

UNITED STATES COMMISSION OF FISH AND FISHERIES.

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PART X.

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REPORT

OF

THE COMMISSIONER

FOR

1882.

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A.—INQUIRY INTO THE DECREASE OF FOOD-FISHES.

B.—THE PROPAGATION OF FOOD-FISHES IN THE  
WATERS OF THE UNITED STATES.

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1884.

LETTER  
FROM THE  
COMMISSIONER OF FISH AND FISHERIES,

TRANSMITTING,

*In compliance with law, his report for the year 1882.*

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FEBRUARY 23, 1883.—Ordered to lie on the table and be printed.

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UNITED STATES COMMISSION OF FISH AND FISHERIES,  
*Washington, D. C., January 11, 1883.*

GENTLEMEN: In compliance with the order of Congress, I have the honor to transmit herewith my report for the year 1882, as United States Commissioner of Fish and Fisheries, embracing, first, the result of inquiries into the condition of the fisheries of the sea-coast and lakes of the United States; and, second, the history of the measures taken for the introduction of useful food-fishes into its waters.

Very respectfully, your obedient servant,

SPENCER F. BAIRD,  
*Commissioner.*

HON. DAVID DAVIS,  
*President of the United States Senate, and*  
HON. J. W. KEIFER,  
*Speaker of the House of Representatives.*

XV.—REPORT ON THE DECAPOD CRUSTACEA OF THE ALBATROSS DREDGINGS OFF THE EAST COAST OF THE UNITED STATES IN 1883.

By SIDNEY I. SMITH.

With the exception of three or four species represented by specimens too imperfect for proper determination or description, this report includes all the true Decapoda from the dredgings of the Albatross in 1883. In the lists of specimens examined I have endeavored to enumerate every specimen which has been submitted to me in order to indicate as far as possible the relative abundance of the species at the different stations. In these lists I have given the temperature and nature of the bottom as fully as the data accessible to me permitted. In indicating the nature of the bottom the following abbreviations, after the Coast Survey system, are used:

Materials.	Colors.	Other qualities.
C. for clay. Cr. for corals. F. for foraminifera. G. for gravel. M. for mud. O. for ooze. P. for pebbles. R. for rocks. S. for sand. Sh. for shells. Spg. for sponges. St. for stones.	bk. for black. bn. for brown. bn. for blue. dk. for dark. gn. for green. gy. for gray. lt. for light. rd. for red. wh. for white.	brk. for broken. crs. for coarse. fne. for fine. gfb. for globigerina. hrd. for hard. rky. for rocky sft. for soft. sml. for small.

In the column for the number of specimens examined, *l* is used to indicate large specimens; *s*, small specimens; and *y*, young. When the sexes were not counted separately the whole number of specimens examined is placed in the middle of the column; when the sexes were counted separately the number of males is put on the right, the number of females on the left, and the number of young in the middle, followed by the letter *y*. As a basis for ascertaining the breeding season, I have, in a great number of cases, noted the presence or absence of egg-bearing females; when the number of such females was counted it is entered in the appropriate column; when specimens carrying eggs were found, but not counted, a plus sign, +, is used; and when none of the specimens examined were carrying eggs a zero, 0, is used. The National Museum catalogue numbers are given for all the specimens except those which I examined at Wood's Holl before they were catalogued. When

the record of specimens examined is not given in tabular form these catalogue numbers simply follow in parenthesis the mention of the specimens. In a few cases I have added to the list of specimens taken by the Albatross (Stations 2001 to 2116) those taken off Martha's Vineyard in 1883 by the Fish Hawk (Stations 1156 to 1176).

## BRACHYURA.

## MAIOIDEA.

## AMATHIA AGASSIZII Smith.

Bull. Mus. Comp. Zool., x, p. 1, pl. 2, figs. 2, 3, 1882; Proc. National Museum, vi, p. 3, 1883.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5879	2092	39 58 35	71 00 30	Fath. 197	45°; gn. M.	Sept. 21	1		
5693	2109	35 14 20	74 59 10	142	50½°; bu. M.	Nov. 9	1L	1L	0

The two specimens from Station 2109 are much larger than any previously obtained, and are fully adult. These specimens differ from the smaller ones described and figured, principally in having proportionally much shorter rostral horns, shorter spines upon the carapax, and longer peræopods. The female, as usual, has much shorter chelipeds and a broader and more swollen carapax than the males. These differences are all well shown by comparing the accompanying measurements with those previously given.

*Measurements in millimeters.*

Catalogue number.....	5693	5693
Station.....	2109	2109
Sex.....	♂	♀
Length of carapax, including rostral and posterior spines.....	58.0	71.3
Length of carapax from base of rostral to tip of posterior spines.....	51.5	62.2
Length of carapax, excluding rostral and posterior spines.....	51.0	62.2
Length of rostral horns or spines.....	7.5	10.0
Breadth of carapax, including lateral spines.....	44.3	54.0
Breadth of carapax, excluding lateral spines.....	41.3	51.0
Length of branchial spines.....	3.5	4.0
Length of cheliped.....	95.0	94.0
Length of chela.....	44.0	44.0
Breadth of chela.....	6.0	6.2
Length of dactylus.....	14.5	17.0
Length of first ambulatory peræopod.....	146.0	183.0
Length of dactylus.....	25.0	28.5
Length of second ambulatory peræopod.....	122.0	146.0
Length of dactylus.....	21.6	25.0

In the two large specimens (5693), after preservation in alcohol for several weeks, the distal parts of the meri and portions of the carpi of all

the peraeopods, and the distal ends of the propodi of the ambulatory ones, are conspicuously marked with dark red, the color being more extensive on the first and second ambulatory peraeopods.

*HYAS COARCTATUS* Leach.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5571	2012	36 41 15	74 39 50	66	-----	Apr. 30		2y.	0
5599	2012	36 41 15	74 39 50	66	-----	Apr. 30	1		
5589	2014	36 41 05	74 38 53	373	S. brk. Sh.	May 1		1s.	0
	2057	42 01 00	68 00 30	86	brk. Sb.	Aug. 30	2	7	5
	2058	41 57 30	67 58 00	35	50°; gy. S.	Aug. 30	1	3	2
	2059	42 05 00	66 46 15	41	bu. M. S.	Aug. 31	1	1	0
	2082	42 17 00	66 37 15	150	42°; S. G.	Aug. 31		1	0
	2085	42 27 00	65 00 45	80	44½°; S. G. bk. Sh.	Aug. 31		1	1
7077	2066	42 19 40	65 49 30	65	43½°; St. G.	Sept. 1	1	3	3
	2076	41 13 00	66 00 50	906	bu. M.	Sept. 4	1		
	2081	41 10 20	66 30 20	46	50°; wh. S.	Sept. 4	2		
	2081	(from stomach of cod)					5	3	3
	2082	41 09 50	66 31 50	49	46½°; crs. S. G.	Sept. 4	9	5	2
	1157	40 14 00	70 29 15	62	45°; sft. M.	Aug. 23	2		
	1159	40 20 00	70 35 00	41	44°; sft. M.	Aug. 23	1s.		

*COLLODES ROBUSTUS* Smith.

Proc. National Mus., vi, p. 5, 1883.

(Plate I, Figs. 1, 1a, 2, 2a, 2b.)

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5518	2004	37 19 45	74 26 00	98	gn. M. Sh.	Mar. 23	3	1	1
5528	2004	37 19 45	74 26 00	98	gn. M. Sh.	Mar. 23		1	1
5532	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23	10	3	3
5000	2014	36 41 05	74 38 53	373	S. brk. S.	May 1	1		

*EUPROGNATHA RASTELLIFERA* Stimpson.

(Plate I, Figs. 3, 3a.)

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens.		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5527	2004	37 19 45	74 26 00	98	gn. M. Sh.	Mar. 23	13	2	2
5537	2004	37 19 45	74 26 00	98	gn. M. Sh.	Mar. 23	12	2	2
5520	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23	18	2	2
5542	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23		1	1
7193	2012	36 41 15	74 39 50	66	-----	Apr. 30	1		

## CANCROIDA.

## CANCER IRRORATUS Say.

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5609	2015	37 31 00	74 53 30	19	S. Sh.	May 5	1s.	1s.	0
5615	2016	37 31 00	74 52 36	19	424°; S. Sh.	May 5	1	1	0
5595	2017	37 30 48	74 51 29	18	424°; S. Sh.	May 5	5s.	3s.	0
5613	2017	37 30 48	74 51 29	18	424°; S. Sh.	May 5	2		0
.....	2057	42 01 00	68 00 30	86	brk. Sh.	Aug. 30	1		0
.....	2058	41 57 30	67 58 00	35	50°; gy. S.	Aug. 30	1		.....
7014	2085	40 05 00	70 34 45	70	50°; bu. M.	Sept. 20		1s.	0

## CANCER BOREALIS Stimpson.

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5519	2004	37 19 45	74 26 00	98	gn. M. Sh.	Mar. 23		6y.	.....
5524	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23		1	0
5577	2011	36 38 30	74 40 10	81	S. brk. Sh.	Apr. 30		1y.	.....
5616	2011	36 38 30	74 40 10	81	S. brk. Sh.	Apr. 30	2		.....
5592	2012	36 41 15	74 39 50	66	.....	Apr. 30	5s.	12y.	4s.
5678	2012	36 41 15	74 39 50	66	.....	Apr. 30	1		.....
5614	2014	36 41 05	74 38 53	373	S. brk. Sh.	May 1	2		0
5602	2014	36 41 05	74 38 53	373	S. brk. Sh.	May 1		3	0
5582	2017	37 30 48	74 51 29	18	453°; S. Sh.	May 4		1y.	.....
5375	2085	40 05 00	70 34 45	70	50°; bu. M.	Sept. 20	1		.....
5408	2086	40 05 05	70 35 00	69	524°; bu. M. gy. S.	Sept. 20	2		0
5410	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20		2c.	0
5420	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	1s.	1s.	0
5372	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20		1y.	.....
5411	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20		2l.	0
5369	2089	39 58 50	70 39 40	168	45°; gy. S.	Sept. 20	1s.		.....
5364	2090	39 59 40	70 41 10	140	484°; S. brk. Sh.	Sept. 20	1	1y.	0
5419	2090	39 59 40	70 41 10	140	483°; S. brk. Sh.	Sept. 20	1y.		.....
5409	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 20	1l.		.....
5691	2109	35 14 20	74 59 10	142	504°; bu. M.	Nov. 9	10	6	0
.....	1158	40 16 00	70 31 00	62	45°; sft. gn. M.	Aug. 23	1y.	1	0
.....	1159	40 20 00	70 35 00	55	44°; sft. M.	Aug. 23		1y.	1
.....	1160	40 24 00	70 35 00	41	43°; bk. M.	Aug. 23		1s.	0
.....	1162	40 32 00	70 39 00	45	464°; bk. M.	Aug. 23		1y.	.....
.....	1163	40 35 30	70 41 00	31	46°; S. M.	Aug. 23		1y.	.....
.....	1164	40 43 00	70 45 00	31	44°; M.	Aug. 23	1		.....
.....	1165	41 50 00	70 49 00	32	45°; gy. S.	Aug. 23		1s.	0

## GERYON QUINQUEDENS Smith.

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	<i>Fath.</i>					
5612	2030	39 29 45	71 43 00	588	.....	May 26		1	0
.....	2053	42 02 00	68 27 00	105	bu. M.	Aug. 29	2s.		.....

## ACHELOUS GIBBESII Stimpson.

*Neptunus Gibbesii* A. M.-Edwards.

Station 2107, November 9, north lat.  $35^{\circ} 19' 30''$ , west long.  $75^{\circ} 15' 20''$ , 16 fathoms.—Three specimens (5633), one male and two females, one of which is carrying eggs.

## LEUCOSOIDEA.

## PERSEPHONE PUNCTATA Stimpson ex Browne.

Station 2114, November 10, north lat.  $35^{\circ} 20'$ , west long.  $75^{\circ} 20'$ , 14 fathoms, mud and broken shells.—One adult female (5655), and two very small young (5664).

## DORIPPIDEA.

## ETHUSINA, gen. nov.

This genus is nearly allied to *Ethusa*, which it resembles closely except in the form of the front and the structure of the eyes. The front, between the eyes, is quadridentate as in *Ethusa*, but the basal segments of the antennulæ are very large and swollen, occupy the whole width of the front, and crowd back the eyes and antennæ into an almost transverse position nearly beneath the outer orbital angles, which are reduced to small lateral teeth far back from the front. The eye-stalks are very small, and immovably imbedded in the orbits, which closely inclose them to near the tips, except for a narrow space beneath. The oral appendages are almost exactly as in *Ethusa micropthalma*, but there are no podobranchiæ at the bases of the first gnathopods, so that there are only six branchiæ each side, two arthrobranchiæ each at the base of the second gnathopod and first peræopod, and one pleurobranchia each for the second and third peræopods.

## ETHUSINA ABYSSICOLA, sp. nov.

(Plate II, Figs. 1, 1a.)

*Male*.—The carapax at the branchial regions is nearly as broad as the length to the middle of the front, but much narrowed anteriorly, the breadth of the front being about three-eighths of the length. The middle teeth of the front are triangular, slightly upturned, and separated by a triangular sinus a little broader and deeper than the rounded antennular sinuses, while the lateral teeth are spiniform and longer than the middle teeth but more strongly upturned, so that they scarcely project in front of them. The surface of the carapax is nearly naked, granulous, and areolated very nearly like that of *Ethusa micropthalma*.

The eye-stalks project very slightly beyond the minute post-orbital teeth, taper distally, are armed with a longitudinal ridge below, and bear at the tips black eyes much smaller than the diameter of the stalks.

The chelipeds are equal, smooth, and naked, and less than twice as long as the carapax, the merus is about a third of the entire length, slender, unarmed, and without angles; the carpus is short, rounded

## EUPAGURUS POLITUS Smith.

Bull. Mus. Comp. Zool., x, p. 12, pl. 2, fig. 5, 1882; Proc. National Mus., vi, p. 27, pl. 4, fig. 4, 1883.

## Specimens examined.\*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—	
		N. lat.	W. long.				No.	With eggs.
		° ' " ° ' "	Fath.					
5522	2003	37 16 30	74 20 36	640		May 23	5	.....
5523	2004	37 19 45	74 26 00	98	gn. M. Sh.	May 23	4	.....
5526	2004	37 19 45	74 26 00	98	gn. M. Sh.	May 23	1	0
5535	2004	37 19 45	74 26 00	98	gn. M. Sh.	May 23	2	.....
5534	2005	37 18 11	74 27 36	78	bu. M. S. brk. Sh.	May 23	5	.....
5591	2011	36 38 30	74 40 10	81	S. brk. Sh.	Apr. 30	2	.....
5605	2014	36 41 05	74 38 53	373	S. brk. Sh.	May 1	8	.....
5610	(f)				S. brk. Sh.	May 1	4	.....
5563	2015	37 31 00	74 53 30	119			1s.	.....
5574	2020	37 37 50	74 15 30	143	S. bu. M.	May 21	1y. E.	.....
5607	2025	40 02 05	70 27 00	239	404°; gn. M.	May 25	8	0
5626	2025	40 02 05	70 27 00	239	404°; gn. M.	May 25	1y.	0
5611	2026	40 04 00	70 28 50	131	48°; gn. M.	May 25	18s. (15 E.)	.....
5585	2026	40 04 00	70 28 50	131	48°; gn. M.	May 25	4	.....
5586	2027	39 58 25	70 37 00	197	43°; bu. M. S.	May 25	7	0
5604	2028	39 57 50	70 32 00	204	41°; bu. M.	May 25	5	0
5630	2025	40 02 05	70 27 00	239	404°; gn. M.	May 25	1y.	.....
.....	2079	41 13 00	66 19 50	75	45°; wh. S.	Sept. 4	3	.....
.....	2080	41 13 00	66 21 50	55	40°; gy. S.	Sept. 4	1	.....
5370	2085	40 05 00	70 34 45	70	50°; bu. M.	Sept. 20	Gl.	0
5373	2086	40 05 05	70 35 00	69	524°; bu. M. gy. S.	Sept. 20	2	0
5418	2086	40 05 05	70 35 00	69	524°; bu. M. gy. S.	Sept. 20	3	0
7010	2086	40 05 05	70 35 00	69	524°; bu. M. gy. S.	Sept. 20	1s.	.....
5362	2092	39 58 35	71 00 30	197	45°; gn. M.	Sept. 21	9l.	0
5363	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	22	.....
5355	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20	5	0
5360	2090	39 59 40	70 41 10	140	484°; S. brk. S.	Sept. 20	21	0
5354	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 21	26 (5 E.)	12
5416	2092	39 58 35	71 00 30	197	45°; gn. M.	Sept. 21	1	0
.....	1156	40 13 00	70 29 00	60	45°; M.	Aug. 23	1	0
.....	1157	40 14 00	70 29 15	62	45°; sft. M.	Aug. 23	1	0
.....	1163	40 35 30	70 41 00	31	46°; S. M.	Aug. 23	1	0

\* Under this and the following species of *Eupagurus*, in the column giving the number of specimens, E indicates that the carcasses were formed of *Epizoanthus Americanus*.

† Labeled "Station 2014 to 2017," but evidently from the first of these stations.

‡ The single small specimen was undoubtedly really from Station 2014.

## EUPAGURUS PUBESCENS Brandt ex Kröyer.

## Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—	
		N. lat.	W. long.				No.	With eggs.
		° ' " ° ' "	Fath.					
.....	2037	42 01 00	68 00 30	86	brk. Sh.	Aug. 30	3, 1 E.	.....
7082	2058	41 57 30	67 58 00	35	50°; gy. S.	Aug. 30	5, 1 E.	.....
.....	2081	41 10 20	66 30 20	50	46°; wh. S.	Sept. 4	1	.....
.....	2082	41 09 50	66 31 50	49	464°; crs. S. G.	Sept. 4	5	.....
7009	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	2s. E.	.....
5426	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	1s.	.....
.....	1159	40 20 00	70 35 00	55	44°; sft. M.	Aug. 23	1	0
.....	1163	40 35 30	70 41 00	31	46°; S. M.	Aug. 23	3	0
.....	1165	40 50 00	70 49 00	32	45°; gy. S.	Aug. 23	2	0

## EUPAGURUS KRÖYERI Stimpson.

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—	
		N. lat.	W. long.				No.	With eggs.
7139	2004	37 19 45	74 26 00	Fath. 98	gn. M. S.	Mar. 23	2s. E.	0
5627	2012	36 41 15	74 39 50	66	.....	Apr. 30	1s.	.....
7145	2025	40 02 05	70 27 00	239	40°; gn. M.	May 25	3s.	.....
6632	2026	40 04 00	70 28 50	131	45°; gn. M.	May 25	1s. E.	.....
.....	2057	42 01 00	68 00 30	86	brk. Sh.	Aug. 30	10	.....
.....	2058	41 57 30	67 58 00	35	50°; gy. S.	Aug. 30	5	0
.....	2060	42 10 00	66 46 15	123	brk. S.	Aug. 31	4	.....
.....	2062	42 17 00	66 37 15	150	42°; S. G.	Aug. 31	15	0
.....	2063	42 23 00	66 23 00	141	46°; S. crs. G.	Aug. 31	1	.....
.....	2068	42 03 00	65 48 40	131	42°; S. fac. G.	Sept. 1	3	.....
.....	2079	41 13 00	66 19 50	75	45°; wh. S.	Sept. 4	1	.....
.....	2086	41 13 00	66 21 50	55	46°; gy. S.	Sept. 4	4l.	.....
5874	2086	40 05 05	70 35 00	69	52°; bu. M. gy. S.	Sept. 20	4s. E.	.....
7008	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	1s. E.	.....
7006	2090	39 59 40	70 41 10	140	48°; S. brk. S.	Sept. 20	1s.	.....
7008	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 21	5s. E.	.....

## EUPAGURUS LONGICARPUS Stimpson ex Say.

Station 2016, May 5, north lat. 37° 31', west long. 74° 52' 36", 19 fathoms—1 specimen (5597).

## EUPAGURUS POLLICARIS Stimpson ex Say.

(Plate IV, Fig. 4.)

Station 2015, May 5, north lat. 37° 31', west long. 74° 53' 30", 19 fathoms—2 young (7136). Station 2017, May 5, north lat. 37° 30' 48", west long. 74° 51' 29", 18 fathoms—1 young (7140).

## CATAPAGURUS SHARRERI A. M.-Edwards.

Smith, Proc. National Mus., vi, p. 31, pl. 4, fig. 5, 1883.

(Plate IV, Figs. 1, 2.)

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
6625	2004	37 19 45	74 26 00	Fath. 98	gn. M. S.	Mar. 23	14	2	.....
6541	2004	37 19 45	74 26 00	98	gn. M. S.	Mar. 23	1	.....	.....
6540	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23	2	.....	.....
7138	2026	40 04 00	70 28 50	131	48°; gn. M.	Mar. 25	7	.....	.....
6376	2090	39 59 40	70 41 10	140	48°; gn. S. Sh.	Sept. 20	4	.....	.....
7004	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 21	2	.....	.....

In the measurements of one of Milne-Edwards's type specimens given in my paper above referred to there are two errors of 10 millimeters

each: the length from front of carapax to tip of pleon should be 13.0 in place of 23.0, and the length of the left cheliped should be 21.0 in place of 31.0.

### PARAPAGURUS PILOSIMANUS Smith.

Trans. Conn. Acad. New Haven, v, p. 51, 1879; Proc. National Mus., iii, p. 428, 1881; Bull. Mus. Comp. Zool., x, p. 20, pl. 2, figs. 4-4<sup>d</sup>, 1882; Proc. Nation Mus., vi, p. 33, pl. 5, figs. 3-5, pl. 6, figs. 1-4<sup>a</sup>, 1883.

#### Specimens examined.\*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
-----	2036	88 52 40	69 24 40	Fath. 1,735	38°; glb. O.	July 18	1E.		
7114	2037	38 53 00	69 23 30	1,731	38°; glb. O.	July 18	5*	7*	5
7115	2038	38 30 30	69 08 25	2,063	glb. O.	July 26	6E.		
5457	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	2E.	3E.	1
5458	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	1U.		
5466	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1		2	2
5484	2098	37 40 30	70 37 30	2,221	glb. O.	Oct. 1	1U.	5E.	4

\*In the column giving the number of specimens, E indicates that the carcinœcia were formed of a species of *Epizoanthus* distinct from either *E. Americanus* or *E. paguriphilus*, and U that the carcinœcia were a species *Urticina*. Of the twelve specimens from Station 2037, four were in the *Epizoanthus*, two in *Urticina*, three in naked gastropod shells, and the others without carcinœcia.

As the above table shows, the Albatross dredgings have very greatly extended the bathymetrical range of this species. It had previously been taken in 250 to 640 fathoms. This increased range in depth is apparently accompanied by a change in the kind of carcinœcia inhabited. All the earlier specimens, over four hundred in number, were found in carcinœcia of *Epizoanthus paguriphilus* Verrill, while the deep-water specimens were either in a very different species of *Epizoanthus*, in naked gastropod shells, or in an actinian closely resembling, if not identical with, *Urticina consors* Verrill, which often serves for the carcinœcium of the next species.

### SYMPAGURUS PICTUS Smith.

Proc. National Mus., vi, p. 37, pl. 5, figs. 2, 2a; pl. 6, figs. 5-8, 1883.

(Plate IV, Fig. 3.)

Station 2089, September 20, north lat. 39° 58' 50", west long. 70° 39' 40", 168 fathoms, gray sand, temperature 45°—1 female (5366) in an *Urticina* with a nucleus of *Epizoanthus*.

## GALATHEIDEA.

## MUNIDA CARIBÆA ? Smith.

Bull. Mus. Comp. Zool., x, p. 22, pl. 10, fig. 1, 1882; Proc. National Mus., vi, p. 40, pl. 3, fig. 11, 1883.

## Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—	
		N. lat.	W. long.				No.	With eggs.
		° ' " ° ' "		Fath.				
5514	2004	37 19 45	74 26 00	93	gn. M. S.	Mar. 23	64	2
5517	2004	37 19 45	74 26 00	98	gn. M. S.	Mar. 23	5	0
5521	2004	37 19 45	74 26 00	98	gn. M. S.	Mar. 23	28	0
5515	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23	68	3
5529	2005	37 18 11	74 27 36	78	bu. M. S. Sh.	Mar. 23	4	0
5801	2011	36 38 30	74 40 10	81	S. brk. Sh.	Apr. 30	28	5
5568	2012	36 41 15	74 39 50	66		Apr. 30	23	0
5572	2026	40 04 00	70 28 50	131	48°; gn. M.	May 25	1	0
5579	2031	39 29 00	72 19 55	74	gy. M.	May 26	1	0
5423	2036	40 05 05	70 35 00	69	52½°; bu. M. gy. S.	Sept. 20	1y.	0
5399	2036	40 05 05	70 35 00	69	52½°; bu. M. gy. S.	Sept. 20	1y.	0

## GALACANTHA ROSTRATA A. M. Edwards.

Bull. Mus. Comp. Zool., Cambridge, viii, p. 52, 1880; Smith, *ibid.*, x, p. 21, pl. 9, figs. 2, 2<sup>a</sup>, 1882.

## Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' " ° ' "		Fath.					
7078	2052	39 40 05	69 21 25	1,098	45°; glb. O.	Aug. 1		1	
7079	2052	39 40 05	69 21 25	1,098	45°; glb. O.	Aug. 1	1s.	.....	
7080	2084	40 16 50	67 05 15	1,290	40°; bu. M. S.	Sept. 5	1	1	
5483	2095	39 29 00	70 58 40	1,342	glb. O.	Sept. 30	1	2	

Soon after preservation in alcohol and before the colors had changed materially from those of life, the large specimen, 7078, was dark-purplish red, except the flagella of the antennæ, which were lighter red than the body (the flagella of the antennulæ were wanting), and the eyes, which were nearly white.

The eggs are about 3 mm in diameter in freshly-preserved alcoholic specimens.

Three specimens give the following measurements in millimeters:

Number of specimen.....	7079	5485	7078
Station.....	2052	2095	2052
Sex.....	♂	♀	♀
Length from tip of rostrum to tip of telson.....	26.0	66.0	96.0
Length of carapax to bases of rostral spines.....	12.7	31.0	45.0
Greatest breadth excluding spines.....	9.8	30.0	37.0
Greatest breadth including spines.....	11.0	22.4	39.5
Length of rostrum above its lateral spines.....	3.1	9.0	8.0
Length of gastric spine.....	3.1	9.2	9.1
Greatest breadth pleon.....	7.8	21.9	35.0
Greatest diameter of eye.....	1.2	3.0	4.0
Length of cheliped.....	18.0	41.0	57.0
Length of chela.....	7.0	16.2	25.0
Length of dactylus.....	4.0	9.5	14.0
Length of first ambulatory pæropod.....		50.0	70.0
Length of posterior pæropod.....		29.0	49.0

## GALACANTHA BAIRDII, sp. nov.

This species, which is represented by a single specimen (5717), is very distinct from either of the species described by A. Milne-Edwards, and readily distinguished by the long, slightly upturned, and laterally spinous rostrum, by the number and form of the lateral spines of the carapax, and by the terminal spines of the eye-stalks. In some of its characters the species is more like *Munidopsis* than *Galacantha*, and it is possible that the genera should be united.

*Female*.—The carapax is broadest at the branchial regions, very slightly narrowed toward the front, and strongly convex transversely, and the length of the lateral margin is a little greater than the breadth. The anterior margins are oblique, and the front gradually narrowed into a long, rather slender, and slightly upturned rostrum, armed along the middle of either edge with three teeth directed outward and forward. The antero-lateral angle is armed with a slender spiniform tooth, turned forward, and back of this the lateral margin is armed with either two or three spines: a large one on the front of the hepatic region and slightly above the spine of the antero-lateral angle; another, but much smaller spine, just back of the first, on the hepatic region of the right side only; and one, about as large as the antero-lateral, on the edge of the branchial region, just back of the shallow cervical suture. There is a pair of large spines on the front of the gastric region, a pair of smaller ones nearer together on the posterior part of the gastric region, and between these two pairs a pair of still smaller ones. The front of the cardiac region is slightly elevated, and armed with a pair of spines like the posterior gastric, and just back of these there is a small median spine. The raised posterior margin of the carapax is armed with four or five small vertical spines either side. The surface of the branchial regions is roughened with numerous short transverse rugæ; other parts of the surface are more or less granular or minutely tuberculous, and the whole surface of the carapax, pleon, and peræopods are more or less thickly clothed with short hairs.

The eyes are very much smaller than in *G. rostrata* and colorless in the alcoholic specimen, and the eye-stalk is prolonged on the dorsal side beyond the cornea in a slender horizontal spine as long as the diameter of the eye.

