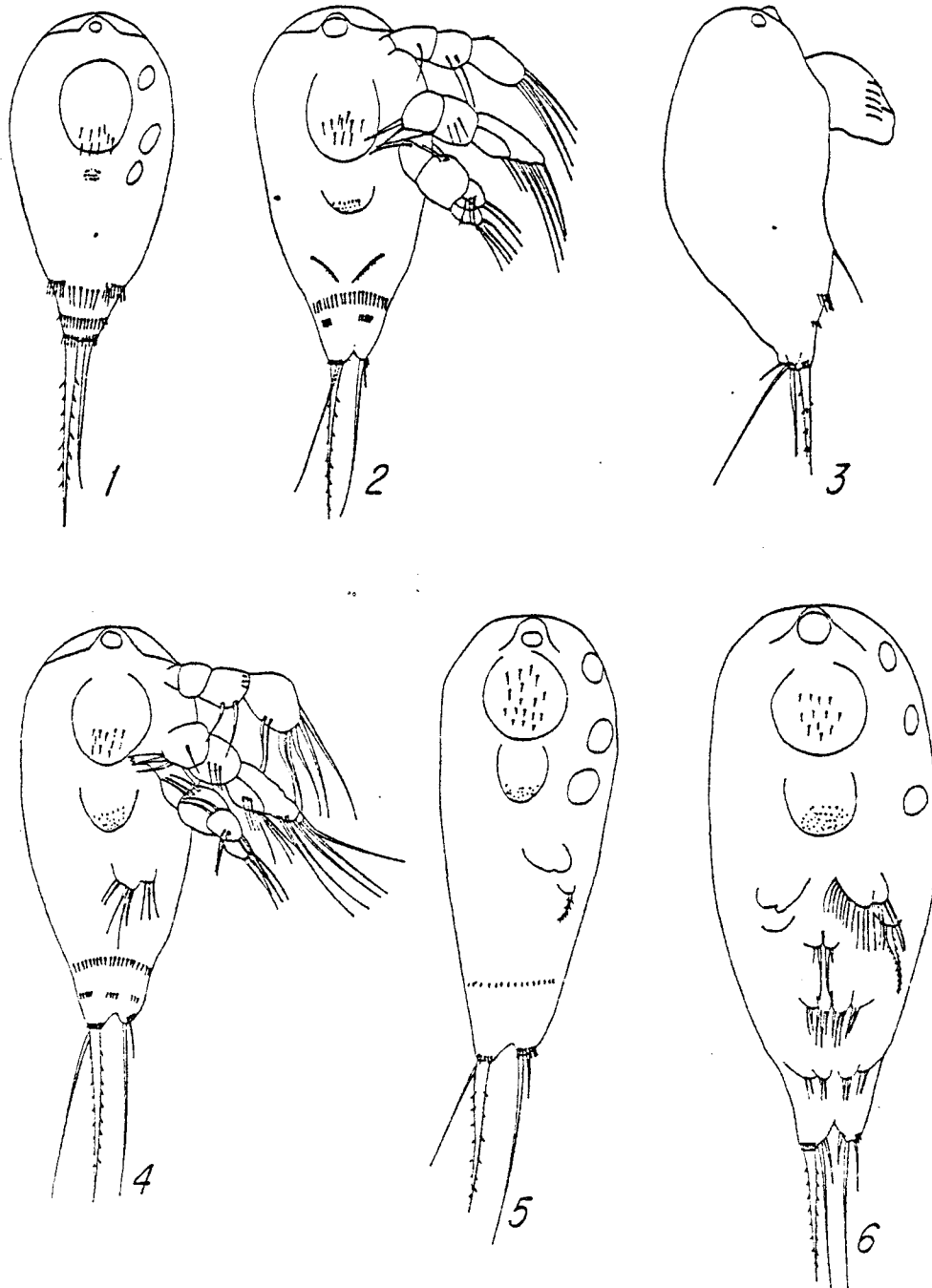
Feeding Habits: No information.

Life History: P. coronatus is a summer-fall species from Cape Cod to Florida. It is found year-round in Delaware Bay (Deevey, 1960). The egg hatches directly into a stage II nauplius (Grice, 1969). The nauplii have been recorded in Narragansett Bay from July through October, with maximum numbers in August (Faber, 1966b).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Grice, 1969)	--	0.20	0.22	0.26	0.30	0.36	
<u>COPEPODITE</u>							
Total Length (mm) (Grice, 1969)	0.44-	0.54-	0.66-	0.85-	1.16-	1.38-	♀
	0.52	0.62	0.74	0.98	1.24	1.48	
				0.78-	0.84-	0.94-	♂
				0.82	0.94	1.02	



Figs. 25-39. *Pseudodiaptomus coronatus*. 25, Copepodid Stage I, dorsal; 26, lateral; 27, Copepodid Stage II, dorsal; 28, lateral; 29, Copepodid Stage III, dorsal; 30, Copepodid Stage IV, female, lateral; 31, Copepodid Stage IV, female, dorsal; 32, Copepodid Stage IV, male, lateral; 33, Copepodid Stage V, female, dorsal; 34, Copepodid Stage V, female, lateral; 35, Copepodid Stage V, male, lateral; 36, adult female, dorsal; 37, adult female, lateral; 38, urosome, adult female, dorsal; 39, adult male, lateral.



