

~~Handwritten scribble~~

29

6858

I

BULLETIN

168-4

OF THE

Harvard University,

MUSEUM OF COMPARATIVE ZOÖLOGY

AT

HARVARD COLLEGE, IN CAMBRIDGE.

VOL. XXV.



CAMBRIDGE, MASS., U. S. A.
1893-1895.

No. 8. — *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of ALEXANDER AGASSIZ, carried on by the U. S. Fish Commission Steamer "Albatross," during 1891, LIEUT. COMMANDER Z. L. TANNER, U. S. N., Commanding.*

[Published by Permission of MARSHALL McDONALD, U. S. Fish Commissioner.]

XIV.

The Pelagic Schizopoda. By ARNOLD ORTMANN.

EUPHAUSIACEA.

Thysanopoda agassizi, nov. spec.

Form of body rather stout. Antero-lateral angles of the carapace rectangular, rounded, and without a denticle. The lateral margins without denticles. Rostral projection triangular, sharply pointed, longer than the eyes. Anterior part of the carapace slightly keeled above. Third, fourth, and fifth segments of the abdomen projecting posteriorly as acute dorsal spines. Sixth segment somewhat longer than the preceding. Preanal spine small, simple. Eyes moderate. The first joint of the antennular peduncle furnished at the distal end with a dorsal cushion-like, densely hispid elevation. This elevation projects forward as an acute, somewhat outwardly directed, spine-like lappet, nearly as long as the second joint. The outer anterior corner of the first joint bears a smaller spine. The second joint projects forward as a spine-like lappet similar to the first joint. The outer corner of the antennal scale bears a denticle. Telson with 10 to 12 pairs of dorsal denticles, inner plate of the uropoda shorter than the outer, the latter as long as the telson. Length, 19 mm.

This species is related by the long spine-like lappets of the antennulæ to *Th. monacantha* Ortmann, and by the hispid cushion of the first joint of the antennulæ to *Th. obtusifrons* Sars. But it may be recognized by the acute rostrum, the absence of lateral denticles on the carapace, and the presence of three dorsal abdominal spines.

Stations of the "Albatross"¹:—

3382. 200 fathoms.† (Gulf of Panama, 60 miles from the 100 fathom line.) One specimen.

3414. Surface to 200 fathoms.* (Between Galapagos and Acapulco, 350 miles from land.) One specimen.

Nyctiphanes australis G. O. Sars.

Challenger Schizopoda, 1885, p. 115, Pl. XX., Pl. XXI. figs. 1-7.

Stations of the "Albatross":—

March 7, 1891. 8.30 p. m. Surface. (Gulf of Panama.)

Hyd. 2619. Surface to 1,000 fathoms, open part of net. (Off Galera Point.)

3388. Surface to 400 fathoms, open part of net; nothing in the closed part towed at 400 fathoms. (Gulf of Panama, 25 miles from land.)

3409. Surface. (Bindloe I., Galapagos.)

3435. Surface. (Gulf of California.)

Stations of the "Survey" (between San Francisco and the Sandwich Islands²):—

52. Surface.

54. Surface. Long. 129° 5' W.; Lat. 35° 3' 30" N.

74. Surface. Long. 133° 56' 30" W.; Lat. 30° 4' 30" N.

542. Surface. Long. 124° 57' 30" W.; Lat. 35° 31' N.

Geographical Distribution. The "Challenger" obtained this species in the Australian seas, on the surface, at night (off East Moncœur Isl., Bass Strait; off Cape Howe; off Port Jackson). The above named stations show that it is not restricted to the Australian seas.

¹ For a list of stations and chart of the route of the "Albatross," see A. Agassiz, Bull. M. C. Z., XXIII. No. 1, p. 4 and Pl. III., 1892.

† Indicates that the specimen came from the depth noted in the closed part of the Tanner tow-net.

* Surface to 200 fathoms, or surface to *xxx* fathoms, hereafter indicates that the specimen was brought up in the open part of the Tanner deep-sea tow-net, and that, except as in the Gulf of California at no great distance from the coast in a closed area, nothing was found in the closed part of the Tanner net when towed at sea at 300 fathoms or any greater depth, so that specimens brought up in the *open part of the net* probably came from a depth of less than 300 fathoms.—A. Agassiz. See Bull. M. C. Z., XXIII. No. 1, 1892.

² A number of pelagic Schizopods collected by the "Albatross" during the survey of the route for a submarine cable between San Francisco and the Sandwich Islands have been examined by Dr. Ortmann, and are included in this report. A. Agassiz.

Euphausia splendens DANA.

G. O. Sars, Challenger Schizopoda, 1885, p. 80, Pl. XIII. figs. 7-17.

The rostral margin is somewhat less produced than in Sars's Figure 15. The structure of the antennulæ is very characteristic; the joints of the peduncle are not provided with lobes, and from the dorsal face of the first joint springs a fascicle of strong curved setæ.