The stout first segment of the peduncle of the antennula is armed distally with five sharp spines, two above and three below the insertion of the second segment. The second segment of the peduncle of the antenna is armed with a triangular tooth below and a spiniform tooth on the outer side; the third segment is armed with two spiniform teeth situated as on the second segment; the fourth with three large spines above and two or three minute ones beneath; and the fifth or last with two small teeth above. The flagella of the antennæ are nearly as in *G. rostrata*.

The second gnathopods are nearly as in *G. rostrata* except the merus,

which is very little stouter than the ischium and without prominent teeth, having instead two or three small and low spiniform tubercles.

The chelipeds are longer than the carapax including the rostrum, rather stouter and much more spiny than in *G. rostrata*: the ischium, merus and carpus are armed along the rounded angles and at the distal ends with spines of which the dorsal and distal on the merus and carpus are large. The chela is longer than the merus, a third as broad as long, the digits are stout and longer than the body of the chela, of which the edges are rounded, the inner armed with two slender spines and the outer with two or three short spinules. The three pairs of ambulatory peraeopods are nearly alike, stout and longer than the chelipeds; the meri and carpi are spiny, as in the chelipeds, though the spines are somewhat smaller; the propodi are rough, with short setae, but not spiny; and the dactyli are stout, slightly curved, terminate in acute chitinous tips, and are armed along the lower edge with a series of spiniform teeth. The posterior peraeopods are nearly as in *G. rostrata*.

The pleon is about as broad as the carapax, only very slightly narrowed posteriorly, and the dorsum is transversely rounded and devoid of longitudinal carinae or teeth. The first and second somites have two transverse ridges each on the middle of the dorsum, and there is a single similar but less conspicuous ridge on the front edge of the third. The lateral edges of all the pleura are obtusely rounded.

The telson, uropods, and pleopods are as in *G. rostrata*.

The eggs are of the same form and size as in *G. rostrata*.

*Measurements in millimeters.*

Length from tip of rostrum to tip of telson.....	82.0
Length of carapax including rostrum.....	44.5
Length of rostrum.....	18.0
Greatest breadth of carapax including spines.....	25.3
Breadth at bases of antero-lateral spines.....	19.0
Breadth at branchial regions.....	24.0
Length of eye-stalk including spine.....	5.5
Length of spine.....	1.8
Diameter of eye.....	1.8
Length of cheliped.....	50.0
Length of chela.....	18.5
Breadth of chela.....	6.4
Length of dactylus.....	10.8
Length of first ambulatory peraeopod.....	64.0
Length of propodus.....	17.0
Length of dactylus.....	12.5
Length of posterior peraeopod.....	30.0
Length of telson.....	11.0
Breadth of telson.....	14.5
Length of inner lamella of uropod.....	9.3
Breadth of inner lamella of uropod.....	7.5
Length of outer lamella of uropod.....	10.2
Breadth of outer lamella of uropod.....	7.5

Station 2106, November 6, north lat. 37° 41' 20", west long. 73° 03' 20", 1,497 fathoms, globigerina ooze, temperature 42½°.

The species is named in honor of G. W. Baird, the accomplished chief engineer of the Albatross.

**MUNIDOPSIS CURVIROSTRA** Whiteaves.

Amer. Jour. Sci., III, vii, p. 212, 1874; Report on further deep-sea dredging operations in the Gulf of Saint Lawrence [in 1873], p. 17, 1874. Smith, Bull. Mus. Comp. Zool., Cambridge, x, p. 21, pl. 8, figs. 2, 3, 3a, 1882.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		o	l	o	l				
5580	2018	37 12 22	74 20 04	788		May 7		1	1
7058	2051	39 41 00	69 20 20	1,106	39°; bu. M., gib. O.	Aug. 1		1	1
7059	2052	39 40 05	69 21 25	1,098	45°; gib. O.	Aug. 1	1s.	1	1
7060	2072	41 53 00	65 35 00	858	39°; gy. M.	Sept. 2	2		
7061	2076	41 13 00	66 00 50	906	bu. M.	Sept. 4	2	1	0
7062	2077	41 09 40	66 02 00	1,255	39°; bu. M.	Sept. 4	2	1	1
7063	2078	41 12 50	66 12 20	499	40°; gy. S.	Sept. 4	2	1	0
7064	2079	41 13 00	66 19 50	75	45°;	Sept. 4		1	0
5390	2079	41 13 00	66 19 50	75	45°;	Sept. 4		1	1
7065	2084	40 10 50	67 05 15	1,290	40°;	Sept. 5	1		
5337	2094	39 44 30	71 04 00	1,022	38½°; F. S. M.	Sept. 21	1		
5403	(?)							1s.	0
5715	2115	35 49 30	74 34 45	843	39°; M., fne. S.	Nov. 11	4		
5716	2116	35 45 23	74 31 25	888	39°; bu. M., fne. S.	Nov. 11	1	1	1

Three specimens give the following measurements in millimeters:

Number of specimen.....	7059	7058	7059
Station.....	2052	2051	2052
Sex.....	♂	♀	♀
Length from tip of rostrum to tip of telson.....	22.0	32.0	38.0
Length of carapax, including rostrum.....	13.5	18.0	21.7
Length of rostrum.....	6.5	8.0	10.6
Greatest breadth of carapax.....	5.9	8.3	9.7
Length of cheliped.....	17.0	25.0	27.0
Length of chela.....	6.0	8.7	10.3
Length of dactylus.....	2.9	4.8	5.2
Length of first ambulatory pæropod.....	14.5	20.0	21.7

The eggs are very few in number—between thirty and forty each in the females measured—and in recently-preserved alcoholic specimens about 0.80<sup>mm</sup> by 0.75<sup>mm</sup> in greater and less diameter.

**MACRURA.**

**ERYONTIDÆ.**

**PENTACHELES SCULPTUS** Smith.

*Polycheles sculptus* Smith, Ann. Mag. Nat. Hist. London, V, v, p. 269, April, 1880; Proc. National Mus., ii, p. 345, pl. 7, 1880.

*Pentacheles sculptus* Smith, Bull. Mus. Comp. Zool., x, p. 23, pls. 3, 4, 1882.

Station 2115, November 11, north lat., 35° 49' 30", west long., 74° 34' 45", 843 fathoms, mud and sand, temperature 39°—3 young males (7141.)

Measurements of the largest of these specimens is given under the next species.

## PENTACHELES NANUS, sp. nov.

This species is very closely allied to *P. sculptus* and will possibly prove to be only a dwarf deep-water variety of it, but the distinctive characters are well marked and very constant in all the large number of specimens seen.

The spines upon the carapax are much longer and more slender than in *P. sculptus* and differ in number. Including the very long and slender spine of the anterior angle, there are only five spines on the lateral margin in front of the cervical suture each side, while there are normally six in *P. sculptus*; on the middle line of the gastric region back of the two rostral spines there are, at nearly equal distances, first two single spines, one behind the other, then a pair close together, and lastly a single one, while in *P. sculptus* there is only one single spine between the rostral spines and the pair; the surface of the branchial region on both sides of the sublateral carina is armed with many small spines or spinules, and on the anterior part of the oblique ridge between the dorsal and sublateral carinæ there is one spine as large as the spines of the sublateral carina itself, while in *P. sculptus* the surface of the branchial region is unarmed and nearly smooth, except for the carinal and marginal spines. There is often a slender, horizontal median spine in front just beneath the rostral spines, but this is not a constant character.

The pleon is more deeply sculptured than in *P. sculptus*, and the dorsal carina very much higher, the recurved carinal teeth of the third, fourth, and fifth somites are very much longer and more slender, and reach far over the somites in front. The edges of the sulcated carina on the sixth somite, instead of being low and uniform as in *P. sculptus*, are very high and broken into several prominent teeth each side, with a stouter and higher tooth at the posterior end of the sulcus. The edges of the pleura of the second to the fifth somite are conspicuously armed with rather widely separated short spiniform teeth, while in *P. sculptus* they are entirely smooth, or, in small specimens, inconspicuously armed with obsolete teeth. In place of the slight median elevation near the middle of the telson of *P. sculptus* there is a sharp spiniform prominence, with occasionally a smaller secondary one just back of it.

In all the specimens seen the first peræopods (great chelipeds) are considerably shorter than in *P. sculptus*, but these appendages are subject to so much individual variation in size that this will very likely not prove a constant character.

Males less than 50<sup>mm</sup> in length are sexually adult, while in *P. sculptus* males considerably larger than this are not adult, the first pleopods being very small and weak, and the secondary stylet at the base of the inner ramus of the second pleopods only about half as long as the other stylet.

In the accompanying table measurements of five adult specimens of this species and of a single immature specimen of *P. sculptus* are given together.

## Measurements in millimeters.

Station .....	Pentacheles nanus.					P. sculptus.
	2106	2052	2116	2077	2102	2115
Sex .....	♀	♀	♀	♂	♂	♂
Length from front of carapax to tip of telson .....	46.0	53.0	87.0	45.0	55.0	54.0
Length of carapax along median line .....	19.2	22.0	35.6	19.0	22.8	23.2
Breadth of carapax between spines of anterior angles .....	8.2	9.7	17.2	8.0	10.0	11.1
Greatest breadth, including spines .....	13.5	15.5	26.5	13.2	17.0	16.0
Length of first pæropod .....	40.0	49.0	73+	38.0	52.0	61.0
Length of merus .....	10.8	14.5	25.0	11.1	15.0	19.0
Length of carpus .....	6.0	8.0	12.0	5.3	7.5	11.4
Length of chela .....	13.0	15.5	17+	12.0	16.0	20.0
Length of dactylus .....	7.8	10.0		7.5	9.2	12.0
Length of second pæropod .....	16.5	20.0	34.0	16.0	20.0	20.0
Length of merus .....	4.0	4.9	8.8	4.1	5.0	5.3
Length of carpus .....	2.5	3.2	5.4	2.3	3.2	3.2
Length of propodus .....	6.1	7.5	12.5	6.0	7.9	7.5
Length of dactylus .....	3.0	3.3	5.3	2.7	3.5	3.3
Length of fifth pæropod .....	10.0	14.0	23.0	10.0	13.0	12.0
Length of propodus .....	3.1	4.3	7.5	3.2	4.2	3.2
Length of dactylus .....	0.9	1.1	2.1	0.9	1.1	0.9
Length of pleon .....	27.0	31.0	52.0	26.0	33.0	30.0
Greatest breadth at second somite .....	10.1	12.9	24.0	10.1	13.3	12.6
Greatest breadth at sixth somite .....	5.6	7.0	11.8	5.5	7.2	6.8
Length of telson .....	8.5	10.2	16.5	8.3	11.1	10.0
Breadth of telson .....	4.2	5.1	8.0	4.1	5.2	4.6

## Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' " ° ' "	Fath.						
7142	2035	39 26 12	70 02 37	1,362	38°; glb. O.	July 17		1	0
	2051	39 41 00	69 20 20	1,106	39°; bu. M. glb. O.	Aug. 1	1		
	2052	39 40 05	69 21 25	1,098	45°; glb. O.	Aug. 1		1	0
7143	2077	41 09 40	66 02 00	1,255	39°; bu. M.	Sept. 4	6		
7144	2084	40 16 50	67 05 15	1,290	40°; bu. M. S.	Sept. 5	1	1	0
5481	2095	39 29 00	70 58 40	1,342	glb. O.	Sept. 30		1	0
5446	2096	39 22 20	70 52 20	1,451	37½°; glb. O.	Sept. 30	1		
5447	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	1		
5714	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5	3	1	0
5712	2103	38 47 20	72 37 00	1,091	39°; glb. O.	Nov. 5	1	1	0
5711	2105	37 50 00	73 03 50	1,395	41°; glb. O.	Nov. 6		1y.	0
5710	2106	37 41 20	73 03 20	1,497	42½°; glb. O.	Nov. 6		1	0
5713	2111	35 09 50	74 57 40	938	gn. M.	Nov. 9		1	0
5709	2115	35 49 30	74 34 45	843	39°	Nov. 11	1	2	0
5708	2116	35 45 23	74 31 25	888	39°; bu. M.	Nov. 11		3	0

## PENTACHELES DEBILIS, sp. nov.

This is represented by two immature males only, but it is apparently so different from either of the foregoing species or any of those described by Bate or Milne-Edwards, that I venture to describe it. Of the described species it is probably most nearly allied to *P. validus* A. M.-Edwards.

The dorsal surface of the carapax is much flatter than in *P. sculptus* or *P. nanus*, broader posteriorly, the greatest breadth being a little back of the middle branchial regions, and the sublateral carinæ of the branchial regions are indistinct or wanting. The orbital sinuses are deep, very much narrowed posteriorly, and the inner angles project forward in a spine-tipped angle far in advance of the rostrum. Including the

slender spine of the anterior angle the lateral margin in front of the cervical suture is armed with eight to ten slender spines, much smaller than in *P. sculptus*. The margin of the hepatic region back of the cervical suture is armed with four or five still smaller spines, and that of the branchial region with twenty to twenty-five minute spines. There are two short rostral spines, and just back of the middle of the gastric region two similar but slightly smaller ones on the dorsal carina, which is low, narrow, and armed the whole length of the carapax with a somewhat irregular double line of short and crowded spinules. There are two or three prominent spines back of the orbital sinuses on either side of the gastric region, and the whole surface is armed with many minute spinules and with short hairs. The ophthalmic lobes are each armed in front with a conspicuous spine. There is a single stout spine on the outer margin of the proximal segment of the peduncle of the antennula, which is otherwise essentially as in *P. sculptus*, as are also the antennæ.

The first peræopods are imperfect and their chelæ wanting in both specimens, but the ischium, merus, and carpus are nearly as in *P. nanus*. In the posterior peræopods the propodus is a little longer than in *P. sculptus* or *P. nanus*, but the propodal digit is shorter, being only about a third as long as the dactylus, which is about three-eighths as long as the propodus.

The first five somites of the pleon are perceptibly, though very inconspicuously, carinated, and on the second, third, and fourth somites there is a narrow sulcus each side, extending from near the carina outward and backward to the articulation with the succeeding somite. The pleura are of nearly the same form as in *P. sculptus*, but are nearly smooth externally, and the edges are wholly unarmed. The sixth somite is rounded and smooth above.

The telson is a little longer and more slender toward the tip than in *P. sculptus* or *P. nanus*, and has a low triangular elevation near the base.

Measurements in millimeters.

Station .....	2084	2074
Length from front of carapax to tip of telson .....	45.0	46.0
Length of carapax along median line .....	20.0	20.5
Breadth of carapax between spines of anterior angles .....	8.2	8.3
Greatest breadth including spines .....	14.0	14.3
Length of merus of first peræopod .....	12.5	.....
Length of carpus of first peræopod .....	8.4	.....
Length of second peræopod .....	16.0	.....
Length of chela .....	5.9	.....
Length of dactylus .....	2.6	.....
Length of fifth peræopod .....	12.0	13.0
Length of propodus .....	8.9	3.8
Length of dactylus .....	1.5	1.3
Length of telson .....	9.6	10.0
Breadth of telson .....	4.7	4.9

Station 2074, September 3, north lat.  $41^{\circ} 43'$ , west long.  $65^{\circ} 21' 50''$ , 1,309 fathoms, fine mud, temperature  $40^{\circ}$ —1  $\delta$  (7145). Station 2084, September 5, north lat.  $40^{\circ} 16' 50''$ , west long.  $67^{\circ} 5' 15''$ , 1,290 fathoms, blue mud and sand, temperature  $40^{\circ}$ —1  $\delta$  (7146).

## CRANGONIDÆ.

## CERAPHILUS AGASSIZII Smith.

Bull. Mus. Comp. Zool., x, p. 32, pl. 7, figs. 4-5a, 1882.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5538	2003	37 16 30	74 20 36	Fath. 640	-----	Mar. 23		5	3
5539	2003	37 16 30	74 20 36	640	-----	Mar. 23		1	0
7096	2048	40 02 00	68 50 30	547	ers. S. M. G.	July 31	2	2y.	2
-----	2072	41 53 00	65 35 00	858	39°; gy. M.	Sept. 2			1
7095	2076	41 13 00	66 00 50	906	bu. M.	Sept. 4	3	5y.	
7097	2078	41 12 50	66 12 20	490	40°; gy. M. S.	Sept. 4		1y.	
-----	2083	40 26 40	67 05 15	950	40°; gy. M.	Sept. 5		1y.	

## CRANGON VULGARIS Fabricius.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5557	2015	37 31 00	74 53 30	19	S. Sh.	May 5		1	0
5560	2016	37 31 00	74 52 36	19	45½°; S. Sh.	May 5	2	2	2
5558	2017	37 30 48	74 51 29	18	45½°; S. Sh.	May 6		1	1

## PONTOPHILUS NORVEGICUS M. Sars.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5590	2025	40 20 05	70 27 00	Fath. 239	40½°; gn. M.	May 25	1	3	0
5584	2027	39 58 25	70 37 00	197	43°; bu. M. S.	May 25		1	0
-----	2053	42 02 00	68 27 00	105	bu. M.	Aug. 29		2	0
5358	2092	39 58 35	71 00 30	197	45°; gn. M.	Sept. 21		7	1

## PONTOPHILUS BREVIROSTRIS Smith.

Proc. National Mus., iii, p. 435, 1881; Bull. Mus. Comp. Zool., x, p. 35, pl. 7, figs. 1-1b, 1882.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5531	2004	37 19 45	74 26 00	Fath. 98	gn. M. Sh.	Mar. 23		3	3
5339	2086	40 05 05	70 35 00	69	52½°; bu. M. S.	Sept. 20	1	6	6
5421	2086	40 05 05	70 35 00	69	52½°; bu. M. S.	Sept. 20		5	3
7005	2086	40 05 05	70 35 00	69	52½°; bu. M. S.	Sept. 20		1	0
5387	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20		5	5

## PONTOPHILUS ABYSSI, sp. nov.

This species is closely allied to *P. gracilis* (Bull. Mus. Comp. Zool., Cambridge, x, p. 36, pl. 7, figs. 2, 3, 1882), but is readily distinguished by the smaller and nearly colorless eyes, and by having two spines in place of one on the gastric region.

The carapax, including the rostrum, is more than twice as long as broad in the male, but broader proportionately in the female, and slightly carinated. The rostrum is about a fifth as long as the rest of the carapax, very slender, and armed near the base with two minute lateral teeth each side. There are three spines on the median line, two near together on the anterior part of the gastric region and one on the anterior part of the cardiac, and between the posterior gastric and cardiac spines the dorsal carina is very distinct, but not high. As in *P. gracilis*, there is a distinct hepatic spine and above and back of this another in the obscure lateral carina, but in addition there is a minute spine each side just back of the supraorbital fissure.

The eyes do not reach to the tip of the rostrum, are only very slightly compressed vertically, little more than half as large proportionately as in *P. gracilis*, the diameter being about a tenth the length of the carapax, and colorless in alcoholic specimens.

The characters of the articular appendages in general and of the pleon are so nearly like those of *P. gracilis* that further description is unnecessary. The number and arrangement of the branchiæ is the same as in *P. Norvegicus* and *brevirostris*, and as in the species of *Sabinea*.

## Measurements in millimeters.

Station.....	2098	2097
Sex.....	♂	♀
Length from tip of rostrum to tip of telson.....	47.0	53+
Length of carapax, including rostrum.....	13.5	15.0
Length of rostrum.....	2.2	2.4
Breadth of carapax.....	6.0	.....
Greatest diameter of eye.....	1.3	1.6
Length of antennal scale.....	7.5	8.5
Breadth of antennal scale.....	2.0	2.2
Length of first peraeopod.....	16.0	19.0
Length of chela.....	6.1	7.0
Length of dactylus.....	2.5	2.9
Length of second peraeopod.....	7.0	9.0
Length of third peraeopod.....	20.0	.....
Length of merus.....	5.0	.....
Length of carpus.....	5.7	.....
Length of propodus.....	3.2	.....
Length of dactylus.....	1.7	.....
Length of fourth peraeopod.....	19.0	.....
Length of merus.....	4.5	.....
Length of carpus.....	2.6	.....
Length of propodus.....	4.0	.....
Length of dactylus.....	2.6	.....
Length of sixth somite of pleon.....	8.0	9.5
Height of sixth somite of pleon.....	3.0	3.5
Length of telson.....	9.0	.....
Length of inner lamella of uropod.....	7.3	9.0
Breadth of inner lamella of uropod.....	1.5	1.7
Length of outer lamella of uropod.....	6.8	8.4
Breadth of outer lamella of uropod.....	2.0	2.3

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♀	♂	With eggs.
7023	2097	37 56 20	70 57 30	Fath. 1,917	glb. O.	Oct. 1	1		
7025	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1		1	1
7024	2098	37 40 30	70 37 30	2,221	glb. O.	Oct. 1	1		

## SABINEA PRINCEPS Smith.

Bull. Mus. Comp. Zool., x, p. 38, pl. 8, figs. 1-1b, 1882.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5533	2063	37 16 30	74 20 36	640	gn. M.	Mar. 23		2l.	0
-----	2072	41 53 00	65 35 00	838	38°; gy. M.	Sept. 2	2	1y. 3	1
5681	2115	35 49 30	74 34 45	843	39°; M. fine. S.	Nov. 11		4y. 1	0
5694	2116	35 45 23	74 31 25	888	39°; bu. M. fine. S.	Nov. 11		1y.	-----

## SABINEA SARSII Smith.

Trans. Conn. Acad., New Haven, v, p. 59, pl. 11, figs. 6, 7, 8, 1879.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
7073	2062	42 17 00	66 47 45	150	42°; S. G.	Aug. 31	1	17	17
-----	2063	42 23 00	66 23 00	141	46°; S. crs. G.	Aug. 31	10	22	21
-----	2064	42 25 40	66 08 35	122	crs. S. G.	Aug. 31	1	7	7
-----	2067	42 15 25	65 48 40	122	46°; S. G.	Sept. 1	12	19	17
7072	2068	42 08 00	65 48 40	131	42°; S. fine. G.	Sept. 1	1	3	2

This species is closely allied to *S. septemcarinata* and has apparently been often confounded with it. It was described from a very few specimens from the Gulf of Maine, Le Have Bank, George's Banks, and the coast of Norway, and has not been taken on our coast since 1877. It apparently inhabits hard sandy and gravelly bottoms, while the *S. septemcarinata* is usually confined to soft or muddy bottoms.

## GLYPHOCRANGONIDÆ, fam. nov.

*Rhachocarina* Smith, Bull. Mus. Comp. Zool., x, p. 45, 1882.

GLYPHOCRANGON A. M.-Edwards, Ann. Sci. nat., VI, xi, no. 4, p. 3, 1881.

*Rhachocaris* Smith, loc. cit., 1882.

Milne-Edwards's recently published figures of the species of his *Glyphocrangon* leave no reasonable doubt that the species were incorrectly de-

scribed, and that my genus is synonymous with his as indicated above. My *Rhachocaris Agassizii* is apparently synonymous with Milne-Edwards's *G. aculeatum*, but the two other species which I have described are apparently specifically distinct from the species figured by Milne-Edwards, and should stand as *Glyphocrangon sculptus* and *longirostris*.

The structural peculiarities of the genus pointed out in my original description are, I think, sufficient to warrant its separation from the typical Crangonidæ as a distinct family.

#### GLYPHOCRANGON SCULPTUS.

*Rhachocaris sculpta* Smith, Bull. Mus. Comp. Zool., x, p. 49, pl. 5, fig. 3, pl. 6, figs. 3-3<sup>d</sup>, 1882.

##### Specimens examined.

Catalogue number.	Station number.	Locality--		Depth.	Temperature and nature of bottom.	Date.	Specimens--		
		N. lat.	W. long.				♂	♀	With eggs.
7181	2035	70 02 37	39 26 12	1,362	38°; glb. O.	July 17		3	2
7182	2051	69 20 20	39 41 00	1,106	39°; bu. M. glb. O.	Aug. 1	2	1	1
7183	2052	69 21 25	39 40 05	1,098	45°; glb. O.	Aug. 1		1	1
7184	2077	66 02 00	41 09 40	1,255	39°; bu. M.	Sept. 4	1		.....
5482	2095	70 58 40	39 29 00	1,342	glb. O.	Sept. 30	2		.....
5637	2102	72 38 00	38 44 00	1,209	39°; glb. O.	Nov. 5	2		.....
5671	2105	73 03 50	37 50 00	1,395	41°; glb. O.	Nov. 6	1		.....
5675	2105	73 03 50	37 50 00	1,395	41°; glb. O.	Nov. 6	1		.....

This species was originally described from a single female, which differed slightly from the usual form of the species as shown in the series of specimens enumerated above. The large vertically-compressed tooth at the extreme anterior end of the lateral lobe of the gastric region is usually more regularly acute than shown in the figures of the original specimen, and the anterior tooth of the middle lateral carina is acute instead of bidentate at tip. The males are considerably smaller than the females, but do not differ essentially, except in the usual modification of the pleopods and of the base of the major flagellum of the antennulæ.

#### PALÆMONIDÆ.

##### ALPHEINÆ.

#### HIPPOLYTE LILJEBORGII Danielssen.

*H. securifrons* Norman.

##### Specimens examined.

Catalogue number.	Station number.	Locality--		Depth.	Temperature and nature of bottom.	Date.	Specimens--		
		N. lat.	W. long.				♂	♀	With eggs.
.....	2062	42 17 00	66 37 15	150	42°; S. G.	Aug. 31		10	0
.....	2063	42 23 00	66 23 00	141	46°; S. ora. G.	Aug. 31		3	0
.....	2067	42 15 25	65 48 40	122	46°; S. G.	Sept. 1		1	0
.....	2068	42 03 00	65 48 40	131	42°; S. fœ. G.	Sept. 1		1	0
.....	2079	41 13 00	66 19 50	75	45°; wh. S.	Sept. 4		2	0

## HIPPOLYTE PUSIOLA Kröyer.

Station 2082, September 4, north lat.  $41^{\circ} 9' 50''$ , west long.  $66^{\circ} 31' 50''$ , 49 fathoms, coarse gravel and sand, temperature,  $46\frac{1}{2}^{\circ}$ —2 young (7070).

## HIPPOLYTE POLARIS Ross.

Station 2067, September 1, north lat.  $42^{\circ} 15' 25''$ ,  $65^{\circ} 48' 40''$ , 122 fathoms, sand and gravel, temperature,  $46^{\circ}$ —3 ♀.

## HIPPOLYTE GROENLANDICA Miers ex J. C. Fabricius.

Station 2058, August 30, north lat.  $41^{\circ} 57' 30''$ , west long.  $67^{\circ} 58'$ , 35 fathoms, gray sand, temperature  $50^{\circ}$ —1 ♀.

## PANDALINÆ.

## PANDALUS MONTAGUI Leach.

*Pandalus Montagu* Leach, "Edinburgh Encyclopedia, vii, p. 432" (teste White), 1813 or 1814; American edition, vii, p. 271.—White, Catal. British Crust., vii, p. 41, 1850.—Smith, Trans. Conn. Acad., v, p. 87, 1879; Proc. National Mus., iii, p. 437 (under *P. leptocerus*), 1881.

*Pandalus annulicornis* Leach, Malacostraca Podophth. Britannia, pl. 40, March, 1815; Trans. Linn. Soc. London, xi, p. 346, 1815.

*Pandalus levigatus* Stimpson, Marine Invert. Grand Manan, p. 58, 1853.

One male (7066), 68<sup>mm</sup> long, was taken at Station 2071, September 1, north lat.  $41^{\circ} 56' 20''$ , west long.  $65^{\circ} 48' 40''$ , 113 fathoms, pebbles.

## PANDALUS PROPINQUUS G. O. Sars.

G. O. Sars, Vidensk.-Selsk. Forhandl. Christiania, 1869, p. 148 (4); Ibid., 1871, 259 (16)—Smith, Proc. National Mus., iii, p. 437, 1881; Bull. Mus. Comp. Zool., x, p. 58, 1882.—A. M.-Edwards, Recueil fig. Crust. nouv., 1883.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—	
		N. lat.	W. long.				No.	With eggs.
5806	2025	° ' " ° ' "	° ' "	Fath.				
-----	2062	40 02 05	70 27 00	239	$41\frac{1}{2}^{\circ}$ ; M.	May 25	12	0
-----	2067	42 17 00	66 37 15	150	$42^{\circ}$ ; S. G.	Aug. 31	97	0
-----	2092	42 15 25	65 48 40	122	$46^{\circ}$ ; S. G.	Sept. 1	6	0
7007	2092	39 58 35	71 00 30	197	$45^{\circ}$ ; ga. M.	Sept. 21	2	0

## PANDALUS BOREALIS Kröyer.

Station 2053, August 29, north lat.  $42^{\circ} 2'$ , west long.  $68^{\circ} 27'$ , 105 fathoms, blue mud—89 specimens, of which 15 were carrying eggs.

