

NOTES ON THE MARINE COPEPODA AND CLADOCERA OF
WOODS HOLE AND ADJACENT REGIONS, INCLUDING
A SYNOPSIS OF THE GENERA OF THE HARPACTICOIDA.

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There are but few reports on the marine Entomostraca of the eastern shores of North America. Thompson and Scott in 1897 published studies on some collections made in the Gulf of St. Lawrence, and in 1900 Prof. W. M. Wheeler, now of Harvard University, made the first contribution of importance since the time of Dana. In 1906 and 1907 Dr. L. W. Williams of the Harvard Medical School reported studies on species from the Narragansett Bay region of Rhode Island. In this report Doctor Williams lists twenty-six free swimming Copepods, while Wheeler records thirty from the Woods Hole region, and Thompson and Scott mention eight from the region about the mouth of the St. Lawrence.

The notes herein recorded are taken from material brought together by the U. S. Bureau of Fisheries schooner *Grampus* and from other collections mostly made in the littoral zones of the Woods Hole region. Little remains to be added in a paper of this sort to Wheeler's report on the pelagic forms.

It is perhaps unnecessary to add that these notes are at best very incomplete. They represent the partial results of a five weeks' use of a table at the U. S. Bureau of Fisheries laboratory at Woods Hole, Massachusetts.

A dichotomic synopsis of the genera of the Harpacticoida is inserted following the text, in the hope that it will prove useful in the study of these very minute and difficult forms. Very little has been done along this line. Much of the data used is taken from Dr. G. O. Sars' *Crustacea of Norway*, vol. 5, Harpacticoida. The writer herewith expresses his high esteem for Doctor Sars' splendid work, without which the compilation of a synoptic table anywhere near up to date would have been an impracticable task.

I also take much pleasure in expressing my sincere appreciation of the courtesies extended me by Dr. F. B. Sumner, director of the Woods Hole Station; and to Dr. F. A. Lucas, curator in chief, and Mr. E. L. Morris, curator, department of natural science, and to Miss

Susan A. Hutchinson, curator of books, all of the museum staff of the Brooklyn Institute of Arts and Sciences.

The following summary is an attempt to tabulate the list of known species of Copepoda and Cladocera for our northeastern shores.

SUMMARY OF SPECIES.

Order COPEPODA.

Tribe GYMNOPLEA.

1. Family CALANIDÆ.

1. Genus *Calanus*.

1. *C. finmarchicus* (Gunnerus), Narragansett Bay, Rhode Island (Williams); Vineyard Sound (Wheeler); station 345, *Grampus*; off Delaware Bay; *Grampus* stations 1, 325, 626, 528, 327, and Nantucket Sound.

2. *C. minor* Claus, Gulf Stream, south of Marthas Vineyard, July (Wheeler).

2. Genus *Eucalanus*.

3. *E. attenuatus* Dana, Gulf Stream south of Marthas Vineyard, July (Wheeler).

4. *E. monachus* Giesbrecht, Gulf Stream south of Marthas Vineyard, July (Wheeler).

3. Genus *Mecynocera*.

5. *M. clausii* I. C. Thompson, Gulf Stream south of Marthas Vineyard, July (Wheeler).

4. Genus *Paracalanus*.

6. *P. parvus* Claus, Gulf Stream south of Marthas Vineyard, July (Wheeler).

5. Genus *Calocalanus*.

7. *C. pavo* Dana, Gulf Stream, as above (Wheeler).

8. *C. plumulosus* Claus, Gulf Stream, as above (Wheeler).

6. Genus *Clausocalanus*.

9. *C. arcuicornis* Dana, Gulf Stream, as above (Wheeler).

7. Genus *Pseudocalanus*.

10. *P. elongatus* (Boeck), Narragansett Bay, Rhode Island, February (Williams).

8. Genus *Euchaeta*.

11. *E. spinosa* Giesbrecht, Sagamore Bay, Cape Cod, June.

2. Family CENTROPAGIDÆ.

9. Genus *Centropages*.

12. *C. typicus* Kröyer, Woods Hole, June to November; Nantucket and Vineyard sounds, Plymouth Harbor, Gulf Stream south of Marthas Vineyard (Wheeler).

13. *C. hamatus* (Lilljeborg), Woods Hole (Wheeler); Narragansett Bay, Rhode Island, January and February (Williams).

14. *C. bradyi* Wheeler, Gulf Stream, south of Marthas Vineyard (Wheeler).

10. Genus *Temora*.

15. *T. longicornis* (Müller), Woods Hole, cooler months (Wheeler); Narragansett Bay, Rhode Island, all through the year (Williams). Common.

11. Genus *Eurytemora*.

16. *E. herdmani* Thompson and Scott, Narragansett Bay, Rhode Island (Williams); Woods Hole, August.

17. *E. hirundoides* (Nordquist), Woods Hole, August; Cuttyhunk, Massachusetts, July; Narragansett Bay (Williams).

2. Family CENTROPAGIDÆ—Continued.

18. *E. americana* Williams, Narragansett Bay, Rhode Island.12. Genus *Metridia*.19. *M. lucens* Boeck, Woods Hole and Plymouth Harbor.13. Genus *Pseudodiaptomus*.20. *P. coronatus* Williams, Woods Hole, July and August; Sheepshead Bay, September; Narragansett Bay (Williams).

3. Family CANDACIIDÆ.

14. Genus *Candacia*.21. *C. armata* Boeck, Gulf Stream south of Marthas Vineyard (Wheeler).

4. Family PONTELLIDÆ.

15. Genus *Labidocera*.22. *L. aestiva* Wheeler, Woods Hole at fisheries wharf (Wheeler).16. Genus *Pontella*.23. *P. meadii* Wheeler, Woods Hole, July (Wheeler).17. Genus *Pontellopsis*.24. *P. regalis* (Dana) Gulf Stream 70 miles south of Marthas Vineyard, July (Wheeler).18. Genus *Anomalocera*.25. *A. patersoni* Templeton, Gulf Stream 70 miles south of Marthas Vineyard (Wheeler); Woods Hole.19. Genus *Acartia*.26. *A. tonsa* Dana, Plymouth Harbor, Woods Hole, Gulf Stream south of Marthas Vineyard (Wheeler); Narragansett Bay (Williams); Jamaica Bay, New York.27. *A. clausii* Giesbrecht, Narragansett Bay, all through the year (Williams).20. Genus *Tortanus*.28. *T. discaudatus* (Thompson and Scott) Gulf of St. Lawrence (Thompson and Scott); Vineyard Sound; Woods Hole.29. *T. setacaudatus* Williams, Narragansett Bay, winter (Williams).

Tribe PODOPLEA.

5. Family CYCLOPIDÆ.

21. Genus *Oithona*.30. *O. plumifera* Baird, Gulf Stream south of Marthas Vineyard, July (Wheeler).31. *O. similis* Claus, Woods Hole at Fisheries wharf (Wheeler); Wickford, Rhode Island, summer (Williams).

6. Family HARPACTICIDÆ.

22. Genus *Microsetella*.32. *M. norvegica* Boeck, Narragansett Bay, March (Williams).23. Genus *Setella*.33. *S. gracilis* Dana, Gulf Stream south of Marthas Vineyard, July (Wheeler).24. Genus *Bradya*.34. *B. limicola*, coast of Gulf of Mexico (Herrick).25. Genus *Clytemnestra*.35. *C. rostrata* Brady, Gulf Stream south of Marthas Vineyard, July (Wheeler).26. Genus *Miracia*.36. *M. efferenta* Dana, Gulf Stream south of Marthas Vineyard, July (Wheeler).27. Genus *Harpacticus*.37. *H. chelifer* (Müller), Charlestown Pond, July (Williams); Sheepshead Bay, New York, September; Hunters Island, New York, September; Little Harbor, Woods Hole, July.38. *H. uniremis* Krøyer, Narragansett Bay, February and April; Charlestown Pond, July (Williams).

7. Family ECTINOSOMIDÆ.
 28. Genus *Ectinosoma*.
 39. *E. curticorne* Boeck, Wickford, and Charlestown Pond, Rhode Island, summer (Williams); brackish pond, Woods Hole, July.
 40. *E. normani* Thompson and Scott, Charlestown Pond, summer (Williams).
8. Family PELTIDIIDÆ.
 29. Genus *Alteutha*.
 41. *A. depressa* Baird, Sheepshead Bay, New York, September; Woods Hole, August.
9. Family TEGASTIDÆ.
 30. Genus *Parategastes*.
 42. *P. sphericus* (Claus), Wickford and Charlestown Pond, Rhode Island (Williams).
10. Family IDYIIDÆ.
 31. Genus *Idya*.
 43. *I. furcata* (Baird), Narragansett Bay, spring, common (Williams); Little Harbor, Woods Hole, July.
11. Family THALESTRIDÆ.
 32. Genus *Thalestris*.
 44. *T. gibba* (Kröyer), Woods Hole, December, "Surface net" (Vinal N. Edwards).
 33. Genus *Halithalestris*.
 45. *H. cronii* (Kröyer), *Grampus* station 528, July; also station 627, July; Cape Cod.
 34. Genus *Dactylopusia*.
 46. *D. thisboides* (Claus), Little Harbor, Woods Hole, July.
 47. *D. vulgaris* Sars, Wickford and Charlestown Pond, Rhode Island, July (Williams); Woods Hole, common.
12. Family DIOSACCIDÆ.
 35. Genus *Diosaccus*.
 48. *D. tenuicornis* (Claus), Charlestown Pond, Rhode Island, July (Williams); Eel Pond, Woods Hole, August.
13. Family LAOPHONTIDÆ.
 36. Genus *Laophonte*.
 49. *L. longicaudata* Boeck, Woods Hole, July.
14. Family LICHOMOLGIDÆ.
 37. Genus *Lichomolgas*.
 50. *L. fucicolus* Brady, Wickford and Charlestown Pond, Rhode Island (Williams); Buzzard's Bay, July.
 51. *L. adherens* Williams, Wickford, Rhode Island, under stones, between tides (Williams).
 52. *L. major* Williams, Wickford, Rhode Island, mantle cavities of *Mya*, *Venus*, and *Maetra* (Williams).
15. Family TACHIDIIDÆ.
 38. Genus *Tachidius*.
 53. *T. brevicornis* (Müller), Charlestown Pond, Rhode Island (Williams); Jamaica Bay, New York, June.
 54. *T. littoralis* Poppe, upper Narragansett Bay, May and April (Williams).
16. Family ONCÆIDÆ.
 39. Genus *Oncæa*.
 55. *O. venusta* Philippi, Gulf Stream 60 miles south of Marthas Vineyard, July (Wheeler).

17. Family CORYCÆIDÆ.

40. Genus *Coryceus*.56. *C. elongatus* Claus, Gulf Stream 70 miles south of Marthas Vineyard, July (Wheeler).57. *C. carinatus* Giesbrecht, as above (Wheeler).41. Genus *Sapphirina*.58. *S. gemma* Dana, Gulf Stream south of Marthas Vineyard, July (Wheeler).

18. Family ILYOPSYLLIDÆ.

42. Genus *Ilyopsyllus*.59. *I. sarsi* Sharpe, harbors and brackish ponds, Woods Hole, Massachusetts.60. *I. natans* Williams, Wickford and Charlestown Pond, Rhode Island, summer (Williams).

Order CLADOCERA.

Division GYMNOMERA.

Tribe ONYCHPODA.

1. Family POLYPIEMIDÆ.

1. Genus *Podon*.1. *P. leuckarti* (G. O. Sars), surface tows off Bureau of Fisheries wharf, Woods Hole, Massachusetts, July to November.2. Genus *Evadne*.2. *E. nordmanni* Lovén, Narragansett Bay, Rhode Island, summer (Williams); surface tows off Bureau of Fisheries wharf, Woods Hole, Massachusetts, August to November.

ANNOTATED LIST.

Order COPEPODA.

Tribe GYMNOPLEA.

Family CALANIDÆ.

Genus CALANUS Leach, 1819.

CALANUS FINMARCHICUS (Gunnerus).

Calanus finmarchicus G. O. Sars, Crustacea of Norway, Calanoida, vol. 4, 1903, p. 9, pls. 1, 2, 3, 22 figs.*Length*.—Female, 2.7 to 5.4 mm; male, 2.35 to 3.6 mm.Said to be our commonest North Atlantic and Arctic Copepod. Sars speaks of it as being "eagerly devoured by our common food fishes, as the herring and mackerel." Prof. Robert Collett states that it forms the almost exclusive food of one of the great whales, *Balanoptera borealis*.