Survey stations (between San Francisco and the Sandwich Islands):—

540. Surface to 300 fathoms. Lat. $35^{\circ} 19' 30''$ N.; Long. $125^{\circ} 21' 30''$ W.

541. Surface to 300 fathoms. Lat. $35^{\circ} 25' 30''$ N.; Long. $125^{\circ} 9' 30''$ W.

542. Surface. Lat. $35^{\circ} 31'$ N.; Long. $124^{\circ} 57' 30''$ W.

543. Surface. Lat. $35^{\circ} 36' 30''$ N.; Long. $124^{\circ} 45' 30''$ W.

Geographical Distribution. Tropical and Southern Pacific; Southern Atlantic.

Euphausia mucronata G. O. SARS.

Challenger Schizopoda, 1885, p. 87, Pl. XV. figs. 9-11.

Stations of the "Albatross":—

March 7, 1891. 8.30 p. m. Surface. (Gulf of Panama.)

Hyd. 2619. Surface to 300 fathoms, and surface to 1,000 fathoms. (Off Galera Point).

3382. 200 fathoms.† (Gulf of Panama.)

3388. Surface to 400 fathoms. (Gulf of Panama, 25 miles from land.)

3412. Surface. (Wenman I., Galapagos.)

3414. Surface to 200 fathoms, and surface to 300 fathoms. (Between Galapagos and Acapulco, 350 miles from land.)

$13^{\circ} 33' 30''$ N.; $97^{\circ} 57' 30''$ W. 8 p. m. Surface. (Between Galapagos and Acapulco, 250 miles S. E. of Acapulco.)

3416. Surface to 300 fathoms. (Near Acapulco.)

120 miles N. W. Acapulco. Surface to 175 fathoms.

Off Guaymas. Surface to 500 fathoms. (Gulf of California.)

Geographical Distribution. This species has been previously captured only by the "Challenger": South Pacific, off the coast of Chili, surface.

Euphausia pellucida DANA.

G. O. Sars, Challenger Schizopoda, 1885, p. 75, Pl. XI., XII.

Ortmann, Decap. u. Schizop. Plankton Exp. 1893, p. 11.

Stations of the "Albatross":—

March 7, 1891. 8.30 p. m. Surface. (Gulf of Panama.)

3388. Surface to 400 fathoms. (Gulf of Panama, 28 miles from land.)

- Hyd. 2628. Surface to 200 fathoms. (Between Cape San Francisco and Galapagos).
 3409. Surface. (Bindloe I., Galapagos.)
 3412. Surface. (Wenman I., Galapagos.)
 3414. Surface to 100 fathoms. }
 Surface to 200 fathoms. } Between Galapagos and Acapulco,
 Surface to 300 fathoms. } 350 miles from land.
 At 200 fathoms. }
- 13° 33' 30" N.; 97° 57' 30" W. 8 p. m. Surface. (Between Galapagos and Acapulco, 250 miles from land.)
 3416. Surface to 300 fathoms. (Near Acapulco).
 3434. Surface. (Gulf of California.)
 50 miles south Guaymas. Surface to 700 fathoms.
 Off Guaymas. Surface to 500 fathoms.

“Survey” stations (between San Francisco and the Sandwich Islands):—

165. Surface. Lat. 30° 23' N.; Long. 140° 26' 30" W.
 542. Surface. Lat. 35° 31' N.; Long. 124° 57' 30" W.
 543. Surface. Lat. 35° 36' 30" N.; Long. 124° 45' 30" W.

Geographical Distribution. Cosmopolitan: Arctic, North, Central, and South Atlantic, Antarctic, South and Central Pacific, and Indian Oceans.

Euphausia diomedæ, nov. spec.

Frontal part of the carapace produced as a broad triangular-pointed plate, arched over the eyes, and covering their peduncles. Anterior part of carapace with a sharp keel, the lateral margins with *two* denticles on each side. Segments of the abdomen smooth, without spines. Sixth segment longer than the preceding. Preanal spine tridentate. Eyes of moderate size. Basal joint of antennulæ with a projecting leaflet above, divided into two lappets at the top. Outer corner of the antennal scale unarmed. Subapical spines of the telson finely denticulated at inner edge. Inner plate of uropoda a little longer than outer, both shorter than the telson.

This species agrees with *E. pellucida* in most respects, but the rostral plate is very different, being in *E. pellucida* acutely produced and not broadly arched over the peduncles of the eyes. Perhaps *E. diomedæ* might be better regarded as a variety of *E. pellucida*.