Figs. 1-6. *Pseudodiaptomus coronatus*. 1, Nauplius Stage II, ventral; 2, Nauplius Stage III, ventral; 3, Nauplius Stage III, lateral; 4, Nauplius Stage IV, ventral; 5, Nauplius Stage V, ventral; 6, Nauplius Stage VI, ventral. (Some appendages omitted in figs. 1, 3, 5 and 6).

Rhincalanus cornutus (Dana)

Calanoida: Eucalanidae

Distinguishing Characteristics: The anterior projection of the head is anchor-shaped, leaving the rostral filaments visible dorsally. The fifth leg of the female has one seta on the third segment, and none on the second segment. The right fifth leg of the male has a straight claw (Wilson, 1932).

Geographical Range: R. cornutus occurs as a stray in the Gulf of Maine (Bigelow, 1926). It has been found in the Great South Channel between Georges Bank and Cape Cod, the Eastern Channel between Georges and Browns Bank, and the southern part of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: R. cornutus is an oceanic species (Bigelow, 1926).

Feeding Habits: R. cornutus is an herbivorous copepod (Itoh, 1970).

Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Gurney, 1934)	--	0.45- 0.47	0.65- 0.70	1.0	1.2	1.33	
<u>COPEPODITE</u>							
Total Length (mm) (Wilson, 1932)	--	--	--	--	--	3.5- 3.75	♀
						2.5- 2.75	♂

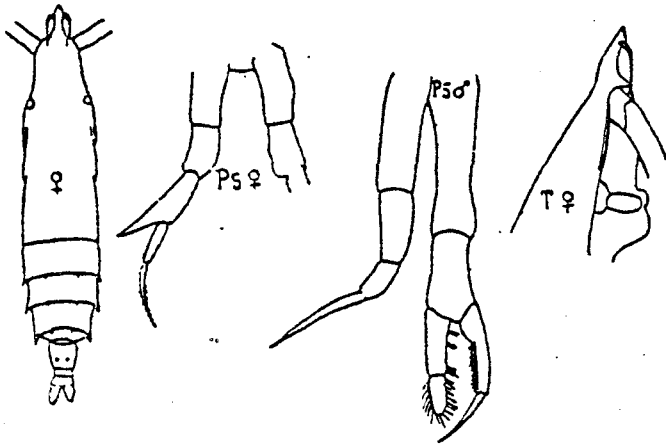
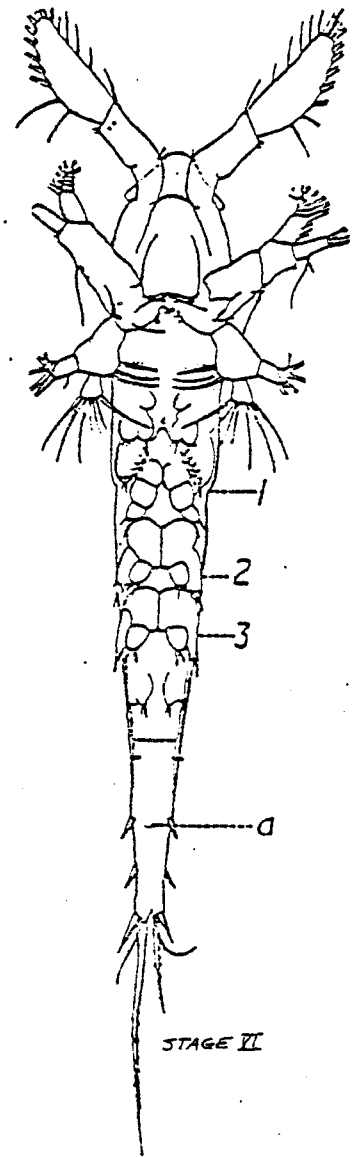


Fig. 23. — *Rhincalanus cornutus* DANA, ♀♂; d'après GIESBRECHT.

ROSE, 1933



GURNEY, 1934

Rhincalanus nasutus Giesbrecht

Calanoida: Eucalanidae

Distinguishing Characteristics: The anterior projection of the head is conical, concealing the rostral filaments. The fifth leg of the female has one seta on the second segment and three setae on the third segment. The right fifth leg of the male is tipped with a curved claw (Wilson, 1932).