Their great abundance in northern waters would seem to bear out the general rule that "the nearer the cold zone, the smaller the number of species, but the larger the number of individuals of the species."

Common in tows from Narragansett Bay, Rhode Island (Williams); Vineyard Sound off Gayhead (Wheeler); Bureau of Fisheries wharf, Woods Hole, Massachusetts. Also the following stations of the U. S. Fisheries schooner *Grampus*:

Station 325, May 29, 1894, lat. $45^{\circ} 47' 30''$ N., long. $50^{\circ} 57' 45''$ W.

Station 327, May 29, 1894, lat. $45^{\circ} 55' 15''$ N., long. $59^{\circ} 35' 00''$ W.

Station 626, July 29, 1894, lat. $49^{\circ} 43' 30''$ N., long. $64^{\circ} 24' 00''$ W.

Station 528, June 28, 1895, lat. $42^{\circ} 35' 00''$ N., long. $70^{\circ} 19' 00''$ W.

These stations were occupied while the *Grampus* was engaged in mackerel work, and are tow-net stations.

Genus EUCHÆTA Philippi, 1852.

EUCHÆTA SPINOSA Giesbrecht.

Euchæta spinosa GIESBRECHT, Fauna und Flora des Golfes von Neapel, etc., 1892, p. 246, 8 figs.

Length.—Females, 6 mm.; males, unknown.

Characters.—First antenna reaches slightly beyond the abdomen. Two terminal setæ of the furca much longer than the others (fig. 1*b*). Outer branch of the second leg with a characteristically invaginated segment (fig. 1*a*).

Occurrence.—Surface collection off Nausett Beach, Cape Cod, June. Also *Grampus* station 627, lat. $42^{\circ} 7'$ N., long. $70^{\circ} 8'$ W., just off the northern part of Cape Cod, July, 11 p. m.

Distribution.—Mediterranean Sea, North Atlantic, Pacific, and Indian oceans.

Family CENTROPAGIDÆ.

Genus EURYTEMORA Giesbrecht, 1881.

EURYTEMORA HERDMANI Thompson and Scott.

Eurytemora herdmani THOMPSON and SCOTT, Proc. Liverpool Biol. Soc., vol. 12, 1897, p. 78, figs. 1, 8, 10.—GIESBRECHT and SCHMEL, Das Tierreich, Dec. 1898, p. 103.—VAN BREE-
MEN, Nordisches Plankton, VIII, Copepoden, 1908, p. 100, 3 figs.

Length.—1.5 to 1.8 mm.

Characters.—Last thoracic segment of female produced into large wing-like expansions. Genital segment of female with conspicuous lateral swellings, which are directed angularly backwards.

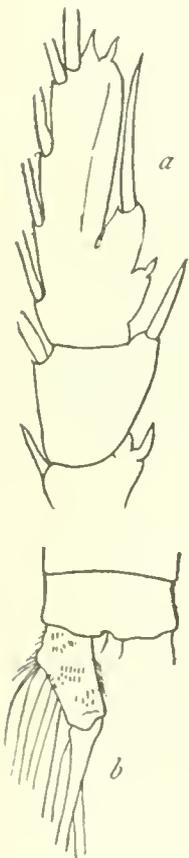


FIG. 1.—EUCHÆ-
TA SPINOSA. *a*,
SECOND FOOT \times
150; *b*, FURCA,
VENTRAL \times 75
(AFTER GIES-
BRECHT).

First antenna about as long as the cephalothorax. Fifth feet of female apparently four-segmented, but consisting really of a two-segmented basal part and a two-segmented exopodite. First segment of exopodite long, narrow, with two strong outer marginal setae, and with a long pointed projection of its inner edge, which is heavily armed with very short stout spines (fig. 2c). Terminal segment twice as long as broad. Fifth legs of male very similar to those of *E. velox*.

Remarks.—This species was first described from specimens collected in association with *E. affinis*, in the St. Lawrence River, between Quebec and Rimouski. The only other report of its occurrence was made by Dr. L. W. Williams in 1906, when he mentioned its presence in tows made in Narragansett Bay, Rhode Island, near Wickford. Found very sparingly by the writer in a surface tow

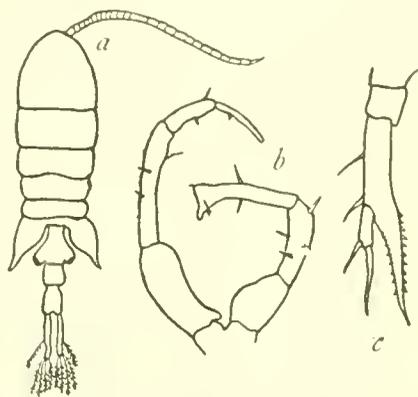


FIG. 2.—EURYTEMORA HERDMANI. *a*, DORSAL VIEW OF FEMALE $\times 35$; *b*, FIFTH FOOT OF FEMALE $\times 100$; *c*, FIFTH FOOT OF FEMALE $\times 150$.

made from the Bureau of Fisheries wharf, Woods Hole, Massachusetts, in August.

EURYTEMORA HIRUNDOIDES (Nordquist).

Temorella affinis, var. *hirundoides* NORDQUIST, Die Calaniden Finlands, vol. 4, 1888, p. 48, figs. 5–11; vol. 5, fig. 5.

Eurytemora affinis, var. *hirundoides* GIESBRECHT, Zool. Jahrb. Syst., vol. 9, 1896, p. 104.

Eurytemora hirundoides G. O. SARS, Crustacea of Norway, vol. 4, Calanoida, 1903, p. 102.—VAN BREEMEN, Nordisches Plankton, VIII, Copepoden, 1908, p. 101, figs. *a-d*.

Length.—0.3–1.15 mm.

Characters.—Somewhat like *E. affinis*. Lateral part of last thoracic segment of female pointed. Genital segment of female swollen. First antenna about as long as the cephalothorax.

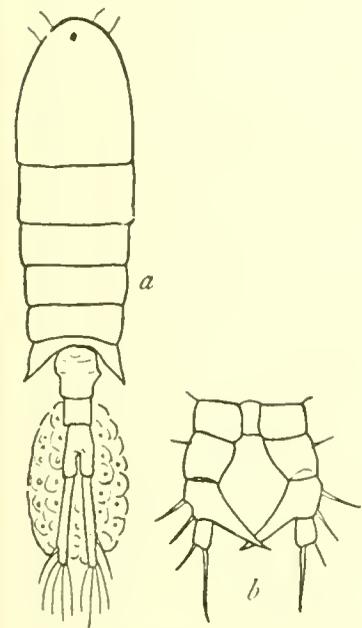


FIG. 3.—EURYTEMORA HIRUNDOIDES. *a*, DORSAL VIEW OF FEMALE; *b*, FIFTH FOOT OF FEMALE.

Occurrence.—Rather sparsely found in brackish pools, Woods Hole, July; also in washings from sea-urchins, Cuttyhunk, July.

Distribution.—Norwegian coast (Sars), Narragansett Bay and Charlestown Pond (Williams).

Genus METRIDIA Boeck, 1864.

METRIDIA LUCENS Boeck.

Paracalanus hibernicus BRADY and ROBERTSON, Ann. Mag. Nat. Hist. (4), vol. 12, 1873, p. 126.

Metridia hibernica GIESBRECHT, Fauna und Flora des Golfes von Neapel, vol. 19, 1892, p. 340, figs. 2, 12, 16, 22, 28, 36, 39.—WHEELER, Bull. U. S. Fish. Comm., vol. 19, 1900, p. 176, figs. *a-f*.

Metridia lucens BOECK, Forh. Vid. Selsk. Christiania, 1864, p. 14.—GIESBRECHT and SCHMEL, Das Tierreich, Dec. 1898, p. 106.—G. O. SARS, Crustacea of Norway, vol. 4, Calanoida, 1903, p. 113.

Length.—Female, 2.45 to 2.85 mm.; male, 2 mm.

Occurrence.—Found in tow at Plymouth Harbor, August, and at Woods Hole, December (Wheeler).

Distribution.—Mediterranean Sea, North Atlantic and Pacific oceans; Gulf of Suez.

Genus PSEUDODIAPTOMUS Herriek, 1884.

PSEUDODIAPTOMUS CORONATUS Williams.

Pseudodiaptomus coronatus WILLIAMS, Amer. Nat., vol. 40, 1906, p. 641, figs. 1-7.

Length.—Female, about 1.5 mm.; male, 1.2 mm.

Characters.—Abdomen of male, five-segmented; of female, four-segmented. First segment of abdomen of female much swollen and with many spines and bristles arranged in irregular patches, and with a pair of small spatulate flaps extending over the genital orifice. Left side of second segment of abdomen has a small depression filled with coarse bristles. Fifth legs of female (fig. 4*a*) four-segmented, with heavy terminal claws; of male, as in fig. 4*b*.

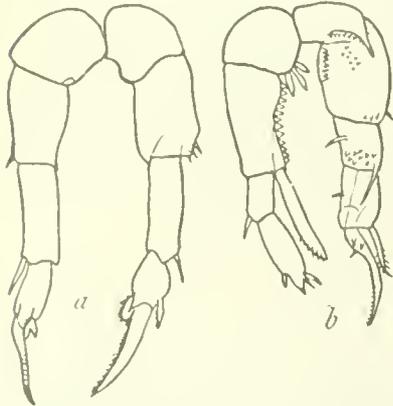


FIG. 4.—PSEUDODIAPTOMUS CORONATUS. *a*, FIFTH FOOT OF FEMALE \times 175; *b*, FIFTH FOOT OF MALE \times 150 (AFTER WILLIAMS).

The females are commonly with two egg-sacs, the right one usually the smaller of the two, and containing an average of but two eggs. Occasionally the egg sacs are about equal in size, and one female was found in Eel Pond, Woods Hole, with but one large oval egg sac.

Remarks.—Many of these interesting Calanoids were noted in copula. The male clasps the female in a manner quite different from that commonly observed among the Harpacticoida, in that they seem always to unite with their anterior extremities pointed in exactly opposite directions, with the abdominal extremity of one or the other pointed to one side at an angle.

Occurrence.—Very common in birge and surface net tows among algæ, at Hadley Harbor, Great Harbor near Ram Island, and Eel Pond, Woods Hole, Massachusetts. Also Sheephead Bay, New York, September.

Distribution.—Previously reported only from Narragansett Bay and Charlestown Pond, Rhode Island, summer (Williams).

Family CANDACIIDÆ.

Genus CANDACIA Dana, 1846.

CANDACIA ARMATA Boeck.

Candacia pectinata BRADY, Copepoda of the British Islands, vol. 1, 1878, p. 19.—

GIESBRECHT, Fauna und Flora des Golfes von Neapel, vol. 19, 1892, p. 242, 15 figures.—WHEELER, Bull. U. S. Fish Comm., vol. 19, 1900, p. 177, figs. *a-c*.

Candacia armata BOECK, Forh. Vid. Selsk. Christiania, 1872, p. 39.—G. O. SARS, Crustacea of Norway, vol. 4, Calanoida 1903, p. 135, figs. 1-10.

Length.—Female, 1.95 to 2.7 mm.; male, 1.7 to 2.7 mm.

Characters.—Last thoracic segment of female with large posteriorly directed points. First antenna of female twenty-three-segmented, and not overreaching the genital segment.

Occurrence.—Gulf Stream about 70 miles south of Marthas Vineyard, July (Wheeler).

Distribution.—Mediterranean Sea and Atlantic Ocean (between 36° and 60° N. lat.) (Giesbrecht); Indian Ocean (Scott).

Family PONTELLIDÆ.

Genus PONTELLOPSIS Brady, 1883.

PONTELLOPSIS REGALIS (Dana).

Pontella regalis DANA, Proc. Amer. Acad. Arts and Sci., 1849, vol. 2, p. 31.

Monops regalis GIESBRECHT, Fauna und Flora des Golfes von Neapel, vol. 19, 1892, p. 486, 15 figures.—WHEELER, Bull. U. S. Fish Comm., vol. 19, 1900, p. 182, figs. *a-c*.

Pontellopsis regalis GIESBRECHT and SCHEMEL, Das Tierreich, Dec. 1898, p. 147.

Length.—Female, 4.0 to 4.4 mm.; male, 3.4 mm.

Color.—Dark blue-green.

Characters.—Last thoracic segment pointed on either side, but in male prolonged into a powerful slightly curved hook. Abdomen of female of two segments. Furca short.