Station of the “Albatross”:—

3409. Surface. (Bindloe I., Galapagos.) Two specimens, associated with *E. pellucida*.

Euphausia gibboides ORTMANN.

Decap. u. Schizop. Plankton Exp. 1893, p. 12, Pl. I. fig. 5.

Stations of the "Albatross":—

Hyd. 2627. Surface to 1,770 fathoms. (Between Cape San Francisco and Galapagos.)

Hyd. 2628. Surface to 200 fathoms. (Between Cape San Francisco and Galapagos, about 250 miles from the Galapagos.)

"Survey" station (between San Francisco and the Sandwich Islands):—

540. Surface to 300 fathoms. Lat. $35^{\circ} 19' 30''$ N.; Long. $125^{\circ} 21' 30''$ W.**Geographical Distribution.** This species was obtained by the "Plankton Expedition" in the tropical part of the Atlantic, between 0 and 500 meters.**Euphausia gracilis** DANA.*G. O. Sars*, Challenger Schizopoda, 1885, p. 89, Pl. XV. figs. 12-23.*Ortmann*, Decap. u. Schiz. Plankton Exp. 1893, p. 13.

Stations of the "Albatross":—

Hyd. 2628. Surface to 200 fathoms. (Between Cape San Francisco and Galapagos, about 250 miles from the Galapagos.)

3409. Surface. (Bindloe I., Galapagos.)

3412. Surface. (Wenman I., Galapagos.)

Geographical Distribution. Central Atlantic; Tropical Pacific; Australian seas; Celebes Sea. Surface to about 1,000 meters.**Nematoscelis megalops** G. O. SARS.*G. O. Sars*, Chall. Schiz. 1885, p. 127, Pl. XXIII. figs. 5-10.*Ortmann*, Plankton Exp., 1893, p. 15.

"Survey" stations (between San Francisco and the Sandwich Islands):—

540. Surface to 300 fathoms. Lat. $35^{\circ} 19' 30''$ N.; Long. $125^{\circ} 21' 30''$ W.541. Surface to 300 fathoms. Lat. $35^{\circ} 25' 30''$ N.; Long. $125^{\circ} 9' 30''$ W.**Geographical Distribution.** North Atlantic; Greenland, Nova Scotia, British coasts; Southern subtropical Atlantic.**Nematoscelis microps** G. O. SARS.*G. O. Sars*, Chall. Schiz. 1885, p. 131, Pl. XXV. figs. 1-4.*Ortmann*, Plankton Exp. 1893, p. 16.

The identification of this species is somewhat doubtful, since in none of the specimens are the elongated legs preserved.

Stations of the "Albatross":—

3382. 200 fathoms.† (Gulf of Panama, about 60 miles from the 100 fathom line.)
 Hyd. 2619. Surface to 1,000 fathoms. (Off Galera Point.)
 Hyd. 2627. Surface to 1,770 fathoms. (Between Cape San Francisco and Galapagos.)
 Hyd. 2628. Surface to 200 fathoms. (Between Cape San Francisco and Galapagos.)
 3414. Surface to 200 fathoms, and surface to 300 fathoms. (Between Galapagos and Acapulco, about 250 miles from land.)
 3416. Surface to 300 fathoms. (Near Acapulco.)
 50 miles South Guaymas. Surface to 700 fathoms.
 Off Guaymas. Surface to 500 fathoms.

Geographical Distribution. North Atlantic; Mediterranean; Central Atlantic. Surface and 600–800 meters.

Nematoscelis tenella G. O. Sars.

G. O. Sars, Chall. Schiz. 1885, p. 133, Pl. XXV. figs. 5–7.

Ortmann, Plankton Exp. 1893, p. 16.

12° 34' N.; 97° 21' W. (Between Galapagos and Acapulco.)

Geographical Distribution. Central Atlantic; Cape of Good Hope; Philippine Islands. Surface to 650 m.

Stylocheiron abbreviatum G. O. Sars.

G. O. Sars, Chall. Schiz. 1885, p. 147, Pl. XXVII. figs. 11–13.

Ortmann, Plankton Exp., 1893, p. 17.

Hyd. 2619. Surface to 300 fathoms. (Off Galera Point.)

Geographical Distribution. Mediterranean; Tropical Atlantic; Sub-tropical Pacific (north of the Sandwich Islands). Surface to considerable depths: 1,300–1,500 meters (Plankton Exp.), 600–1,200 meters (Chun).

Stylocheiron suhmi G. O. Sars.

G. O. Sars, Chall. Schiz., 1885, p. 142, Pl. XXVII. fig. 1–4.

Ortmann, Plankton Exp. 1893, p. 17.

In none of the specimens are the elongated legs preserved, but this species is recognizable by the form of the eyes.

Stations of the "Albatross":—

3388. Surface to 400 fathoms (open part of net, nothing in closed part at 400 fms.). (Gulf of Panama, 25 miles from land.)