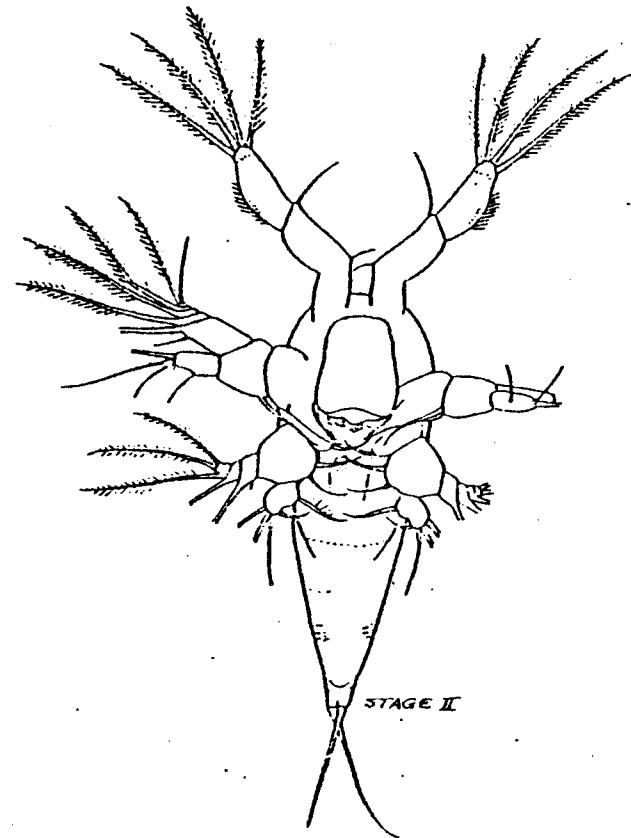
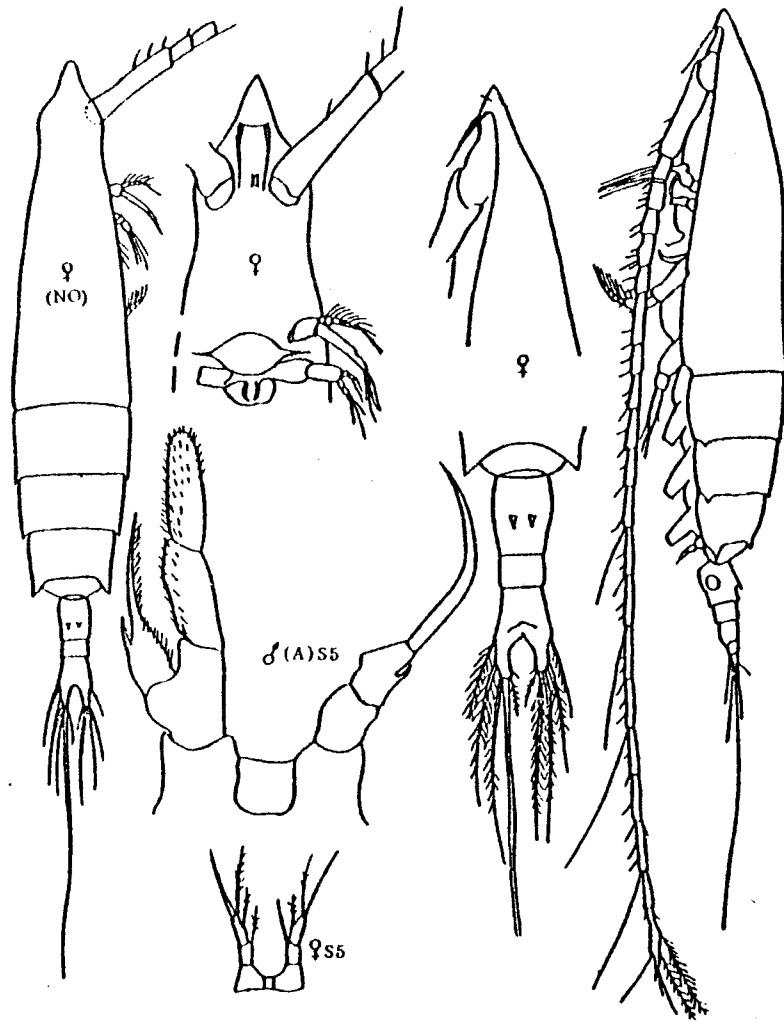
Geographical Range: R. nasutus is widespread in the North Atlantic (Brodskii, 1967). It has been found over deep water along the southern edge of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: R. nasutus is an oceanic species (Bigelow, 1926). It is found from the surface down to 1800 meters (Farran, 1911).

Feeding Habits: R. nasutus is an herbivorous copepod (Mullen, 1967).

Life History: No information.

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Gurney, 1934)	--	0.46	0.68	0.85	1.0	1.16	
<u>COPEPODITE</u>							
Total Length (mm) (Wilson, 1932)	--	--	--	--	--	4.0- 5.5	♀
						3.0- 4.0	♂



GURNEY, 1934

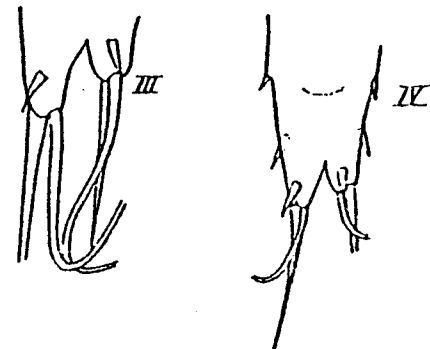


FIGURE 32. *Rhincalanus nasutus* Giesbrecht (after Sars, 1903: male S5 after Giesbrecht, 1892)

BRODSKII, 1967

Scolecithrix danae (Lubbock)

Calanoida: Scolecithricidae

Distinguishing Characteristics: The shovel-shaped protuberance on the genital segment of the female and the form of the fifth legs in the male are the most distinguishing characteristics (Wilson, 1932).