Occurrence.—Gulf Stream, 70 miles south of Marthas Vineyard, July (Wheeler).

Distribution.—Mediterranean Sea; Atlantic, Pacific, and Indian oceans (between 13° N. and 26° S. lat.).

Genus ACARTIA Dana, 1846.

ACARTIA TONSA Dana.

Acartia tonsa DANA, Proc. Amer. Acad. Arts and Sci., 1849, vol. 2, p. 26.—GIESBRECHT, Fauna und Flora des Golfes von Neapel, vol. 19, 1892, p. 508, 5 figures.—GIESBRECHT and SCHMELL, Das Tierreich, Dec. 1898, p. 154.—WHEELER, Bull. U. S. Fish Comm., vol. 19, 1900, p. 183, figs. *a-d*.

Length.—Female, 1.3 to 1.5 mm.; male, 1.05 mm.

Characters.—Rostral filaments present. Last thoracic segment rounded on sides. Abdomen without spines. Anal segment hairy on sides, but in male with fine points on the second segment. Middle segment of female fifth foot about as long as broad. Terminal claw more than twice as long as the terminal segment, straight, and alike for each foot.

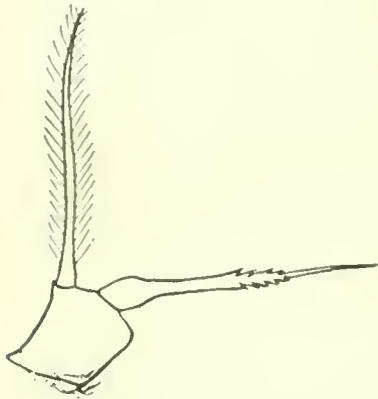


FIG. 5.—ACARTIA TONSA. FIFTH FOOT OF FEMALE $\times 500$.

Wheeler, 1900, page 183, shows a figure of the fifth foot of the female which evidently is very exceptional; probably that of a mutilated specimen, or of a regenerated leg. All studied by the writer were as in fig. 5.

Occurrence.—One of the commonest copepods taken from the wharf of the Fish Commission at Woods Hole, summer (Wheeler).

Also Plymouth Harbor, and Gulf Stream 70 miles south of Marthas Vineyard (Wheeler). Also occurring abundantly in nearly all the tows examined by the writer from the Woods Hole region, even in the Eel Pond and the brackish water ponds of the vicinity. In fact, nearly all the pelagic copepods of these ponds were this species.

Distribution.—Port Jackson, New South Wales (Dana): west coast of South America, between Valparaiso and Callao (Giesbrecht).

Genus TORTANUS Giesbrecht.

TORTANUS DISCAUDATUS (Thompson and Scott).

Corynura discaudata THOMPSON and SCOTT, Proc. Liverpool Biol. Soc., vol. 12, 1897, p. 80, pl. 6, figs. 1-11; pl. 7, figs. 1, 2.

Corynura bumpusii WHEELER, Bull. U. S. Fish Comm., vol. 19, 1900, p. 185, figs. *a-f*.

Tortanus discaudatus GIESBRECHT and SCHMELL, Das Tierreich, Dec., 1898, p. 158.—VAN BREEMEN, Nordisches Plankton, VIII, Copepoden, p. 162, figs. *a-c*.

Length.—Female, 2.25 mm.; male 1.8 to 2 mm. Very similar to *T. gracilis* (Brady) but with the right furcal branch and its spine-like outer bristle much more thickened.

Endopodite of first leg three-segmented, which is very unusual for *Tortanus*.

Occurrence.—Tows off Fish Commission wharf and Vineyard Sound, July (Wheeler); off Fish Commission wharf, May (Vinal N. Edwards). Specimens collected by the writer from the same locality were blood-red in color and were unusually quick in their movements, moving by quick jerks. Wheeler says "both sexes rather opaque and without pigment, except along mid-ventral line, where there are segmental accumulations of black coloring matter in the male." (Wheeler, 1900, p. 185.)

Distribution.—Gulf of St. Lawrence; Puget Sound; Woods Hole.

Tribe **PODOPLEA.**

Family **HARPACTICIDÆ.**

Genus **HARPACTICUS** Milne Edwards, 1838.

HARPACTICUS CHELIFER (O. F. Müller).

Cyclops chelifer O. F. MÜLLER, Zool. Dan. Prodr., 1776, p. 2413; Entomostraca, 1785, p. 114, pl. 19, figs. 1-3.

Harpacticus chelifer CLAUS, Die Freilebenden Copepoden, 1863, p. 135, pl. 19, figs. 12-19.—BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 146, pl. 64, figs. 19, 20; pl. 65, figs. 1-15.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 49, 18 figs.

Length.—Female, 9 mm.; male, 1 mm.

Characters.—Body unusually compressed, posterior maxillipeds very large. Fifth legs as in fig. 6.

Occurrence.—Collected in birge net at Little Harbor, Woods Hole, July; Hunters Island, New York City, October; Sheepshead Bay, New York, September.

Distribution.—British Isles

(Brady); coast of France (Camu); Franz Josef Land (Scott); Ceylon (A. Scott); Heligoland (Claus).

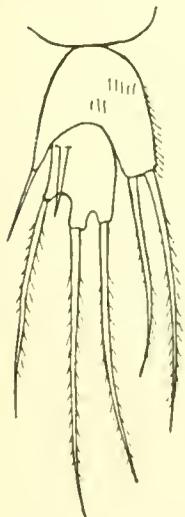


FIG. 7.—ECTINOSOMA CURTICORNE. FIFTH FOOT OF FEMALE.

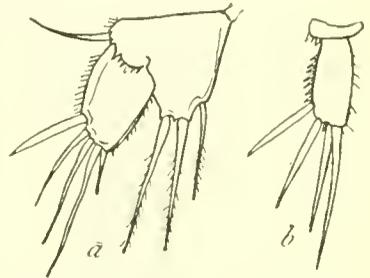


FIG. 6.—HARPACTICUS CHELIFER. a, FIFTH FOOT OF FEMALE; b, FIFTH FOOT OF MALE.

Family **ECTINOSOMIDÆ.**

Genus **ECTINOSOMA** Boeck, 1864.

ECTINOSOMA CURTICORNE Boeck.

Ectinosoma curticorne BOECK, Forh. Vid. Selsk. Christiana, 1872, p. 45.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 36, pl. 20, fig. 1.

Length.—Female, 0.7 mm.

Color.—Dark brown or corneous.

Characters.—Anterior antenna very short, of six segments, the first of which shows a well defined pigment spot. Caudal rami about twice as long as broad and slightly divergent.

Occurrence.—Collected by a birge net among algæ, muddy bottom, in the brackish ponds about Woods Hole, Massachusetts, July.

Distribution.—Scottish coasts (Scott); Spitzbergen (Scott); Norwegian Fjords (Sars); Charlestown Pond, Rhode Island (Williams).

Family PELTIDIIDÆ.

Genus ALTEUTHA Baird, 1846.

ALTEUTHA DEPRESSA Baird.

Alteutha depressa BAIRD, British Entomostraca, 1850, p. 216, pl. 30, figs. 1, 2.—BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 160, figs. 1-5.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 64, pl. 38, 12 figs.

Length.—Female, about 1.3 mm.

Characters.—Body yellowish in color, but with a strikingly dark purplish transverse band near the middle, occupying three segments. Body much depressed seen dorsally, oblong-oval in form, with the greatest width about the middle. Cephalic segment very large, exceeding in length the four succeeding segments combined. Anterior antenna short and stout, nine-segmented. Fifth legs robust, and armed at the tip with three coarse spines (fig. 8 *b*).

Remarks.—When seen with a small lens the most striking character is the shape and color. It somewhat superficially resembles certain of the parasitic Copepods, as *Argulus*. While Sars (1903, p. 64) speaks of it as usually occurring in depths varying from 6 to 20 fathoms on a sandy or gravelly bottom, my best haul of these

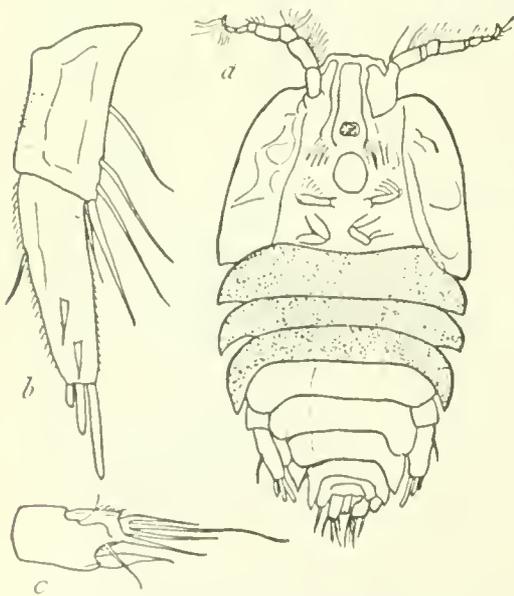


FIG. 8. ALTEUTHA DEPRESSA. *a*, VENTRAL VIEW OF MALE; *b*, FIFTH FOOT OF FEMALE; *c*, CAUDAL RAMUS OF FEMALE.

curious little creatures was made with a surface net, but a few inches below the surface in open water just along the Bureau of Fisheries wharf at Woods Hole, Massachusetts.

Occurrence.—Collected with a birge net among algæ, in about 2 fathoms of water, over sandy bottom, Sheephead Bay, New York, September. Also surface net just off Fisheries wharf, Woods Hole, Massachusetts. It has not, to my knowledge, been heretofore reported from American shores.

Distribution.—British seas (Brady); coast of France (Canu); west coast of Norway and Trondhjem Fjord (Sars).

Family IDYIIDÆ.

Genus IDYA Philippi, 1843.

IDYA FURCATA (Baird).

Cyclops furcatus BAIRD, Mag. Zool. and Bot., vol. 9, 1837, figs. 26-28.

Canthocamptus furcatus BAIRD, British Entomostraca, 1850, p. 210, figs. 1-6.

Tisbe furcatus CLAUS, Die Freilebenden Copepoden, 1863, p. 116, figs. 1-12.

Idya furcata BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 172, figs. 1-11.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 88, 11 figs.

Length.—Female, average, 1 mm.; male, 0.65 mm. Maximum length of deep-water variety, 1.5 mm.

Characters.—Body of female whitish in color and more or less transversely banded with clear crimson; ovarial tubes commonly of a clear dark color.

Caudal rami scarcely as long as the anal segment. Fifth pair of legs of the female with the inner expansion of the proximal joint broadly rounded and armed with three setæ, the middle one rather slender, the other two very small; distal segment sublinear, with five slender setæ, of which three issue from the tip and two from the outer edge close to the end.

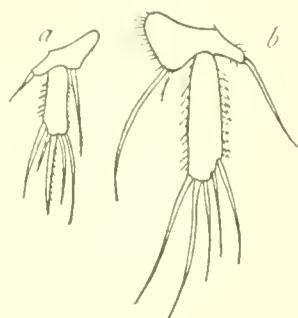


FIG. 9.—IDYA FURCATA. *a*, FIFTH FOOT OF MALE; *b*, FIFTH FOOT OF FEMALE.

Remarks.—Perhaps the commonest and most widely distributed of all the Harpacticoida. While it is most commonly to be found with littoral forms, yet a larger pelagic form is to be met with at greater depths on decaying algae. "A very active creature, swimming about with great speed, now and then affixing itself to fronds of the algae or to the walls of the vessel in which it is being observed" (Sars).

Occurrence.—Collected with a birge net amongst floating algae and eel grass at Little Harbor, Woods Hole, July. Water about 10 feet deep at high tide, sandy bottom. Also from Eel Pond, Woods Hole, August.

Distribution.—Arctic Ocean, widely distributed; British seas; Kattegat; coast of France (Canu); Mediterranean and Red seas (A. Scott); New Zealand (Brady); Pacific at Chatham Islands (Sars); Franz Josef Land (Scott); Narragansett Bay, Rhode Island (Williams).

Family THALESTRIDÆ.

Genus THALESTRIS Claus, 1863.

THALESTRIS GIBBA (Kröyer).

Harpacticus gibba KRÖYER, Gaimard's Voyage en Scandinavie, 1845, pl. 43, figs. 2, *a-p*.

Thalestris gibba, G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 105, pl. 61, 12 figs.

Length.—Female, 1.5 mm.; male slightly smaller.

Characters.—Color of body, except dorsal face of the cephalic segment, dark bluish gray to almost black. Posterior edges of

all the segments minutely crenulated. Caudal rami unusually produced, about three times as long as broad.