## PANDALUS LEPTOCERUS Smith.

Proc. National Mus., iii, p. 437, 1881; Bull. Mus. Comp. zool., x, p. 58, 1882.  
A. M.-Edwards, Recueil fig. Crust. nouv., 1883.

(Plate V, Fig. 1.)

Specimens examined.

Catalogue number.	Station number.	Locality--		Depth.	Temperature and nature of bottom.	Date.	Specimens--		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' " ° ' "		<i>Fath.</i>					
5559	2017	37 30 48	74 51 29	18	45½°; S. Sh.	May 5		1	1
5552	2020	37 37 50	74 15 30	143	S. bu. M.	May 21	5		0
5561	2028	40 04 00	70 28 50	131	48°; M.	May 25	1		0
5569	2031	39 29 00	72 19 55	74	gy. M.	May 26	1		0
5566	2032	39 29 00	72 19 40	73	gy. M.	May 26	3		0
	2058	41 57 30	67 58 00	35	50°; gy. S.	Aug. 30	94		0
7069	2059	42 05 00	66 46 15	41	bu. M. S.	Aug. 31	2		0
	2061	42 10 00	66 47 45	115	40°; bu. M. gy. S.	Aug. 31	600		0
	2064	42 25 40	66 08 35	122	crs. S. G.	Aug. 31	77.		0
	2079	41 13 00	66 19 50	75	45°; wh. S.	Sept. 4	78		0
7071	2080	41 13 00	66 21 50	55	46°; gy. S.	Sept. 4	2		0
	2081	41 10 20	66 30 20	50	46°; wh. S.	Sept. 4	600		0
	2082	41 09 50	66 31 50	49	46½°; crs. G. S.	Sept. 4	1		0
7068	2085	40 05 00	70 34 45	70	50°; bu. M.	Sept. 20	7		1
5377	2086	40 05 05	70 35 00	69	52½°; bu. M. gy. S.	Sept. 20	57		21
5412	2086	40 05 05	70 35 00	69	52½°; bu. M. gy. S.	Sept. 20	4		0
5348	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	86		0
5424	2087	40 06 50	70 34 15	65	50°; gn. M. S.	Sept. 20	1		0
5365	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20	27.		0
5363	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20	2		0
5382	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20			0
5383	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20			0
5414	2088	39 59 15	70 36 30	143	48°; yl. S.	Sept. 20	36		1
5413	2089	39 58 50	70 39 40	168	45°; gy. S.	Sept. 20	75		29
5415	2089	39 58 50	70 39 40	168	45°; gy. S.	Sept. 20		1	1
5356	2090	39 59 40	70 41 10	140	48½°; S. brk. S.	Sept. 20	125		0
5417	2090	39 59 40	70 41 10	140	48½°; S. brk. S.	Sept. 20	10		0
5359	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 21	52		11
5396	2091	40 01 50	70 59 00	117	49°; gn. M.	Sept. 21	1		0
5361	2092	39 58 35	71 00 30	197	45°; gn. M.	Sept. 21	3	7	7
	1156	40 13 00	70 29 00	60	45°; M.	Aug. 23	106		1
	1157	40 14 00	70 29 15	62	45°; sft. M.	Aug. 23		1	1
	1158	40 16 00	70 31 00	62	45°; sft. gn. M.	Aug. 23	3		0
	1159	40 20 00	70 35 00	55	44°; sft. M.	Aug. 23	19		0
	1160	40 24 00	70 35 00	41	43°; bk. M.	Aug. 23	38		0
	1162	40 32 00	70 39 00	45	46½°; bk. M.	Aug. 23	15		0
	1163	40 35 30	70 41 00	31	46°; S. M.	Aug. 23	3		0

## NEMATOCARCININÆ.

## NEMATOCARCINUS ENSIFERUS.

*Eumiersia ensifera* Smith, Bull. Mus. Comp. Zool., x, p. 77, pl. 13, figs. 1-9, 1882.

(Plate VII, Fig. 1.)

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' "	° ' "	Fath.					
5553	2030	39 29 45	71 43 00	588	bu. M.	May 26	1		
7091	2035	39 26 12	70 02 37	1,362	38°; glb. O.	July 17	7	11	3
7092	2035	39 26 12	70 02 37	1,362	38°; glb. O.	July 17			0
7093	2036	38 52 40	69 24 40	1,765	38°; glb. O.	July 18	4	3	0
-----	2037	38 53 00	69 23 30	1,731	38°; glb. O.	July 18	28	16	0
-----	2038	38 30 30	69 08 25	2,033	glb. O.	July 26			2
-----	2041	39 22 50	68 25 00	1,608	38°; glb. O.	July 30	2	2	0
-----	2042	39 33 00	68 26 45	1,555	38½°; glb. O.	July 30	2	1	0
-----	2043	39 49 00	68 28 30	1,467	38½°; glb. O.	July 30	3	3	0
-----	2051	39 41 00	69 20 20	1,106	39°; bu. M. glb. O.	Aug. 1	4	3	0
-----	2052	39 40 05	69 21 25	1,098	45°; glb. O.	Aug. 1	4	4	-----
-----	2074	41 43 00	65 21 50	1,309	40°; fna. S. M.	Sept. 3		2	1
-----	2077	41 09 40	66 02 00	1,255	39°; bu. M.	Sept. 4	2	1	0
-----	2084	40 16 50	67 05 15	1,290	40°; bu. M. S. M.	Sept. 5		2	0
5351	2094	39 44 30	71 04 00	1,022	38½°; F. S. M.	Sept. 21		7s.	0
5471	2095	39 29 00	70 58 40	1,342	glb. O.	Sept. 30	5	9	3
5472	2096	39 22 20	70 52 20	1,451	37½°; glb. O.	Sept. 30	3	5	1
5455	2096	39 22 20	70 52 20	1,451	37½°; glb. O.	Sept. 30	2		-----
5468	2096	39 22 20	70 52 20	1,451	37½°; glb. O.	Sept. 30			1
5470	2096	39 22 20	70 52 20	1,451	37½°; glb. O.	Sept. 30	3	3	2
5453	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	2	1	0
5461	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	2	1	0
5474	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1		1y.	-----
5636	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5		1	0
5038	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5		2	1
5641	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5	1	1	0
5634	2103	38 47 20	72 37 00	1,091	39°; glb. O.	Nov. 5	2s.	4	0
5672	2105	37 50 00	73 03 50	1,395	41°; glb. O.	Nov. 6	1		-----
5689	2105	37 50 00	73 03 50	1,345	41°; glb. O.	Nov. 6	5	6	1
7135	2106	37 41 20	73 03 20	1,497	42½°; glb. O.	Nov. 6		1	0
5686	2106	37 41 20	73 03 20	1,497	42½°; glb. O.	Nov. 6	1	2	0
5642	2111	35 09 50	74 57 40	938	M.	Nov. 9		2	-----
5650	2111	35 09 50	74 57 40	938	M.	Nov. 9		1	0
5680	2115	35 49 30	74 34 45	843	39°; M.	Nov. 11	1s. 7y.	2s.	0
5684	2116	35 45 23	74 31 25	888	39°; M.	Nov. 11	5s. 3y.	13s.	0

The recently-published figures (Recueil de figures de Crustacés nouveaux ou peu connus) show that my *Eumiersia* is apparently synonymous with A. Milne-Edwards's *Nematocarcinus* (Ann. Sci. Nat. Zool., VI, ix, No. 4, p. 14, 1881), although the type species of the two genera are evidently distinct. The genus resembles *Pandalus* in the external form of the carapax and abdomen, agrees with it essentially in the structure of the oral appendages, and has the same number and arrangement of branchiæ and epipods. The form of the first and second peræopods, and the presence of exopods at the bases of the first four pairs of peræopods are more like *Acanthephyra* than *Pandalus*, but the peræopods are all exceedingly long and slender, and the three last pairs are very nearly alike and peculiarly modified at the extremities. The mandibles, though essentially as in *Pandalus*, are stouter and have larger molar processes, while the ventral processes are very thin, more expanded, and with broader serrate tips, thus approaching somewhat to the struct-

ure in *Acanthephyra*, as do the palpi, which are much stouter than in the typical species of *Pandalus*.

The following description of the external parts of my species is somewhat modified from the original description, based on imperfect specimens:

The carapax is as broad as high, with the cervical suture indicated by a distinct sulcus from the dorsum to the upper part of the hepatic region either side, where the sulcus terminates in a small depression; the anterior margin is armed with a stout antennal and a distinct pterygostomian spine, though the latter is sometimes wanting. Back of the cervical suture the dorsum is very broad and evenly rounded, but there is often a very small dentiform tubercle in the middle line on the posterior part of the cardiac region; the rostrum in the smaller specimens is often not half as long as the carapax proper, but in the larger specimens much longer, frequently fully as long as the rest of the carapax, nearly straight and horizontal, or curved considerably upward, narrow, with a strong ridge either side, tapering to a more or less acute tip, and with the dorsal carina extending back upon the carapax nearly to the cervical suture and armed with twenty to thirty spines which are directed forward, movably articulated with the carapax, thickly crowded posteriorly but more and more remote anteriorly, and of which five to ten are crowded upon the carapax in about half the space between the orbit and the cervical suture; beneath, the rostrum is ciliated and in most of the specimens entirely unarmed, but occasionally there are one or two teeth near the tip.

The eye-stalks are short and terminated by small hemispherical black eyes. The peduncle of the antennula is about half as long as the antennal scale; the first segment is about as long as the two others taken together, excavated above for the reception of the eye, which, however, does not reach the extremity of the segment, with a prominent lateral process terminating in an acute spine, and the body of the segment itself produced in a spiniform process outside the articulation with the second segment; the second and third segments are subequal in length and nearly cylindrical. The flagella are approximately equal in length and often at least twice as long as the length from the tip of the rostrum to the tip of the telson; the upper is slightly compressed near the base, and, in the male, clothed for a short distance along the lower edge with short hairs, but otherwise like the upper. The antennal scale is thick and strong, about two-thirds as long as the carapax excluding the rostrum, about a fourth as broad as long, and only slightly narrowed toward the tip, which is truncated and does not extend beyond the strong tooth in which the thickened outer margin terminates. The flagellum is subcylindrical, and often more than three times as long as the length from the tip of the rostrum to the tip of the telson.

The second gnathopods reach beyond the middle of the antennal scales: the proximal segment is nearly as long as the two distal, vertically compressed, with a knife-like mesial edge; the middle segment

is very slender, cylindrical, and nearly naked, the distal segment is about two-thirds as long as the middle, somewhat triquetral, very slightly expanded near the middle, tapered to a point distally, and armed with numerous short setæ. The exopod is very slender and about three-fourths as long as the proximal segment of the endopod. The epipod is rudimentary, scarcely longer than the breadth of the protopod, in a transverse sulcus on the outer side of which it lies.

The first four pairs of peræopods have exopods and epipods, like the second gnathopods, but the exopods diminish in size very rapidly posteriorly and are minute upon the fourth pair. The first pair are nearly as long as the carapax, including the rostrum, and reach to about the tips of the antennal scales: the ischium is slightly longer than the merus, and both are very slender and armed with a few small spines; the carpus is very much more slender than the merus, and about twice as long, slightly enlarged at the distal extremity, and entirely naked and unarmed; the chela is about a fourth or fifth as long as the carpus, considerably stouter, slightly flattened, and the digits nearly a third of the entire length, slightly curved, and rather sparsely clothed with slender setæ. The second are similar to the first, but very much longer and more slender: the chela is about as long as in the first pair, but not quite as stout, while the ischium, merus, and carpus are very much longer than in the first pair. The third, fourth, and fifth pairs are nearly alike, much longer than the second, and exceedingly slender: the ischia, meri, and carpi are proportionally about as long as in the second; the propodi are very short, approximately a tenth as long as the carpi, and slightly stouter; the dactyli in the third and fourth pairs are a little longer than the propodi, slender, acute, and surrounded at base and almost hidden by a circle of very long and slender setæ; in the fifth pair the dactylus is very short, about a fourth as long as the propodus, but surrounded and hidden by a circle of setæ about as long as in the third and fourth.

The first and second somites of the pleon are broadly rounded above, and not at all compressed, but the succeeding somites are considerably compressed particularly near the dorsum, which is not really carinated on any of the somites however, though the third somite is prolonged in a broad and prominent tooth over the fourth. The first pleuron is broad and evenly rounded below, the second much longer than high and elliptical, the third and fourth with the posterior edges rounded, but the fifth produced posteriorly in an acute point. The sixth somite is about twice as long as the fifth, less than half as high as long, and very strongly compressed.

The telson is about as long as the sixth somite, narrow distally, rounded above, and armed with five to ten pairs of dorsal aculei and two pairs of long spines at the tip. The outer lamella of the uropod reaches to about the tip of the telson, is nearly four times as long as broad, with the rounded tip extending much beyond the tooth, in which the stout outer margin terminates, and just within which there is a spine,

as in most species of *Pandalus*. The inner lamella is considerably shorter and much narrower than the outer, and lanceolate in outline.

In the female, the inner ramus of the pleopod is lamellar, about two-thirds as long as the outer, four times as long as broad, and tapered to an acute point. In the male, this ramus is lamelliform, but shorter and very much broader, being ovate and about twice as long as broad. The inner of the two stylets on the inner ramus of the second pleopod of the male is as long as the other stylet and expanded into broad lamella obtusely rounded and ciliated at the tip.

The surface of the carapax and pleon is naked but minutely punctate. Three specimens give the following measurements in millimeters:

Station.....	2035	2036	2035-
Sex.....	♀	♂	♀
Length from tip of rostrum to tip of telson.....	110	110	130
Length of carapax, including rostrum.....	44.8	43	50.5
Length of rostrum.....	20.5	18.4	23.4
Height of carapax.....	12	11.5	13
Breadth of carapax.....	12	11.8	13.3
Length of eye-stalk and eye.....	3.3	.....	.....
Greatest diameter of eye.....	2.8	.....	.....
Length of antennal scale.....	17.1	17.3	19
Breadth of antennal scale.....	4.1	4.3	4.8
Length of first pereopod.....	39	41	44
Length of merus.....	8.1	9	9.7
Length of carpus.....	15	18.5	17.5
Length of chela.....	4.1	4	4.3
Length of dactylus.....	1.2	1.3	1.3
Length of second pereopod.....	64	67	80
Length of merus.....	16	17	19.5
Length of carpus.....	23	24.5	30.5
Length of chela.....	4.2	4	4.5
Length of dactylus.....	1.2	1.1	1.6
Length of third pereopod.....	83	81	.....
Length of merus.....	23	22.5	.....
Length of carpus.....	30	28	.....
Length of propodus.....	3.1	3	.....
Length of dactylus.....	4.2	4	.....
Length of fourth pereopod.....	78	.....	94
Length of merus.....	22.8	.....	27
Length of carpus.....	29	.....	45
Length of propodus.....	3.2	.....	3.8
Length of dactylus.....	4	.....	4.8
Length of fifth pereopod.....	82	80	95
Length of merus.....	24	25	30
Length of carpus.....	85	34	41
Length of propodus.....	2.7	2.6	2.7
Length of dactylus.....	0.7	0.8	1.8
Length of sixth somite of pleon.....	15.2	15	17
Height of sixth somite of pleon.....	7	6.7	7.5
Length of telson.....	14+	15.5	17.5
Length of inner lamella of uropod.....	12	.....	.....
Breadth of inner lamella of uropod.....	2.7	.....	.....
Length of outer lamella of uropod.....	13.6	.....	.....
Breadth of outer lamella of uropod.....	3.2	.....	.....

Seven other specimens give the following measurements of the body and antennal scales:

Station.....	2035	2037	2037	2035	2096	2096	2037
Sex.....	♀	♀	♂	♀	♂	♂	.....
Length from tip of rostrum to tip of telson.....	108	129	145	135	135+	114	130
Length of carapax including rostrum.....	42.5	52.2	61.5	55.0	61.4	43.7	51.0
Length of rostrum.....	19.0	23.7	31.0	25.0	31.6	18.1	23.5
Breadth of carapax.....	10.8	14.4	14.5	14.0	14.5	12.5	13.8
Length of antennal scale.....	16.4	20.0	23.8	20.4	21.0	19.2	19.0
Breadth of antennal scale.....	4.0	5.1	5.2	5.2	5.1	4.4	4.9
Length of sixth somite of pleon.....	15.0	17.8	19.0	18.2	18.0	15.3	17.0
Height of sixth somite of pleon.....	6.8	7.8	8.0	7.9	8.0	6.9	7.3
Length of telson.....	15.0	19.0	20.5	18.3	.....	16.0	18.0

## EPHYRINÆ.

## ACANTHEPHYRA A. M.-Edwards.

The figures of *Acanthephyra armata*, which Milne-Edwards has recently published (Recueil de figures de Crustacés nouveaux on peu connus), show that it is congeneric with my *Miersia Agassizii*. Milne-Edwards's genus was characterized in a very indefinite manner, one of the original species has since been referred to *Pandalus*, and no characters have been given for distinguishing it from *Miersia*; but as Milne-Edwards probably had access to typical species of *Miersia*, *Acanthephyra* is most likely a distinct genus, which should include the two following species.

In both these species the structure, number, and arrangement of the branchiæ is essentially as in the typical species of *Pandalus*, except there is no epipod at the base of the fourth leg, so that the branchial formula is as follows:

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	0	0	(6)
Podobranchiæ.....	0	1	0	0	0	0	0	0	1
Arthrobranchiæ.....	0	0	2	1	1	1	1	0	6
Pleurobranchiæ.....	0	0	0	1	1	1	1	1	5
									12+(6)

## ACANTHEPHYRA AGASSIZII.

*Miersia Agassizii* Smith, Bull. Mus. Comp. Zool., x, p. 67, pl. 11, figs. 5-7; pl. 12, figs. 1-4, 1882.

(Plate VIII, Fig. 1.)

Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' " ° ' "		Fath.					
5547	2002	37 20 42	74 17 36	641	gn. M.	Mar. 23	3	2	0
5530	2003	37 16 30	74 20 36	640	gn. M.	Mar. 23	3		.....
5554	2030	39 29 45	71 43 00	588	bu. M.	May. 26	2		.....
7083	2034	39 27 10	69 56 20	1,340	41°; glb. O.	July 17	2	1	1
7084	2037	38 53 00	69 23 30	1,731	38°; glb. O.	July 18	1	3	0
	2040	39 35 13	68 18 00	2,226	38°; glb. O.	July 29	1		.....
7085	2041	30 22 50	68 25 00	1,698	38°; glb. O.	July 30	1		.....
	2042	39 33 00	68 26 45	1,555	38½°; glb. O.	July 30		1	0
	2043	39 49 00	68 28 30	1,467	38½°; glb. O.	July 30	1	1	0
7086	2047	40 02 20	68 49 40	389	52°; bu. m.	July 31	1	1	0
7087	2051	39 41 00	69 20 20	1,106	39°; bu. M. glb. O.	Aug. 1	2		.....
	2052	39 40 05	69 21 25	1,098	45°; glb. O.	Aug. 1	1	1	1
	2053	42 02 00	68 27 00	105	bu. M.	Aug. 29	2	1y. 1	0
7088	2072	41 53 00	65 35 00	858	39°; gy. M.	Sept. 2	4	1y. 1	1
7098	2075	41 40 30	65 35 00	855	39°; fnc. S. M.	Sept. 3		1y.	.....
7089	2077	41 09 40	66 02 00	1,255	39°; bu. M.	Sept. 4	3		0
7090	2083	40 26 40	67 05 15	959	40°; gy. M.	Sept. 5	1	1	0
7026	2094	39 44 30	71 04 00	1,022	38½°; F. M.	Sept. 21	1	1y. 2	1
5469	2095	39 29 00	70 58 40	1,342	glb. O.	Sept. 30		1	0
5454	2098	37 40 30	70 37 30	2,221	glb. O.	Oct. 1	1½.	3½.	3
5452	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2	1½.	2½.	2
5462	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2	1		0
5465	2100	39 22 00	68 34 30	1,628	37½°; glb. O.	Oct. 3	1s.	1	1
5640	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5	1	1	1
7134	2103	38 47 20	72 37 00	1,091	39°; glb. O.	Nov. 5		1	1
5683	2106	37 41 20	73 03 20	1,497	42½°; glb. O.	Nov. 6	1		.....
5643	2110	35 12 10	74 37 15	516	40°; bu. M.	Nov. 9	2		.....
5685	2116	35 45 23	74 31 25	888	39°; bu. M.	Nov. 11	1		.....

The carapax in front is broader than high, but much higher than broad posteriorly, and slightly compressed above, so as to make the dorsum somewhat obtusely angular, though rounded and not at all carinate, even anteriorly. The rostrum is usually a little shorter than the rest of the carapax in large specimens, but in small specimens is often nearly or quite twice as long; it is stout at base, but rapidly tapered above the first segment of the peduncle of the antennula, beyond which it is very slender, slightly upturned, and armed with six to ten teeth above and four to seven beneath, the dorsal teeth extending back as far as the orbit, and both series reaching nearly to the acute tip. The anterior margin projects in an acute, but scarcely spiniform, angle above the base of the antenna, and opposite the base in an acute and laterally prominent branchiostegial spine, below which the branchiostegite is suddenly incurved in the anterior part of the carapax. The surface of the carapax and abdomen is naked and smooth to the unaided eye, but is microscopically punctate.

The eye-stalks are very short, and terminated by small hemispherical black eyes. The peduncle of the antennula is short, much less than half as long as the antennal scale; the first segment is fully as long as the second and third taken together, is deeply excavated above, for the reception of the eye, and its outer edge is armed distally with a small tooth; the second and third segments are broader than long and subcylindrical. The outer or major flagellum in the male is twice to three times as long as the antennal scale, with the proximal portion to near the tip of the antennal scale, compressed vertically, broadly expanded, and thickly clothed beneath with fine hairs, but the distal portion very slender and somewhat compressed vertically. In the female the compressed and thickened proximal part is much shorter and slightly narrower and the whole flagellum a little shorter. The inferior flagellum is about as long as the upper, and slender throughout. The antennal scale is approximately three-fourths as long as the carapax, excluding the rostrum, and near the base about a fourth as broad as long, but narrowed regularly to a very slender tip. The second segment of the peduncle is armed with an acute dentiform spine below, and a triangular tooth above the base of the scale. The distal segment of the peduncle reaches only about a third of the way from the base to the tip of the antennal scale. The flagellum is slender, slightly compressed, and nearly as long as the body of the animal.

The labrum is fleshy, prominent, as seen in front, and the inferior edge is thickened and slightly indurated and applied to the concave dorsal surfaces of the mandibles. The lobes of the metastome are very broad distally and somewhat truncated. The mandibles are expanded into thin, dorsally concave, and strongly dentate ventral processes, above and closely connected with which are small and narrow molar areas. The opposing edges of the ventral processes differ somewhat on the two sides: on the right side the mesial edge is slightly convex, as seen

from above or below, and armed with about eight acutely triangular teeth, beyond which there are several small teeth on the anterior edge; on the left side the mesial edge, as seen from above or below, is straight or slightly concave, terminates anteriorly in a sharp angle, beyond which there are no teeth on the anterior edge, and the teeth on the anterior part of the mesial edge are very small, though back of these small teeth there are about as many and as large teeth as on the mesial edge of the right mandible. The protognathal lobes of the first maxilla are approximately equal in size, broad at the ends, and armed as usual with slender spines upon the distal, and numerous setæ upon the proximal lobe. The endognath is small, obtusely pointed, and armed with a very few marginal setæ and with two slender spines upon a small fold on the ventral side near the tip. The protagnathal lobes of the second maxilla are very unequal, the proximal lobe is broad but very short, while the distal is long and deeply divided into two narrow and obtuse lobes. The endognath is unsegmented, short, and narrowed to a slender tip. The scaphognath projects anteriorly slightly beyond the endognath, and both ends are broad and evenly rounded.

The protopod of the maxilliped projects very little anteriorly, and is obscurely divided into a very small proximal and a large distal lobe. The endopod is well developed and composed of three segments, of which the proximal is very short, broader than long, the second nearly three times as long as broad, the terminal a little smaller than the second, and lanceolately pointed, and all the segments margined with setæ. The exopod is a very large lamelliform lobe, longer than the endopod, about a third as broad as long, expanded and broadly rounded in outline distally, and edged with plumose setæ, which gradually increase in size distally along the margin. The epipod is small, branchial, with the anterior and posterior parts approximately equal. The ischium in the first gnathopod is much shorter than broad, the merus between two and three times as long as broad, the carpus a little narrower than the merus and about as long as broad, the propodus bent back upon the merus, as in most Palæmonidæ, a little longer than the merus, nearly half as broad as long, and obliquely truncated along the mesial edge for the articulation of the dactylus, which is more than twice as broad as long, and armed with setæ and slender spines, as is the mesial and anterior edge of the dactylus. The exopod is nearly as long as the endopod, slender, and multiarticulate and flagelliform for more than half its length. The epipod is broad at base, somewhat triangular, and bears a large phyllobranchia. The endopod of the second gnathopod reaches a little beyond the middle of the antennal scale, and is slender and composed of three segments, of which the proximal is the longest, reaches as far forward as the antero-lateral angle of the carapax, and is strongly curved and dorsally compressed in the middle opposite the mouth; the middle and the distal segments are straight, the middle about half as long, and the distal nearly as

long as the proximal; all the segments are more or less setigerous. The exopod is slender, multiarticulate, flagelliform, and about as long as the proximal segment of the endopod. The epipod is narrow, lamellar, nearly as long as the middle segment of the endopod, and lies between the branchiæ of the ninth and tenth somites.

All the peræopods are furnished with exopods like those of the second gnathopods, and the first, second, and third pairs are furnished also with epipods like those of the second gnathopods. The first and second are slender, do not reach the tips of the second gnathopods, and are very nearly alike, but the carpus and chela are a little longer and more slender in the second than in the first. In both pairs the merus is a little longer than the ischium, and reaches to the antero-lateral angle of the carapax. In the first pair the carpus is scarcely more than half as long and about as stout as the merus, and the chela is somewhat longer and a little stouter than the carpus, and with slender, slightly compressed and nearly straight digits about a third of the whole length. In the second pair the carpus is scarcely as stout as the merus and about two-thirds as long, and the chela is scarcely stouter than the carpus, but considerably longer. In the second pair there is a slender spine on the lower edge of the distal end of the merus, but otherwise both pairs are unarmed, though sparsely clothed with soft hairs. The third and fourth pairs are nearly alike and reach to about the tips of the second gnathopods: the lower edges of the meri are spinulose, the propodi considerably longer than the carpi, and the dactyli slender, nearly straight, unarmed, and about a fourth as long as the propodi. The posterior plæopods are about as long as the third and fourth, and like them except the distal extremities, which are peculiarly modified. The propodus is slender, a little longer than in the third and fourth, clothed with a few long plumose setæ, thickly beset distally along the lower edge with serrately armed and simple setæ, and so densely clothed at the tip with long setæ as to very nearly hide the dactylus, which is very short, curved at the tip, and armed with several slender spines.

The pleon is large relatively to the cephalo-peræon, strongly compressed, and dorsally carinated except upon the first somite, the carina being most conspicuous on the third somite, where it projects posteriorly in a long and very slender tooth. The three succeeding somites each project similarly in a minute tooth. The pleura of the four anterior somites are broad and very deep, the height of the pleon at these somites being greater than that of the carapax. The first pleuron is as deep as the second, and its anterior edge is slightly concave in outline; the second is about as broad as high, and approximately orbicular; the third and fourth project posteriorly in broadly rounded lobes; the fifth projects posteriorly in an angular lobe obtusely rounded at the tip. The sixth somite is about a third longer than the fifth, and about twice as long as high.

The telson is much longer than the sixth somite, very slender toward

the tip, rounded and slightly sulcated above, armed with five to twelve pairs of stout dorsal aculei on the distal half, and with a median spine at the tip. The outer lamella of the uropod scarcely reaches, or falls much short of, the tip of the telson, is about four times as long as broad, tapers very slightly except near the tip, which is ovate and projects nearly the width of the lamella beyond the angle in which the thickened outer margin ends; the inner lamella is obtusely lanceolate, and considerably shorter and a little narrower than the outer.

The outer ramus of the first pleopod is long and slender like that of the succeeding pairs. The inner ramus in the male is developed into a broad oval lamella about a fourth as long as the outer ramus, setigerous on the middle of either edge, and the inner edge thickened and bearing a stylet armed along its inner edge as usual with minute hooks. In the female the inner ramus is no longer than in the male, and is narrow, lanceolate, and thickly setigerous.

In alcoholic specimens the eggs are about  $0.45^{\text{mm}}$  and  $0.32^{\text{mm}}$  in longer and shorter diameter.

Measurements of a large male are given under the next species.