Hyd. 2628. Surface to 200 fathoms. (Between Cape San Francisco and Galapagos, about 250 miles from the Galapagos.)

3414. Surface to 300 fathoms. (Between Galapagos and Acapulco, 350 miles from land.)

12° 34' N. 97° 21' W. (Between Galapagos and Acapulco, about 300 miles S. E. of Acapulco).

Geographical Distribution. Central Atlantic, Pacific; New Guinea and Philippine Islands. Surface and 1,300–1,500 meters.

Stylocheiron flexipes ORTMANN.

Plankton Exp. 1893, p. 18, Pl. I. fig. 7.

Stations of the "Albatross":—

3382. 200 fathoms.† (Gulf of Panama, about 60 miles from the 100 fm. line.)

Hyd. 2627. Surface to 1,770 fathoms (open part of net). (Between Cape San Francisco and Galapagos.)

Geographical Distribution. Central Atlantic, between surface and 500 m.

MYSIDACEA.

BOREOMYSIS G. O. SARS.

Synopsis of the known Species.

a₁ Eyes of the usual structure, with visual elements.

b₁ Eye-peduncles conical or fusiform, cornea moderately or not at all expanded, not projecting laterally beyond the carapace.

c₁ Frontal margin produced to a sharp rostrum or pointed in the middle.

d₁ No lateral frontal spines over the eyes.

e₁ Eye-peduncle conical, cornea somewhat expanded. Rostrum well developed.

f₁ Eye-peduncle not prolonged as a tubercle over the cornea.

g₁ Rostrum bent upwards.

1. *B. arctica* (Kröyer). Greenland, Norway, 200–400 fathoms. (Cf. G. O. Sars, Monogr. Norg. Mys. 3, 1879, p. 10, Pl. XI.–XIII.)

g₂ Rostrum perfectly horizontal.

2. *B. nobilis* G. O. Sars. Spitzbergen Sea, 459 fathoms. (Den Norske Nordhavs Exp. Zool. Crust. 1885, p. 54, Pl. V. figs. 22–28.)

f₂ Eye-peduncle prolonged to a sharp tubercle over the cornea.

3. *B. californica* n. sp. Gulf of California.

- e₂ Eye-peduncle fusiform, cornea very small, not expanded. Rostrum represented by a small pointed projection.
4. *B. microps* G. O. Sars. South of Nova Scotia, 1,250 fathoms. (Chall. Schizop. 1885, p. 184, Pl. XXXIII. figs. 7-10.)
- d₂ A lateral frontal spine over each eye, therefore the frontal margin three-spined. Eye-peduncle conical, cornea expanded.
5. *B. tridens* G. O. Sars. Norway, 300-400 fathoms. (Monogr. Norg. Mysid. 3, 1879, p. 16, Pl. XIV.)
- c₂ Frontal margin obtusely rounded, without a rostral spine. Eye-peduncles conical, cornea expanded.
6. *B. obtusata* G. O. Sars. North Pacific, 345 and 2,740 fathoms. (Chall. Schizop. 1885, p. 182, Pl. XXIII. figs. 1-6.)
- b₂ Eye-peduncles constricted, very thin and cylindrical at the base. Cornea greatly expanded, projecting laterally considerably beyond the carapace. Frontal margin obtusely pointed, without a rostrum.
7. *B. megalops* G. O. Sars. Norway, 80-200 fathoms. (Monogr. Norg. Mysid. 3, 1879, p. 18, Pl. XV., XVI.)
- a₂ Eyes imperfectly developed, calyciform, without pigment or visual elements.
8. *B. scyphops* G. O. Sars. Arctic and Antarctic, deep-sea. (Nordhavs Exp. 1885, p. 56, Pl. VI. Chall. Schiz. 1885, p. 178, Pl. XXXII. figs. 10-20.)

Boreomysis californica, nov. spec.

This new species agrees so closely in almost every regard with *B. arctica*, that it is useless to give a detailed description. The only difference I observe is the peculiar character of the eye, whose cornea is somewhat less expanded, and whose peduncle is prolonged over the cornea as a sharp conical tubercle. The color of the cornea is pale brown, as in *B. arctica* (pigmento fulvescente).

It is somewhat doubtful whether this species belongs to the genus *Boreomysis* or to a new genus. The rudimentary condition of the pleopods and the want of male appendages to the antennulæ show that the specimens are females, but the incubatory lamellæ are not developed. In the largest specimen I observe at the base of the legs seven pairs of very little leaflets, which may be the seven pairs of incubatory lamellæ characteristic of the genus *Boreomysis*, and therefore I believe that this specimen, and also the two smaller ones, which do not show these leaflets, are not fully developed females. On the other hand, in case they are males, this species must be the representative of a new genus agreeing with the genera *Mysidella* and *Heteromysis* in the rudimentary condition of the male pleopods, but differing in the structure of the other appendages which are normally developed here.