Occurrence.—Found in a surface tow made by Mr. Vinal N. Edwards of the U. S. Fish Commission at Woods Hole, December.

Distribution.—Norwegian coast (Sars); Franz Josef Land (Scott).

This species appears heretofore not to have been reported from American shores. Seemingly a boreal form, brought to the Woods Hole region by the Labrador current.

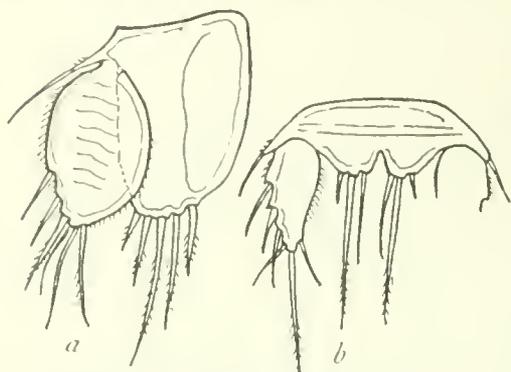


FIG. 10.—*Thalestris gibba*. a, FIFTH FOOT OF FEMALE (AFTER SARS); b, FIFTH FOOT OF MALE.

Genus HALITHALESTRIS Sars, 1903.

HALITHALESTRIS CRONI (Kröyer).

Harpacticus croni KRÖYER, Gaimard's Voyage en Scandinavie, 1845, Zool., pl. 43, figs. 3, a-n.

Thalestris serrulata BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 133, figs. 2-11 (male).

Halithalestris croni G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 118, pl. 72, 12 figs.

Length.—Female, 2.3 mm.; male, 1.7 mm.

Characters.—Cephalic segment hardly longer than the three following segments taken together. Rostrum short. Genital segment about as long as wide. Furca very long, about half as long as the abdomen and with widely divergent rami. First antennæ shorter than the cephalic segment. Fifth leg reaching nearly to the middle of the genital segment, its terminal segment (female) oval, and with six marginal bristles, of which two are rather long. The same segment of male more elongate (fig. 11b), and terminal seta the longer. Basal segment triangular, with five terminal setæ in female and three in male, the middle one in each case being the longer. Egg sacs very large, reaching about to middle of furcal rami.

Body of a light greenish hue, and commonly filled with clear oil bubbles of various sizes.

Remarks.—One of the largest known Harpacticoids, and also very unusual in its habits in that it leads a truly pelagic life. Williams (1906) speaks of collecting it by scraping piles at high tide at Rocky Point in Narragansett Bay. He calls his specimen *Thalestris serrulata* Brady, which is mentioned above as a synonym, but as *Halithalestris croni* seems to be truly pelagic, and such a habitat as

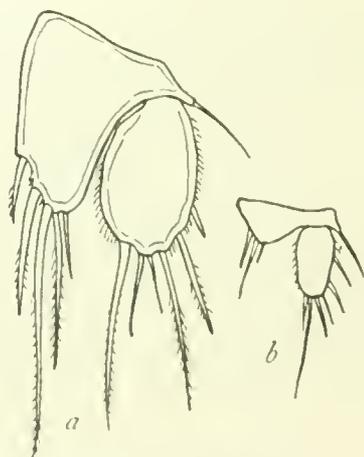


FIG. 11.—*Halithalestris croni*. a, FIFTH FOOT OF FEMALE (AFTER SARS); b, FIFTH FOOT OF MALE.

Williams mentions seems to rest on only one individual and also to be very unusual, it is presumed that his specimen is not the above species.

Occurrence.—Found in tows made by the U. S. Bureau of Fisheries schooner *Grampus* at station 528, July 18, 1894, 5 a. m., lat. $42^{\circ} 55' N.$, long. $68^{\circ} 49' W.$, and at station 627, July 29, 1894, 11 p. m., lat. $42^{\circ} 7' N.$, and long. $70^{\circ} 8' W.$

Distribution.—British seas (Brady) †; coast of Spitzbergen (Scott); off the coasts of Norway and Finmark (Sars).

Genus DACTYLOPUSIA Norman, 1903.

DACTYLOPUSIA THISBOIDES (Claus).

Dactylopusia thisboides CLAUS, Die Freilebenden Copepoden, 1863, p. 127, figs. 24-28.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 126, pls. 77, and 97, 11 figs.

Length.—Female, about 1 mm.; male, smaller.

Characters.—Body a golden yellow hue in fresh specimens, with a chestnut-colored transverse band across the anterior part of the genital segment. Fifth pair of legs of female with a rounded oval distal segment, with six marginal setæ (fig. 12*b*); inner expansion of proximal joint very large and broad, foliaceous, extending beyond the tip of the distal segment, and marked inside the inner edge with a regular row of short transverse chitinous stripes. Ovisac large. The fifth pair of legs of the female especially characterize this species.

Occurrence.—Collected among algæ with a birge net, at Little Harbor, Woods Hole, July, sandy bottom, at about 12 feet depth. Not heretofore reported from American shores.

Distribution.—British seas (Brady); coast of France (Canu); Mediterranean (Claus); Red Sea (Claus); Franz Josef Land (T. Scott); Norwegian and Finnish coasts.

DACTYLOPUSIA VULGARIS Sars.

Dactylopus stromi CLAUS, Die Freilebenden Copepoden, 1863, p. 126, figs. 1-6.

Dactylopusia vulgaris G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 128, pl. 79, figs. 1-6.

Length.—Female, 0.7 mm.

Characters.—Color, dark yellow to olivaceous brown. Cephalic segment fully as long as the four succeeding ones combined. Anterior antennæ of moderate length, and nine-segmented. Fifth legs of female with their distal segments broadly ovate (fig. 13*a*), narrowly

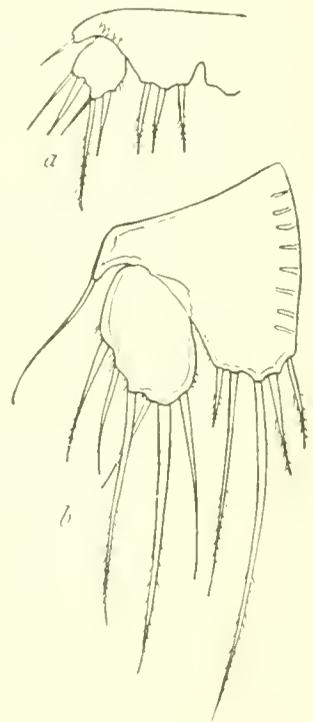


FIG. 12.—DACTYLOPUSIA THISBOIDES. *a*, FIFTH FOOT OF MALE; *b*, FIFTH FOOT OF FEMALE.

pointed at tip, which carries two setæ, the outer of which is weak, and not more than half the length of the other. Three outer

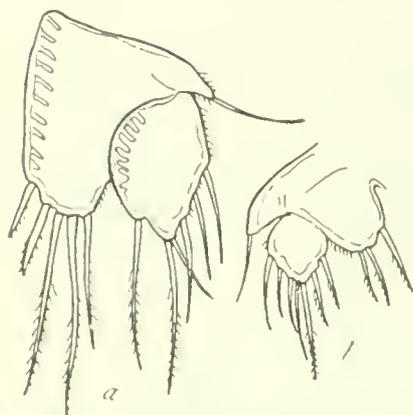


FIG. 13.—*DACTYLOPUSIA VULGARIS*. *a*, FIFTH FOOT OF FEMALE (AFTER SARS); *b*, FIFTH FOOT OF MALE.

marginal spine-like setæ and one inner one. Inner expansion rather large and extending about as far as the distal segment and armed with five terminal spine-like setæ. Fifth legs of male with a shorter distal segment, which is also provided with an additional seta inside, while the proximal segment carries but three terminal spine-like setæ instead of five.

Occurrence.—Collected with birge net at Little Harbor, Woods Hole, Massachusetts, among surface algæ, July. Also brackish ponds near Woods Hole, July, and among *Fucus* along the U. S. Fisheries wharf, July. Common.

Distribution.—British Isles (Brady); coast of France (Canu); Heligoland (Claus); Charlestown Pond, Rhode Island (Williams).

Family DIOSACCIDÆ.

Genus DIOSACCUS Boeck, 1872.

DIOSACCUS TENUICORNIS (Claus).

Dactylopus tenuicornis CLAUS, Die Freilebenden Copepoden, 1863, p. 127, pl. 16, figs. 17-23.

Diosaccus tenuicornis BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 68, pl. 59, figs. 12-16.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 146, pls. 89 and 90.

Length.—Female about 0.8 mm.; male slightly smaller. Color a golden yellow in life.

Female.—Cephalic segment more than twice as long as all the free segments of the metasome combined. Rostrum very prominent. Furca closely set, the rami slightly longer than broad at base, their apical setæ nearly parallel. Anterior antennæ unusually slender. Fifth pair of legs (fig. 14*b*) with the distal segment oblong in form and armed on its outermost edge with six rather unequal setæ. Inner expansion of proximal segment considerably produced, narrow linguiform in shape, and extending beyond the distal segment; armed with five marginal setæ, the middle one very thick, the others thick and spinous. Two ovisacs, pyriform, and somewhat divergent.

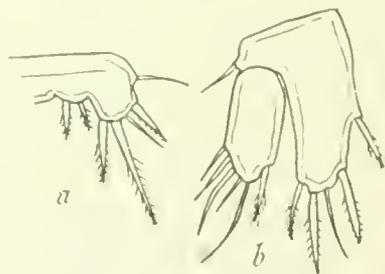


FIG. 14.—*DIOSACCUS TENUICORNIS*. *a*, FIFTH FOOT OF MALE; *b*, FIFTH FOOT OF FEMALE.

Male.—Anterior antennæ prehensile. Fifth legs as in fig. 14*a*.

Occurrence.—Collected with birge net among algæ, Eel Pond, Woods Hole, August.

Distribution.—British Isles (Brady); Mediterranean (Claus); coast of Bohüsland (Cleve); Wickford and Charlestown Pond (Williams); Liverpool Bay (Thompson).

Family LAOPHONTIDÆ.

Genus LAOPHONTE Philippi, 1840.

LAOPHONTE LONGICAUDATA Boeck.

Laophonte longicaudata BOECK, Forh. Vid. Selsk. Christiana, 1864, p. 279.—BRADY Copepoda of the British Islands, vol. 2, 1880, p. 82, figs. 1-10.—G. O. SARS, Crustacea of Norway, vol. 5, 1903, p. 243, pl. 161.

Length.—Female, 0.73 mm..

Characters.—Body of whitish color, with three light orange transverse bands, the first across the cephalic segment, the second occupying the posterior part of the genital segment, the third the anal segment..

Body of female rather slender, with long and slender caudal rami, which equal in length the last two segments combined, and extend straight behind. Anterior antennæ about half the length of the cephalic segment, and seven-segmented. Fifth pair of legs of the female small, distal segment narrow, oval in form, with a straight inner edge, also five terminal setæ. Inner expansion of proximal segment short and broad (fig. 15*a*), with five marginal setæ, the apical one the longest. Male, fifth leg as in fig. 15*b*.

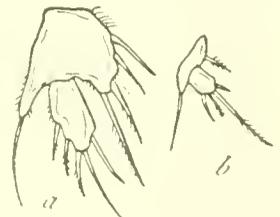


FIG. 15.—LAOPHONTE LONGICAUDATA. *a*, FIFTH FOOT OF FEMALE; *b*, FIFTH FOOT OF MALE.

Occurrence.—Collected with a birge net just off the Bureau of Fisheries wharf, Woods Hole, Massachusetts, July.

Distribution.—British seas (Brady); Norwegian coast (Sars); Franz Josef Land (Scott). Not heretofore reported from the western Atlantic.

Family LICHOMOLGIDÆ.

Genus LICHOMOLGUS Thorell, 1859.

LICHOMOLGUS FUCICOLUS Brady.

Lichomolgus fucicolus BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 41, pl. 85, figs. 1-11.—THOMPSON, Trans. Liverpool Biol. Soc., vol. 7, 1893, p. 33, figs. 1-3.

Length.—Female, 1.3 mm.; male, 1 mm.

Characters.—Color dark brown. Free swimming. Second antenna (fig. 16*a*) three-segmented, bearing a few marginal setæ, and at the apex of the third segment four long and one short seta, and a most

remarkable large falciform serrated claw, which is one-half as long as the antenna. Fifth legs (fig. 16*c*) of a single long curved segment, with two apical setæ. Female with two egg sacs.