#### ACANTHEPHYRA EXIMEA, sp. nov.

This species, which is represented in the collection by a single male (5644) is closely allied to the last, but is apparently a larger species, and is readily distinguished by the sharply carinated carapax and the much stouter base of the rostrum.

The carapax is higher in front than in the last species, and there is a sharp carina extending from the rostrum to near the posterior margin, rising into a slight crest on the cardiac region. The rostrum is shorter than the rest of the carapax, very stout and high at the base, tapered rapidly to about the middle, and from this point slender and slightly upturned. The dorsal edge is distally unarmed for about half the length, but back of this there is a series of about seven small teeth extending a little way back upon the carapax, while beneath there are four teeth on the middle and distal part.

The eyes, antennulæ, and antennæ are nearly as in the last species, except that the antennal scales are somewhat broader, and less slender at the tips. The oral appendages are essentially as in the last species, although the crowns of the mandibles are somewhat different, the teeth of the ventral edges being nearly uniform in size and confined to the mesial edge. The second gnathopods and the peræopods are proportionally a little stouter than in the last species, but appear not to differ in other respects.

The dorsum of the pereon is carinated and toothed nearly as in the last species, but the carina is slightly higher and the tooth of the third somite stouter. The pleuron of the fifth somite is proportionally longer and reaches nearly to the infero-posterior angle of the sixth somite, which, however, is considerably shorter and higher than in the last spe-

cies. The telson is imperfect at the tip, but is apparently shorter and stouter than in the last species. The lamella of the uropods are considerably broader than in the last species.

In the accompanying table measurements of this species and of a single specimen of *A. Agassizii* are given together.

*Measurements in millimeters.*

	<i>A. eximia.</i>	<i>A. Agassizii.</i>
Station.....	2111	2099
Sex.....	♂	♂
Length from tip of rostrum to tip of telson.....	135	120
Length of carapax including rostrum.....	48.0	43.0
Length of rostrum.....	27.0	20.0
Height of carapax.....	21.0	17.0
Breadth of carapax at branchiostegial spines.....	16.0	13.6
Breadth of carapax about the middle.....	15.0	12.5
Length of eye-stalk and eye.....	5.0	4.6
Greatest diameter of eye.....	3.5	3.2
Length of antennal scale.....	22.0	21.0
Breadth of antennal scale.....	6.2	5.2
Length of second gnathopod.....	32.0	25.0
Length of first pereopod.....	30.0	22.0
Length of chela.....	7.5	5.6
Breadth of chela.....	1.8	1.2
Length of dactylus.....	3.0	2.4
Length of second pereopod.....	35.0	26.0
Length of chela.....	8.0	7.0
Breadth of chela.....	1.3	1.0
Length of dactylus.....	3.2	2.8
Length of third pereopod.....		31.0
Length of propodus.....		7.5
Length of dactylus.....		7.5
Length of fourth pereopod.....	42.0	30.0
Length of propodus.....	10.2	7.5
Length of dactylus.....	2.6	1.9
Length of fifth pereopod.....	40.0	31.0
Length of propodus.....	18.5	9.5
Length of dactylus.....	0.5	0.6
Height of second somite of pleon.....	24.0	21.0
Length of sixth somite of pleon.....	14.0	13.4
Height of sixth somite of pleon.....	10.0	8.0
Length of telson.....	18. +	23.0
Length of inner lamella of uropod.....	17.3	15.0
Breadth of inner lamella of uropod.....	5.2	3.4
Length of outer lamella of uropod.....	20.2	17.4
Breadth of outer lamella of uropod.....	6.7	4.8

The single specimen (5644) is from Station 2111, November 9, north lat. 35° 09' 50'', west long. 74° 57' 40'', 938 fathoms, green mud.

#### NOTOSTOMUS ROBUSTUS, sp. nov.

(Plate VII, Fig. 2.)

This species is closely allied to *N. gibbosus* A. Milne-Edwards, but is distinguished from it as figured in Milne-Edwards's *Recueil de Figures de Crustacés*, by its much larger eyes, much shorter and distally unarmed rostrum, and the strongly divergent lateral carinæ of the carapax. In the *gibbosus* the rostrum, measured from the back of the orbit, is much longer than in *robustus*, the high dorsal crest does not extend more than half the length, and the terminal portion is slender and serrate above and below to the very tip; while in *robustus* the dorsal crest extends to within a short distance of the slender and unarmed tip, back of which there are only three or four spiniform teeth on the under edge. In *ro-*

*bustus* the upper lateral carina begins just back of the base of the eye-stalk, and below and entirely separate from the posterior fading out of the lateral carina of the rostrum; is very sharp and prominent above the broad, depressed, and concave antenno-hepatic region, which is separated from the branchial region by an oblique branchio-hepatic carina, connecting the upper with the nearly straight, sharp, and prominent lower lateral carina. The posterior part of the upper carina, back of the branchio-hepatic, is less prominent than in front, nearly straight, and diverges very rapidly from the lower carina, while in *gibbosus* these carinæ are figured as very nearly parallel. In *robustus* there is a well-marked submarginal carina nearly the whole length of the inferior margin. Nearly the whole surface of the carapax between the carinæ is marked with minute dendriform elevations, which look somewhat like, but are apparently not, minute wrinkles due to contraction; otherwise the surface of both carapax and pleon is nearly smooth and quite naked. The eyes are well developed, nearly hemispherical, somewhat swollen, two-thirds as broad as the length of the eye and eye-stalk, conspicuously faceted, black, and face somewhat obliquely inward. In the male the proximal part of the upper flagellum of the antennula, for a distance the length of the antennal scale, is compressed, broadly expanded, and the outer inferior surface clothed with very short hairs; while in the female the same part is similarly but very much less expanded.

The pereopods, especially the three posterior pairs, are apparently considerably stouter in *robustus* than in *gibbosus*, and the ischia and meri in the three posterior pairs are all armed with small spines along the lower edge in *robustus*, while Milne-Edwards's figure shows no such spines anywhere upon the posterior pair, and none upon the ischia in the third and fourth pairs. In Milne-Edwards's figure, however, an articulation is incorrectly introduced in the merus in the fourth and fifth pairs and apparently also in the third, so these appendages are very likely incorrectly figured in other respects.

The dorsal carina of the pleon is apparently less conspicuous in *robustus* than in *gibbosus*, and the teeth in which it projects at the third, fourth, fifth, and sixth somites are much shorter. The dorsal facet of the first somite is overhung behind by a sharp lamellar projection, beneath which the posterior margin of the carapax fits when the pleon is extended, and which is continuous either side with the pleuron, which broadly overlaps the side of the carapax.

The entire integument of the animal is rather soft and membranaceous, but in the specimen figured the form is very well preserved. Soon after preservation in alcohol, and, according to the statement of Mr. Benedict, before the color had changed materially from that of life, the entire animal, except the eyes, was very intense dark crimson.

The oral appendages are essentially as in *Acanthephyra Agassizii* and the number and arrangement of the branchiæ are the same as in that species.

The genus *Notostomus* is very closely allied to *Meningodora* and it is quite possible that it will be necessary to unite them.

*Measurements in millimeters.*

Station	2042	2074
Sex	♂	♀
Length from tip of rostrum to tip of telson	135	150
Length of carapax including rostrum	61	65
Length of rostrum	13	16
Height of carapax	35	36
Breadth of carapax		25
Length of eye-stalk and eye		6.6
Greatest diameter of eye		4.4
Length of antennal scale	21.0	20.5
Breadth of antennal scale	7.8	8.5
Length of second peraeopod	42	44
Length of first peraeopod	38	36
Length of chela	9.5	9.4
Length of dactylus	3.5	3.6
Length of second peraeopod	46	45
Length of chela	9.4	9.3
Length of dactylus	3.2	3.2
Length of third peraeopod	75	70
Length of propodus	34.5	31.5
Length of dactylus	3.5	3.6
Length of fifth peraeopod	65	63
Length of propodus	25	24
Length of dactylus	0.7	0.6
Length of sixth somite of pleon	11.3	13.0
Height of sixth somite of pleon	9.3	9.0
Length of telson	24.0	24.5

Station 2042, July 30, north lat.  $39^{\circ} 33'$ , west long.  $68^{\circ} 26' 45''$ , 1,555 fathoms, globigerina ooze, temperature  $38\frac{1}{2}^{\circ}$ —1 male (7051). Station 2074, September 3, north lat.  $41^{\circ} 43'$ , west long.  $65^{\circ} 21' 50''$ , 1309 fathoms, fine mud, temperature  $40^{\circ}$ —1 female (7052).

**MENINGODORA MOLLIS** Smith.

Bull Mus. Comp. Zool. Cambridge, x, p. 74, pl. 11, figs. 8-9, pl. 12, figs. 5-9, 1882.

One male (7051) was taken August 1 at Station 2051, N. lat.  $39^{\circ} 41'$ , W. long.  $69^{\circ} 20' 20''$ , 1,106 fathoms, blue mud and globigerina ooze, temperature  $39^{\circ}$ .

On account of the extreme softness of the entire animal, this specimen, like the single female from which the species was first described, is in rather bad condition, but it has the peraeopods complete, and enables me to supplement the original description to a considerable extent.

The dorsal carina, over and back of the base of the rostrum, is armed with about seven minute spiniform teeth. The proximal part of the upper flagellum of the antennula is much stouter than the lower, strongly compressed, and its outer inferior surface clothed with short hairs. The antennal scale is considerably more than twice as long as broad, very thin, foliaceous, slightly narrowed distally, and obliquely rounded at the tip.

The first peraeopods are scarcely stouter than the second gnathopods and fall considerably short of their tips: the merus is compressed and as long as the proximal segment of the endopod of the second gnatho-

pod; the carpus is scarcely half as long as the merus, subcylindrical, and slightly enlarged distally; the chela is about twice as long as the carpus, very slightly swollen proximally, the digits nearly a third of the whole length, strongly curved at the tips, and the propodal one considerably stouter than the dactylus. The second peræopods are very slender and reach to the tips of the second gnathopods: the ischium and merus are strongly compressed, and the latter is longer than in the first pair, and reaches to the distal extremity of the proximal segment of the endopod of the second gnathopods; the carpus is slender, cylindrical, and about half as long as the merus; the chela is slightly longer than the carpus, scarcely as long as in the first pair, cylindrical, scarcely as stout as the carpus, not at all swollen, and with very slender and slightly compressed digits about one-fifth the entire length. The third and fourth pairs of peræopods are nearly alike: the ischia and meri are compressed and nearly as in the second pair, but a little longer; the carpi are a little shorter and broader than in the second pair; the propodi are about a third of the entire length, very slender, slightly compressed, flattened or grooved on all the four sides and with the angles acutely carinated; the dactyli are less than a third as long as the propodi, very slender, very slightly curved, regularly tapered, and angulated like the propodi.

The outer ramus in the first pair of pleopods is long and slender like that in the succeeding pairs, but the inner ramus is developed into a broad oval lamella as in *Acanthephyra Agassizii*, except that the stylet at the inner edge is very short, scarcely projecting beyond the tip of the lamella.

The number and arrangement of the branchiæ and epipods is the same as in *Acanthephyra Agassizii* and *eximeæ*. In the original description of the genus *Meningodora* I stated that there was apparently but one branchia at the base of the second gnathopod, as I was unable to find a second in the badly-preserved specimen first examined, but in the specimen here described there are two branchiæ as in the allied genera.

*Measurements in millimeters.*

Station .....	2051
Sex .....	♂
Length from tip of rostrum to tip of telson .....	65
Length of carapax, including rostrum .....	27
Length of rostrum .....	4
Height of carapax .....	13
Length of eye-stalk and eye .....	4.1
Greatest diameter of eye .....	1.3
Length of antennal scale .....	9.6
Breadth of antennal scale .....	4.0
Length of second gnathopod .....	23.0
Length of first peræopod .....	23.0
Length of chela .....	6.4
Breadth of chela .....	1.3
Length of dactylus .....	2.0

Length of second peræopod.....	26.5
Length of chela.....	6.2
Breadth of chela.....	0.7
Length of dactylus.....	1.3
Length of third peræopod.....	36
Length of merus.....	10.8
Length of carpus.....	4.3
Length of propodus.....	11.0
Length of dactylus.....	3.4
Length of fourth peræopod.....	37
Length of propodus.....	12.0
Length of dactylus.....	3.3
Length of fifth peræopod.....	31
Length of propodus.....	10.0
Length of dactylus.....	0.2
Length of sixth somite of pleon.....	7.2
Hight of sixth somite of pleon.....	4.0
Length of telson.....	10+
Length of inner lamella of uropod.....	10.5
Breadth of inner lamella of uropod.....	2.6
Length of outer lamella of uropod.....	12.0
Breadth of outer lamella of uropod.....	3.9

## PASIPHAIDÆ.

## PASIPHAË PRINCEPS, sp. nov.

(Plate V, Fig. 2.)

This species, which is far larger than any of the genus heretofore known, is unfortunately represented by a single specimen (5473) only.

*Female*.—The dorsum of the carapax is rounded except for about a third of the length anteriorly, where it rises into a carina, terminating in a short, mucronate and obliquely upturned rostrum overhanging, but projecting scarcely as far forward as the front itself, which is prominent though rounded in outline as seen from above. The lower angle of the orbit projects in a prominent but obtuse angle, about as far as the front, and below this the anterior margin is armed with a small spine directed obliquely outward over the base of the antenna. The eye-stalks are short and stout, and bear the large swollen black eyes facing only very slightly outward. The eyes as seen in front are nearly circular, but slightly larger in the transverse diameter, which is about three-fourths the length of the eye-stalk and eye. The antennal scale is about two-fifths as long as the carapax, scarcely a third as broad as long, and the outer edge arcuate and terminating in an acutely triangular lamellar tooth. There is an acute spine on the peduncle of the antenna beneath the articulation of the scale as in *P. tarda*, with which species the antennæ, antennulæ, and oral appendages agree in all essential particulars, except the tip of the antennal scale just described.

The peræopods are very nearly as in *P. tarda*. The first pair are smooth, naked, and unarmed, except on the prehensile edges of the digits, which are about three-fourths as long as the body of the chela. The second pair are armed with a few small spines along the lower edge of

the propodus, and the lower distal angle of the carpus is produced into a sharp spine, but are otherwise nearly like the first pair, except longer and more slender, the chela being nearly a fourth longer, not so stout, and with the digits about as long as the body of the chela. The third pair are imperfect at the tips, exceedingly slender, cylindrical, and unarmed; the merus about two-thirds as long as the carapax, the carpus very short, and the propodus acicular and apparently about a fourth as long as the merus. The fourth pair are little more than half as long as the carapax. The fifth pair are nearly twice as long as the fourth, with the propodus and dactylus more than twice as long as in that pair.

The pleon, exclusive of the telson, is about one-half longer than the carapax, the four anterior somites are each higher than the carapax, and the posterior angles of their pleura are broadly rounded, while the corresponding angle of the fifth pleuron is nearly right angular but with the apex of the angle rounded. The second, third, fourth, and fifth somites are dorsally carinate, the fourth and fifth most conspicuously. The sixth somite is a little more than a third as long as the carapax, nearly two-thirds as high as long, about one-half as broad as high, compressed but scarcely carinated dorsally, and with a conspicuous, slightly curved, longitudinal, rib-like ridge either side. The telson is slightly longer than the sixth somite, about as long as the antennal scale, with a broad and shallow dorsal sulcus nearly the whole length, the tip divided by a narrow sinus about as deep as the breadth of the tip, and the edges of the sinus armed with about ten short spines each side. The inner lamella of the uropod is narrow, ovate, a little shorter than the telson, and about three and a half times as long as broad. The outer lamella is nearly a third longer than the inner, proportionately as broad, more obtuse at the tip, which is armed at the outer edge with an acutely triangular lamellar tooth.

The protopodites of the first four pairs of pleopods are composed of two nearly equal segments of which the proximal, or coxa, is not movably articulated with ventral wall of the somite and is consolidated very nearly its whole length with the adjacent pleuron, while the distal segment, or basis, is freely articulated with it and projects considerably below the pleuron. The coxæ in the fifth pair are much shorter than in the fourth, but otherwise the fifth pair are similar to the fourth, though shorter and not egg-bearing, the eggs being carried by the four anterior pairs and attached to the coxæ only. The outer ramus of the first pleopod is long and slender, as in the succeeding pairs, but the inner ramus expands into a short ovate lamella, bearing near the middle of its anterior edge a small process for mesial attachment, and with both margins below this clothed with long setæ. The structure of the pleopods is essentially the same in *P. tarda*, and the peculiarities are doubtless common to all the species of the genus, and to a considerable extent to the new genus *Parapasiphaë*, about to be described.

The eggs, which are just beginning to show the pigment of the devel-

oping eyes, are slightly elliptical in outline and about 3 by 4<sup>mm</sup> in shorter and longer diameter.

The single specimen, from which the accompanying measurements were made, was taken at station 2095, September 30, north lat. 39° 29', west long. 70° 58' 40", 1342 fath., globigerina ooze. At the next station, 1451 fath., the temperature was 37½°.

*Measurements in millimeters.*

Sex.....	♀
Length from tip of rostrum to tip of telson .....	215
Length of carapax .....	75
Height of carapax .....	37
Breadth of carapax .....	21
Length of eye-stalk and eye .....	8.0
Greatest diameter of eye .....	6.0
Length of antennal scale .....	29
Breadth of antennal scale .....	8.8
Length of second gnathopod .....	65
Length of first peræopod .....	94
Length of chela .....	36
Breadth of chela .....	5.3
Length of dactylus .....	15.2
Length of second peræopod .....	114
Length of chela .....	44
Breadth of chela .....	4.3
Length of dactylus .....	21.8
Length of third peræopod .....	70+
Length of merus .....	50.5
Length of carpus .....	2.5
Length of propodus .....	11+
Length of fourth peræopod .....	39
Length of propodus .....	9.0
Length of dactylus .....	2.3
Length of fifth peræopod .....	70
Length of propodus .....	19.5
Length of dactylus .....	5.5
Height of second somite of pleon .....	45
Length of sixth somite of pleon .....	26.3
Height of sixth somite of pleon .....	16.3
Length of telson .....	28
Length of inner lamella of uropod .....	25
Breadth of inner lamella of uropod .....	7.2
Length of outer lamella of uropod .....	34
Breadth of outer lamella of uropod .....	9.5

PARAPASIPHAË, gen. nov.

In external characters, and especially in the form and structure of the peræopods, this genus is very near *Pasiphaë*, but the body is less compressed, and the rostrum, not separated from the front of the carapax, projects above or between the bases of the eye-stalks. In the three species seen the front margin of the carapax below the rostrum is unarmed and the lateral carinæ more conspicuous than in *Pasiphaë* and differently arranged. In all the species there is a sharp carina extending back from the base of the antenna to the hepatic region, where it

gives off a sharp carina, running downward and backward toward the inferior margin, and then continues on in a nearly straight line across the branchial region to near the posterior margin. The eyes are much smaller than in *Pasiphaë*, and are borne on the outer edge of the tip of a vertically flattened stalk, which is rather broader than the eye and projects in a more or less conspicuous terminal process just inside of the cornea. The antennulæ, antennæ, second gnathopods, peræopods, and appendages of the pleon are essentially as in *Pasiphaë*, but the oral appendages and the number of the branchiæ are essentially different.

The mandibles (Plate VI, Fig. 2) bear very small and slender palpi, composed of two approximately equal segments, while in other respects they are almost exactly as in *Pasiphaë*. The proximal lobe of the protognath of the first maxilla (Fig. 3) is well armed with spines and setæ, and is not very much smaller than the distal, which is much shorter along the mesial edge than in *Pasiphaë*; the endognath is well developed, projects much in front of the protognath, has the inner edge emarginate, and is armed with long setæ. The endopod of the maxilliped (Fig. 5) is nearly as in *Pasiphaë*, but the epipod is well developed, with free and approximately equal anterior and posterior lobes. The first gnathopod (Fig. 6) bears a rudimentary, probably epipodal, appendage, and the second gnathopod a rudimentary epipod, and at its base two arthrobranchiæ. Except in the characters above described, the oral appendages are essentially as in *Pasiphaë*.

In structure the branchiæ are essentially as in *Pasiphaë*, but there are six arthrobranchiæ each side instead of three, that is one each at the bases of the four anterior peræopods besides the two just mentioned, so that the branchial formula is:

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipoda.....	1	1	1	0	0	0	0	0	(3)
Podobranchiæ.....	0	0	0	0	0	0	0	0	0
Arthrobranchiæ.....	0	0	2	1	1	1	1	0	6
Pleurobranchiæ.....	0	0	0	1	1	1	1	1	5
									11+(3)

While in *Pasiphaë tarda* and *pinceps* the branchial formula is—

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipoda.....	0	0	0	0	0	0	0	0	(0)
Podobranchiæ.....	0	0	0	0	0	0	0	0	0
Arthrobranchiæ.....	0	0	0	1	1	1	0	0	3
Pleurobranchiæ.....	0	0	0	1	1	1	1	1	5
									8+(0)

PARAPASIPHAË SULCATIFRONS, sp. nov.

(Plate V, Fig. 4; Plate VI, Figs. 1-7.)

*Female*.—The carapax is high back of the middle but vertically contracted in front, as in the species of *Pasiphaë*, with the dorsal carina extending the whole length and rising into a high crest in front, but the

edge of the crest is truncated and sulcated longitudinally from the middle of the gastric region to the tip of the rostrum, or for nearly a third of the entire length. The front projects straight forward in an acute rostrum about half as long as the eye-stalk. Below the small orbital sinus each side, the short anterior margin is nearly vertical to the base of the antenna, where it is at first longitudinal and then transverse, leaving a broad open space opposite the efferent branchial passage.

The eye-stalks are nearly two-fifths as long as the antennal scales, compressed vertically, about half as broad as long, and project in front, just inside the cornea, in a small conical tubercle. The eyes are approximately hemispherical, though slightly compressed vertically, distinctly faceted, and colored with pigment which is dark brown in the alcoholic specimens. The peduncle of the antennula is about three-fourths as long as the antennal scale; the proximal segment is more than half the entire length, and bears a squamiform lateral process, which is concave on its outer surface and projects at its upper edge in an acute tip reaching nearly as far forward as the body of the segment itself; the middle segment is very short, and the distal about twice as long. The inner or minor flagellum is very slender, subcylindrical, and about as long as the carapax, while the outer is compressed and expanded at the base, and much stouter than the inner. There is an inconspicuous tooth below the base of the antennal scale, but otherwise the peduncle of the antenna is unarmed. The antennal scale is narrow, ovate, about two-fifths as long as the carapax, nearly a third as broad as long, and stiffened by two longitudinal rib-like ridges on the dorsal surface, one nearly median, the other parallel with and very near the outer edge and terminating in the distal spine, which projects beyond the narrow but obtusely rounded tip. The flagellum is somewhat compressed and approximately twice as long as the carapax.

The second gnathopods (Plate VI, Fig. 7), are about as long as the carapax and reach to the tips of the antennal scales: the coxa bears a rudimentary epipod; the basis is elongated and bears an exopod reaching half way to the tip of the endopod, with the proximal segment of which it is consolidated, as in the species of *Pasiphaë*, the segment thus formed (the antepenultimate) being nearly as long as the two distal taken together, broader than they, strongly compressed in the middle, and sparsely setigerous; the two distal segments are slender and compressed, the penultimate a little more than half as long as the ultimate, and both armed on the inner side with setæ which become spiniform at the tip.

The first peræopods reach by the tips of the antennal scales about half the length of the chelæ, and are smooth, nearly naked, and unarmed, except the prehensile edges of the digits: the merus is a little shorter than the antennal scale and strongly compressed; the carpus a little longer than broad, compressed, with the distal angles sharp; the chela is longer than the antennal scale, the outer surface of the body slightly

concave and its dorsal edge strongly compressed and thin, the digits considerable shorter than the body of the chela, slender, tapering to very slender and strongly curved tips, and the prehensile edges armed, except at the tips, with a closely set uniform series of slender spiniform teeth. The second peræopods are about a third longer than the first: the basis and ischium are armed with minute spines or teeth along the lower edge; the merus is about a third longer but scarcely stouter than in the first pair, and the lower edge is armed with a series of several acute spiniform teeth; the carpus is scarcely longer than in the first pair, but the lower distal angle is produced and spiniform; the chela is about a third longer than in the first pair and much more slender, being absolutely narrower, and narrowed from near the base, the body is convex on the outside and flat on the inside, and the digits are as long as the body, with sharply curved tips, armed as in the first pair. The third peræopods are a little shorter than the first, exceedingly slender, subcylindrical, naked, and unarmed: the merus is nearly half the entire length; the carpus very short; the propodus is more than half as long as the merus, and tapers to a very slender tip which bears a short seta-like dactylus. The fourth peræopods are about as long as the merus in the third pair and very slender throughout; the merus is about a third the length of the endopod, and about equal to the propodus and dactylus taken together, while the dactylus is only about a fourth as long as the propodus. The fifth peræopods are about a third longer than the fourth and slender throughout; the merus and propodus are subequal and together make more than half the whole length, and the dactylus is less than a third as long as the propodus. The exopods of the first and second pairs are slightly longer than those of the second gnathopods, while those of the three posterior pairs decrease in length successively to the fifth pair, where they scarcely reach by the middle of the merus.

The pleon is about twice as long as the carapax, the three anterior somites are higher than the carapax, with the dorsum evenly rounded and the lower edges of their pleura horizontal and the angles rounded. The fourth somite is armed with a dorsal carina, beginning at the middle of the somite and produced back over the next somite in a small and acute tooth; the lower edge of the pleuron is on a line with those of the preceding somites, and its angles rounded or obtuse. The fifth somite is only a little higher than the sixth; the dorsum is flattened and slightly sulcated; and the pleuron is truncated below, but the apices of the angles are obtuse. The sixth somite is considerably shorter than the antennal scale, about two-thirds as high as long, compressed, and the dorsum rounded.

The telson is about one-half longer than the sixth somite, has a dorsal sulcus, but no dorsal or lateral aculei, and is regularly tapered to a narrow, convex tip, armed with six to eight slender spines, of which the lateral pair are much the larger. The inner lamella of the uropod is

nearly as long as the telson, narrow ovate, and about a third as broad as long. The outer lamella is very little longer than the inner, a little broader proportionately, and the tip broad, rounded, and projecting much beyond the small distal spine of the outer edge.

The pleopods are nearly as in *Pasiphaë princeps*, but the inner lamelliform ramus in the first pair is more elongated, with the small process of the anterior edge nearer the tip.

The eggs are very few in number, not over twenty-five in any of the specimens examined, and enormous for the size of the animal, being 4 by 5<sup>mm</sup>, in shorter and longer diameter.

*Measurements in millimeters.*

Station .....	2072	2084
Sex .....	♀	♀
Length from tip of rostrum to tip of telson .....	73	83
Length of carapax including rostrum .....	24.2	26.0
Length of rostrum .....	2.0	2.1
Height of carapax .....	13	14
Breadth of carapax .....	8.2	9.0
Length of eye-stalk and eye .....	3.7	4.1
Greatest diameter of eye .....	1.6	1.9
Length of antennal scale .....	10.9	10.5
Breadth of antennal scale .....	3.2	3.3
Length of second gnathopod .....	22.5	24.0
Length of first peraeopod .....	33	35
Length of chela .....	12.0	12.3
Breadth of chela .....	2.1	2.2
Length of dactylus .....	4.7	5.1
Length of second peraeopod .....	44	48
Length of chela .....	18.0	20.5
Breadth of chela .....	2.0	2.1
Length of dactylus .....	9.2	10.0
Length of third peraeopod .....	29	32+
Length of merus .....	13.6	16.0
Length of carpus .....	0.7	0.8
Length of propodus .....	8.0	10.2
Length of dactylus .....	1.2	.....
Length of fourth peraeopod .....	13	14
Length of propodus .....	2.4	3.5
Length of dactylus .....	0.6	0.8
Length of fifth peraeopod .....	16	21
Length of propodus .....	4.5	5.6
Length of dactylus .....	1.0	2.0
Length of sixth somite of pleon .....	8.0	8.5
Height of sixth somite of pleon .....	5.2	5.4
Length of telson .....	12.0	13.3
Length of inner lamella of uropod .....	10.5	12.8
Breadth of inner lamella of uropod .....	2.8	3.0
Length of outer lamella of uropod .....	11.5	13.0
Breadth of outer lamella of uropod .....	3.4	4.1

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
5551	2002	° ' " ° ' "	° ' " ° ' "	Fath.	gn. M.	Mar. 23			
7047	2034	37 02 42	74 17 36	641	41°; glb. O.	July 17	1g.	1	0
7046	2037	39 27 10	69 58 20	1,346	38°; glb. O.	July 18		1	1
7048	2072	38 53 00	69 23 30	1,731	39°; gy. M.	Sept. 2		1	.....
7049	2074	41 53 00	65 35 00	858	39°; fne. S. M.	Sept. 3		1	.....
5362	2004	39 44 30	71 04 00	1,022	38½°; F. S. M.	Sept. 30		2	2
5469	2007	37 58 20	70 57 30	1,017	glb. O.	Oct. 1	1g.	1	.....
7022	2009	37 12 20	69 39 00	2,949	glb. O.	Oct. 2		1	1
5057	2105	37 50 00	73 03 50	1,395	41°; glb. O.	Nov. 6		1s	0
5649	2110	35 12 10	74 57 15	516	40°; bu. M.	Nov. 9		1	0

## PARAPASIPHAË CRISTATA, sp. nov.

(Plate V, Fig. 3.)