50 miles south of Guaymas (Gulf of California). Surface to 700 fathoms. (From the open part of net.) Three specimens.

Siriella thompsoni (MILNE-EDWARDS).

G. O. Sars, Chall. Schiz. 1885, p. 205, Pl. XXVI. figs. 1-24.
Ortmann, Plankton Exp. 1893, p. 23.

“Survey stations” (between San Francisco and the Sandwich Islands):—

74. Surface. Lat. $30^{\circ} 4' 30''$ N.; Long. $133^{\circ} 56' 30''$ W.
 133. Surface (females only). Lat. $32^{\circ} 35' N.$; Long. $135^{\circ} 3' W.$
 165. Surface (males only). Lat. $30^{\circ} 23' N.$; Long. $180^{\circ} 26' 30'' W.$

Geographical Distribution. Tropical and subtropical seas, surface; Atlantic, Pacific, and Indian Oceans.

Siriella gracilis DANA.

Cf. *G. O. Sars*, Chall. Schizop. 1885, p. 209, Pl. XXXVI. fig. 25-28.

Galapagos: Charles Island, surface.

$13^{\circ} 33' 30''$ N.; $97^{\circ} 57' 30''$ W. 8 p. m. Surface. (Between Galapagos and Acapulco, about 250 miles S. E. of Acapulco.)

Geographical Distribution. Restricted up to the present to the Tropical Pacific. All the specimens were taken at the surface of the sea.

Euchætomera typica G. O. SARS.

G. O. Sars, Chall. Schiz., 1885, p. 211, Pl. XXXVII. figs. 1-20.
Ortmann, Plankton Exp. 1893, p. 23.

Hyd. 2619. Surface to 300 fathoms. (Off Galera Point. Nothing in closed part of net at 300 fathoms.)

Geographical Distribution. Tropical Atlantic and Northern subtropical Pacific, surface.

OBSERVATIONS ON THE VERTICAL DISTRIBUTION OF SCHIZOPODA.

The following species were taken at the surface : —

Station.	Time.		Number of Specimens.
March 7.	8.30 p. m.	<i>Nyctiphanes australis</i> .	5
Gulf of Panama.		<i>Euphausia mucronata</i> .	9
		<i>Euphausia pellucida</i> .	Many.
3409.	7.24 p. m.	<i>Nyctiphanes australis</i> .	2
Off Brinloe Isl., Galapagos.		<i>Euphausia pellucida</i> .	10
		<i>Euphausia diomedea</i> .	2
		<i>Euphausia gracilis</i> .	Many.
3412.	9 p. m.	<i>Euphausia mucronata</i> .	Many.
Off Wenman Isl., Galapagos.		<i>Euphausia pellucida</i> .	Many.
		<i>Euphausia gracilis</i> .	27
13° 33' 30" N.;	8 p. m.	<i>Euphausia mucronata</i> .	12
97° 57' 30" W.		<i>Euphausia pellucida</i> .	Many.
About 250 miles S. E. of Acapulco.		<i>Siriella gracilis</i> .	1
3434.	10.14 a. m.	<i>Euphausia pellucida</i> .	1
Gulf of California, off Altata.			
3435.	8.56 a. m.	<i>Nyctiphanes australis</i> .	8 jun.
Gulf of California, off Carmen Isl.			

In the first place one observes that all surface catches which contain a considerable number of specimens were made at night, that is to say after sunset. The catches at Stations 3434 and 3435, made in the forenoon, contain but few specimens. In all the other catches made in the daytime the Schizopoda are wanting. This fact shows again that the pelagic Schizopoda live at the surface of the sea chiefly in the night, especially the species *Nyctiphanes australis*, *Euphausia mucronata*, *pellucida*, and *gracilis*.

Other hauls made between surface and various depths contain the following species taken in the open part of the Tanner net : —

Depth.	Station.	
0-100 fathoms.	3414.	<i>Euphausia pellucida</i> .
	350 miles S. E. of Acapulco.	
0-175 fathoms.	120 miles N. W. Acapulco.	<i>Euphausia mucronata</i> .
0-200 fathoms.	Hyd. 2628.	<i>Thysanopoda agassizi</i> .
	250 miles from the Galapagos.	
	3414.	<i>Euphausia mucronata</i> .
	350 miles S. E. of Acapulco.	<i>Euphausia pellucida</i> .
		<i>Euphausia gibboides</i> .
		<i>Euphausia gracilis</i> .
		<i>Nematoscelis microps</i> .
		<i>Stylocheiron suhmi</i> .