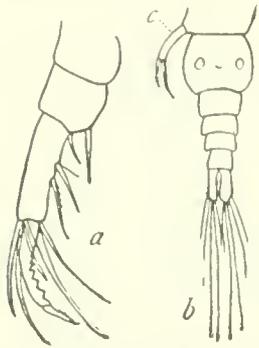


FIG. 16.—*LICHOMOLGUS FUCICOLUS*. *a*, SECOND ANTENNA OF FEMALE; *b*, ABDOMEN OF FEMALE; *c*, FIFTH FOOT.

Occurrence.—Collected in surface net at Buzzards Bay, Woods Hole, July.

Distribution.—British seas (Brady); Liverpool Bay (Thompson); Narragansett Bay (Charlestown Pond), Rhode Island (Williams).

Family TACHIDIIDÆ.

Genus *TACHIDIUS* Lilljeborg, 1853.

TACHIDIUS BREVICORNIS (Müller).

Cyclops brevicornis MÜLLER, Zool. Dan. Prodr., 1776, p. 414; Entomostraca, 1785, p. 118.

Tachidius brevicornis CLAUS, Die Freilebenden Copepoden, 1863, p. 112, figs. 1-8.—BRADY, Copepoda of the British Islands, vol. 2, 1880, p. 20, figs. 1-16.—THOMPSON, Trans. Liverpool Biol. Soc., vol. 7, 1893, p. 18, figs. 1-2.

Length.—About 1.65 mm.

Characters.—Body robust, with a short rostrum. Body segments fringed on their posterior margins with rows of minute teeth. Fifth pair of feet in both sexes (fig. 17*a, b*) broad, one-segmented, subquadrate, longer in female than in male. A typical inhabitant of warm, brackish pools.

Occurrence.—Collected by a birge net from a brackish pool near Old Mill, Jamaica Bay, Long Island, June.

Distribution.—British seas (Brady and Thompson); Charlestown Pond, Rhode Island (Williams).

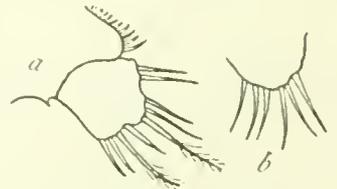


FIG. 17.—*TACHIDIUS BREVICORNIS*. *a*, FIFTH FOOT OF FEMALE; *b*, FIFTH FOOT OF MALE.

Family ILYOPSYLLIDÆ.

First antennæ very short, five-to-six segmented, basal segment greatly dilated. Second antennæ stout, dactyl-like, and destitute of a secondary branch. Mandible small, and bearing a simple bisetose palp. First pair of feet stout, strongly spined, with an outer branch which is indistinctly two-segmented, and an inner branch which is three-segmented. Second, third, and fourth pairs with both rami three-segmented. Fifth feet plate-like, inconspicuous, and with lobed margins. Abdomen short, and tapering toward the extremity; caudal setæ commonly distinctly spatulate.

Remarks.—The members of this group seem so very distinct from other known Harpacticoids as to merit the formation of this family. At present, the characters of the genus *Ilyopsyllus* are those of the family. Brady (1880, p. 145) was unable to find any evidences of fifth feet, therefore this is omitted from the original description of this genus.

Genus ILYOPSYLLUS Brady and Robertson, 1873.

ILYOPSYLLUS SARSI, new species.

Length of female exclusive of caudal setæ, 0.5 mm. Male unknown. Color deep blood red.

Seen from the side (fig. 18*b*) the ventral line is nearly straight, while the cephalic region is very unusually arched. First segment of the

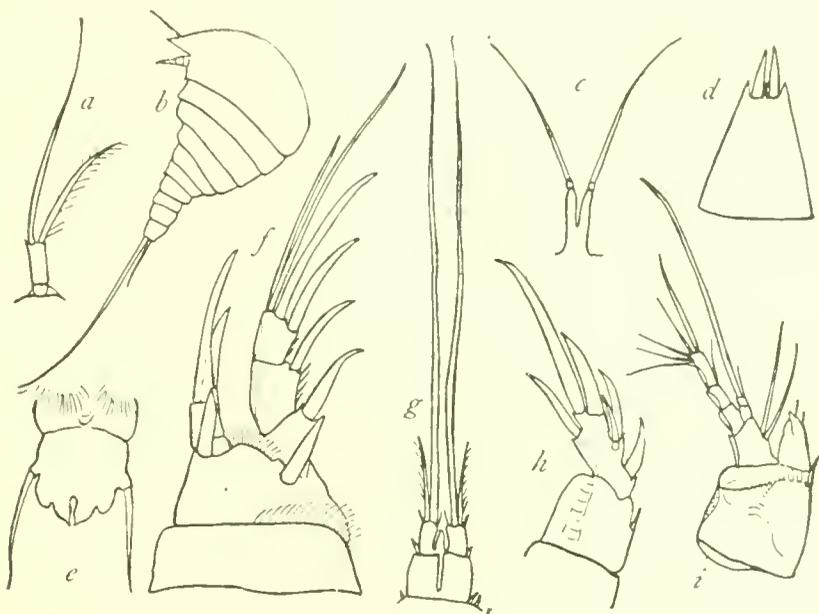


FIG. 18.—ILYOPSYLLUS SARSI. *a*, MANDIBULAR PALP. $\times 250$; *b*, LATERAL VIEW OF FEMALE $\times 70$; *c*, MAXILLIPEDS $\times 250$; *d*, ROSTRUM $\times 250$; *e*, FIFTH FOOT OF FEMALE; *f*, FIRST FOOT OF FEMALE $\times 250$; *g*, FURCAL RAMI OF FEMALE $\times 250$; *h*, SECOND ANTENNA OF FEMALE $\times 250$; *i*, FIRST ANTENNA OF FEMALE $\times 250$.

cephalothorax about one-half length of body. Abdominal segments armed posteriorly with a row of small spinules, with one or two larger spines at the outer angles. Rostrum (fig. 18*d*) large, triangular, and armed at tip with two movable spines. First antenna (fig. 18*i*) six-segmented, the first segment very large and with a semicircular row of spinules at its inner distal angle. Second segment very short, and produced into a broad, blunt, somewhat beak-like process, which is fully as long as the third segment. Third segment slightly longer than broad, and bearing a very long aesthetasc, which is supported on a two-segmented base, and is about twice as long as the four last segments of the antenna taken together. Fourth and fifth segments small, about as wide as long, terminal segment slightly longer and bearing a number of setæ.

Second antenna (fig. 18*h*) three-segmented, broad, strong, and dactyl-shaped, its terminal segment about twice as long as wide and armed with six strong spines, one of which is situated on the face of the segment, and is somewhat inconspicuous. Mandibular palp (fig. 18*a*) with a two-segmented base, and bearing two bristles at its tip, one plumose and about twice as long as the base, the other longer and simple.

The maxillipeds are as in fig. 18*c*. First leg (fig. 18*f*) with a basal part of two broad segments, the first one over three times as broad as long and bearing a semicircular row of spinules at its outer distal margin. Second segment irregular in shape, with a heavy plain spine at each distal angle, and a semicircular row of spinules between the bases of the two rami. Outer ramus three-segmented, and more than twice as long as the inner one, each segment with a large spine on its outer distal angle, and the terminal segment with an extra spine and two slender setæ. Inner ramus indistinctly two-segmented, the terminal segment with two strong plain spines. Second to fourth feet alike, with both rami three-segmented, and with many long plumose setæ.

Fifth foot (fig. 18*e*) slightly longer than wide, and in the form of a plate, with a seta on each lateral margin, which is slightly longer than the foot. Its distal margin is four-lobed, with the deepest indentation in the middle. Basal portion with two semicircular rows of spinules.

Furcal rami (fig. 18*g*) slightly longer than wide, each with a very short inner seta, a dorsal seta, and two large terminal setæ, the outer of which is about one-seventh as long as the inner and plumose exteriorly, while the inner is fully as long as the body, but very slightly spatulate at base, and with very delicate tips.

Named for Dr. G. O. Sars.

Remarks.—This species at first glance superficially somewhat resembles *I. natans* Williams, but differs markedly in color, in shape of rostrum, size, and shape of projection of second segment of first antenna, character of armature of terminal segment of second antenna, first leg with two terminal setæ and two spines, instead of one terminal seta and two spines, comparative lengths of terminal setæ of furca, and shape of fifth foot: it having four lobes, which are of different sizes and shapes, instead of being regularly six-lobed.

But four other species of this genus are known to the writer—*I. affinis* Scott (Gulf of Guinea), *I. coriaceus* Brady and Robertson (British seas and coast of France), *I. holothuriæ* (Edwards), and *I. natans* Williams (Narragansett Bay, Mill Cove, Wickford).

Occurrence.—Collected plentifully with a birge net among floating algae in Eel Pond and Little Harbor, Woods Hole, Massachusetts, July, August; also brackish ponds, Woods Hole.

Type.—Cat. No. 39512, U.S.N.M.

SYNOPSIS OF THE GENERA OF HARPACTICOIDA.

Inner ramus of fourth leg three-segmented. *Alteutha, Amcira, Ameiropsis, Amenophia, Amphiascus, Aspidiscus, Bradya, Canuella, Cerviniopsis, Dactylopodella, Dactylopusia, Danielssenia, Delavalia, Diosareus, Ectinosoma, Eucanuella, Eupelte, Euterpe, Halithalestris, Harpacticus, Herdmania, Hermanella, Hersiliodes, Idomene, Idya, Idyella, Idyopsis, Ilyopsyllus, Longipedia, Machairopus, Microsetella, Microthalestris, Misophria, Nitocera, Onychocamptus, Parameira, Parastenhelia, Parategastes, Parathalestris, Parawestwoodia,^a Peltidium, Phyllothalestris, Porcellidium, Psamathe, Pseudobradya, Pseudothalestris, Robertsonia, Rhynchothalestris, Stenhelia, Stenocopia, Sunaristes, Tachidius, Tegastes, Thalestris, Tigriopus, Zaus, Zosime* A.

Inner ramus of fourth leg two-segmented. *Asellopsis, Atheyella, Canthocamptus, Cervinia, Ceylonia, Cletodes, Cyliodropsyllus, Euhydrosoma, Heteropsyllus, Laophonte, Laophontodes, Laophontopsis, Leptopsyllus, Lichomolgus, Maranbiotus, Mesochra, Moraria, Normanella, Paralichomolgus, Paratachidius, Phyllopodopsyllus, Pseudolichomolgus, Stenheleopsis, Tetragoniceps* B.

Inner ramus of fourth leg one-segmented. *Laophontella, Pontopolites, Pseudanthessius* C.

Inner ramus of fourth leg rudimentary, of a few spines or missing. *Dyspontius, Nannopus, Platychelipus* D.

D Inner ramus of third leg three-segmented. No fifth legs. On weed, 20 to 40 fathoms *Dyspontius*.

Inner ramus of third leg rudimentary D 1.

D 1. Both rami of the first leg two-segmented. Muddy bottoms between tides. *Platychelipus*.

Both rami of the first leg not two-segmented, the outer of three segments, the inner of two segments. Muddy bottoms, brackish pools *Nannopus*.

C. Inner ramus of third leg one-segmented to rudimentary. Bottom, 10 to 20 fathoms *Pontopolites*.

Inner ramus of third leg more than one-segmented C 1.

C 1. Inner ramus of third leg three-segmented. Littoral, Indian Ocean. *Pseudanthessius*.

Inner ramus of third leg two-segmented. Littoral, Indian Ocean. *Laophontella*.

B. Inner ramus of second and third leg rudimentary or obsolete. Bottom forms; mud. Males unknown *Icropsyllus*.

Inner ramus of third leg two- or three-segmented B 1.

B 1. Inner ramus of third leg three-segmented B 2.

Inner ramus of third leg two-segmented. One egg sac B 7.

B 2. Fifth pair of legs two-segmented. One egg sac B 3.

Fifth pair of legs one-segmented. Two egg sacs B 6.

B 3. Inner ramus of first leg forming a powerful claw, two-or-three segmented. Body regions sharply defined. Moderate depths, amongst algae. *Laophonte*.

Inner ramus of first leg normal, not forming a powerful claw B 4.

B 4. Inner ramus of second and third legs normal, not modified in any way. Fresh-water ponds and streams. Bottom forms amongst debris and algae. *Canthocamptus* (female).

Inner ramus of first, second, or third legs may be modified B 5.

B 5. Inner ramus of but the third leg modified. Freshwater lakes, ponds, etc. as *Canthocamptus* *Atheyella* (male).