Geographical Range: S. danae has been found over Georges Bank, Browns Bank and the southern part of the Gulf of Maine (Colton, Temple and Honey, 1962).

Ecology: S. danae is an oceanic species (Colton, Temple and Honey, 1962).

Feeding Habits: S. danae is an omnivorous copepod (Arashkevich, 1969).

Life History: No information.

Total length: Female: 2.0-2.25 mm
Male : 1.85-2.15 mm (Wilson, 1932)

PLATE LXVIII Scolecithrix danae.

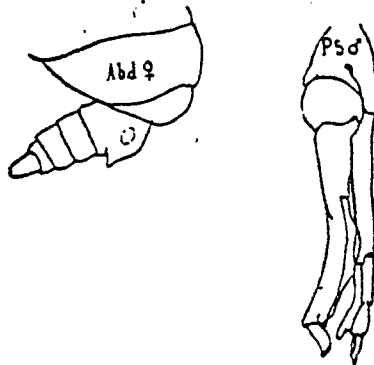


Fig. 457. — *Scolecithrix Danae* LUBBOCK, ♀♂; d'après GIESBRECHT.

ROSE, 1933

Temora longicornis Müller

Calanoida: Temoridae

Distinguishing Characteristics: T. longicornis has a characteristic diamond-shaped metasome when viewed dorsally, and a humpback when viewed laterally. The caudal rami are very long (Conway and Minton, 1975).

Geographical Range: T. longicornis is distributed all across the Continental shelf from the Gulf of St. Lawrence to Chesapeake Bay (Bigelow, 1926).

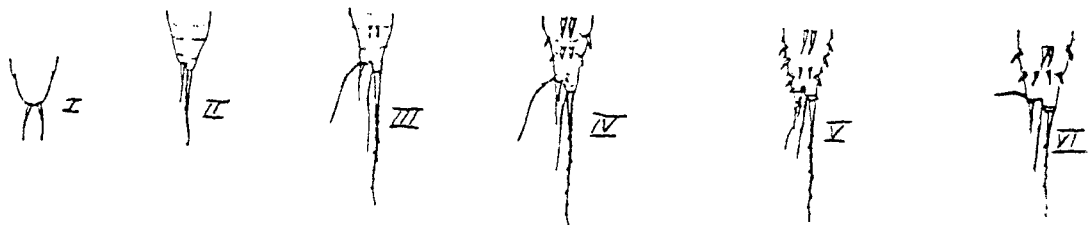
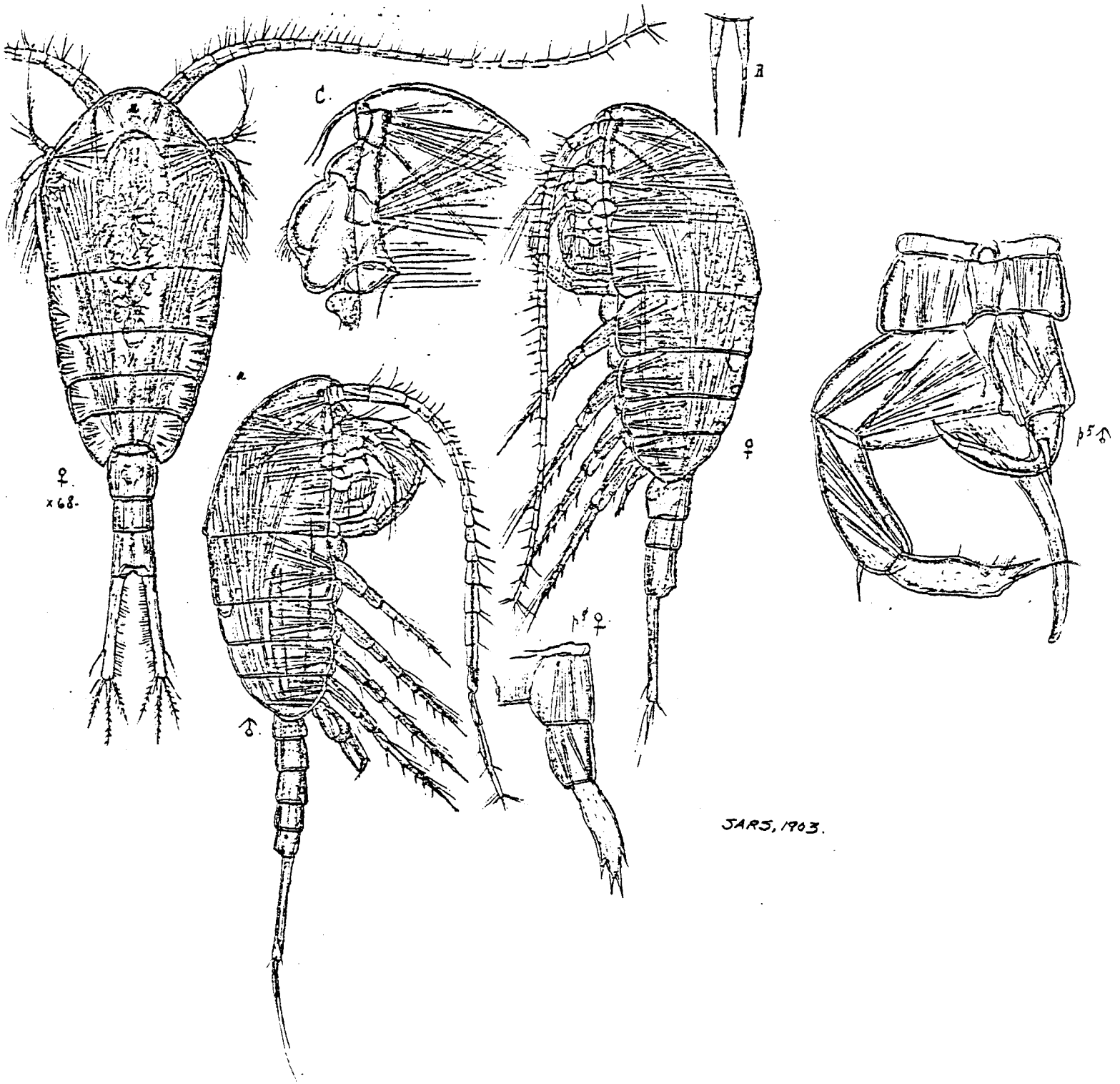
Ecology: T. longicornis is a littoral and neritic species (Bigelow and Sears, 1939). Its zone of greatest abundance is above 50 meters. It is eurythermal and euryhaline (Bigelow, 1926).