*Female*.—This species, which is represented by a single specimen (7021), is very closely allied to the last. The dorsal crest of the carapax, however, is not truncated nor sulcated in front, but evenly arcuated longitudinally, and very sharp to the tip of the acute rostrum, which is slightly longer than in *P. sulcatifrons*. The eyes are very much smaller, their diameter being less than a third the length of the stalk, while in *P. sulcatifrons* the diameter is nearly half the length of the stalk. The eye-stalks themselves are fully as broad as in *P. sulcatifrons*, expanded at the distal end inside the eye, and terminating in a prominent, curved, and conical tubercle, which projects much in advance of the eye. The fourth somite of the pleon has a slight dorsal carina back of the middle, and the posterior margin projects dorsally over the fifth somite in a broad angular prominence, not a narrow triangular tooth as in *P. sulcatifrons*. The fifth somite is rounded above and not sulcated.

Station 2100, October 3, north lat.  $39^{\circ} 22'$ , west long.  $68^{\circ} 34' 30''$ , 1628 fath., globigerina ooze, temperature  $37\frac{1}{2}^{\circ}$ .

*Measurements in millimeters.*

Sex.....	♀
Length from tip of rostrum to tip of telson.....	73
Length of carapax including rostrum.....	24.4
Length of rostrum.....	2.5
Hight of carapax.....	13
Breadth of carapax.....	8.5
Length of eye-stalk and eye.....	3.8
Greatest diameter of eye.....	1.1
Length of antennal scale.....	10.0
Breadth of antennal scale.....	3.1
Length of second gnathopod.....	22
Length of first peræopod.....	33
Length of chela.....	13.0
Breadth of chela.....	2.5
Length of dactylus.....	5.8
Length of second peræopod.....	44
Length of chela.....	17.5
Breadth of chela.....	2.0
Length of dactylus.....	9.6
Length of third peræopod.....	29+
Length of merus.....	14.0
Length of carpus.....	0.7
Length of propodus.....	5.2+
Length of fourth peræopod.....	13
Length of propodus.....	3.0
Length of dactylus.....	0.8
Length of fifth peræopod.....	16.5
Length of propodus.....	5.2
Length of dactylus.....	1.3
Length of sixth somite of pleon.....	8.2

Height of sixth somite of pleon .....	4.9
Length of telson .....	12.0
Length of inner lamella of uropod .....	10.7
Breadth of inner lamella of uropod .....	2.5
Length of outer lamella of uropod .....	11.6
Breadth of outer lamella of uropod .....	3.8

PARAPASIPHAË COMPTA, sp. nov.

*Female*.—This species, like the last, represented by a single specimen, agrees essentially with the two foregoing species in the form of all the appendages and in the number and position of the branchiæ, but is at once distinguished by the form of the dorsal crest and rostrum, the non-carinated pleon, and the form and armament of the extremity of the telson.

The carapax is more compressed than in either of the other species, and on the posterior two-thirds is armed with a sharp, but not high, dorsal carina, which rises on the anterior part of the gastric region into a high and very thin crest projecting forward in a laterally thin lamellar rostrum with a broad and obtuse tip reaching considerably beyond the middle of the eye-stalks. The eyes and eye-stalks are very nearly as in *P. sulcatifrons*, except that the former are apparently black in the alcoholic specimen, and perhaps slightly more compressed vertically. The antennal scale is about three-eighths as long as the carapax, nearly four times as long as broad, and terminates in a triangular tooth instead of a spine.

The second gnathopods, though only about as long as the carapax, reach considerably by the tips of the antennal scales. The first peræopods are a little longer, and their chelæ more slender than in either of the other species: the merus is a little longer than the antennal scale, and armed with a few teeth along the lower edge; the distal angle of the upper edge of the carpus is somewhat produced and acute; and the chela is more than half as long as the carapax, nearly three-eighths longer than the antennal scale, with the digits nearly as long as the body of the chela. The second peræopods are about a sixth longer than the first; the basis, ischium, and merus are armed with a very few spines along their lower edges, and the merus is about as long as the merus and carpus in the first pair; the chela is about a fourth longer than in the first pair, and the digits about as long as the base of the chela.

None of the somites of the pleon are dorsally carinated or have the posterior margins produced. The sixth somite is scarcely three-fourths as long as the antennal scale and proportionately a little higher than in *P. sulcatifrons*. The telson is half as long as the carapax, fully three-fourths longer than the sixth somite, dorsally sulcated, tapers regularly to where it is very narrow near the tip, and then suddenly expands laterally, and terminates in an ovately rounded extremity, armed with about eighteen slender spines, of which the sublateral and median are

the larger. The inner lamella of the uropod is longer than the antennal scale, does not reach the tip of the telson, is narrow ovate, and about three and a half times as long as broad. The outer lamella is about an eighth longer than the inner, reaches considerably by the tip of the telson, is proportionately about as broad as the inner, and the tip broad, rounded, and projecting somewhat beyond the triangular lamellar tooth in which the outer margin terminates.

The specimen (7050), which is in rather bad condition on account of the softness of the integument, was taken at Station 2039, July 28, north lat.  $38^{\circ} 19' 26''$ , west long.  $68^{\circ} 20' 20''$ , 2,369 fathoms, globigerina ooze.

*Measurements in millimeters.*

Sex .....	♀
Length from tip of rostrum to tip of telson.....	120
Length of carapax, including rostrum.....	44
Length of rostrum .....	3.5
Height of carapax .....	21
Breadth of carapax .....	13±
Length of eye-stalk and eye.....	5.6
Greatest diameter of eye.....	2.2
Length of antennal scale.....	16.5
Breadth of antennal scale.....	4.3
Length of second gnathopod .....	44
Length of first peræopod.....	59
Length of chela.....	23.5
Breadth of chela.....	3.8
Length of dactylus.....	11.4
Length of second peræopod.....	69
Length of chela.....	29
Breadth of chela.....	3.5
Length of dactylus.....	14.5
Length of third peræopod.....	42+
Length of merus .....	26
Length of carpus .....	1.2
Length of propodus .....	5+
Length of fourth peræopod.....	22
Length of propodus .....	3.9
Length of dactylus.....	2.2
Length of fifth peræopod.....	34
Length of propodus .....	9.0
Length of dactylus .....	2.9
Length of sixth somite of pleon .....	12.5
Height of sixth somite of pleon .....	7
Length of telson .....	22
Length of inner lamella of uropod.....	17
Breadth of inner lamella of uropod.....	4.8
Length of outer lamella of uropod.....	19
Breadth of outer lamella of uropod.....	5.6

## PENÆIDÆ.

## BENTHESICYMUS BARTLETTI, gen. nov.

*Benthesicymus Bartletti* Smith, Bull. Mus. Comp. Zool., x, p. 82, pl. 14, figs. 1-7, 1882.

(Plate X, Fig. 8.)

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens.		
		N. lat.	W. long.				♂	♀	With eggs.
5555	2030	0	0	Fath.	bu. M.	May 26	2	1	0
7116	2072	89 29 45	71 43 00	588	39°; gy. M.	Sept. 2	1		.....
		43 53 00	65 35 00	858					

The second gnathopods, which were wanting in the single imperfect specimen described from the "Blake" collection, show that this species does not belong to Bate's genus *Benthesicymus*, to which it was very doubtfully referred. In *Benthesicymus* the second gnathopod is described as terminating in a "sharp-pointed dactylus," which is afterward referred to (under *Gennadas*) as "cylindrical and sharp," while in our species the dactylus of the second gnathopod is short and flattened, and truncated at the tip—differences undoubtedly accompanied by other differences in the oral appendages, which are not described in Bate's species. The genus here proposed is further characterized by the structure of the maxillipeds and first gnathopods, and apparently also by the form of the dactyli of the fourth and fifth peræopods. The number and arrangement of the branchiæ, as shown in the following table, is apparently the same as in Bate's genus. All the podobranchiæ, except the posterior one on each side are, however, much more slender than the corresponding arthro- and podobranchiæ, and the highest and most anterior of the two branchiæ at the base of the second gnathopod arises in the border of the articular membrane, corresponds very nearly in size and position with the podobranchiæ of the somites back of it, and might, perhaps, more properly be considered a pleurobranchia than an arthrobranchia, as it is in the following table. There is the same difficulty in distinguishing between pleuro- and arthrobranchiæ in many other genera.

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	1	0	(7)
Podobranchiæ.....	0	1	1	1	1	1	0	0	5
Arthrobranchiæ.....	1	2	2	2	2	2	2	0	13
Pleurobranchiæ.....	0	0	1	1	1	1	1	1	6
									24+(7)

The specimens from the Albatross collection enable me to correct somewhat the original description of the species, and I therefore restate the more essential characteristics.

*Male*.—The carapax is scarcely at all compressed laterally, and the dorsal carina of the anterior half rises suddenly just back of the orbit into a lamellar crest, which projects forward in a short, acute, and, as seen from the side, triangular rostrum, reaching about three-fourths of the way from the base to the tip of the eye-stalk, and armed above with two sharp teeth, one at the highest point just over the orbit, and the other nearly half way from it to the tip.

The eye-stalks are about a third as long as the antennal scales, slender, strongly compressed vertically, with a small obtuse dentiform prominence at the middle of the inner side, and just in front and outside of this a small spot of black pigment, showing faintly on the upper, but conspicuously on the lower side. The eyes themselves are scarcely wider than the stalks, but are less compressed vertically, though still much broader than high, distinctly faceted, and dark brown in the alcoholic specimens.

The flagella of the antennulæ are imperfect in all the specimens, but both flagella are longer than the antennal scale, and the proximal part of the upper is considerably stouter than the lower.

The antennal scale is about two-thirds as long as the carapax along the dorsal line, about a third as broad as long, and only slightly narrowed at the sharp tooth terminating the thickened outer margin, beyond which the anterior margin is oblique, so that the tip is toward the inner edge, and much in front of the terminal tooth of the outer margin.

The mandibles are almost exactly alike, somewhat contracted at the crowns, which are small, and nearly as in *Penæus*. The proximal of the two segments of the palpus is considerably the longer and broader, while the distal is narrowly ovate, with the tip rounded.

The proximal lobe of the protognath of the first maxilla is small and ovate, the distal lobe obliquely truncated and armed as in the allied genera. The endognath is narrow, curved, unsegmented, and shorter than the distal lobe of the protognath.

The three distal lobes of the protognath of the second maxilla increase successively in size distally, the distal being twice as wide as the next. The endognath is much shorter than the distal lobe of the protognath, and tapers regularly to the tip. The anterior part of the scaphognath is much longer than the posterior and projects beyond the protognath, while the posterior part is short, broadly expanded, and strongly incurved at the extremity.

The protopod of the maxilliped projects anteriorly in a straight lobe twice and a half as long as broad and rounded at the tip. The endopod is composed of three very distinct segments: a narrow basal one reaching a little by the protopod and with a slight expansion of the inner edge armed with slender spines, while the rest of the inner margin and the distal part of the outer are clothed with hairs; a second segment about half as long as the first, but expanded in the middle so as to be somewhat elliptical and nearly half as broad as long, with very long

tion, slender, very slightly curved at the tips, and the prehensile edges setigerous.

The second peræopods are much like the first, but a little more slender and considerably longer, reaching to the tips of the peduncles of the antennæ; the merus and carpus are approximately equal in length, and narrower than in the first pair, and the chela is considerably shorter than the carpus.

The third peræopods reach beyond the middle of the antennal scales, are more slender than the second pair, and naked except at the tips of the digits: the ischium is shorter than the merus, and both these segments are very narrow and slightly compressed; the carpus is about as long as the merus, or a little longer, and subcylindrical; the chela is about half as long as the carpus, very slender, scarcely stouter than the carpus, and the digits slightly more than half the whole length.

The endopods of the fourth peræopods are wanting or imperfect in all the specimens. They are very slender, and, exclusive of the dactyli, considerably longer than the third pair: the ischium and merus are slightly compressed and setigerous along the inner edges; the carpus is a little shorter than the merus, and both the carpus and propodus are throughout cylindrical, exceedingly slender, much more slender than the distal end of the merus, and naked.

The fifth peræopods are wanting in all but one specimen, and in this only one of them is complete. This peræopod is like the fourth pair, but even more slender, and about as long as those of the third pair: the carpus and propodus are subequal in length and each is a little shorter than the merus; the dactylus is a little shorter than the propodus, very slender, cylindrical, rather suddenly tapered at the tip, which is armed with a few setæ, and is not hard and chitinous, but apparently somewhat soft and flexible.

There are no exopods at the bases of any of peræopods.

The pleon is slightly more than twice as long as the carapax, anteriorly about as broad as high, but much compressed posteriorly, so that the sixth somite is fully twice as high as broad. The dorsum is evenly rounded on the first four somites, but there is a narrow and sharp carina on the fifth and sixth, which upon the middle of the fifth is armed with a very slender spiniform tooth projecting back as far as the posterior edge of the somite. This tooth is broken in nearly all of the specimens, and in the specimen from the Blake dredgings was wholly wanting, having undoubtedly been broken off close to the base. The posterior prolongations of the first and second pleura are broadly rounded; those of the third and fourth less broad and more angular, but still obtuse and rounded at the posterior angle; while the fifth is acutely angular, but with the tip itself obtuse. The sixth somite is twice as long as the fifth, and more than half as high as long.

The telson is shorter than the sixth somite, narrowly triangular,

thickened and transversely very strongly convex above at base, but not carinated, and posteriorly flattened or even slightly sulcated above. The extreme tip is acute and spiniform, and the edges are clothed with slender setæ.

The lamellæ of the uropods are thin and lanceolate in outline. The inner is only a little shorter than the sixth somite, less than a third as broad as long, and stiffened in the middle by two slender rib-like thickenings, separated, on the dorsal surface, by a narrow sulcus. The outer is about a half longer than the inner, about a fourth as broad as long, and the narrow tip is prolonged far beyond the sharp spine in which the thickened outer margin terminates, and from which a slender rib-like thickening, with a narrow sulcus along its inner edge on the dorsal surface, runs nearly parallel with the outer edge to the base of the lamella.

The sternum of the first somite of the pleon is armed with a large median laterally compressed dentiform process, which projects forward in an acute point. The first pleopods are as large as the second, much longer than the uropods, and the distal multiarticulate portion is more than three times as long as the protopod and very slender. The peculiar male appendage (petasma) is a thin, squarish plate attached by a constricted base, below which there is a small oblong process standing out at nearly right angles to the plane of the rest of the plate. The plate itself, which is apparently carried in a nearly horizontal position, in front and on the mesial side of the protopod to which it is attached, is obliquely divided vertically or longitudinally by imperfect articulations into three parts, of which the middle one is much the largest and projects at the inner inferior angle in a large ovately-pointed process, while the inner or distal of the three parts is narrow and has the lower or posterior part of its free edge armed with minute hooked spines for the attachment of the appendages of the opposite sides of the animal. The outer rami of the second to the fifth pairs of pleopods are similar to the single rami of the first pair. The inner ramus in the second pair is very much more slender and considerably shorter than the outer, and is furnished on the anterior side at base with two small and obtusely terminated, hard, lamelliform processes. The inner rami of the third, fourth, and fifth pairs are as in the first pair except that they are without the lamelliform processes at base.

The single *female* examined wants the endopods of the fourth and fifth peræopods, except a part of one of the fourth pair, and is very nearly like the males. The bases of the upper flagella of the antennulæ are perhaps a little more slender than in the males; the male appendage of the first pleopod is replaced by a minute styliform process; and in place of the two plates at the distal end of the protopod of the second pleopod, there is a single and much shorter plate.

plumose setæ on the outer edge and smaller and more numerous ones on the inner; and a small terminal segment about a third as long as the second, half as broad as long, and edged with small setæ or hairs. The exopod is longer even than the endopod, the proximal two-thirds or three-fourths of its length wider than the first segment of the endopod, but the distal portion narrowed, multiarticulate, and flagelliform. The lamelliform branchial epipod is as large as the endopod and the anterior portion a little smaller than the posterior.

The ischium of the first gnathopod is broader than long: the merus fully as long as the three distal segments taken together, more than three times as long as broad, compressed along the mesial edge, but not expanded distally, and very little wider than the ischium and propodus; the carpus and propodus are subequal in length and each a little longer than wide; the dactylus is a little shorter than the propodus, only half as wide as long, and narrowed to a somewhat triangular tip, which is armed with two or three curved spines; the edges of all the segments are more or less hairy or setigerous. The exopod is slender, regularly tapered, about a half longer than the endopod, and its distal half multiarticulate, flagelliform, and furnished with long plumose setæ, while the proximal part is unsegmented and furnished with short hairs or setæ. The epipod is short, nearly orbicular, and bears a short and dense dendrobranchia.

The second gnathopod (Plate X, Fig. 8) reaches considerably by the middle of the antennal scale: the ischium is nearly a third of the entire length of the endopod and strongly compressed; the merus is about two-thirds as long as the ischium, compressed proximally, but narrowed slightly toward the distal end, which is approximately cylindrical; the carpus is slender, and about as long as the merus; the propodus is slightly smaller and shorter than the carpus, but otherwise like it; the dactylus is turned in toward the mesial line and carried at right angles to the propodus, is about a third as long as the propodus, very little narrowed, and not tapered, but compressed and truncated at the tip, the edge of which is chitinous, and armed with a few stout spines, and the chitinous edge continued along the outer edge, which is armed with short spinules and setæ; the inner edges of all the segments except the dactylus are armed with long setæ. The exopod is like that of the first gnathopod except that it is a little smaller. The epipod is about as long as in the first gnathopod, but narrow, ovate, and bears a dendrobranchia nearly as long as itself.

The first pereopods are slender and reach scarcely by the bases of the antennal scales: the merus is slightly longer than the ischium, and both these segments are strongly compressed vertically and setigerous along the inner edges; the carpus is slightly compressed, about as wide as the merus, and setigerous like it; the chela is about as long as the carpus, and no stouter, and the digits are about as long as the basal por-

## Measurements in millimeters.

Station.....	2030	2072	2030
Sex.....	♂	♂	♀
Length from tip of rostrum to tip of telson.....	77	88	76
Length of carapax including rostrum.....	24.3	27.5	24.5
Length of rostrum.....	4.1	4.0	4.3
Height of carapax.....	12.5	.....	13.0
Breadth of carapax.....	12.2	.....	12.0
Length of eye-stalk and eye.....	6.0	6.0	6.1
Greatest diameter of eye.....	2.0	2.5	2.2
Length of antennal scale.....	16.0	19.0	15.6
Breadth of antennal scale.....	5.4	6.0	5.2
Length of second gnathopod.....	22.5	26.0	22.0
Length of propodus.....	3.7	4.5	3.6
Length of dactylus.....	1.3	1.5	1.2
Length of first peræopod.....	15	19.0	16.0
Length of merus.....	4.1	5.5	4.5
Length of carpus.....	3.4	3.5	3.4
Length of chela.....	3.0	3.6	3.5
Breadth of chela.....	0.7	1.0	0.8
Length of dactylus.....	1.4	1.7	1.5
Length of second peræopod.....	21.0	26.0	20.0
Length of merus.....	6.1	7.3	6.0
Length of carpus.....	5.6	6.0	5.5
Length of chela.....	4.0	4.6	3.8
Breadth of chela.....	0.8	1.0	0.7
Length of dactylus.....	2.1	2.5	2.0
Length of third peræopod.....	27.0	33.0	28.0
Length of merus.....	8.0	9.0	8.4
Length of carpus.....	8.4	10.2	8.3
Length of chela.....	4.5	5.4	4.5
Breadth of chela.....	0.7	0.8	0.6
Length of dactylus.....	2.3	2.9	2.3
Length of fourth peræopod.....	35+	.....	31+
Length of merus.....	11.8	.....	10.7
Length of carpus.....	9.5	.....	9.0
Length of propodus.....	11+	.....	7+
Length of fifth peræopod.....	27.0	.....	.....
Length of merus.....	7.0	.....	.....
Length of carpus.....	5.2	.....	.....
Length of propodus.....	5.1	.....	.....
Length of dactylus.....	4.0	.....	.....
Length of pleon.....	53	60	52
Length of sixth somite of pleon.....	12.7	13.5	11.9
Height of sixth somite of pleon.....	7.5	8.5	7.6
Length of telson.....	10.9	11.8	10.2
Length of inner lamella of uropod.....	10.5	12.3	10.0
Breadth of inner lamella of uropod.....	3.6	3.8	3.0
Length of outer lamella of uropod.....	16.3	18.0	15.3
Breadth of outer lamella of uropod.....	4.1	4.7	3.7

A. Milne-Edwards's "*Benthescyrmus Bartletti* (Smith)?" from the Travailleur dredgings (figured in the *Recueil de Figures de Crustacés nouveaux ou peu connus*, April, 1883), if correctly figured, is certainly specifically different from my species, and probably belongs to a different genus, perhaps to Bate's *Benthescyrmus*. In Milne-Edwards's species, the dactylus of the second gnathopod is figured as slender and styli-form, and the dactyli of the fourth and fifth peræopods are represented as very long, slender, multiarticulate, and flagelliform. It is possible that the single dactylus of a fifth peræopod of *Benthæcetes Bartletti* which I have been able to examine may be a reproduced and abnormal segment, and that the fourth and fifth peræopods are similar to those in Milne-Edwards's species, but I think this not at all probable.

BENTHESICYMUS? CARINATUS, sp. nov.

(Plate X, Figs. 6, 7.)

A single mutilated female (7027) from Station 2094, September 21, north lat. 39° 44' 30", west long. 71° 4', 1,022 fathoms, foraminifera, sand

and mud, temperature  $38\frac{1}{2}^{\circ}$ , represents a species closely allied to the last though generically distinct from it, and perhaps belonging to Bate's genus, as indicated above. The generic affinities of this species are so interesting that I describe it, although the specimen is in bad condition and wants the endopods of the second gnathopods and of all the peræopods.

The form and areolation of the carapax are nearly as in the last species, but the crest upon the rostrum is higher and apparently unarmed. The eyes, antennulæ, and antennæ are apparently nearly as in the last species, though the badly mutilated antennal scales appear to be broader and the anterior margin ovate and not oblique. The mandibles and maxillæ are essentially as in the last species, although the distal lobe of the protognath of the second maxilla is proportionately broader. The maxilliped also agrees very closely with that of the last species, except the penultimate segment of the endopod (Plate 10, Fig. 6) is a little broader distally and the ultimate segment very short, scarcely a tenth as long as the penultimate, and broader than long.

The endopod of the first gnathopod (Fig. 7) is almost exactly as in *Amalopenæus elegans*, the merus being expanded into a broad lamellar plate, half as broad as long, and projecting distally in a thin and broadly rounded lobe beyond the articulation of the carpus, so that when the three short distal segments are flexed they are concealed by it.

The number and arrangement of the branchiæ and epipods are exactly as in the last species, but there are small rudimentary exopods at the bases of all the peræopods.

The pleon is very nearly as in the last species in general form, but there is a crest-like dorsal carina on the third and fourth somites, and a sharp carina on the fifth and sixth. The telson is about as long as the sixth somite, of nearly the same form as in the last species, but more distinctly sulcated above and armed at the tip with a short median spiniform tooth and a spine either side at its base, and just above the tip with two or three spines along each side. The pleopods are nearly as in the female of the last species, but there is no conspicuous process on the sternum of the first somite.

*Measurements in millimeters.*

Length from tip of rostrum to tip of telson.....	74
Length of carapax including rostrum.....	28
Length of rostrum.....	5.0
Length of antennal scale.....	14.7
Breadth of antennal scale.....	5.8
Length of sixth somite of pleon.....	11.0
Hight of sixth somite of pleon.....	5.4
Length of telson.....	11.0

*BENTHESICYMUS?* sp. indet.

(Plate X, Figs. 3, 4, 5.)

A single mutilated specimen (7117), wanting the whole of the pleon and the endopods of the fourth and fifth peræopods represents still an-

other species, which has very interesting affinities to the species just described. This specimen is from Station 2042, July 30, north lat. 39° 33', west long. 68° 26' 45'', 1,555 fathoms, globigerina ooze, temperature 38½°.

The carapax is broken and badly distorted, but is evidently very nearly like that of *Benthæcetes Bartletti*, and the rostrum is similar in form and is armed with two teeth in the same way. The eyes, antennulæ, antennæ, mandibles, and maxillæ are essentially as in *Benthæcetes Bartletti*. The ultimate segment of the endopod of the maxilliped (Plate X, Fig. 3) is about a sixth as long as the penultimate segment and intermediate in form and size between that of *Benthæcetes Bartletti* and that of *Benthescycymus ? carinatus*, and the distal extremity of the exopod is suddenly narrowed into a slender flagellum, but otherwise the maxilliped agrees with that of *Benthæcetes Bartletti*.

The first gnathopod (Fig. 4) is intermediate in form between that of *Benthæcetes Bartletti* and that of *Benthescycymus ? carinatus*: the mesial side of the merus is expanded into a thin lamella the whole length of the segment, which is two-fifths as broad as long but not much broader distally than proximally and projects only very slightly beyond the articulation of the carpus; the terminal segments are nearly as in *Benthescycymus ? carinatus*. The second gnathopods (Fig. 5) reach beyond the middle of the antennal scales, and the relative proportion of the segments is about the same as in *Benthæcetes Bartletti*, but the form of the dactylus is different, though it is carried in the same position. This segment is a little longer and narrower than in *Benthæcetes Bartletti*, and obliquely truncated on the mesial side at the extremity, so that the triangular tip, which is armed with a single long spine, is at the outer edge; the outer and the truncated distal edges are setigerous.

There are minute rudimentary exopods at the bases of all the pereopods, of which the first three pairs are otherwise very much as in *Benthæcetes Bartletti*, except that they are much longer and more slender, the second pair reaching beyond the middle of the antennal scales and the third pair far beyond the tips.

The number and arrangement of the branchiæ and epipods is apparently the same as in *Benthæcetes Bartletti*.

The specimen gives the following, merely approximate, measurements in millimeters:

Length of carapax .....	21
Length of second gnathopod .....	22
Length of first pereopod .....	19
Length of second pereopod .....	28
Length of third pereopod .....	42

*AMALOPENÆUS ELEGANS* Smith.

Bull. Mus. Comp. Zool., x, p. 87, pl. 14, figs. 8-14, pl. 15, figs. 1-5, 1882.

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens.	
		N. lat.	W. long.				♂	♀
5548	2002	37 20 42	74 17 36	Fath. 641	gn. M.	Mar. 23	3	8
7120	2003	37 18 30	74 20 36	640	gn. M.	Mar. 23		1
7108	2035	39 26 12	70 02 37	1,362	38°; glb. O.	July 17		1
7109	2036	33 52 40	69 24 40	1,735	38°; glb. O.	July 18	1	
7110	2039	38 19 26	68 20 20	2,369	glb. O.	July 28		2
7111	2040	38 35 13	68 16 00	2,226	glb. O.	Aug. 1	Fragment.	
7112	2076	41 18 00	66 00 50	906	glb. O.	Sept. 4		1
7113	2083	40 26 40	67 05 15	959	40°; gy. M.	Sept. 5	3	6
7035	2084	39 44 30	71 04 00	1,022	38½°; F. S. M.	Sept. 21		1
5636	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5		1
5657	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5		1
5695	2116	35 45 23	74 31 25	888	39°; M. S.	Nov. 11		1

The carapax is not at all compressed laterally, but about as broad as high, thin and membranaceous, and its surface naked and polished. A sharp dorsal carina extends the whole length, but is most conspicuous in front of the gastric sulcus, rises in front into a sharp lamellar crest armed with a single sharp tooth over the posterior margin of the orbit, and projects forward in a short but acute and laterally compressed rostrum, which scarcely reaches the middle of the eye-stalks.

The eye-stalks, including the eyes, are about a fourth as long as the carapax. The stalks are slender, compressed vertically, and bear a slender but obtuse papilliform process about the middle of the inner side, and just in front and outside of this there is a small spot of black pigment showing more conspicuously above than below. The eyes themselves are nearly round, scarcely as wide as the stalks, faceted, and dark brown in the alcoholic specimens.