Inner rami of the first, second, and third legs, or the second and third legs modified *Canthocamptus* (male).

^a The old name *Westwoodia* Dana 1855, preoccupied in Hymenoptera. The name *Parawestwoodia* here supplied.

- B 6. Anterior antennæ six- or seven-segmented. Free swimming in plankton, or in the branchial sacs of Ascidians..... *Lichomolgus*.
Anterior antennæ three-segmented. Otherwise as *Lichomolgus*. Washings from dredgings, Indian Ocean..... *Paralichomolgus*.
- B 7. Inner ramus of first leg three-segmented..... B 8.
Inner ramus of first leg two-segmented..... B 10.
- B 8. First antenna not more than five-segmented. Fifth legs two-branched, foliaceous. One egg sac. Males unknown. Moderate depths..... *Heteropsyllus*.
First antenna more than five-segmented, seven-to nine-segmented..... B 9.
- B 9. Caudal rami long and narrow, discontinuous. First antenna seven-segmented. Fifth legs two-segmented, the basal segment scarcely wider than the terminal one. Inner rami of second, third, and fourth legs two-segmented, more or less modified. One hundred fathoms or more..... *Cervinia*.
Caudal rami short and broad. First antenna nine-segmented. Tidal pools amongst algae..... *Paratachidius*.
- B 10. Rostrum anchor-shaped, of three strong spines, the two outer ones slightly curved outward at end. Towings, Puget Sound... *Pseudolichomolgus* (male).
Rostrum not anchor-shaped or of three spines..... B 11.
- B 11. Fifth legs one-segmented, sometimes plate-like..... B 12.
Fifth legs two-segmented..... B 18.
- B 12. Fifth legs forming enormous concave plates which serve for holding ova. Male unknown. Muddy bottom, 10 to 30 fathoms..... *Phyllopodopsyllus*.
Fifth legs normal, not used for holding ova..... B 13.
- B 13. Basal segment of all the legs, elbow-like. Fifth legs long and narrow. Littoral, 10 to 30 fathoms..... *Laophontodes* (male).
Basal segment of all the legs, not elbow-like, normal..... B 14.
- B 14. Furcal rami long and narrow, strongly divergent. Fifth leg plate-like. Two egg sacs. Male unknown. 50 fathoms, muddy bottom..... *Stenheliopsis*.
Furcal rami, normal, fifth legs variously shaped..... B 15.
- B 15. Anterior antennæ five-segmented..... B 16.
Anterior antennæ seven- to eight-segmented..... B 17.
- B 16. Body almost exactly cylindrical, about eleven times as long as wide. Anterior and posterior maxillipeds claw-like. (Parasitic?) Fifth leg narrow. Littoral. Muddy bottoms, 5 to 15 fathoms..... *Cylindropsyllus*.
Body subcylindrical, about seven times as long as wide. Fifth leg broad. Littoral, 10 to 30 fathoms..... *Enhydrosoma* (male).
- B 17. Fifth leg plate-like and two-lobed. Inner rami of third legs modified. Oyster washings, Indian Ocean..... *Cydonia* (male).
Fifth leg much longer than wide. Second maxilliped forming a prehensile clawed hand. Littoral, muddy bottoms..... *Tetragoniceps* (female).
- B 18. Outer rami of first legs two-segmented..... B 19.
Outer rami of first legs three-segmented..... B 20.
- B 19. First legs prehensile. Body depressed. Caudal rami lamellar, apical setæ rudimentary. Inner ramus of third leg transformed in male. Littoral... *Asellopsis*.
First legs not prehensile. Body subcylindrical. Caudal rami not lamellar. Inner ramus of third leg transformed in male. Fresh water. One egg sac, *Maranbiotus*.
- B 20. First legs prehensile..... B 21.
First legs not prehensile..... B 25.
- B 21. Basal segment of inner ramus of first leg with no seta on its inner margin. Rostral plate not well defined at base..... B 22.
Basal segment of inner ramus of first leg with a seta. Rostral plate well defined at base. Inner rami of first leg always two-segmented. One egg sac..... B 23.

- B 22. Body cylindrical, no conspicuous constrictions between the segments. Natatory legs normal, but inner rami of first legs two- to three-segmented. Inner rami in third legs modified in male. One egg sac. Brackish pools and ditches *Mesochra*.
 Body abnormal, with decided constrictions between its segments. Natatory legs bent, elbow-like. 10 to 30 fathoms..... *Laophontodes* (female).
- B 23. First antenna four- to five-segmented, stout. Furca lamellar. Both segments of fifth feet especially narrow. 6 to 10 fathoms, muddy bottoms.
Laophontopsis.
 First antenna of seven segments..... B 24.
- B 24. Inner ramus of first leg much longer than the outer. Fifth legs not foliaceous, but rather narrow. Furca normal. Bottom forms, pelagic..... *Normanella*.
 Inner ramus of first leg shorter than the outer, with an odd rod-like projection from its basal segment. Fifth legs foliaceous. Furca with a large thick terminal spine, and a few setæ. Bottom washings, pelagic. . *Ceylonia* (female).
- B 25. Anterior antenna four- to six-segmented. One egg sac. Marine..... B 26.
 Anterior antenna seven- to eight-segmented. One egg sac. Fresh-water. . B 27.
- B 26. Basal segment of fifth foot a broad plate. Terminal segment comparatively short and broad. Pelagic, sandy bottom *Euhydrosoma* (female).
 Basal segment of fifth foot narrow and produced into a narrow flange. Terminal segment of same very long and narrow. Pelagic, muddy sand..... *Cletodes*.
- B 27. Anterior antenna eight-segmented, the terminal part of four segments. Inner rami of first legs two- or three-segmented. Littoral and bottom.
Attheylla (female).
 Anterior antenna seven-segmented, the terminal part of three segments. Inner rami of first legs always two-segmented. Bottom..... *Moraria*.
- A. Inner ramus first leg one-segmented A 1.
 Inner ramus first leg two- or three-segmented A 6.
- A 1. Outer ramus of first leg three-segmented, strongly spined..... A 2.
 Outer ramus of first leg one-segmented..... A 3.
- A 2. Fifth legs very minute, plate-like, and lobed on distal margin. First antennæ five-segmented; basal segments much dilated. Body tumid and gibbous. Littoral. 5 to 20 fathoms. Algae..... *Hyposyllus*.
- A 3. Outer rami of the second, third, and fourth legs three-segmented..... A 4.
 Outer rami of the second, third, and fourth legs two-segmented A 5.
- A 4. First legs imperfectly prehensile. Fifth foot of male one-segmented; of female, two-segmented. No true ovisac. Head and last thoracic segment very large, produced ventrally. 3 to 30 fathoms. Sandy bottom..... *Tegastes*.
- A 5. First legs not prehensile. Otherwise much as *Tegastes*..... *Parategastes*.
- A 6. Inner ramus of first legs two-segmented A 7.
 Inner ramus of first legs three-segmented..... A 24.
- A 7. Outer rami of first legs two-segmented. One egg sac..... A 8.
 Outer rami of first legs three-segmented..... A 10.
- A 8. Fifth legs two-segmented; first legs prehensile..... A 9.
 Fifth legs one-segmented; first legs not prehensile; inner rami peculiarly bent at right angles, and with natatory setæ. One egg sac. Pelagic, in towings.
Euterpe.
- A 9. Outer rami of first legs shorter than the inner. Body not flattened. First antenna eight-segmented. Tidal pools, or "tidal lagoons"..... *Pseudothulestris*.
 Outer rami of first legs longer than the inner. Body flattened, broad. Littoral, amongst algae and in tidal pools, or lagoons..... *Zaus* (mostly).
- A 10. Rami of first legs enormously broadened, flattened, and otherwise modified. Body short and flat. Furca lamellate, with rudimentary setæ. Fifth legs two-segmented. Littoral, on *Laminaria*, etc *Porcellidium*.
 Rami of first legs not unusually modified or developed..... A 11.

- A 11. Fifth legs one-segmented A 12.
 Fifth legs two- to four-segmented A 13.
- A 12. First leg not prehensile. Caudal setae modified. One egg sac. Muddy bottoms, 20 fathoms *Zosime*.
 First leg prehensile. Inner rami of second legs three-segmented, modified. Fifth leg an inconspicuous plate in male. Two egg sacs. 3 to 30 fathoms. Muddy bottoms or algae *Stenhelicia* (part).
- A 13. Fifth leg four-segmented; first antenna nine-segmented A 14.
 Fifth leg less than four-segmented A 15.
- A 14. Outer ramus first leg with segments approximately same length. Inner rami alike in sexes. Washings from muddy dredgings *Parastenhelia* (male).
 Outer ramus first leg with the middle segment much the larger. Inner ramus of third leg unlike in the sexes. Not more than 0.5 mm. long. Littoral, among algae *Microthalestris* (male).
- A 15. Fifth foot three-segmented A 16.
 Fifth foot two-segmented A 17.
- A 16. Furca extremely long and narrow. First leg not prehensile, but terminal segment with a finger-like projection. First antenna nine-segmented. Pelagic, muddy bottoms *Herdmania* (male).
 Furca not extremely long and narrow. First leg prehensile. Body depressed. Littoral, 2 to 20 fathoms *Eupelte*.
- A 17. Fifth legs narrow, linear A 18.
 Fifth legs not narrow and linear. Basal segment much expanded A 20.
- A 18. Body short, oval, and much flattened. Furca not reaching beyond posterior expansions of body segments, and narrow. Inner segments of first legs broad. Littoral, sandy bottom *Peltidium*.
 Body not oval and much flattened A 19.
- A 19. Furca very long and narrow. First foot not prehensile, but terminal segment with a finger-like projection. First antenna nine-segmented. Muddy bottoms, 30 to 40 fathoms *Herdmania* (female).
 Furca not very long and narrow. First foot prehensile, the basal segment very broad, the terminal one narrow. First antenna eight-segmented. Somewhat like *Cyclops*. 10 to 30 fathoms, muddy bottom *Idylla*.
- A 20. First antenna five-segmented. First leg not prehensile. Inner ramus of second leg two-segmented in male and modified; three-segmented in female. One egg sac. Brackish mouths of rivers, and pelagic *Danielssenia*.
 First antenna six- to nine-segmented. First feet prehensile A 21.
- A 21. Inner ramus of second legs two-segmented, modified in male, also with a spine. Body dilate and depressed in front. First antenna six-segmented. 6 to 20 fathoms, among algae and hydroids *Dactylopodella*.
 Inner ramus of second legs not modified in the sexes A 22.
- A 22. Inner rami first legs shorter than the outer rami. Two egg sacs. First antenna eight-segmented. Brackish pools, muddy bottom *Delavalia*.
 Inner rami first legs longer than the outer rami A 23.
- A 23. Outer rami of first legs with the three segments about the same size. Inner rami of all legs alike in the sexes. Washings from muddy dredgings. *Parastenhelia* (female).
 Outer rami of first legs with the middle segment much the longest of the three. Not more than 0.6 mm. long. Inner ramus of third leg modified in male. Littoral, among algae *Microthalestris* (female).
- A 24. Outer rami of first leg one- to two-segmented. Prehensile A 25.
 Outer rami of first leg always three-segmented A 28.
- A 25. Outer rami of first legs longer than the inner A 26.
 Outer rami of first legs shorter than the inner (one-segmented in *Parawestwoodia nobilis*) A 27.