Feeding Habits: T. longicornis is an omnivorous copepod (Mullen, 1967).

Life History: T. longicornis is a summer-fall species in the Gulf of Maine. It is found year-round from the Gulf of Maine to Cape Cod, and it is a winter-spring species from Cape Cod to Delaware Bay (Deevey, 1960). The greatest mortality occurs during the naupliar stages (Harris and Paffenhofer, 1976).

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Ogilvie, 1953)	0.112	0.16	0.21	0.26	0.32	0.38	
<u>COPEPODITE</u>							
Cephalothorax Lgth. (mm) (Conway & Minton, 1975)	0.31- 0.34	0.37- 0.42	0.42- 0.51	0.53- 0.70	0.76- 0.87	0.93- 1.10	♀
				0.59- 0.70	0.62- 0.70	0.70- 0.93	♂

PLATE LXIX Adult and naupliar stages of Temora longicornis.



Tortanus discaudatus (Thompson and Scott)

Calanoida: Tortanidae

Distinguishing Characteristics: In both sexes, the caudal rami are highly asymmetrical, the right one being thicker than the left (Brodskii, 1967).

Geographical Range: T. discaudatus has a wide distribution in boreal waters on the Atlantic and Pacific coasts of North America (Johnson, 1934). It has been recorded from the Gulf of St. Lawrence to Delaware Bay (Faber, 1966b).

Ecology: T. discaudatus is neritic and estuarine (Bigelow, 1926).

Feeding Habits: T. discaudatus is a carnivorous copepod (Mullen, 1967).

Life History: T. discaudatus is most abundant in summer in the Gulf of Maine (Sherman, 1963). The nauplii are present in Narragansett Bay from late March through July. They are most abundant in May and June (Faber, 1966b).

EGG 0.11 mm diameter

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Johnson, 1934)	0.12- 0.14	0.185- 0.205	0.23- 0.26	0.30	0.32- 0.34	0.36	
<u>COPEPODITE</u>							
Total Length (mm) (Johnson, 1934)	0.55	0.74	0.96	1.11	1.24- 1.40	1.43- 2.25	♀
(Brodskii, 1967)						1.36- 2.00	♂

PLATE LXX Tortanus discaudatus.