The antennal scale is a little more than half as long as the carapax, nearly three times as long as the greatest breadth, which is near the base, from where the margins arcuately converge to a narrow but obtusely rounded tip, which is scarcely in advance of the small terminal spine of the outer margin.

The crowns of the mandibles are nearly as in *Penæus*. The mandibular palpi are very large, and reach nearly to the middle of the antennal scales; the proximal segment is more than half as broad as long, nearly twice as long as the distal segment, with the distal part of the mesial edge straight and the outer edge curved and directed inward distally, so as to narrow the segment very much at the articulation of the terminal segment, which is about twice and a half as long as broad, and ovate with the tip rounded.

The first maxilla is as in *Benthæcetes Bartletti*, except that the endognath is expanded somewhat a little way from the base.

The three distal lobes of the protognath of the second maxilla in-

crease successively in size distally, though the distal is not more than a third broader than the one next it. The endognath is nearly as long as the distal lobe of the protognath, broadly expanded near the middle, where it is more than a third as broad as long, and has a rounded prominence edged with slender setæ on the inner margin, but suddenly contracted to a very slender tip armed distally with four long setæ on the inner edge, and with two or three stouter and curved setæ on the outer edge just below these. The scaphognath is nearly as in *Benthœcetes Bartletti*, except that the posterior part is a little narrower, and not so strongly incurved.

The propod and branchial epipod of the maxilliped are nearly as in *Benthœcetes Bartletti*, but the endopod and exopod are very different. The proximal segment of the endopod does not reach the tip of the propod, though it is between three and four times as long as broad, the inner edge is armed distally with three or four slender spines and the rest of the way with long setæ or hairs; the second segment is a little narrower than the first, between a third and a half as long, about twice as long as broad, and margined with hairs; the terminal segment is considerably wider than the second segment, and about once and a half as long, approximately elliptical, and margined all round with long setæ or hairs. The exopod is a little longer than the endopod, unsegmented, lamellar, very thin and of nearly uniform breadth throughout, rounded at the tip, and with both edges setigerous, the setæ upon the outer edge being long and plumose.

The ischium of the first gnathopod is very short; the merus is considerably longer than the carpus and propodus combined, half as broad as long, and projects distally in a thin and broadly rounded lobe beyond the articulation of the carpus; the carpus is as long as the breadth of the merus, less than half as broad as long, and somewhat narrowed proximally; the propodus is a little shorter than the carpus, but as broad, and is slightly produced at the inner distal angle; the dactylus is about two-thirds as long as the propodus, nearly half as broad as long, obtusely pointed, and armed with a strong curved spine at the tip. The exopod is slender, reaches to about the extremity of the carpus, and is distinctly multiarticulate from near the base to the tip. The epipod is small, ovate, and bears a relatively large dendrobranchia.

The second gnathopods reach nearly to the tips of the antennal scales and are longer than either the first or second peræopods: the ischium is about a third of the entire length of the endopod, fully a third as broad as long, and very slightly narrowed proximally; the merus is as broad and about two-thirds as long as the ischium, and narrowed distally to the breadth of the carpus; the carpus is slightly shorter than the merus, and only about a third as wide; the propodus is about as long as the carpus, but a little narrower; the dactylus itself is a little broader than the propodus, but less than half as long, broadest at the middle and with the tip triangular and armed with a slender spine not

much shorter than the segment itself; both edges of the dactylus, the extremity and inner edge of the propodus, and the inner edge of the carpus, are armed with exceedingly long and slender setiform spines, and the inner sides of the proximal segments are, as usual, armed with setæ. The exopod is slender, reaches a little beyond the ischium, and is distinctly multiarticulate to near the base. The epipod is narrow, and not longer than the breadth of the ischium.

The first and second peræopods are very nearly equal in length, the first reaching about to the extremities of the peduncles of the antennæ, and the second scarcely falling short of the same point. In both the corresponding segments are of very nearly equal lengths, except the carpi, which are a very little longer in the second, but the ischia, meri, and carpi are narrower in the second than in the first: the ischium is about two-thirds as long as the merus, half as broad as long in the first and scarcely more than a third as broad as long in the second; the merus is about a third of the entire length of the endopod, slightly narrowed distally, and in the first more than a third as broad as long, but in the second scarcely more than a fifth as broad as long; the carpus in the first is about two-thirds as long and half as wide as the merus, while in the second it is longer and absolutely a little narrower than in the first; the chelæ are very nearly alike in both pairs, nearly as long and about as broad as the carpus in the second pair, with the digits slender, curved at the tips, and about two-fifths of the whole length; the edges of the chelæ are furnished with fascicles of short setæ, the tips of the digits densely clothed with much longer setæ and hairs, the inner edges of the other segments thickly clothed with plumose hairs and long setæ, and the outer edges sparsely clothed with short hairs, except on the carpus in the first pair where the outer edge is thickly hairy. The third peræopods are considerably longer and much more slender than the second, beyond which they reach by the length of their chelæ: the ischium is about as long as in the second, but narrower; the merus is twice as long as the ischium, very slender, and of nearly equal diameter throughout; the carpus is a little shorter and scarcely stouter than the merus, and very slightly thickened distally; the chela is very near the same size as in the first and second pairs, but the digits are a little longer in proportion.

The fourth and fifth peræopods are nearly alike, a little longer than the third and very slender, the fifth being a little more slender than the fourth, and both sparsely armed with long setiform spines, except upon the dactyli, which are nearly naked, long, very slightly curved, and acute.

The pleon to the tip of the telson is about twice as long as the carapax, anteriorly about as broad as the carapax and with the dorsum broadly rounded, but much compressed posteriorly, so that the sixth somite is twice as high as broad. None of the anterior somites are dorsally carinated or toothed, but the sixth, which is about twice as long as the fifth

and nearly half as high as long, has a thin dorsal carina, nearly the whole length. The pleura are rather small and the posterior angles more or less rounded in all the somites.

The telson is about two-thirds as long as the sixth somite, narrowly triangular, thickened at base, with a longitudinal sulcus the whole length above, and with a shorter one either side near the base, and with the tip truncated, narrow, and armed with a spine either side and a series of long plumose hairs between.

The inner lamella of the uropod is a little longer than the sixth somite, lanceolate, and about five times as long as broad. The outer lamella is about a third longer than the inner, scarcely wider proportionally, and with the ovate tip prolonged about the width of the lamella beyond the sharp spine in which the outer margin terminates.

In both sexes the protopods of the pleopods are stout and all nearly alike; the outer rami are all very long and slender, and the inner rami of the four posterior pairs are shorter and more slender than the outer. The peculiar sexual appendage of the first pleopod in the male is carried as in *Benthæcetes Bartletti*, and, as in that species, consists of a thin, squarish plate, divided by imperfect articulations into three parts and attached by a constricted base, below which there is a small, broad, oval process; but the middle of the three parts is as large as the two others combined, inferiorly projects beyond the other parts, and at either side there is an obtuse tooth, above the inner of which there is an obtuse lobe in the margin and then a deep and narrow notch separating the middle from the inner or distal part, while on the anterior side, above the notch, there is an oblong process which may be turned either in over the distal part of the plate or out over the middle part; the distal part is thin, membranous, curls easily over upon the middle part, and is armed along the free edge with minute hooked spines. There are two oblong lamellar plates at the base of the inner ramus of the second pleopod much larger than the corresponding plates in *Benthæcetes Bartletti*; the outer plate is somewhat truncated at the extremity and the inner rounded. On the inner side of the base of the outer ramus there are two small inconspicuous dentiform processes or plates, one above the other, and with their points opposed.

Specimens in alcohol retain for a considerable time bright purple markings about the oral appendages.

Most of the specimens seen are between 30<sup>mm</sup> and 40<sup>mm</sup> in length, a few females only exceeding the latter measurement. Detailed measurements of a large female are given under the next species.

#### AMALOPENÆUS VALENS, sp. nov.

(Plate X, Fig. 2.)

This species, of which there is only one specimen (5536), is closely allied to the last, but is readily distinguished from it by the larger eyes and different petasma.

*Male*.—The form and areolation of the carapax are very nearly as in the last species, but the rostrum terminates in an acicular tip longer than in that species. The eye-stalks are considerably longer than in the last species, and the eyes are much larger, the diameter being about a ninth of the length of the carapax, while in the last species it is not more than a thirteenth. The antennulæ, antennæ, and oral appendages are essentially as in the last species; and, excepting the dactyli of the fourth and fifth pairs, which are broken and in part wanting, the same is true of the peræopods.

The form of all the somites of the pleon and the telson are very nearly as in the last species, but the lamellæ of the uropods are apparently slightly broader in proportion. The sexual appendages (petasma) of the first pleopods (Plate X, Fig. 2) are larger and conspicuously different in form from those of the last species, though essentially the same in general plan of structure. The broad, oval process (*a*) over the narrow base of attachment is much smaller; the inferior chitinous edge of the middle part is complicated in form, being divided into three irregular lobes, the outer of which projects in an obtuse point, and is separated from the others by a deep and irregular sinus, while the other lobes are broad, truncated, the outer longer than the inner, and separated from it by a small, narrow sinus; the inner of these lobes is separated by a broad, rounded sinus from a large, broad lobe which arises from the anterior side and projects over the membranous inner part of the appendage. This last lobe (*b*) is very much larger and proportionally broader than the corresponding lobe in the last species, and has a small lobule on the inferior side near the base. The two plates at the base of the inner ramus of the second pleopod are of nearly the same form as in the last species, but somewhat larger. There are also two small processes on the base of the outer ramus, but the proximal one is very small, low, and inconspicuous, while the distal is very much larger, conspicuous, lamellar, and ovate, with the tip directed downward away from the other process.

Measurements, in millimeters, of the single specimen, from Station 2003, March 23, north lat.  $37^{\circ} 16' 30''$ , west long.  $74^{\circ} 20' 36''$ , 640 fathoms, are given in the second column of the following table, and similar measurements of *A. elegans* in the first column.

	<i>A. elegans</i> .	<i>A. valens</i> .
Station .....	2083	2003
Sex .....	♀	♂
Length from tip of rostrum to tip of telson .....	43	38
Length of carapax, including rostrum .....	13.5	10.7
Length of rostrum .....	2.0	2.0
Height of carapax .....	8.2	6.2
Breadth of carapax .....	7.5	6.0
Length of eye-stalk and eye .....	3.3	3.3
Greatest diameter of eye .....	1.0	1.2
Length of antennal scale .....	7.3	6.7
Breadth of antennal scale .....	2.4	2.0

	A. elegans.	A. valens.
Station.....	2083	2063
Length of second gnathopod.....	♀ 14.0	♂ 13.0
Length of ischium.....	4.2	3.8
Length of merus.....	2.8	2.4
Length of carpus.....	2.1	2.1
Length of propodus.....	2.2	2.0
Length of dactylus.....	1.0	1.0
Length of first peraeopod.....	11.0	9.5
Length of merus.....	3.3	2.9
Breadth of merus.....	1.2	1.0
Length of carpus.....	2.2	1.8
Length of chela.....	2.5	2.2
Breadth of chela.....	0.6	0.5
Length of dactylus.....	1.0	1.0
Length of second peraeopod.....	11.5	-----
Length of merus.....	3.6	-----
Breadth of merus.....	0.7	-----
Length of carpus.....	2.6	-----
Length of chela.....	2.3	-----
Breadth of chela.....	0.5	-----
Length of dactylus.....	0.9	-----
Length of third peraeopod.....	15.5	13.0
Length of merus.....	5.0	3.9
Length of carpus.....	4.2	4.0
Length of chela.....	2.5	2.1
Breadth of chela.....	0.5	0.5
Length of dactylus.....	1.1	1.0
Length of fourth peraeopod.....	19.0	-----
Length of propodus.....	3.5	-----
Length of dactylus.....	2.5	-----
Length of sixth somite of pleon.....	7.1	-----
Height of sixth somite of pleon.....	3.0	6.4
Length of telson.....	5.0	2.7
Length of inner lamella of uropod.....	6.6	4.6
Breadth of inner lamella of uropod.....	1.3	6.9
Length of outer lamella of uropod.....	9.9	1.2
Breadth of lamella of uropod.....	1.6	8.2
		1.5

## ARISTEUS? TRIDENS, sp. nov.

(Plate IX, Figs. 1-6.)

The carapax is not compressed, but broad and broadly rounded above. The inferior angle of the orbit projects as a low spine, from which the anterior margin retreats slightly to a stout antennal spine projecting somewhat laterally; and below this the margin is at first longitudinal, and then transverse, leaving an opening opposite the efferent branchial passage. The rostrum is nearly as long as the rest of the carapax, with a short dorsal carina at the base, armed with three large spiniform teeth directed forward, and of which the middle one is just over the orbit, the carina extending back upon the gastric region, but not in front of the anterior tooth, and the distal two-thirds of the rostrum, directed slightly upwards, straight, slender, tapering, subcylindrical, naked, and unarmed. The cervical sulcus is not distinctly marked, except for a short distance below the hepatic region each side, but there is a deep antennal sulcus which extends back beneath the hepatic region, and a slight gastro-hepatic sulcus. There is a slight longitudinal carina on the hepatic region; a carinal ridge between the cardiac and the posterior part of the branchial region; a conspicuous carina extending back from the antennal spine, and below this a submarginal carina the whole length of the carapax, of which a broad margin below the carina is thin and membranaceous.

The eye-stalks are slender, vertically compressed, with a slight prominence (much more conspicuous in very small specimens than in adults) near the middle of the inner edge, do not reach the second segment of the antennula, and bear the small, slightly-swollen, minutely faceted, and nearly black eyes, facing obliquely inward and forward.

The antennulæ do not differ noticeably in the two sexes. The peduncle is very much shorter than the antennal scale. The body of the first segment is about half the entire length, strongly compressed vertically, but not much excavated above, and armed with a long, slender, and acute lateral process extending forward to the ultimate segment. The second segment is longer than broad and subcylindrical. The ultimate segment is smaller than the second and bears the upper flagellum about the middle of its dorsal surface, and the lower flagellum at its tip. The lower flagellum is slender, subcylindrical, and about three times as long as the carapax, excluding the rostrum. The upper flagellum is about as long as the proximal segment of the peduncle, compressed vertically, a little broader than the lower, and clothed below with short hairs, but naked and very smooth above. The second segment of the peduncle of the antenna is armed with a stout, spiniform curved process just inside the base of the scale; but the peduncle is otherwise wholly unarmed. The ultimate segment is nearly as long as the eye-stalk. The antennal scale is more than half as long as the carapax, exclusive of the rostrum, a little less than half as broad as long, the inner margin and the tip broadly rounded in outline and ciliated, the outer margin thickened, rod-like, and terminating in a short spine a considerable distance from the tip, but the rest of the scale is unusually thin and membranaceous. The flagellum is considerably longer than the lower flagellum of the antennula, about as stout, somewhat flattened vertically, smooth, and nearly naked.

The labrum is triangular, soft, fleshy, and very prominent ventrally. The lobes of the metastome are very large, covering the whole of the posterior surfaces of the crowns of the mandibles. The mandibles (Plate IX, Fig. 2) are almost exactly alike. The opposing surfaces of the crowns are triangular in outline, the posterior edge is sharp, continuous, and terminates ventrally in a triangular tip, between which and the irregular and slightly prominent molar area there is a broad and shallow depression. The proximal of the two segments of the palpus is about three times as long as broad, reaches slightly by the tip of the crown and expands a little distally; the distal segment is little more than half as long as the proximal, expands on the inner edge near the base in a triangular prominence, beyond which it is suddenly contracted, and terminates in an obtuse tip; the anterior surface of both segments is convex, smooth, and naked, the posterior surface thickly clothed with short hair.

The proximal lobe of the protognath of the first maxilla (Fig. 3) is small and obtusely ovate at the tip, the distal twice as broad and its

long mesial edge armed with stout spines, spinules and setæ. The endognath is small, narrow, obtuse at the tip, unsegmented, and not longer than the mesial edge of the distal lobe of the protognath. The distal one of the four lobes of the protognath of the second maxilla (Fig. 4) is twice as broad as the next, which is a little broader than the two subequal proximal lobes. The endognath is much shorter than the distal lobe of the protognath and tapered obliquely to a slender tip. The anterior part of the scaphognath is as long as the distal lobe of the protognath, narrow, and obtuse at the tip, while the posterior part is very short, broad, and obtusely rounded.

The protopod of the maxilliped (Fig. 5) projects forward in a straight lobe twice and a half as long as broad and rounded at the tip. The endopod is composed of three very distinct segments: the proximal segment is a little less than half the entire length and with a small rounded emargination at the distal end of the inner edge, which is ciliated and armed just below the emargination with several curved spines; the middle segment is a little more than half as long as the proximal, narrower, and reaches considerably by the protopod; the distal segment is a little shorter and slightly wider than the middle one, ovate, about three times as long as broad, and ciliated along both edges. The exopod is unsegmented, a little shorter than the endopod, narrow, obtuse at the tip, then, membranaceous, ciliated along the edges, and folded longitudinally. The lamelliform branchial epipod is as large as the protopod, the posterior part a little the larger, and both extremities obtuse. The endopod of the first gnathopod (Fig. 6) is short and stout: the merus is compressed and a little more than three times as long as broad; the three distal segments are subequal in length and together about as long as the merus; the carpus is a little longer than broad; the propodus a little narrower than the carpus and much narrowed distally; the dactylus is slender, almost spiniform, and terminates in a very slender spiniform and dorsally curved tip. The exopod is about two-thirds as long as the merus, flagelliform, slender, and multiarticulate. The epipod is about as long as the exopod, a third as long as broad, obtuse at the tip, and bears a dense branchial pyramid about as long as itself. The endopod of the second gnathopod is a little longer than the carapax excluding the rostrum and reaches to about the tip of the antennal scale: the ischium is approximately a third of the entire length; the merus, carpus, and propodus subequal in length and each slightly less than half as long as the ischium; the dactylus is about two-thirds as long as the propodus and very slender. The exopod is very small, less than half as long as in the first gnathopod. The epipod is slightly larger than in the first and bears a little larger branchial pyramid.

All the peræopods bear minute exopods, all except the posterior pair bear epipods, and all except the last two pairs bear branchial pyramids like the second gnathopods. The three pairs of chelate peræopods are similar, slender, not conspicuously compressed, and decrease in length

successively from the third, which scarcely reach the tips of the second gnathopods to the first, which only reach the bases of the chelæ of the third. The first pair are a little stouter than the others and sparsely setigerous, while the second and third are nearly naked. The meri all reach to about the same point; the carpi increase successively in length from the first, which is about two-thirds as long as the merus, to the third, which is about twice as long as the first; the chelæ increase very slightly in length, but not at all in thickness, from the first to the third, and all are slender, subcylindrical, with slender and nearly straight digits, considerably longer than the body of the chela. The fourth and fifth pairs of pereopods are alike, considerably longer than the third pair, reaching to about the tips of the antennal scales, very slender, and nearly naked, and in each the merus is about as long as the carpus and propodus combined, the carpus about as long as the propodus and dactylus combined, and the dactylus about half as long as the propodus, slender and very slightly curved.

The pleon is about twice as long as the carapax excluding the rostrum, broad anteriorly, not compressed laterally, the first, second, and third somites broadly rounded above, and the first and second unarmed, but the third and the fourth each armed with a stout laterally compressed spiniform tooth directed back over the succeeding somite. The fifth somite has a conspicuous dorsal carina terminating in a sharp tooth like that on the fourth, but much smaller. The sixth somite is about as long as the fourth and fifth combined, about three-fifths as high as long, compressed and conspicuously carinated above, the carina terminating in a small tooth over the base of the telson. The pleura are all truncated below, the first and second rounded in outline behind, the third with an obtusely rounded angle, and the fourth and fifth with a minute mucronation at the otherwise obtusely rounded angle.

The telson is about once and a third as long as the sixth somite, narrow, regularly and acutely triangular, rounder above, and armed with a very few inconspicuous dorso-marginal aculei below the middle. The inner lamella of the uropod is shorter than the telson, but reaches by its tip, is ovate-lanceolate in outline and about three and a half times as long as broad. The outer lamella is rather longer than the telson, proportionally about as broad as the inner, with the outer edge rod-like and terminating in an acute tooth some distance from the ovate tip of the lamella.

The pleopods are all highly developed and the basal portions very large, stout, and nearly alike. The outer rami, in both sexes, are very long, slender, and subcylindrical, those of the anterior pair nearly or quite as long as the five anterior somites taken together, and the posterior about half as long as the anterior. The peculiar appendage of the first pair of pleopods in the male is a squarish plate attached by one corner near the middle of the protopod, the dorsal edge thickened and distally separated from the plate as a slender stylet not projecting beyond the plate itself, and with a notch in the outer edge, from which a fold extends

across the plate. In place of this appendage, in the larger female examined, there is a small ovate lamella with a narrow fold along its inner edge, while in the smaller female there is a minute styloform process. The inner ramus of the second pleopod of the male is very slender and less than a fourth as long as the outer, but bears on the anterior side near the base an approximately round chitinous plate about  $3\frac{1}{2}$ mm in diameter with the inner and distal edges armed with short setæ. The inner ramus of the second pleopod of the female is similar, but wants the chitinous plate. The inner rami of the third, fourth, and fifth pairs of pleopods in both sexes are very slender, but increase successively in length to the fifth pair where they are only a little shorter than the outer rami.

The number and arrangement of the branchiæ are indicated in the following formula:

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	1	0	(7)
Podobranchiæ.....	0	1	1	1	1	1	0	0	5
Artrobranchiæ.....	1	1	2	2	2	2	2	0	12
Plenobranchiæ.....	0	1	1	1	1	1	1	1	7
									24+(7)

*Measurements in millimeters.*

Station .....	2036	2042	2037	2043
Sex .....	♂	♂	♀	♀
Length from tip of rostrum to tip of telson.....	199	250	190+	300+
Length of carapax including rostrum.....	89	122	.....	.....
Length of rostrum.....	52	61	.....	.....
Length of carapax excluding rostrum.....	47	61	50	81
Breadth of carapax.....	23	28	23	35
Height of carapax.....	25	32	25	41
Length of antennal scale.....	32	36.5	32.5	44.5
Breadth of antennal scale.....	13.5	16.0	14.0	21.4
Length of first peræopod.....	.....	57	.....	.....
Length of chela.....	.....	13.8	.....	.....
Breadth of chela.....	.....	2.7	.....	.....
Length of dactylus.....	.....	8.4	.....	.....
Length of second peræopod.....	.....	68	.....	.....
Length of chela.....	.....	14.8	.....	.....
Breadth of chela.....	.....	2.8	.....	.....
Length of dactylus.....	.....	9.3	.....	.....
Length of third peræopod.....	.....	77	.....	.....
Length of chela.....	.....	16.0	.....	.....
Breadth of chela.....	.....	2.7	.....	.....
Length of dactylus.....	.....	9.5	.....	.....
Length of fourth peræopod.....	.....	96	.....	.....
Length of fifth peræopod.....	.....	100	.....	.....
Length of sixth somite of pleon.....	19.0	25.5	20.0	28.0
Height of sixth somite of pleon.....	11.0	14.0	11.5	16.5
Length of telson.....	28	35	28	40
Length of inner lamella of uropod.....	.....	28.5	.....	33.5
Breadth of inner lamella of uropod.....	.....	8.3	.....	9.6
Length of outer lamella of uropod.....	.....	36.0	.....	42.3
Breadth of outer lamella of uropod.....	.....	10.5	.....	12.4
Length of first pleopod.....	.....	77	.....	94
Length of its ramus.....	.....	63	.....	76
Length of second pleopod.....	.....	72	.....	86
Length of its outer ramus.....	.....	57	.....	68
Length of its inner ramus.....	.....	11	.....	17
Length of fifth pleopod.....	.....	42	.....	50
Length of its outer ramus.....	.....	30	.....	35
Length of its inner ramus.....	.....	22	.....	26

## Specimens examined.

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens—		
		N. lat.	W. long.				♂	♀	With eggs.
		° ' " "	° ' " "	<i>Fath.</i>					
7054	2036	38 52 40	69 24 40	1,735	38°; glb. O.	July 18	1		-----
7055	2037	38 53 00	69 23 30	1,731	38°; glb. O.	July 18		1	0
7056	2042	39 33 00	68 26 45	1,555	38½°; glb. O.	July 30	1		-----
7057	2043	39 49 00	68 28 30	1,467	38½°; glb. O.	July 30		1	0
7015	2098	37 40 30	70 37 30	2,221	glb. O.	Oct. 1		1y.	-----
5635	2102	38 44 00	72 38 00	1,209	39°; glb. O.	Nov. 5	1s.		-----
5690	2115	35 49 30	74 34 45	843	39°; M. S.	Nov. 11		1	0

I refer this species to Duvernoy's genus *Aristeus* with much hesitation. It appears to have the same branchial formula as the species of *Aristeus* described by Bate from the Challenger collections and is apparently congeneric with them, but, as pointed out by Bate, Duvernoy's species is figured and described as having no epipods at the bases of the fourth peræopods, and on this account Bate "proposes provisionally" the name *Plesiopenæus* for such as have the epipods at bases of the fourth peræopods, though he describes his species as *Aristeus*. According to the description and figures, Duvernoy's species differs also, though not pointed out by Bate, in wanting pleurobranchiæ on the twelfth and thirteenth somites, so that the branchial formula of his species, as nearly as can be made out from the description and figures, would be:

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	0	0	(6)
Podobranchiæ.....	?	1	1	1	1	1	1	0	5
Arthrobranchiæ.....	?	1	2	2	2	2	2	0	11
Pleurobranchiæ.....	?	1	1	1	1	0	0	1	5
									21 + (6)

The figure of the mandibular palpus of Duvernoy's species does not show the form of the distal segment characteristic of the species just described nor of *Aristeus Edwardsianus*, as figured by Miers, and it is described as composed of three articulations—an evident mistake. It does not seem at all improbable that Duvernoy may have overlooked the epipod and the two pleurobranchiæ, and that his species is really congeneric with the species here described.

Bate's *Aristeus armatus*, from "the Australasian Archipelago, in the North Pacific and South Atlantic," is, perhaps, closely allied to the species here described, or even specifically identical with it, but is not described with enough detail to show its affinities.

**HEPOMADUS TENER, SP. NOV.**

(Plate IX, Figs. 7, 8.)

I refer this species, of which only a single imperfect specimen was taken, to Bate's genus *Hepomadus* with some hesitation. Bate charac-

terizes the genus wholly on the branchiæ, places it next to *Aristeus*, and refers to it two species, each based on a single injured specimen; but as our species is closely allied to *Aristeus* and agrees with *Hepomadus* in the number and arrangement of the branchiæ, it seems probable that it belongs to Bate's genus.

*Male*.—The carapax, the rostrum excepted, is of nearly the same form as in *Aristeus? tridens*, but is a little more slender, the dorsal part of the cervical suture is more conspicuous, and there is a well-developed hepatic spine in addition to the two spines of the anterior margin. In front of the cervical suture the dorsum is carinated and projects forward in a laterally compressed, regularly tapered, acute, and somewhat upturned rostrum about half as long as the rest of the carapax, its dorsal edge armed with two teeth near the middle and one just back of the base in the dorsal crest of the carapax proper, and the lower edge unarmed but fringed with a series of long hairs. The eye-stalks and eyes are about a fourth as long as the carapax, exclusive of the rostrum, and very nearly as in *Aristeus? tridens*, except the prominences on the inner edges of the stalks are larger, though not very much larger than in very young specimens of the *Aristeus*. The eyes are minutely faceted and black pigmented.

The peduncles of the antennulæ reach nearly to the tips of the antennal scales: the body of the proximal segment is about half the entire length, but the spiniform lateral process does not reach the extremity of the segment itself, which, however, is armed with a slender spine just outside the base of the second segment; the second segment is about twice as long as the distal. The flagella are imperfect. The second segment of the peduncle of the antenna is armed with a stout spiniform curved process just inside the base of the scale, as in *Aristeus? tridens*. The antennal scale is about half as long as the carapax, including the rostrum, about three eighths as broad as long, and in form and texture like that of *Aristeus? tridens*.