Depth.	Station.	
0-300 fathoms. ¹	Hyd. 2619. Off Galera Point.	<i>Euphausia mucronata</i> .
	3414.	<i>Euphausia pellucida</i> .
	350 miles S. E. of Acapulco.	<i>Nematoscelis microps</i> .
	3416.	<i>Stylocheiron abbreviatum</i> .
	25 miles S. E. of Acapulco.	<i>Stylocheiron suhmi</i> .
		<i>Euchætomera typica</i> .
0-400 fathoms. ²	3388. Gulf of Panama, 25 miles from land.	<i>Nyctiphanes australis</i> .
		<i>Euphausia mucronata</i> .
		<i>Euphausia pellucida</i> .
		<i>Stylocheiron suhmi</i> .
0-500 fathoms.	Off Guaymas, from open part of net.	<i>Euphausia mucronata</i> .
		<i>Euphausia pellucida</i> .
		<i>Nematoscelis microps</i> .
0-700 fathoms.	50 miles S. of Guaymas, from open part of net.	<i>Euphausia pellucida</i> ,
		<i>Nematoscelis microps</i> .
0-1,000 fathoms.	Hyd. 2619. Off Galera Point, from open part of net.	<i>Nyctiphanes australis</i> .
		<i>Euphausia mucronata</i> .
		<i>Nematoscelis microps</i> .
0-1,770 fathoms.	Hyd. 2627. Between Cape San Francisco and the Galapagos (nothing in closed part of net).	<i>Euphausia gibboides</i> .
		<i>Nematoscelis microps</i> .
		<i>Stylocheiron flexipes</i> . ³

This series shows that the catches in the open part of the Tanner net to depths of more than 300 fathoms do not contain more species than those between 0 and 300 fathoms. It is also to be noted, that the hauls to 500 and more fathoms⁴ contain a remarkably small number of species. *All the species obtained by the hauls extending from the surface to greater depths than 300 fathoms certainly occur, as is shown by other catches, in depths less than 300 fathoms, and it is very probable, that they occurred also in the same lesser depth here; especially Euphausia mucronata, pellucida, and gracilis, Nematoscelis microps, and others.*

From 200 fathoms were obtained in the closed part of the Tanner tow-net, in the Gulf of Panama, about 60 miles from the 100 fathom line (Station 3382), *Thysanopoda agassizi*, 1 specimen, *Euphausia mucronata*, 6 specimens, *Nematoscelis microps*, many specimens, *Stylocheiron flexipes*, 3 specimens.

¹ It should be borne in mind that at no station at sea did the closed part of the Tanner net bring up anything from a depth of 300 fathoms. — A. Agassiz.

² Nothing in the closed part of the Tanner net when towed at 400 fathoms.

³ Is also found at Station 3382, in 200 fathoms, in the Gulf of Panama.

⁴ All of which come from the open part of the Tanner net, the closed part of the net having at no station at sea brought up anything. — A. Agassiz.

Very interesting is the Station 3414,¹ at 11.14 a. m., 350 miles S. E. of Acapulco. Here were obtained in the open part of the Tanner net:—