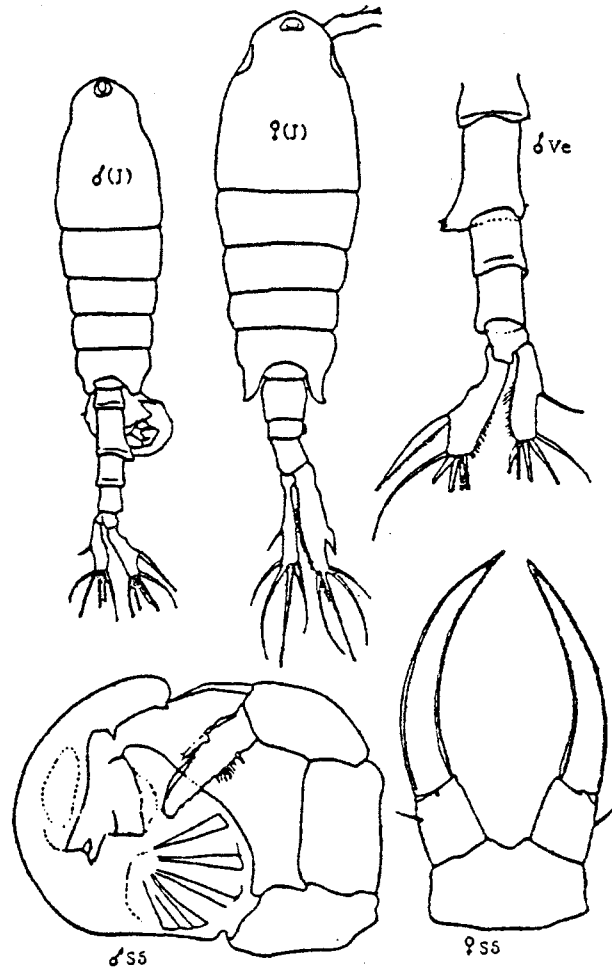
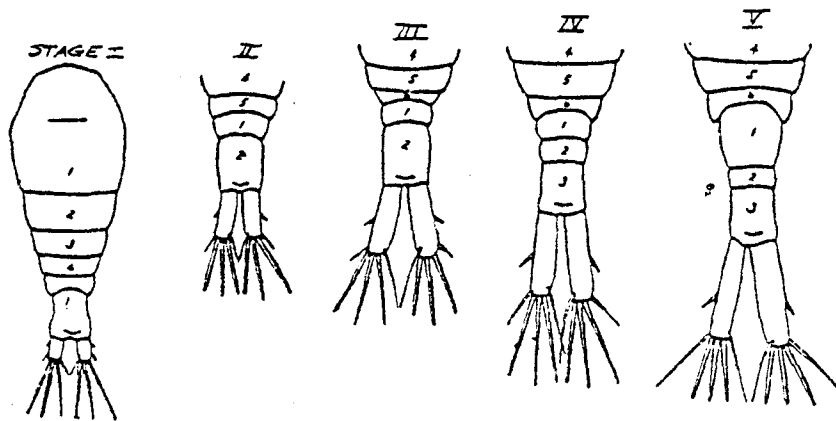
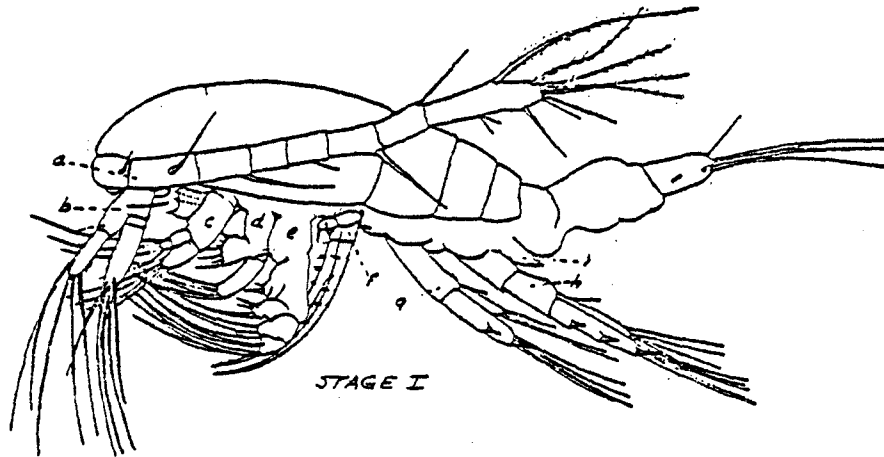
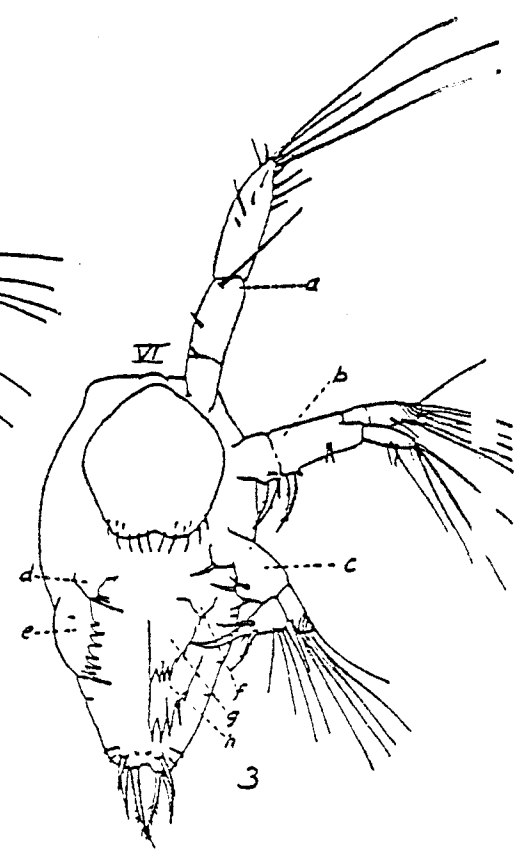
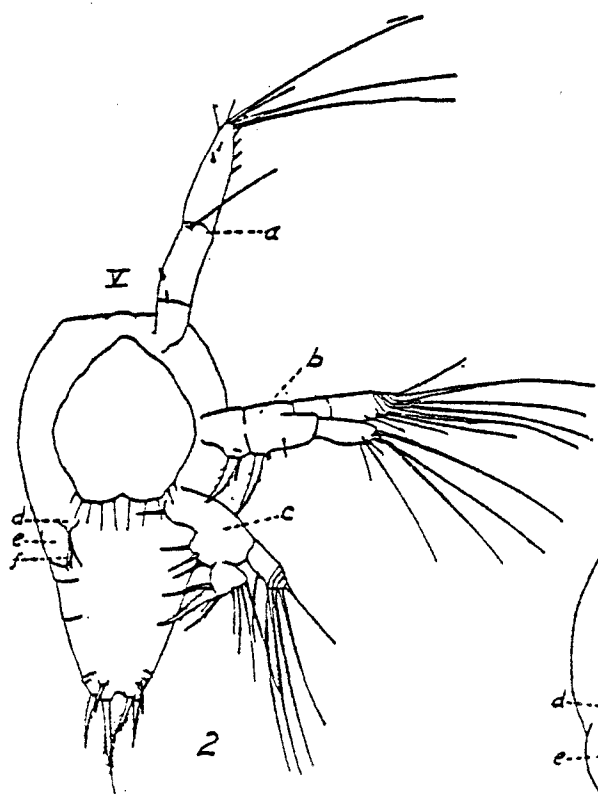