The oral appendages are very similar to those of *Aristeus? tridens*, although they show good distinctive characters. The molar areas of the mandibles are larger and the triangular ventral angles of the crowns less acute; the proximal segment of the palpus is somewhat shorter, and the expansion of the inner edge of the distal segment is a little nearer the base. The distal lobe of the protognath of the first maxilla is much narrower, so that the mesial edge is comparatively short. The second maxilla differs scarcely at all, except in having the distal lobe of the protognath a little narrower. The endopod of the maxilliped is apparently composed of four segments, though the first articulation is rather obscure and possibly the result of accident: the proximal segment is much less than half the entire length, but is proportionately about as long as in the *Aristeus?*; the second and third segments are subequal in length, but the second is narrower than the third and alone reaches beyond the tip of the protopod; the terminal segment is only about half

as long as the third, much narrower than it, and lanceolate in outline. The exopod of the maxilliped is about as long as the endopod, but at the distal fourth of its length it is suddenly narrowed into a slender flagelliform tip. The endopod of the first gnathopod is almost exactly as in *Aristeus? tridens*, but the exopod is very much larger, being considerably more than twice as long as the merus of the endopod; the epipod is apparently a little smaller, and the branchia is less dense and more slender at the tip. The second gnathopod is a little shorter than the carapax including the rostrum, much longer than the carapax excluding the rostrum, very slender, and reaches to about the tip of the antennal scale.

The first three pairs of peraeopods are slender, very nearly naked and very nearly alike. The first pair reach to the tips of the second gnathopods, and the second and third each reach successively a little further forward. In each the merus is somewhat compressed and shorter than the carpus, and in the first and second pairs the lower edge is armed with a slender spine near the distal end. In the first and second pairs the chela is about as long as the carpus, in the third pair a little shorter than the carpus, and in each the digits are exceedingly slender, nearly straight, slightly separated at the bases, and much longer than the slightly swollen body of the chela. The fourth and fifth peraeopods are very nearly alike, the fourth a little longer than the third, and the fifth slightly longer than the fourth; all the segments are slender, unarmed, and nearly naked; the propodus is about a sixth of the whole length, very slightly thickened proximally but narrowed distally; the dactylus is considerably shorter than the propodus, very slender, and nearly straight.

The pleon is about twice and a half as long as the carapax excluding the rostrum, the posterior somites strongly compressed laterally, but the anterior ones not at all compressed and broadly rounded dorsally. The third somite, however, is dorsally carinated and the carina projects back over the next somite in a slender compressed tooth. The fourth, fifth, and sixth somites are dorsally carinated, but the carinae do not project posteriorly, or only very slightly. The sixth somite is about a fourth of the entire length of the pleon, very strongly compressed, and less than half as high as long.

The telson is not quite as long as the sixth somite, narrow, regularly tapered, slightly flattened above, and armed with small dorso-marginal and terminal aculei. The inner lamella of the uropod is a little longer than the telson and about four times as long as broad. The outer lamella is about a fourth longer than the inner, proportionally about as broad as the inner, and with the outer edge terminating in a triangular tooth some distance from the ovate tip of the lamella.

The pleopods are nearly as in *Aristeus? tridens*.

The number and arrangement of the branchiae and epipods is the same as in *Aristeus? tridens*, except that there is no podobranchia at

the base of the third peræpod and only a rudimentary epipod at the base of the fourth, so that the branchial formula is—

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	r	0	(6+r)
Podobranchiæ.....	0	1	1	1	1	0	0	0	4
Arthrobranchiæ.....	1	1	2	2	2	2	2	0	12
Pleurobranchiæ.....	0	1	1	1	1	1	1	1	7
									23 + (6+r)

The pleurobranchiæ, except the last, are smaller and much more slender than the other branchiæ.

There are apparently no exopods at the bases of any of the peræopods.

*Measurements in millimeters.*

Length from tip of rostrum to tip of telson.....	72
Length of carapax including rostrum.....	26.0
Length of rostrum.....	8.2
Length of eye-stalk and eye.....	4.4
Greatest diameter of eye.....	1.5
Length of antennal scale.....	13.0
Breadth of antennal scale.....	5.1
Length of second gnathopod.....	23.
Length of first peræpod.....	25.
Length of merus.....	5.5
Length of carpus.....	7.8
Length of chela.....	8.0
Breadth of chela.....	1.3
Length of dactylus.....	5.5
Length of second peræpod.....	28.
Length of merus.....	6.0
Length of carpus.....	8.3
Length of chela.....	8.2
Breadth of chela.....	1.2
Length of dactylus.....	5.7
Length of third peræpod.....	31.
Length of merus.....	9.0
Length of carpus.....	10.0
Length of chela.....	9.0
Breadth of chela.....	1.3
Length of dactylus.....	5.9
Length of fourth peræpod.....	36
Length of propodus.....	5.8
Length of dactylus.....	4.6
Length of fifth peræpod.....	40
Length of sixth somite of pleon.....	11.3
Height of sixth somite of pleon.....	5.0
Length of telson.....	10.4
Length of inner lamella of uropod.....	11.0
Breadth of inner lamella of uropod.....	2.8
Length of outer lamella of uropod.....	14.0
Breadth of outer lamella of uropod.....	3.4

Station 2099, October 2, north lat.  $37^{\circ} 12' 20''$ , west long.  $69^{\circ} 30'$ , 2,949 fathoms, globigerina ooze—1 ♂ in rather bad condition, No. 5464. The specimen is labeled "White when found."

*HYMENOPENÆUS MICRUPS*, sp. nov.

(Plate X, Fig. 1.)

This is very closely allied to *H. debilis* Smith (Bull. Mus. Comp. Zool., x, p. 91, pl. 15, figs. 6-11, pl. 16, figs. 1-3, 1882), but is readily distinguished by the very much smaller and nearly hemispherical eyes, which in *H. debilis* are large and reniform as in the typical species of *Penæus*. The species is represented by two females only, and one of these imperfect.

As in the typical species the whole integument is very thin and delicate so that the form of the body is not very well preserved in the alcoholic specimens. The carapax is slightly compressed laterally and dorsally carinated nearly the whole length, but the carina is indistinct back of the cervical suture. The rostrum is horizontal, less than a third as long as the rest of the carapax, narrow vertically, tapers regularly to an acute point, is wholly unarmed below, and armed above with five nearly equidistant teeth, of which the posterior is just back of the orbit on the carapax proper, while far back on the gastric region there are two other teeth in the dorsal carina.

The eyes are black, scarcely reach the middle of the proximal segment of the antennula, are approximately hemispherical and very small, the diameter equaling only about half the length to the base of the stalk.

The antennal scale is about half as long as the carapax excluding the rostrum, and rather more than four times as long as broad.

The oral appendages are almost exactly as in *H. debilis*. In the description and figure of the last-mentioned species I overlooked the proximal articulation in the endopod of the maxilliped, which is composed of four segments. In both species the proximal segment is less than half the whole length, broad at base, but the inner margin abruptly contracted beyond the middle, leaving an angular projection, which is armed with long setæ; the three distal segments are approximately equal in length; the second segment curves round beyond the end of the protopod; the last two are very narrow and margined with a regular series of slender plumose setæ, which are much longer upon the outer than upon the inner edge.

The second gnathopods and all the peræopods except the fifth pair have very minute rudimentary exopods as in *H. debilis*. The three pairs of chelate peræopods are very nearly as in *H. debilis*. The fourth and fifth peræopods are very long, slender, and nearly naked. The fourth are about as long as the carapax including the rostrum; the merus and carpus are subequal in length, and together make fully two-thirds the whole length; the propodus is slightly more than a fourth as long as

the merus, and the dactylus about three-fifths as long as the propodus. The fifth pair are considerably longer than the fourth; the merus is a little longer, and the carpus about as long as in the fourth; the propodus is fully half as long as the carpus, and more than twice as long as in the fourth, and the dactylus is very slender and only about a fourth as long as the propodus.

The three anterior somites of the pleon are rounded above, but the fourth, fifth, and sixth are compressed and sharply carinated dorsally, and on the sixth somite the carina terminates in a small tooth at the posterior margin. The telson is much longer than the sixth somite, tapers regularly to a narrow tip, which, however, is not quite perfect in either of the specimens, and is armed either side about a fourth of the way from the tip to the base with a very long and slender spine.

*Measurements in millimeters.*

Station.....	2037	2076
Sex.....	♀	♀
Length from tip of rostrum to tip of telson.....	51	.....
Length of carapax including rostrum.....	19.2	.....
Length of carapax excluding rostrum.....	15.0	22.0
Length of rostrum.....	4.3	.....
Length of eye-stalk and eye.....	2.4	3.3
Greatest diameter of eye.....	1.2	1.6
Length of antennal scale.....	8.0	10.0
Breadth of antennal scale.....	2.2	2.8
Length of second gnathopod.....	24.0	32.0
Length of first pereopod.....	16.5	21.0
Length of carpus.....	4.2	5.4
Length of chela.....	2.8	3.7
Length of second pereopod.....	21.0	27.0
Length of carpus.....	7.5	10.0
Length of chela.....	3.2	3.7
Length of third pereopod.....	27.0	33.0
Length of carpus.....	11.0	14.0
Length of chela.....	3.7	4.5
Length of fourth pereopod.....	38.0	45.0
Length of propodus.....	3.4	4.3
Length of dactylus.....	2.0	2.4
Length of fifth pereopod.....	43.0	54.0
Length of propodus.....	7.4	9.3
Length of dactylus.....	1.9	2.1
Length of sixth somite of pleon.....	6.5	8.0
Height of sixth somite of pleon.....	3.5	4.3
Length of telson.....	8.5	11.0
Length of inner lamella of uropod.....	.....	8.7
Length of outer lamella of uropod.....	.....	11.0

Station 2037, July 18, north lat.  $38^{\circ} 50'$ , west long.  $69^{\circ} 23' 30''$ , 1,731 fathoms, globigerina ooze, temperature  $38^{\circ}-1^{\circ}$  (7147).

Station 2076, September 4, north lat.  $41^{\circ} 13'$ , west long.  $60^{\circ} 00' 50''$ , 906 fathoms, blue mud—1 ♀ (7148).

## SERGESTIDÆ.

## SERGESTES ARCTICUS Krøyer.

Smith, Proc. Nat. Mus., iii, p. 445, 1881; Bull. Mus. Comp. Zool., x, p. 96, pl. 16, fig. 4, 1882.

(Plate VIII, Fig. 2.)

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens.		
		N. lat.	W. long.				♂	♀	
5550	2002	37° 20'	42° 74'	17 36	641	gn. M.	Mar. 23	1	3
7126	2003	27° 16'	30° 74'	20 36	640	-----	Mar. 23	1	
5596	2023	37° 48'	00° 74'	01 30	377	S. bu. M.	May 21	6	12
5594	2024	40° 02'	10° 70'	27 00	221	40½° dk. gn. M.	May 25	16	15
5587	2025	40° 02'	05° 70'	27 00	239	40½° S. gn. M.	May 25	1	3
5556	2030	39° 20'	45° 71'	43 00	588	bu. M.	May 26		2
7100	2045	40° 04'	20° 68'	43 50	373	40° bu. M.	July 31	5	1
7101	2047	40° 02'	30° 68'	49 40	389	52° bu. M.	July 31	1	1
7102	2049	39° 43'	40° 69'	20 00	1,025	39° bu. M.	Aug. 1	2	3
7103	2076	41° 13'	00° 66'	00 50	906	bu. M.	Sept. 4		8
7123	2110	35° 12'	10° 74'	57 15	516	40° bu. M.	Nov. 9	1	
5653	2111	35° 09'	50° 74'	57 40	938	gn. M.	Nov. 9		1
5697	2116	35° 45'	23° 74'	31 25	888	39° bu. M.	Nov. 4	1	1

In this species there is an epipod and a well-developed podobranchia at the base of the first gnathopod, and above its base a simple lamella in place of a pleurobranchia, a large anterior pleurobranchia with a simple lamella back of it on each of the three succeeding somites, a large anterior and a small posterior pleurobranchia on the antepenultimate somite, and on the penultimate somite two small branchiæ, of which the posterior is very much the smaller, while the last somite is without branchiæ; or, indicating the simple pleurolamellæ by accents, branchial formula may be indicated as follows:—

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XVI.	Total.
Epipoda.....	1	1	0	0	0	0	0	0	(2)
Podobranchiæ.....	0	1	0	0	0	0	0	0	1
Artirobranchiæ.....	0	0	0	0	0	0	0	0	0
Pleurobranchiæ.....	0	0'	1'	1'	1'	2	2	0	7
									8+(2)

The structure of the branchiæ themselves, in this and in the two following species as well, is very different from that in *Penæus*, or any of the Penæidæ described in this paper. The branchiæ are pinnate in form, and each pinna is a complete phyllobranchia; that is, they are compound phyllobranchiæ, while those of *Penæus* are compound trichobranchiæ. The structure is more like that in *Sicyonia* (judging by Bate's description of the branchiæ of that genus) than that in *Penæus*.

The first peræopods are subchelate, and the dactyli of the second gnathopods and the propodi of the first, second, and third peræopods are mul-

tiarticulate, as in the two following species, but the articulations are more conspicuous. These structural characters of the peræopods are, however, undoubtedly characteristic of all the species of the genus.

**SERGESTES ROBUSTUS** Smith.

*Sergestes*, sp., Smith, Proc. National Mus., iii, p. 445, 1881. *Sergestes robustus* Smith, Bull. Mus. Comp. Zool., x, p. 97, pl. 16, figs. 5-8b, 1882.

(Plate 8, Figs. 3-6b.)

*Specimens examined.*

Catalogue number.	Station number.	Locality—		Depth.	Temperature and nature of bottom.	Date.	Specimens.	
		N. lat.	W. long.				♂	♀
5549	2002	37 02 42	74 17 36	Falh. 641	gn. M.	Mar. 23	1	
5516	2003	37 16 31	74 20 36	640	.....	Mar. 23	4	

*Male*.—The carapax is strongly compressed, the breadth being considerably more than the height at the base of the antennæ, but much less than the greatest height posteriorly, which is fully twice that at the base of the antennæ. The dorsum is broadly rounded to the base of the rostrum, which rises rather abruptly from the dorsum, is very thin, acutely triangular, and extends a little forward of the truncated middle lobe of the ophthalmic somite.

The eye-stalks to the tips of the eyes are about two-fifths as long as the antennal scales, and the diameter of the eye itself at least half the length. The peduncle of the antennula is fully a fourth longer than the antennal scale, the first segment scarcely half as long as the antennal scale, and the second and third successively a little shorter; all the segments are very stout, the diameter in the second and third being equal to more than half the length. The proximal segment of the upper or major flagellum is scarcely more than a fourth as long as the distal segment of the peduncle, and scarcely longer than the proximal segment of the flagellum, which is modified as in the allied species. The antennal scale (Fig. 5) is about half as long as the carapax along the dorsal line, about a third as broad as long, and much broader at the tip than in the allied species.

The oral appendages do not differ essentially from the oral appendages of *P. Frisii* and *arcticus* as figured by Krøyer.

The second gnathopods reach by the tips of the antennal scales fully the length of their dactyli, and are about as stout as the third peræopods: all five segments of the endopod are approximately equal in length, though the dactylus is slightly shorter than the others, and all are armed with very slender spines; the dactylus is slender and multiarticulate, being composed of about five segments, and tipped with two or three spines. The first peræopods fall a little short of the tips of the

antennal scales: the merus is about twice as long as the carpus and about as long as the propodus, which is very slender, composed of about ten segments, and armed, like the ischium, merus, and carpus, with exceedingly long, and for the most part simple, setiform spines, and at the proximal extremity with a tuft of serrate setæ, corresponding to a similar tuft on the distal extremity of the carpus; the dactylus is very minute, but perfectly distinct, and armed with an exceedingly long and slender spiniform seta, while the tip of the propodus is armed with a very much shorter spine. The second peræopods reach to about the tips of the second gnathopods: the merus is a little longer than in the first; the carpus twice as long as in the first and only a little shorter than the merus; the propodus is longer than the merus, composed of about twelve segments, and armed very nearly as in the first, except that the tuft of setæ at the proximal extremity, with the corresponding one on the carpus, is wholly wanting, while the digits of the well-developed chela (Fig. 4) are considerably longer than the diameter of the propodus at their base, slender, nearly straight, and armed at the tips with a dense brush of setæ, most of which are serrate. The third peræopods are almost exactly like the second, except that they are considerably longer, reaching by the second by about half the length of their dactyli. The fourth peræopods reach by the middle of the antennal scale, are very much stouter than the third pair, and the endopods are composed of only four segments each, the dactylus, apparently, being wanting: the ischium, carpus, and propodus (or the proximal and the two distal segments) are subequal in length, while the merus (or antepenultimate segment) is about once and a half as long as each of the others: the merus is about six times as long as broad, and, like the ischium, densely ciliated along both edges, but the cilia on the lower edge are several times longer than those upon the upper, which are not as long as the breadth of the segment; the carpus is slightly broader than the merus, being more than a fourth as broad as long, ciliated like the merus along the lower edge, but the upper edge naked; the propodus (or ultimate segment) is a little less than a fifth as broad as long, ovate at the tip, and has the lower edge ciliated and the upper naked like the carpus. The fifth peræopods are a little more than half as long as the fourth, and their endopods are composed of the same number of segments: the ischium and carpus are subequal in length, the merus is a little longer and the propodus a little shorter, and all the segments are ciliated along both edges, though the cilia upon the lower edge are much longer than those upon the upper; the merus is about a fourth as broad as long, and considerably broader than the ischium or carpus; the carpus is less than a fourth as broad as long, and slightly tapered distally; the propodus is a little less than a fifth as broad as long, and regularly tapered from near the base to the acute tip.

The pleon, excluding the telson, is nearly twice as long as the carapax along the dorsal line, is considerably compressed, though anteriorly about as broad as the carapax, and, like the carapax, rounded above,

but with a shallow median sulcus on the third and fourth somites. [There are apparently similar sulci on the abdomen of *S. arcticus*.] The pleura of the first three somites are large and project backward in an angle, while the pleura of the fourth and fifth somites project backward quite as far, but have the outline more rounded. The sixth somite is about as long as the antennal scale, considerably more than half as high as long, and strongly compressed.

The telson is considerably shorter than the sixth somite, flattened and slightly sulcated above, with a deep lateral groove each side, acutely angular at the tip, and ciliated along the edges. The inner lamella of the uropod is about as long as the telson, about three times as long as broad, and lanceolate at the top. The outer lamella is between a third and a fourth longer than the inner, about a fourth as broad as long, the outer margin terminates in a strong tooth about two-thirds of the way from the base to the tip, and the tip is narrow, but rounded.

The peculiar sexual appendages (Fig. 6) of the first somite of the pleon have essentially the same structure as in *S. arcticus*, but are much more complicated than would be inferred from the figures of that species given by Kröyer. The appendages of the two sides are usually hooked together along the middle line (*h*), but are really entirely distinct. Each is attached by a narrow process (*a*) to the protopod of the pleopod, and is divided by more or less distinct sutures into three portions. The outer portion, that next the protopod, projects above the point of attachment in a narrow process, and below the point of attachment in a broad lamellar lateral expansion, and below this in a long, flat, chitinous stylet (*b*) terminating in a sharp hook below a rounded sinus in the extremity. The middle portion projects below and alongside of, but far beyond, the hooked stylet (*b*), in a complicated appendage divided distally into three membranaceous and hook-bearing processes (*e*, *f*, *g*) and bearing two slender and unarmed stylets (*c*, *d*); and each of the membranaceous processes is armed along one edge with a series of peculiar chitinous hooks retracted within invaginated papillæ (Fig. 6<sup>b</sup>), and at the tip with a larger and somewhat differently shaped but similarly retracted hook (Fig. 6<sup>a</sup>). The lateral hooks themselves are semi-mushroom shaped, like those which serve to hook together the inner rami of the pleopods in many crustaceans, and very much like those along the mesial edge (*h*) of this same appendage but larger. The terminal hooks are more properly hook-shaped, as shown in the figure, but are broad at the tips. The invagination of the membrane around the hooks is possibly due to contraction in the alcoholic specimens, but the hooks are similarly retracted in all the specimens of *S. arcticus* which I have examined, their bases appear to be connected with strong muscular fibers, and I think there is little doubt that the hooks are capable of being retracted in life. The mesial portion of the appendage is thin, lamellar, longitudinally folded, and armed along the mesial edge with great numbers of semi-mushroom-shaped hooks, which serve to attach together the appendages of the two sides.

The branchiæ are the same in number and have the same arrangement as in *S. arcticus*, but the posterior branchia on the twelfth (antepenultimate) somite is nearly as large as the anterior, which is the largest of the series, and the branchiæ of the penultimate somite are very nearly alike, and not very much smaller than the pair next in front of them.

Measurements in millimeters.

Station.....	2002	2008
Sex.....	♂	♂
Length from tip of rostrum to tip of telson.....	04	73
Length of carapax including rostrum.....	19.3	21.6
Length of rostrum.....	2.0	2.5
Height of carapax anteriorly.....	4.5	5.0
Height of carapax posteriorly.....	9.2	10.5
Breadth of carapax.....	7.2	7.5
Length of eye-stalk and eye.....	3.6	4.1
Greatest diameter of eye.....	2.0	2.2
Length of peduncle of antennula.....	12.5	14.6
Length of distal segment.....	3.3	4.0
Length of antennal scale.....	9.2	10.2
Breadth of antennal scale.....	3.1	3.4
Length of sixth somite of pleon.....	9.8	11.1
Height of sixth somite of pleon.....	6.2	7.0
Breadth of sixth somite of pleon.....	3.4	4.0
Length of telson.....	8.1	9.1
Length of inner lamella of uropod.....	8.0	8.9
Breadth of inner lamella of uropod.....	2.7	2.9
Length of outer lamella of uropod.....	11.9	13.0
Breadth of outer lamella of uropod.....	3.0	3.2

**SERGESTES MOLLIS**, sp. nov.

*Sergestes*, sp. indet., Smith, Bull. Mus. Comp. Zool., x, p. 100, 1882.

This species resembles *S. robustus* considerably in form and size, but the whole integument is very soft and all parts of the animal exceedingly fragile; the cephaloperæon is scarcely at all compressed, the rostrum is small and obtuse, and the eyes are very little larger than the eye-stalks.

*Male*.—The carapax is broad and the dorsum broadly rounded to the base of the small obtuse rostrum, which projects very little anteriorly. The cervical suture is much more conspicuous than in either *S. robustus* or *arcticus*. The eye-stalks to the tips of the eyes are nearly a sixth as long as the carapax and about a third as long as the antennal scale, and the diameter of the eye itself is about a third of the length, or very little greater than the stalk. The peduncle of the antennula is nearly as in *S. robustus*, very stout, much longer than the antennal scale, and more than half as long as the carapax; the proximal segment is about half as long as the antennal scale, and the middle and distal segments approximately equal in length. The proximal segment of the upper or major flagellum is nearly half as long as the distal segment of the peduncle and more than twice as long as the proximal segment of the lower flagellum, which is nearly as in the allied species. The antennal scale is less than half as long as the carapax, fully a third as broad as long, as broad at the tip as in *S. robustus*, and without any tooth or spine at the distal end of the non-ciliated outer edge, or with a very minute one.

The gnathopods and peræopods are essentially as in *S. robustus*, except that the fourth and fifth peræopods are much narrower and very nearly as in *S. arcticus*.

The pleon is broad anteriorly, but strongly compressed posteriorly, and the dorsum rounded. The sixth somite is shorter than the antennal scale, more than half as high as long, and very strongly compressed. The telson is about as long as the sixth somite, sulcated as in *S. robustus*, and rather obtusely triangular at the tip, which, however, is mucronate. The inner lamella of the uropod is about four times as long as broad and regularly lanceolate in outline, without any angular expansion near the middle of the outer edge. The outer lamella is nearly a third longer than the inner, about four and a half times as long as broad, and the outer margin terminates in a tooth about two-ninths of the length, or the width of the lamella, from the tip.

The peculiar sexual appendages (petasma) of the first pair of pleopods are very nearly as described and figured for *S. robustus*, although there is a little difference in the form and proportions of the hook-bearing processes and unarmed stylets of the main branch of each appendage: the lateral unarmed stylet (marked *c* in the figure of *S. robustus*) is stouter than in that species and truncated at the tip, while the mesial stylet (*d*) is nearly as long as the hook-bearing process (*g*) with which it is connected at base.

The females are considerably larger and stouter than the males, the peduncles of the antennulæ are apparently a little shorter, and the eyes slightly smaller.

Although a considerable number of specimens have been taken by the Albatross, none of them are perfect and most of them are in very bad condition.

The branchiæ are all much smaller than in *S. robustus*, the posterior pleurobranchia of the twelfth (antepenultimate) somite is replaced by a simple lamella like that upon the somite next in front, and the two branchiæ of the penultimate somite are very small, as in *S. arcticus*.

Three specimens (7106) from Station 2051 give the following measurements, of which some, on account of the imperfections and soft condition of the specimens, are only approximate:

Sex.....	♂	♀	♀
Length from tip of rostrum to tip of telson.....	50	57	72
Length of carapax along dorsum.....	18	21	26
Length of eye-stalk and eye.....	2.9	3.0	3.0
Greatest diameter of eye.....	1.0	0.9	1.1
Length of peduncle of antennula.....	9.8	10.0	13.0
Length of its distal segment.....	2.6	2.6	3.2
Length of antennal scale.....	8.2	8.8	.....
Breadth of antennal scale.....	2.8	3.3	.....
Length of sixth somite of pleon.....	8.0	9.0	10.8
Height of sixth somite of pleon.....	4.2	4.8	5.8
Length of telson.....	8.1	8.0	10.0
Length of inner lamella of uropod.....	8.0	.....	.....
Breadth of inner lamella of uropod.....	2.0	.....	.....
Length of outer lamella of uropod.....	10.8	.....	.....
Breadth of outer lamella of uropod.....	2.4	.....	.....

## Specimens examined.

Catalogue number.	Station number.	Locality--		Depth.	Temperature and nature of bottom.	Date.	Specimens.	
		N. lat.	W. long.				♂	♀
7121	2002	37 20 42	74 17 36	Fath. 641	gn. M.	Mar. 23		1s.
5573	2018	37 12 22	74 20 04	788	39°; bu. M.	May 7		1
7104	2040	38 35 13	68 16 00	2,226	glb. O.	July 19		1
7105	2045	40 04 20	68 43 50	373	40°; bu. M.	July 31		1
7106	2051	39 41 00	69 20 20	1,106	39°; bu. M. glb. O.	Aug. 1	3	3
7107	2083	40 26 40	67 05 15	959	40°; gy. M.	Sept. 5		2
7028	2093	39 42 50	71 01 20	1,000	39°; F. S. M.	Sept. 21	1	
7029	2094	39 44 30	71 04 00	1,022	38½°; F. S. M.	Sept. 21		1
7036	2097	37 56 20	70 57 30	1,917	glb. O.	Oct. 1	1	1
5440	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2		1
5442	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2		frag.
5460	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2		1
7031	2099	37 12 20	69 39 00	2,949	glb. O.	Oct. 2	1	1
5450	2100	39 22 00	68 34 30	1,628	37½°; glb. O.	Oct. 3	1	1
7032	2101	39 18 30	68 24 00	1,686	37°; glb. O.	Oct. 3	1	1
5648	2103	38 47 20	72 37 00	1,091	39°; glb. O.	Nov. 5	1	
5652	2103	38 47 20	72 37 00	1,091	39°; glb. O.	Nov. 5	1	2
5706	2104	38 48 00	72 40 20	991	41½°; bu. M.	Nov. 5		1
5670	2105	37 50 00	73 03 50	1,395	41°; glb. O.	Nov. 6		frag.
5647	2110	35 12 10	74 57 15	516	40°; bu. M.	Nov. 9		1
7122	2116	35 45 23	74 31 23	888	39°; bu. M. S.	Nov. 11		1

NEW HAVEN, CONN., February 16, 1884.

## EXPLANATION OF PLATES.

All the figures on Plates I, II, III, IV, V, and VII; Fig. 1, Plate VI; Figs. 1 and 3, Plate VIII; Figs. 1 to 6, Plate IX; and Fig. 1, Plate X, were drawn by J. H. Emer-ton; all the other figures were drawn by the author.

A considerable number of the figures have been made from specimens taken by the Fish Hawk before 1883, but the numbers of the stations from which the specimens figured came are given in all cases.

## PLATE I.

FIG. 1.—*Coilodes robustus* Smith. Dorsal view of young male, from Station 1036, enlarged two diameters. The mud has been removed from the front and right side, but the other side is represented covered with mud, etc., as when taken.

FIG. 1a.—Right chela of the same specimen, seen from the inside, enlarged four diameters.

FIG. 2.—Large male of the same species, from Station 940, dorsal view, natural size.

FIG. 2a.—Ventral view of the front and oral regions of the same specimen, enlarged two diameters.

FIG. 2b.—Right chela of the same specimen, seen from the inside, natural size.

FIG. 3.—*Euprognatha rastellifera* Stimpson. Dorsal view of male, from Station 922, enlarged two diameters.

FIG. 3a.—Lateral view of the carapax of the same specimen, enlarged the same amount.