- A 26. Body slender and not flattened. First antenna eight-segmented. Inner ramus second leg modified in male. Outer ramus third leg large and robust, spiny and prehensile. One egg sac. Littoral to 100 fathoms. *Harpacticus*.
 Body slender, oblong, and much flattened, lateral plates produced. First antenna five-segmented. 20 to 30 fathoms. *Zaus goodsiri*.
- A 27. Basal segment of inner ramus very long, several times as long as the last two segments taken together. One egg sac. Littoral, tidal pools among algae. *Paravestwoodia*.
 Basal segment of inner ramus very short, but a small proportion of the inner ramus. Two egg sacs. Fifth foot of male of two separate lobes. Fresh-water pools as with *Diaptomus* and *Canthocamptus*. *Onychocamptus*.
- A 28. Fifth legs three-segmented. First legs not prehensile, but as *Cyclops*. First antenna sixteen-segmented, that of male somewhat less. One egg sac. 20 to 50 fathoms, sandy bottom. *Misophria*.
 Fifth legs less than three-segmented. A 29.
- A 29. Fifth legs of a small setiferous lamella. A 30.
 Fifth legs from one-to two-segmented. A 33.
- A 30. First foot slightly prehensile. First pedigerous segment separated from the cephalothorax. Genital segment with a dorsal suture. Two egg sacs. 10 fathoms, sandy bottom, algae. *Canuella*.
 First foot not at all prehensile. No transverse dorsal suture of genital segment of female. First pedigerous segment not separated from cephalothorax. A 31.
- A 31. First antenna eight-segmented. Body like *Cyclops*. Inner ramus of second leg modified, two-segmented. 3 to 30 fathoms, mostly muddy bottom. *Stenelia* (male, part).
 First antenna, six- to seven-segmented. A 32.
- A 32. Outer ramus of second antenna six-segmented. Body slender, not compressed. But trace of a seta on middle segment of inner ramus of fourth legs. Inner rami of second legs modified in male. Two egg sacs. A few fathoms, sandy bottoms (shells of hermit crabs) *Sunaristes*.
 Outer ramus of second antenna three-segmented, but well developed. Anterior part of body somewhat depressed and broadened. A well developed seta on middle segment of inner ramus of fourth legs. One egg sac. Males unknown. 10 to 30 fathoms, sandy bottom. *Bradya* (in part).
- A 33. Fifth legs one-segmented. A 34.
 Fifth legs two-segmented. A 37.
- A 34. Fifth foot an oval setiferous segment in both sexes, about as broad as long. One egg sac. Inner ramus of second leg modified in male. Brackish marsh pools and bays *Tachidius*.
 Fifth foot longer than broad. A 35.
- A 35. Body like *Cyclops*. Genital segment much broader than the preceding one. Antennæ much as *Cyclops*. Two egg sacs. Surface net and washings. A 36.
 Body *Canthocamptus*-like, genital segment not distinctly broader than the preceding segment. Antennæ much as *Canthocamptus*. Two egg sacs. 3 to 30 fathoms, mostly mud bottom, occasionally algae. *Stenelia* (male, partly).
- A 36. Anterior half of body almost circular. Second segment of first antenna much the longest. Washings from sponges, etc. (Indian Ocean). *Hermanella*.
 Anterior half of body about one-half as wide as long. Second segment of first antenna not the longest. Surface net and washings (Indian Ocean). *Hersiliodes*.
- A 37. Fifth foot with terminal segment trilobate, each lobe with a spine, and inner expansion of basal segment always with two spines, as in text fig. 7. Body slender, fusiform. Readily float on surface film. One egg sac. 10 to 30 fathoms, muddy bottom. *Ectinosoma*.
 Fifth foot not trilobate, and inner expansion of basal segment not with two spines. A 38.

- A 38. Terminal segment of second leg enormously lengthened. First legs partly prehensile. First antenna five-segmented. One ovisac. Muddy bottoms. 6 to 30 fathoms *Longipedia*.
Terminal segment of second leg unusually lengthened. First antenna six- to nine-segmented..... A 39.
- A 39. Basal segment of inner ramus of first leg enormously broadened. First leg otherwise modified..... A 40.
Basal segment of inner ramus of first leg not enormously broadened. First leg normal..... A 43.
- A 40. Posterior part of body not so sharply demarcated from the anterior part as to approximately equal width of the abdomen. Body much depressed. Basal segment of inner rami of first leg very broad and triangular, and as long as the outer ramus. One egg sac. 6 to 20 fathoms, adhering to debris, etc. *Idomene*.
Posterior part of body sharply and abruptly demarcated from the anterior part, with abdomen approximately one-third width of segment just anterior to it. Body more or less depressed. First antenna eight- to nine-segmented. One egg sac..... A 41.
- A 41. Middle segment of inner ramus of third and fourth legs, with two setæ each. Anterior part of body broad. Sublittoral, closely clinging to fronds of algæ, as *Laminaria* *Psamathe*.
Middle segment of inner ramus of third and fourth legs, with one seta each. A 42.
- A 42. Middle segment of outer ramus armed with a strong, claw-like spine curving outward. Littoral, amongst algæ *Machairopus*.
Middle segment of outer ramus not armed with a strong, claw-like spine curving outward. Fifth legs long and narrow. The two segments preceding genital segment, fornicate posteriorly. Sublittoral, closely clinging to fronds of *Laminaria*..... *Aspidiscus*.
- A 43. Caudal rami, long, narrow, linear, and so contiguous as to almost appear as a single appendage. Genital segment in female produced on each side to a recurved, spiniform projection. First antenna six-segmented, with a long fusiform appendage from the fourth segment. One egg sac. Male unknown. Great depths, loose muddy deposits..... *Cerriniopsis*.
Caudal rami, not long, narrow, and so contiguous as to appear as a single appendage..... A 44.
- A 44. Both rami of first legs natatory, as those of the natatory legs, not prehensile. One egg sac..... A 45.
Both rami of first legs not natatory, one or both prehensile. One or two egg sacs..... A 48.
- A 45. Basal segment of first leg with three large accessory spines, one of which is situated on the face of the segment, the others on the margins. Abdomen distinctly separated from the thorax. Inner branch of second antenna two-segmented. Inner ramus second legs modified in male. 20 to 30 fathoms, muddy bottom..... *Robertsonia*.
Basal segment of first leg normal, with no accessory spines..... A 46.
- A 46. Anterior part of body not appreciably broader than the posterior part. Body very slender, linear. The two middle setæ of the furca greatly elongate. Outer branch of second antenna greatly elongate. Pelagic, near the surface, in plankton..... *Microsetella*.
Anterior part of body appreciably broader than the posterior part..... A 47.

- A 47. Posterior antenna with the outer ramus poorly developed, and occasionally of only two segments. Anterior part of body slightly depressed and broadened. Fifth legs large and alike in the sexes. 3 to 6 fathoms, muddy sand.
Pseudobradya.
- Posterior antenna well developed and distinctly three-segmented. Anterior part of body somewhat depressed and broadened. Fifth feet small (in male but one-segmented, a small setiferous lamella). 10 to 30 fathoms, sandy bottom.....*Bradya*.
- A 48. Rami of the natatory legs form a decided angle with the segment bearing them. Body depressed, oval, shield-shaped. Rolls up when disturbed. Outer rami of first legs the larger. Fifth legs falciform, alike in the sexes. Furca short, broad, and lamellar. Littoral, on *Laminaria* and other algæ, and on sandy and gravelly bottoms, 2 to 20 fathoms.....*Alteutha*.
- Rami of the natatory legs not forming a decided angle with the segment bearing them.....A 49.
- A 49. Outer rami of the first legs somewhat longer than the inner rami.....A 50.
- Outer rami of the first legs somewhat shorter than the inner rami, or occasionally subequal. (*Thalestris* and *Parathalestris* variable).....A 55.
- A 50. Middle segment of inner rami of fourth legs with no setæ on inner margin, one seta in similar location of other natatory legs. Inner rami of second legs modified in male. One egg sac. Rock and tidal pools and occasionally in fresh water in-shore.....*Tigriopus*.
- Middle segment of inner rami with at least one seta. One egg sac.....A 51.
- A 51. Body quite flat and shield-like. No rostrum. Eye present. Middle segment of inner ramus of second legs modified in male. 6 to 20 fathoms, at sea.
Amenophia.
- Body not flat nor shield-shaped. Rostrum present.....A 52.
- A 52. Fifth legs of both sexes foliaceous, those of the female large, more or less covering the egg sac.....A 53.
- Fifth legs of female slender, not covering the egg sacs. Male unknown. Genital segment of female with a well-developed dorsal suture (transverse), and produced on each side to a strong spiniform projection. Furca somewhat lamellar. Eye absent. First antenna with a very large seta on the fourth segment. 50 to 60 fathoms.....*Eucannella*.
- A 53. Fifth legs of female enormously developed, foliaceous, wholly covering the egg sacs. Genital segment in female with a well-marked dorsal transverse suture, and not produced on each side to a strong spiniform projection. Eye large and complicated. Inner rami of second legs modified in male. Among algæ, 6 to 20 fathoms.....*Phyllothalestris*.
- Fifth legs not enormously developed, and commonly not covering the egg sacs.....A 54.
- A 54. Rostrum sharply defined from the cephalic shield, and partially mobile. Body slender, cylindrical, and somewhat laterally compressed, fifth legs of moderate size. Littoral and tidal pools, among algæ.....*Parathalestris*.
- Rostrum not defined at base, short, thick, and immobile. Body robust. Rami of first legs subequal in length. Fifth legs large. Littoral, 10 to 20 fathoms, in algæ.....*Thalestris*.
- A 55. Inner margins of middle segments of inner rami of the natatory legs with 2 setæ each. One egg sac.....A 56.
- Inner margins of middle segments of inner rami of the natatory legs not with 2 setæ each.....A 58.

- A 56. Basal segment of inner ramus of first leg not larger than the rest of the ramus. Body more or less depressed. Spines of outer rami of first legs with long cilia. Eye normal. Littoral and pelagic..... *Idya*.
 Basal segment of inner ramus of first leg longer than the rest of the ramus. Inner ramus of second leg modified in male. Eye present..... A 57.
- A 57. Rostrum very prominent and very mobile. Body divisions sharply marked off from one another. First antennæ nine-segmented. Spines of outer rami of natatory legs coarsely denticulate. 6 to 20 fathoms, *Laminaria* and other algæ..... *Rhynchothalestris*.
 Rostrum not unusually prominent and mobile. Body divisions not unusually well marked. Body stout. First antennæ five- to nine-segmented. Spines of outer rami of natatory legs commonly plain, not coarsely denticulate. Littoral and tidal pools, among algæ..... *Dactylopusia*.
- A 58. Middle segments of inner rami of natatory legs with one seta each. One egg sac..... A 59.
 Middle segments of inner rami of natatory legs not with one seta each, with two on the second and third inner rami, or one on the third and fourth... A 63.
- A 59. Basal segment of inner rami of first leg shorter than rest of ramus. Eye absent. No rostrum. Body short, stout, and cylindrical. 20 to 30 fathoms, muddy bottom..... *Parameira*.
 Basal segment of inner rami of first leg longer than the rest of the ramus. Inner rami of second leg not modified in male. One egg sac..... A 60.
- A 60. Caudal rami long and narrow, ten to twenty times as long as wide. Rami of natatory legs long and narrow. Body slender. Rostrum small. Eye absent. Last two segments of inner rami of first legs, more or less bent on the first. 30 to 50 fathoms, muddy bottom..... *Stenocopia*.
 Caudal rami not long and narrow, not more than one to five times as long as wide. Eye present..... A 61.
- A 61. Outer rami of second antennæ two-segmented. Rostrum small, but distinct. Body slender. First two segments of first antenna much the larger. Basal segments of inner rami of first leg longer than the outer rami. Moderate depths among algæ..... *Ameiropsis*.
 Outer rami of second antennæ one-segmented. Body slender. Rostrum small..... A 62.
- A 62. Caudal rami scarcely spinulose. Anal opercle perfectly smooth. Moderate depths among algæ, rarely littoral..... *Ameira*.
 Caudal rami coarsely spinulose. Anal opercle denticulate. Segments of urosome coarsely spinulose. Strictly littoral, brackish and tidal pools.... *Nitocra*.
- A 63. Middle segment of inner rami of second and third legs, with two setæ each, of fourth pair, one..... A 64.
 Middle segment of inner rami of second legs with two setæ, of third and fourth legs, one each. Inner rami of second legs modified in male. One egg sac. A 66.
- A 64. Terminal segment of fifth legs long and narrow, not foliaceous. Body short and depressed, its posterior part abruptly much narrowed. Males not known. Rostrum small. One egg sac. Littoral, 10 to 40 fathoms..... *Idyopsis*.
 Terminal segment of fifth legs not long and narrow, foliaceous. Two egg sacs. Rostrum prominent. Inner rami of second legs modified in male..... A 65.
- A 65. Outer rami of second antenna one-segmented. Body compressed in front, attenuate behind. The two segments of the fifth legs of male confluent. Littoral and tidal pools, among algæ..... *Diosaccus*.
 Outer rami of second antenna two-segmented. Body slender, cylindrical. The two segments of fifth legs of male not confluent. Moderate depths among algæ; not littoral..... *Amphiascus*.