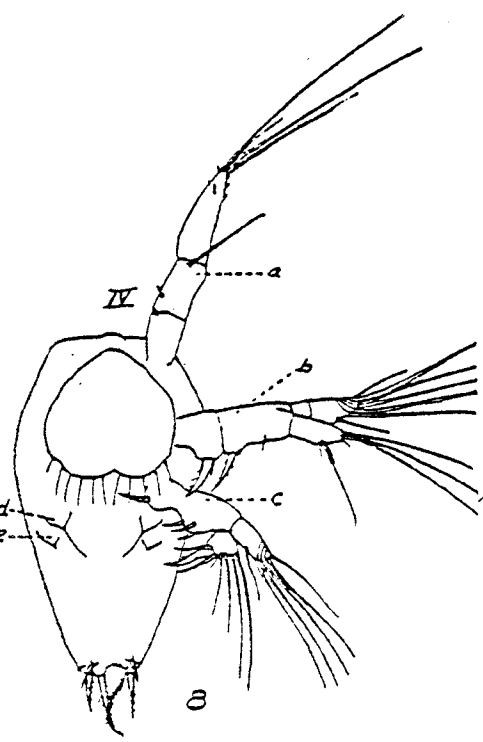
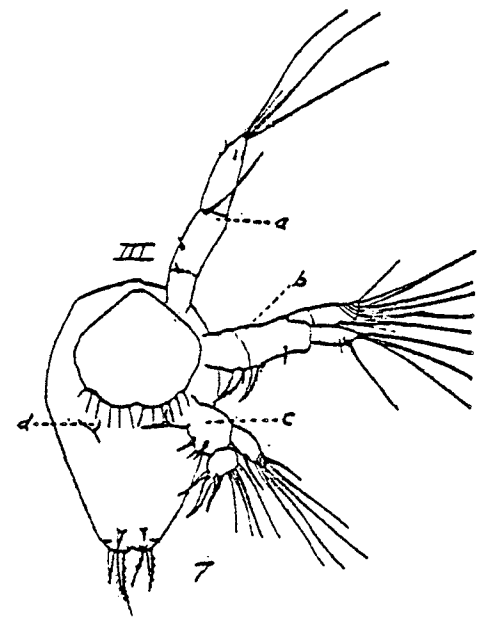
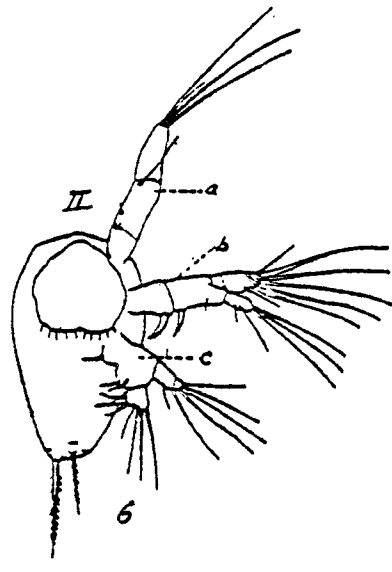
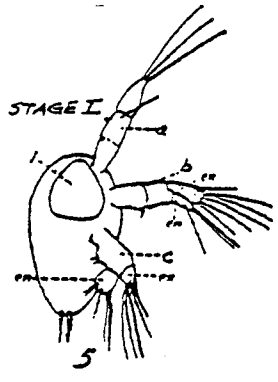