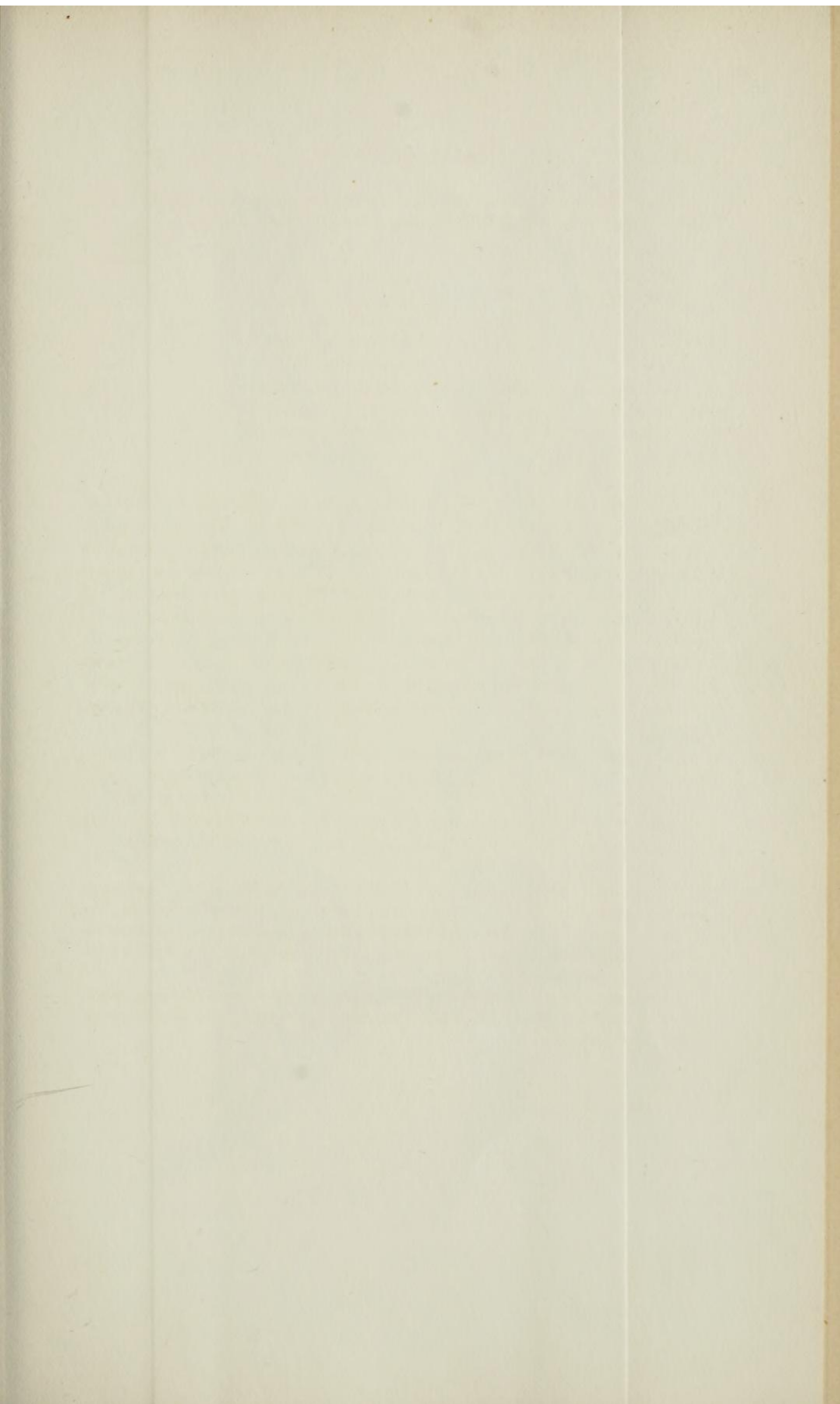
		Number of specimens.
0-100 fathoms.	<i>Euphausia pellucida</i> .	3
0-200 fathoms.	<i>Thysanopoda agassizi</i> .	1
	<i>Euphausia mucronata</i> .	2
	<i>Euphausia pellucida</i> .	32
	<i>Nematoscelis microps</i> .	1
0-300 fathoms (nothing in the closed part of the Tanner net towed at that depth 15 minutes).	<i>Euphausia mucronata</i> .	4
	<i>Euphausia pellucida</i> .	17
	<i>Nematoscelis microps</i> .	5
	<i>Stylocheiron suhmi</i> .	2