- A 66. Caudal rami narrow, prolonged, and very divergent. Body elongate, subcylindrical, with no sharp divisions. Large, from 2.0 to 2.5 mm. long. Truly pelagic, near the surface.....*Halithalestris*.
 Caudal rami not narrow, and not divergent; not much longer than wide..A 67.
- A 67. Rostrum sharply defined from the cephalic shield, and partially mobile. Body slender, cylindrical, and somewhat laterally compressed. Fifth legs of moderate size. Littoral and tidal pools, among algæ.....*Parathalestris*.
 Rostrum not defined at base, short, thick, and not mobile. Body robust. Rami of first legs subequal in length; fifth legs large. Littoral, 10 to 20 fathoms, in algæ.....*Thalestris*.

UNCLASSIFIED.

- Ancorabolus*, new genus, *mirabilis* new species, A. M. NORMAN, Notes on the Nat. Hist. of East Finmark, Ann. Mag. Nat. Hist. (7), vol. 10, 1902, p. 341; vol. 11, 1903, pp. 1-4.
- Dermatomyzon*, *D. elegans* C. CLAUS, Arbeit. Zool. Inst. Wien, vol. 8, 1889, pp. 327-370.
- Lamippe* T. SCOTT, 1896, Fourteenth Ann. Rept. Fisheries Board of Scotland.
- Parartotrogus*, new genus, *richardi*, new species, Firth of Forth, T. SCOTT, Ann. Mag. Nat. Hist. (6), vol. 11, 1893, pp. 210, 211, figs. 1-11.
- Pseudocletodes*, new genus, *vararensis*, new species, Moray Firth, T. SCOTT, Ann. Mag. Nat. Hist. (6), vol. 12, 1893, p. 239, pl. 12, figs. 4-14.
- Pseudolaophonte* for *P. aculeata*, off Spanish Head, Isle of Man, A. SCOTT, Proc. Liverpool Biol. Soc., vol. 10, 1896, p. 144.

SYNONYMS.

- Amymone*=*Tegastes*.
Beatricella=*Stenhelia*.
Carillus=*Peltidium*.
Cleta=*Laophonte*.
Cyclopicra=*Dermatomyzon*.
Cylindrosoma=*Cylindropsyllus*.
Dactylopus=*Dactylopusia*.
Evansia=*Tetragoniceps*.
Jonesiella=*Danielssenia*.
Jurinia. Related to *Nannopus*? (See Brady, Copepoda of the British Islands, vol. 2, 1880, p. 101.)
Leptascus=*Tetragoniceps*?
Lilljeborgia=*Cletodes*.
Oniscidum=*Peltidium*.
Ophiocamptus=*Moraria*.
Orthopsyllus=*Cletodes*.
Pseudowestwoodia=*Pseudothalestris*.
Reticulina=*Peltidium*.
Seutellidium=*Psamathe*.
Sterope=*Peltidium*.
Tisbe=*Idya*.
Westwoodia=*Parawestwoodia*^a (new name).

^aOld name *Westwoodia* preoccupied in Hymenoptera.

Order CLADOCERA.

Division GYMNOMERA.

Tribe ONYCHPODA.

Genus PODON Lilljeborg, 1833.

PODON LEUCKARTI (Sars).

Pleopsis leuckarti Sars, Forh. Vid. Selsk. Christiania, 1861, p. 45.

Podon polyphemoides P. E. Müller, Danmarks Cladocera, 1867, p. 220, pl. 6, figs. 5-6.

Podon leuckarti Sars, Forh. Vid. Selsk. Christiania, 1890, no. 1, p. 14.—LILLJEBORG, Nova Acta Regiæ Soc. Sci. Upsaliensis, ser. 4, vol. 19, 1901, p. 636, pl. 85, fig. 12; pl. 86, fig. 1-3.—APSTEIN, Nordisches Plankton, Cladocera, Kiel, 1901, p. 13, fig. 23.

Female from 0.89 to 1 mm. long, and about two-thirds as high. Males slightly smaller. Seen from the side (fig. 19 *a, b*), both sexes

are broadly and evenly rounded dorso-posteriorly. The head has a nearly straight upper contour, about two-thirds as high as long, and nearly one-half the length of the entire body. A prominent convexity below and just posterior to the neck region. - Both branches of the two branched antennæ (second antennæ) are armed with six setæ each, while both *P. intermedius* Lilljeborg, and *P. polyphemoides* (Leuckart) have seven setæ on one branch and six on the other one.

Outer process of the first leg with one seta; of second leg with one seta; of third leg with one seta; of fourth leg with two setæ.

The posterior part of the body terminates in two long spines. The shell is very transparent, and from grayish yellow to whitish in color. The so-called neck gland is situated near the neck invagination.

Remarks.—This species was noted in the same collections as those containing *Eradne nordmanni* Lovén, and therefore

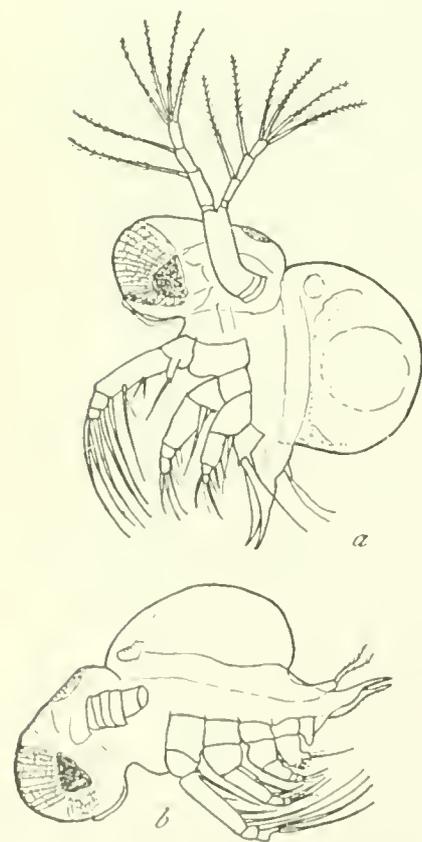


FIG. 19.—PODON LEUCKARTI. *a*, SIDE VIEW OF FEMALE; *b*, SIDE VIEW OF MALE.

with the same species of Copepoda.

Occurrence.—Surface tidal tows at Bureau of Fisheries wharf, Woods Hole, Massachusetts. Also in ordinary surface tows at 10 p. m., quiet water and northeast wind; more abundantly at 8 a. m. in sunlight at the same place, August 11, 1909.

Distribution.—North Sea (Timm), May-July; off western coast of Europe and the Mediterranean Sea (Lilljeborg).

Genus EVADNE Lovén, 1836.

EVADNE NORDMANNI Lovén.

Evadne nordmanni LOVÉN, Kongl. Sven. Vet. Akad. Handl., 1835, p. 1, pls. 1-2, figs. 1-16.—BAIRD, British Entomostraca, 1850, p. 111, pl. 17, fig. 2.—SARS, Forh. Vid. Selsk. Christiania, 1890, no. 1, p. 14. LILLJEBORG, Nova Acta Regiæ Soc. Sci. Upsaliensis, ser. 4, vol. 19, 1901, p. 642, pl. 86, figs. 4-17.—APSTEIN, Nordisches Plankton, Cladocera, Kiel, 1901, p. 12, fig. 22.

Length of female from 0.90 to 1.15 mm. Height about one-half the length. Males slightly smaller, and tapering more rapidly posteriorly to a hyaline point.

Seen from the side (fig. 20*a*) the female is more or less triangular, depending upon the number of eggs in the brood sac. The body is somewhat rounded posteriorly, tapering to a small hyaline point. Head small, not separated from the brood sac by a distinct invagination, and about one-third the length of the rest of the body. The so-called neck gland is situated nearly over the eye spot. Eye spot as usual, large, somewhat triangular, and with many long crystalline lenses.

The brood sac may contain from three to eight embryos, thus causing its outline to be quite variable. Shell plain, quite transparent, and with no especial markings. Grayish white to yellowish in color.

Remarks.—Collected in company with *Poëdon leuckarti*, *Temora longicornis*, *Pontella meadii*, *Acartia tonsa*, *Centropages hamatus*, and *Labidocera astiva*.

Occurrence.—Surface tows from Bureau of Fisheries wharf, Woods Hole, Massachusetts, June to November.

Distribution.—North Sea, April to August (Timm); Atlantic Ocean (Hansen); North Atlantic (Lilljeborg); Narragansett Bay (Williams); Norwegian Plankton (Apstein).

BIBLIOGRAPHY.

The bibliography here given includes only those names not found in Williams' list in the American Naturalist, vol. 40, no. 477, September, 1906.

APSTEIN, C.

1901. Nordisches Plankton. VII. Cladocera. Kiel, pp. 11-15.

BAIRD, W.

1846. On some new Genera and Species of British Entomostraca. Ann. Mag. Nat. Hist., vol. 17.

1849. Arrangement of the British Entomostraca, with a list of species. Trans. Berwick Nat. Field Club, vol. 2.

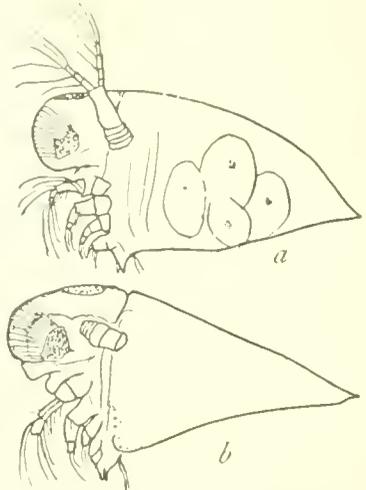


FIG. 20.—EVADNE NORDMANNI. *a*, SIDE VIEW OF FEMALE; *b*, SIDE VIEW OF MALE.

BRADY, G. S.

1872. Contributions to a study of the Entomostraca, No. 7. *Ann. Mag. Nat. Hist.*, vol. 10.

DANA, J. D.

1849. *Conspectus Crustaceorum*, etc. *Proc. Amer. Acad. Arts and Sci.*, vol. 2, pp. 9-55.

GOODSIR, H. D.

1845. On several new species of Crustacea allied to Sapphrina. *Ann. Mag. Nat. Hist.*, vol. 16, p. 326.

LEACH, W. E.

1819. *Dictionary Sci. Nat.*, vol. 14, p. 524. Article Entomostraca.

LILLJEBORG, W.

1901. Cladocera Sueciæ. *Nova Acta, Upsala*, ser. 4, vol. 19, pp. 1-701, pls. 1-87.

LOVÉN, L.

1836. *Evadne Nordmanni*, etc., *Kongl. Sven. Vet. Akad. Handl.*, pp. 1-29, pls. 1-2.

NORDQUIST, O.

1890. *Bidrag till kannedomen*, etc. *Medd. Soc. Fauna et Flora Fennica*, p. 17.

PHILIPPI, A.

1840. Fernere Beobachtungen über die Copepoden des Mittelmeeres. *Wieg. Archiv. Naturg.*, Jahrg. 6.

POPPE, S. A.

1888. Ein neuer Podon aus China nebst Bemerk. zur Synom. der bisher bekannten Podon-arten. *Abh. Naturw. Verein Bremen*, vol. 9, pp. 295-300.

SARS, G. O.

1861. Om Crust. Cladocera, etc. *Forbh. Vid. Selsk. Christiania*, pp. 144-167.

1890. Oversigt af Norges Crustaceer, etc. *Forbh. Vid. Selsk. Christiania*, No. 1.

SCOTT, T.

1898. Rept. on the marine and fresh water crustacea from Franz Josef Land. *Linn. Soc. Jour., Zool.*, vol. 27, pp. 60-126, 7 pls.

STENROOS, K. E.

1895. Die Cladocera der Umgebung von Helsingfors. *Acta Soc. Flora et Fauna Fennica*, vol. 11, no. 2, 1 plate.

THOMPSON, I. C.

1893. Revised report on the Copepoda of Liverpool Bay. *Trans. Liverpool Biol. Soc.*, vol. 7, pp. 1-56, pls. 15-35.

THORELL, T.

1859. *Bidrag till Kannedomen om Krustaceer*, etc. *Kongl. Sven. Vet. Akad. Handl.*, September.

VAN BREEMEN, P. J.

1908. *Nordisches Plankton*. VIII, Copepoden, pp. 1-263, figs. 1-251.

WHITE, ADAM.

1857. *Popular History of British Crustacea*.

WILLIAMS, L. W.

1906. Notes on marine Copepoda of Rhode Island. *Amer. Nat.*, vol. 40, no. 477, September, pp. 639-660, figs. 1-23.

1907. List of Rhode Island Copepoda, Phyllopoda and Ostracoda with new species of Copepoda. *Thirty-seventh Ann. Rept. Commis. of Inland Fisheries of Rhode Island (special paper No. 30)*, pp. 69-79, 3 plates.