FIGURE 304. *Tortanus discaudatus* (Thompson et Scott)

BRODSKII, 1967



JOHNSON, 1934



Undinula vulgaris (Dana)

Calanoida: Calanidae

Distinguishing Characteristics: The form of the fifth legs and the deep notch on the second segment of the second exopod in both sexes are distinguishing characteristics (Wilson, 1932).

Geographical Range: U. vulgaris prefers tropical waters (Wilson, 1932), but it has been found over the Great South Channel between Georges Bank and Cape Cod, the Eastern Channel between Georges and Browns Banks, and the southern part of Georges Bank (Colton, Temple and Honey, 1962).

Ecology: U. vulgaris is an oceanic species (Colton, Temple and Honey, 1962).

Feeding Habits: U. vulgaris is an herbivorous copepod (Itoh, 1970).

Life History: No information.

EGG: 0.16 mm diameter

STAGE	I	II	III	IV	V	VI	
<u>NAUPLIUS</u>							
Total Length (mm) (Bjørnberg, 1966)	0.16	0.20	0.28- 0.33	0.32	0.38- 0.42	0.47- 0.48	
<u>COPEPODITE</u>							
Total Length (mm) (Bjørnberg, 1966)	0.65-	0.81	---	---	---	2.4 2.85	♀
(Wilson, 1932)	0.70	1.19				2.25- 2.5	♂

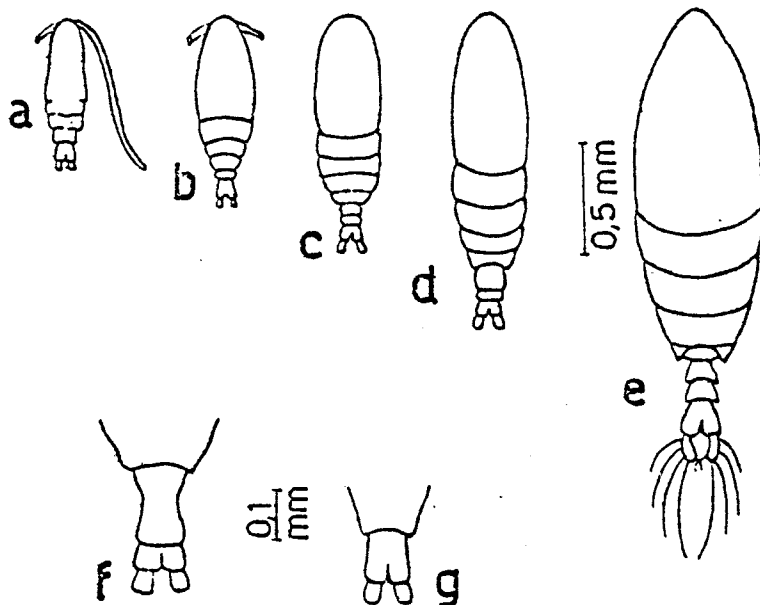


Fig. 6. *Undinula vulgaris* (Dana), copepodid stages. a, first copepodid; b, second copepodid; c, third copepodid; d, fourth copepodid; e, fifth copepodid; f, abdomen of second copepodid; g, abdomen of first copepodid.

BJÖRNBERG, 1966

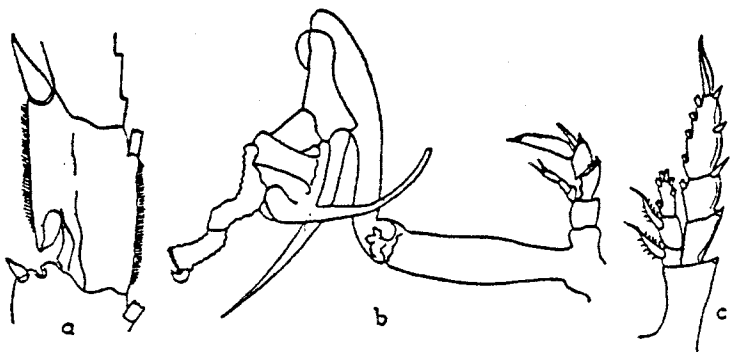
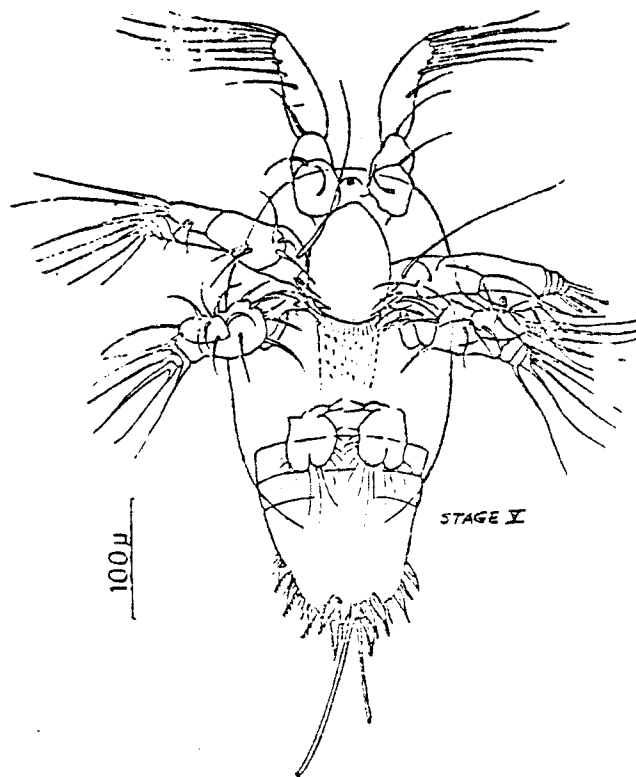


FIGURE 14.—*Undinula vulgaris*: a, Second segment of second exopod; b, fifth legs of male; c, fifth leg of female

WILSON, 1932



BJÖRNBERG, 1966

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