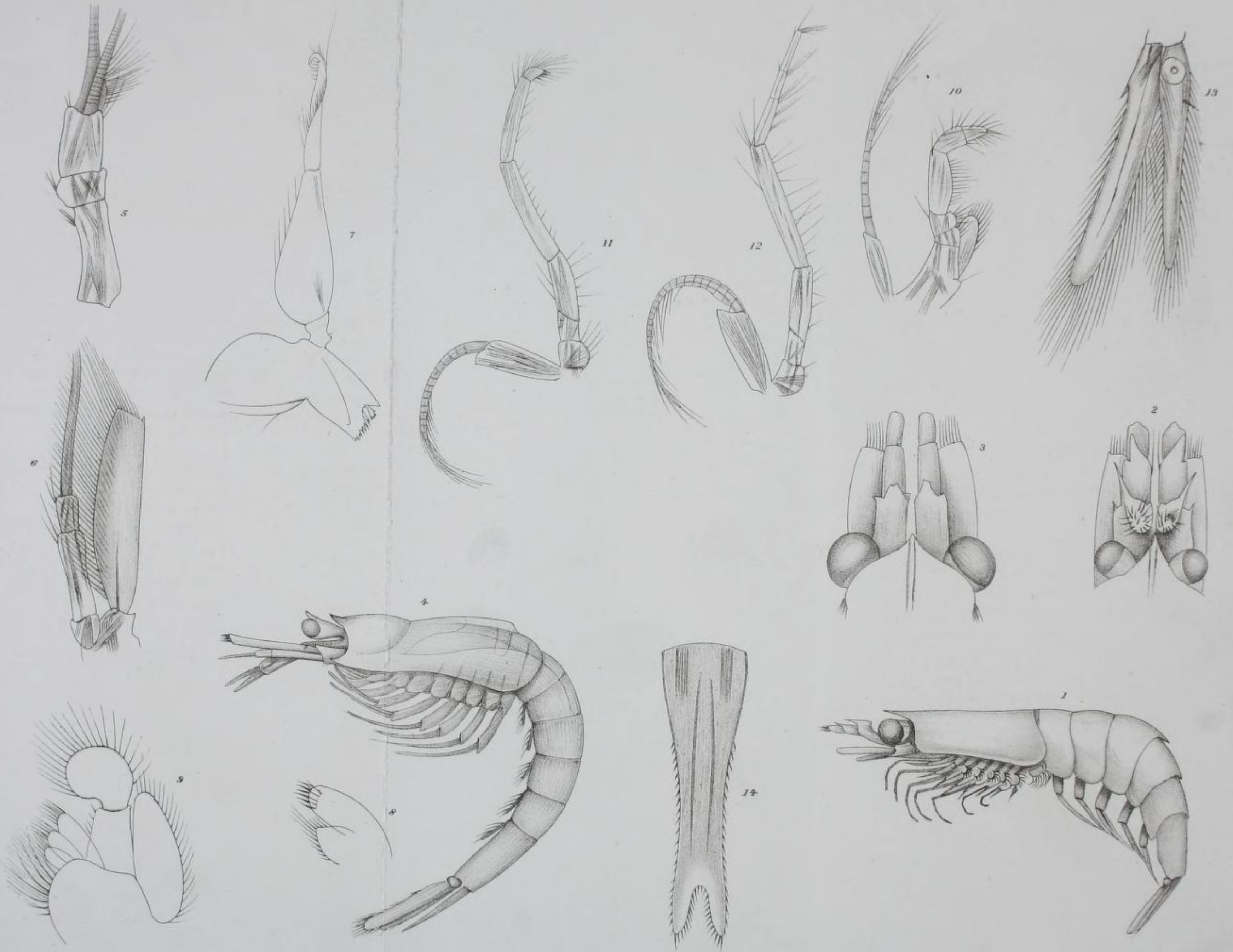
Euphausia pellucida is the only species which comes in the daytime, although in small numbers, near the surface of the sea, the other species swimming at a greater depth. And, indeed, most of the *E. pellucida* are found by day at a greater depth than 100 fathoms. On the other hand the catch from 0 to 300 fathoms contains no more specimens of this species than that from 0 to 200 fathoms. It is therefore very probable that most specimens of *E. pellucida* swim during the daytime in depths from 100 to 200 fathoms. It seems that the species *E. mucronata* and *Nematoscelis microps* are under analogous conditions; they are wanting in the daytime in the zone of water above 100 fathoms, but in the zone between 100 and 300 fathoms they are present.

Since other species are but rarely contained in the several catches, it is impossible to get a good idea of their vertical distribution. But according to existing data one may conclude that the most important and most abundant Schizopoda, especially the species of the genus *Euphausia*, live in the daytime in a depth from about 100 to 200 or 300 fathoms, and ascend at night to the surface.²

¹ This locality, 350 miles from the nearest land, was the one selected for testing the vertical distribution of the pelagic fauna by towing with the Tanner deep-sea tow-net at depths of 100, 200, and 300 fathoms during the morning hours when the surface species would naturally have sunk. See Bull. M. C. Z., Vol. XXIII. No. 1, p. 52. — A. Agassiz.

² This agrees with the well known paucity of the surface fauna during the bright hours of the day. Nearly all pelagic material is collected more abundantly at night. — A. Agassiz.





EXPLANATION OF PLATE.

-
- Fig. 1. *Thysanopoda agassizi*, nov. spec., lateral view, $\frac{3}{1}$.
 Fig. 2. " " frontal margin, eyes, antennulæ, and antennal scale, $\frac{6}{1}$.
 Fig. 3. *Euphausia diomedææ*, nov. spec., frontal margin, eyes, antennulæ, and antennal scale, $\frac{10}{1}$.
 Fig. 4. *Boreomysis californica*, nov. spec., a young female, lateral view, $\frac{6}{1}$.
 Fig. 5. " " antennula (*b*), $\frac{10}{1}$.
 Fig. 6. " " antenna (*c*), $\frac{10}{1}$.
 Fig. 7. " " mandibula (*d*), $\frac{20}{1}$.
 Fig. 8. " " first maxilla (*e*), $\frac{20}{1}$.
 Fig. 9. " " second maxilla (*f*), $\frac{20}{1}$.
 Fig. 10. " " maxilliped or first cormopod (*g*), epipodite omitted, $\frac{15}{1}$.
 Fig. 11. " " second cormopod (*h*), $\frac{10}{1}$.
 Fig. 12. " " third cormopod (*i*), $\frac{10}{1}$.
 Fig. 13. " " uropod (*u*), $\frac{10}{1}$.
 Fig. 14. " " telson (*z*), $\frac{15}{1}$.