## PLATE II.

- FIG. 1.—*Ethusina abyssicola*, sp. nov. Dorsal view of male, from Station 2037, enlarged two diameters.
- FIG. 1a.—Ventral view of front and oral region of the same specimen, enlarged four diameters.
- FIG. 2.—*Latreillia elegans* Roux. Dorsal view, with the distal portions of the pereopods omitted, of female, from Station 940, enlarged two diameters.
- FIG. 2a.—Lateral view of the same specimen, enlarged the same amount.

## PLATE III.

- FIG. 1.—*Latreillia elegans*. Dorsal view of male, from Station 940, natural size.
- FIG. 2.—*Catapagurus gracilis* Smith. Dorsal view of male, from Station 871, enlarged four diameters.
- FIG. 3.—Dorsal view of chelipeds of female of the same species, from Station 871, enlarged four diameters.

## PLATE IV.

- FIG. 1.—*Catapagurus Sharreri* A. M.-Edwards. Dorsal view of female, in carcinoecium formed of *Epizoanthus Americanus* Verrill, from Station 877, enlarged two diameters.
- FIG. 2.—Dorsal view of male of the same species, removed from the carcinoecium, enlarged two diameters.
- FIG. 3.—*Sympagurus pictus* Smith. Dorsal view of carapax, anterior appendages and chelipeds of male, from Station 924, natural size.
- FIG. 4.—*Eupagurus pollicaris* Stimpson. Dorsal view of the carapax and anterior appendages of male, from Station 1166, natural size.

## PLATE V.

- FIG. 1.—*Pandalus leptocerus* Smith. Lateral view of female, from Station 1160, enlarged two diameters.
- FIG. 2.—*Pasiphaë princeps*, sp. nov. Lateral view of female, from Station 2095, one-half natural size.
- FIG. 3.—*Parapasiphaë cristata*, sp. nov. Dorsal view of anterior part of carapax and anterior appendages of female, from Station 2100, natural size.
- FIG. 4.—*Parapasiphaë sulcatifrons*, sp. nov. Dorsal view of carapax and anterior appendages of female, from Station 2099, natural size.

## PLATE VI.

- FIG. 1.—*Parapasiphaë sulcatifrons*. Lateral view of female, from Station 2034, natural size.
- FIG. 2.—Ventral view of mandibles of female, from Station 2034, enlarged eight diameters.
- FIG. 3.—First maxilla of the right side of the same specimen, enlarged eight diameters.
- FIG. 4.—Second maxilla of the left side of the same specimen, enlarged six diameters.
- FIG. 5.—Maxilliped of the right side of the same specimen, enlarged six diameters.
- FIG. 6.—First gnathopod of the right side of the same specimen, enlarged six diameters.
- FIG. 7.—Second gnathopod of the right side of the same specimen, enlarged three diameters.

## PLATE VII.

- FIG. 1.—*Nematocarcinus ensiferus* Smith. Lateral view of female, from Station 2035, natural size.
- FIG. 2.—*Notostomus robustus*, sp. nov. Lateral view of female, from Station 2074, natural size.

## PLATE VIII.

- FIG. 1.—*Acanthephyra Agassizii* Smith. Lateral view of male, from Station 2034, natural size.
- FIG. 2.—*Sergestes aroticus* Kröyer. Antennal scale of the right side of a male, from Station 1030, enlarged four diameters.
- FIG. 3.—*Sergestes robustus* Smith. Lateral view of male, from Station 893, enlarged two diameters.
- FIG. 4.—Distal extremity of chela of the second peræopod of the left side of another male, from the same station, enlarged twenty-four diameters.
- FIG. 5.—Antennal scale of the right side of the same specimen, enlarged four diameters.
- FIG. 6.—Appendage (petasma) of the protopod of the first pleopod of the right side of the same specimen, seen from in front, enlarged eight diameters; *a*, point of attachment to the protopod; *b*, hooked stylet; *c*, *d*, unarmed stylets; *e*, *f*, *g*, terminal processes armed with invaginated hooks; *h*, mesial line where the appendages of the two sides are hooked together.
- FIG. 6a.—Invaginated hook at the tip of process *f*, enlarged one hundred diameters.
- FIG. 6b.—Invaginated hook from the side of the same process, enlarged one hundred diameters.

## PLATE IX.

- FIG. 1.—*Aristeus? tridens*, sp. nov. Lateral view of male, from Station 2036, one-half natural size.
- FIG. 1a.—Dorsal view of the carapax and anterior appendages of the same specimen, one-half natural size.
- FIG. 2.—Mandible of the right side of female, from Station 2043, ventral and dorsal views, natural size.
- FIG. 3.—First maxilla of the right side of the same specimen, natural size.
- FIG. 4.—Second maxilla of the right side of the same specimen, natural size.
- FIG. 5.—Maxilliped of the right side of the same specimen, natural size.
- FIG. 6.—First gnathopod of the right side of the same specimen, natural size.
- FIG. 7.—*Hepomadus tener*, sp. nov. Lateral view of front of carapax and eye of male from Station 2099, enlarged four diameters.
- FIG. 8.—Distal part of third peræopod of right side of the same specimen, enlarged four diameters.

## PLATE X.

- FIG. 1.—*Hymenopenæus microps*, sp. nov. Lateral view of female, from Station 2037, enlarged two diameters.
- FIG. 2.—*Amalopenæus valens*, sp. nov. Appendage (petasma) of the protopod of the first pleopod of the right side of male, from Station 2003, seen from in front, enlarged twelve diameters; *a*, oval process over the base of attachment to the protopod *c*; *b*, broad lobe projecting over the membranous inner part of the appendage.
- FIG. 3.—*Benthesicymus?* sp. indet. Distal part of maxilliped of the right side of specimen, from Station 2042, enlarged eight diameters.

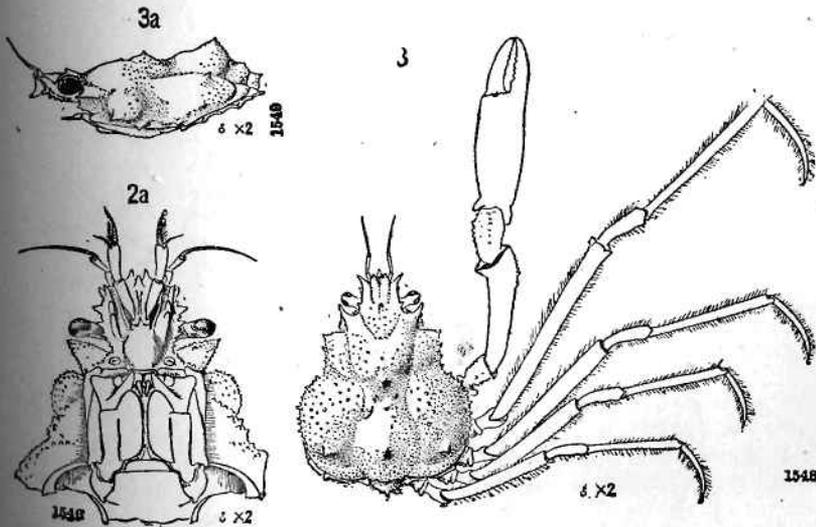
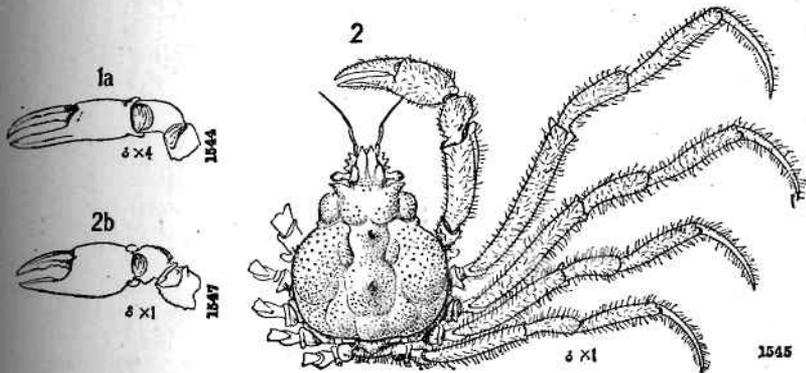
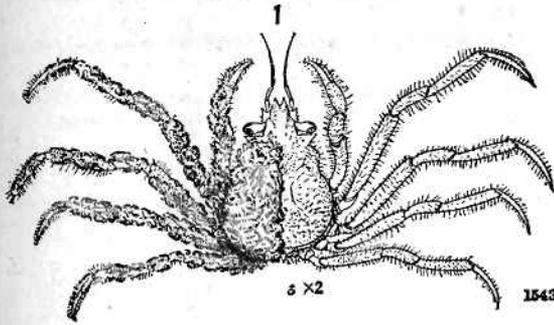
- FIG. 4.—First gnathopod of the right side of the same specimen, enlarged eight diameters.
- FIG. 5.—Distal part of second gnathopod of the same specimen, enlarged eight diameters.
- FIG. 6.—*Benthescymus ? carinatus*, sp. nov. Distal part of maxilliped of left side of female, from Station 2094, enlarged eight diameters.
- FIG. 7.—First gnathopod of the left side of the same specimen, enlarged four diameters.
- FIG. 8.—*Benthæceles Bartletti* Smith. Distal part of second gnathopod of male, from Station 2072, enlarged eight diameters.

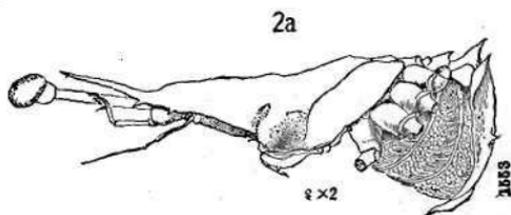
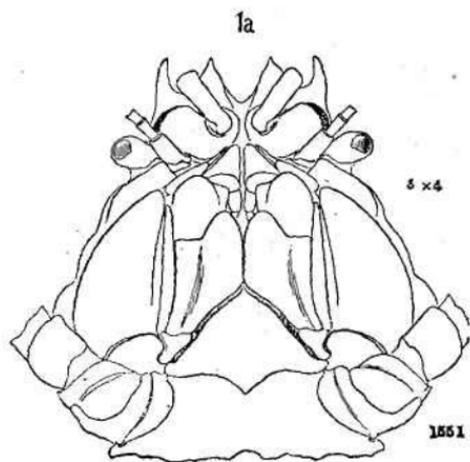
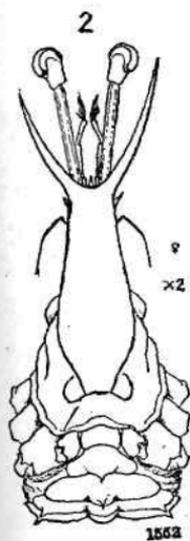
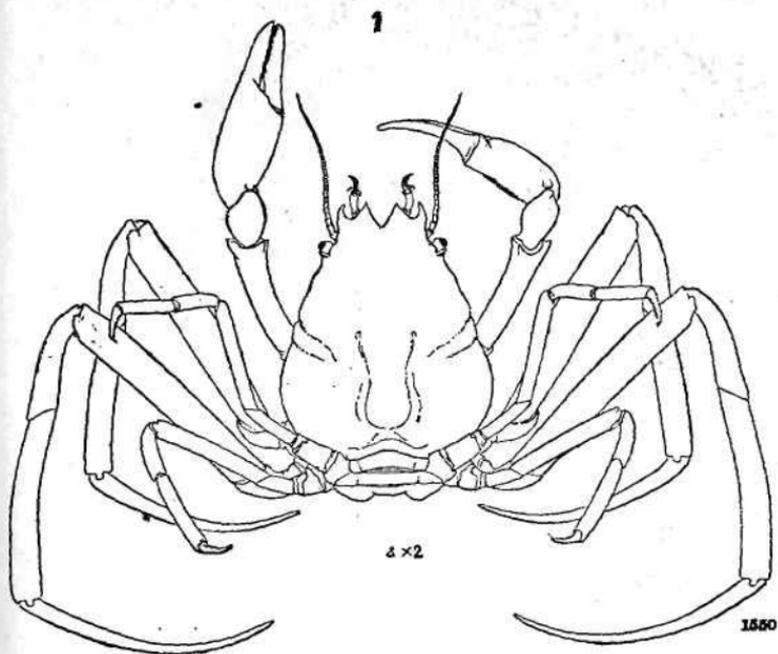
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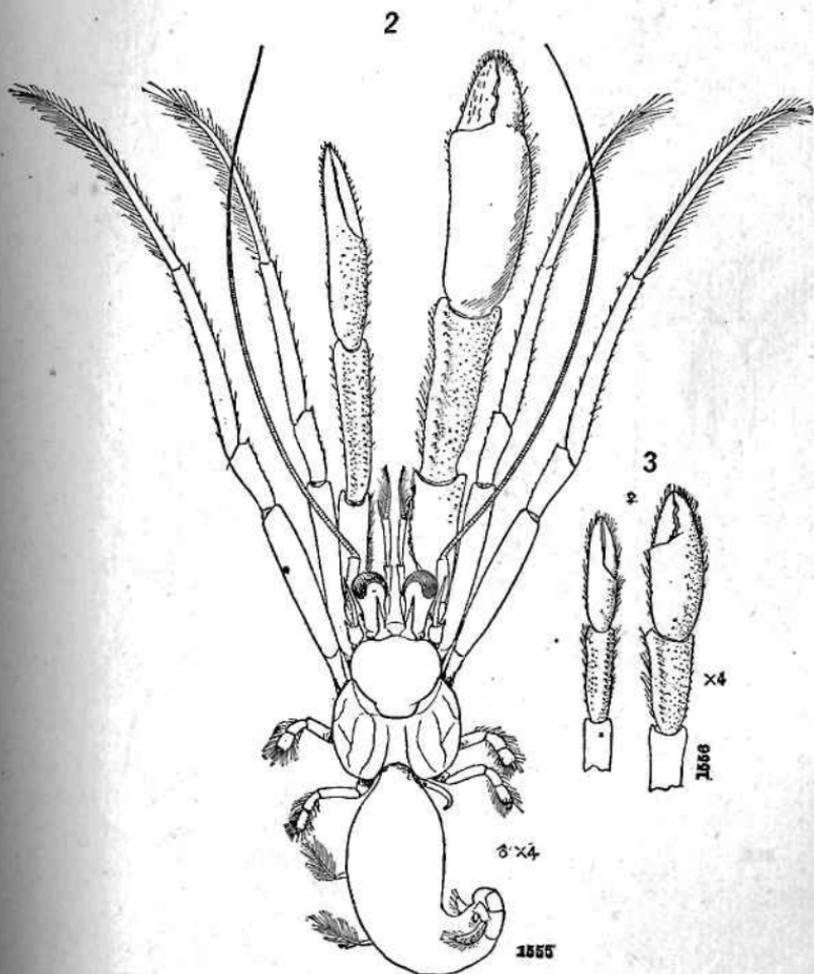
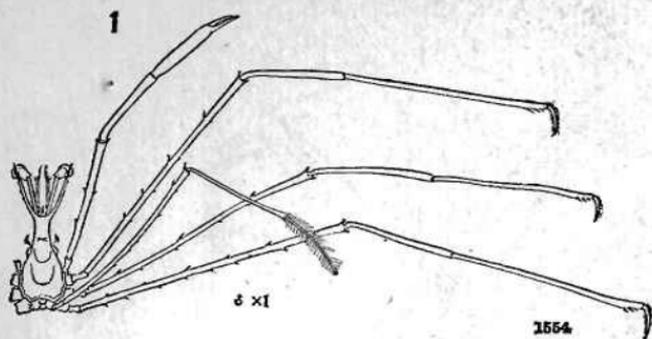
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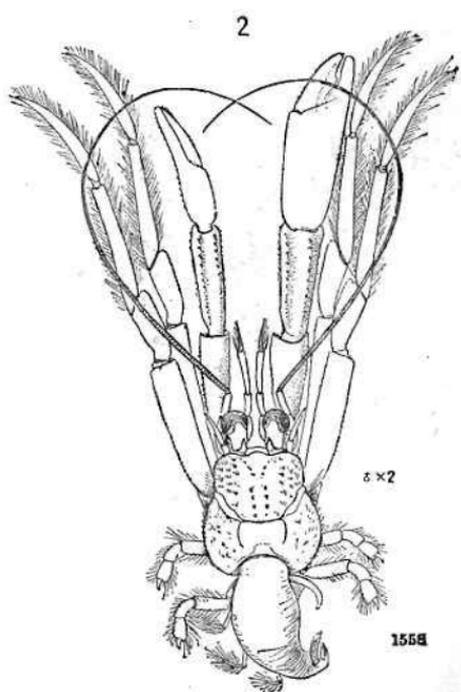
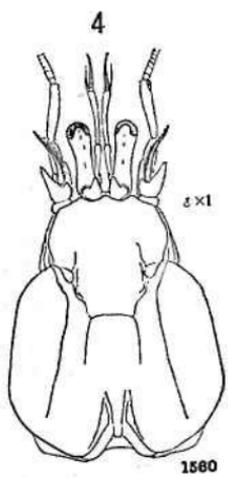
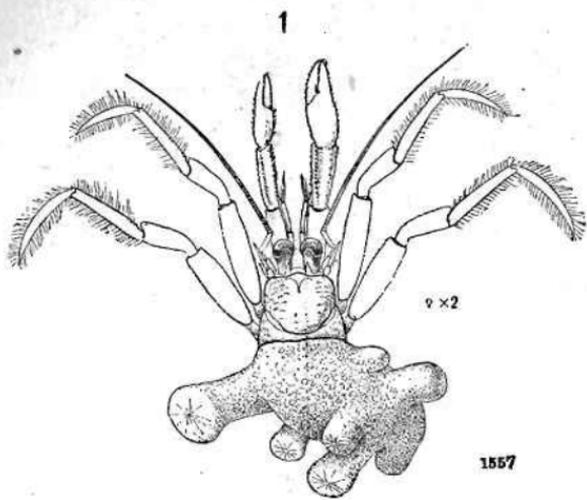
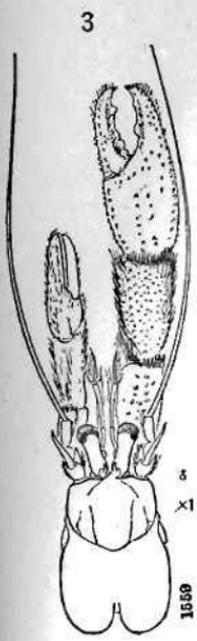
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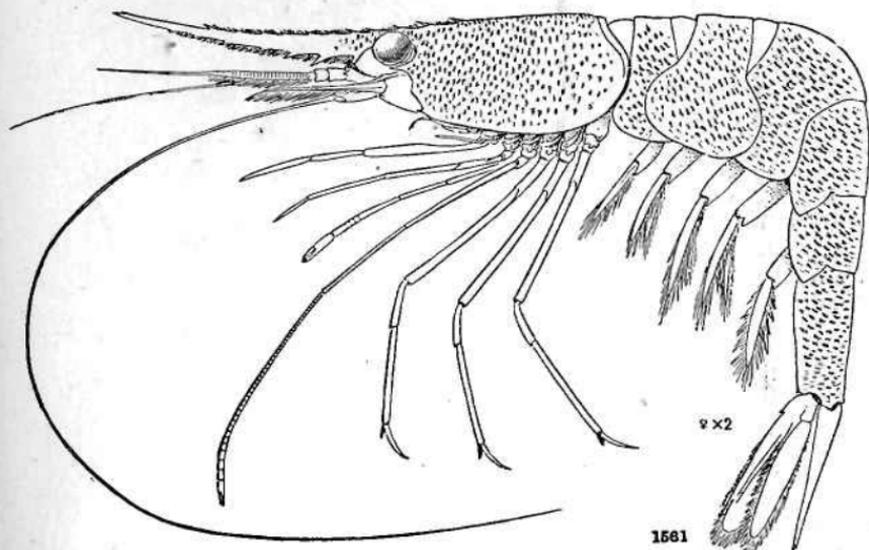




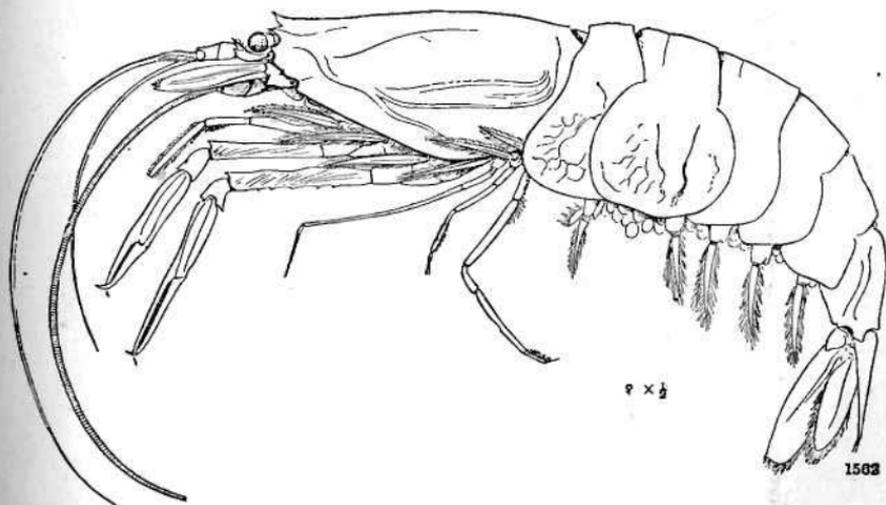




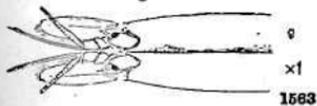
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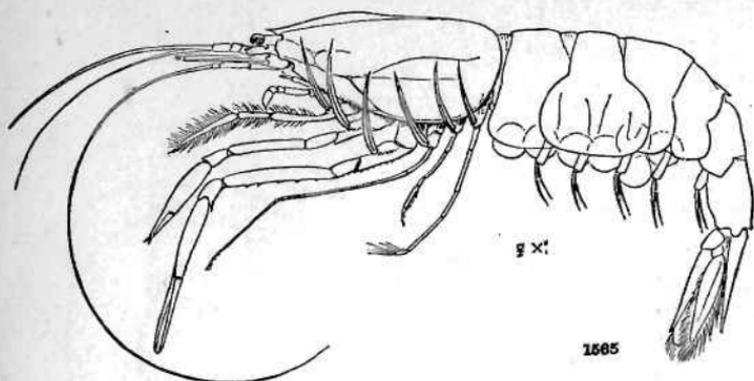
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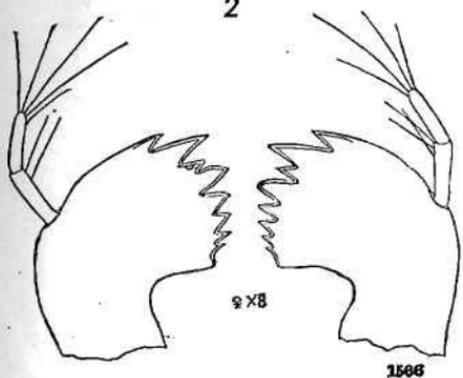
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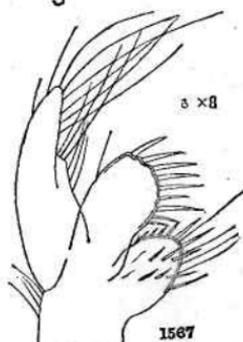
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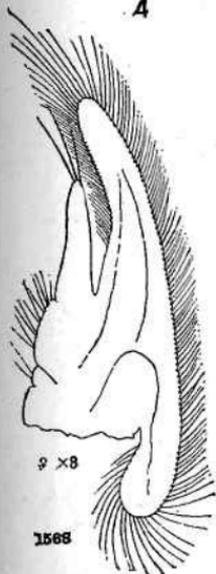
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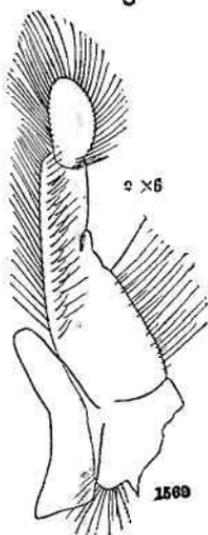
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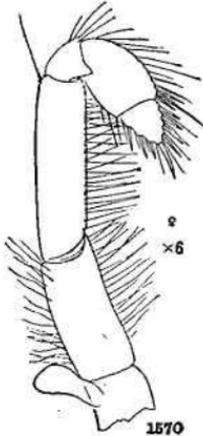
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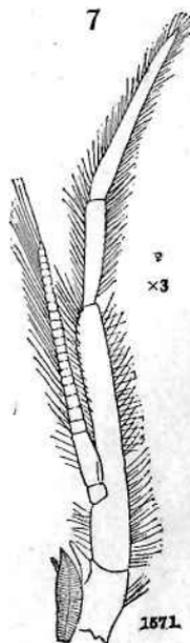
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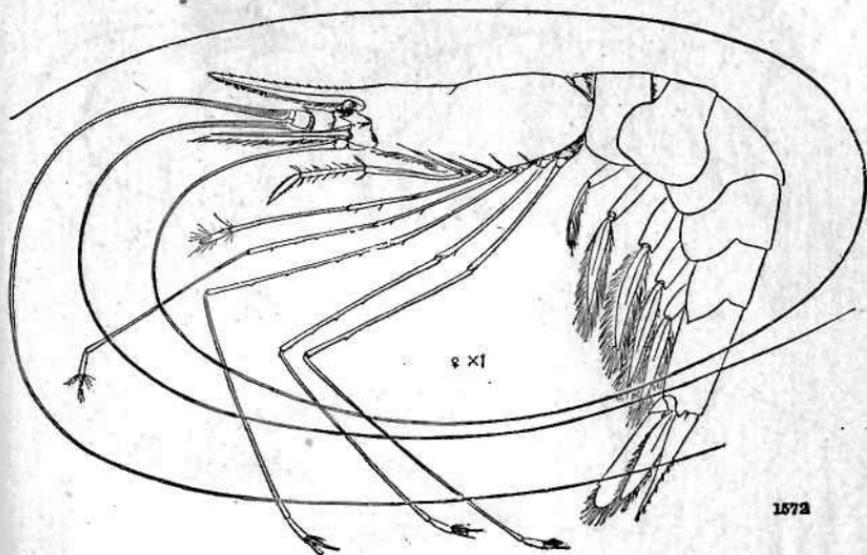
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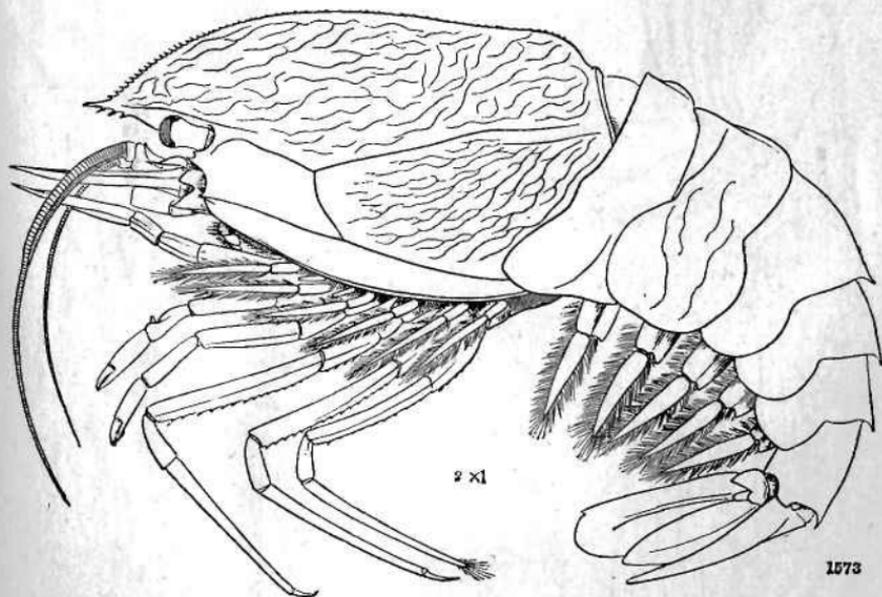
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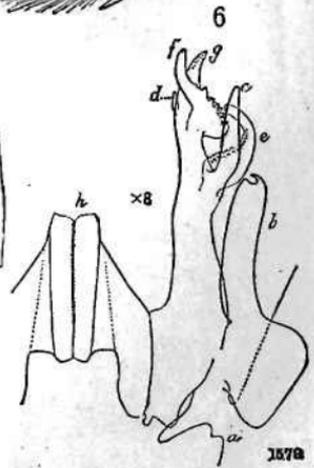
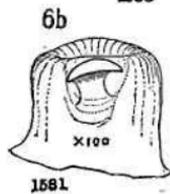
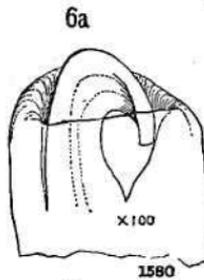
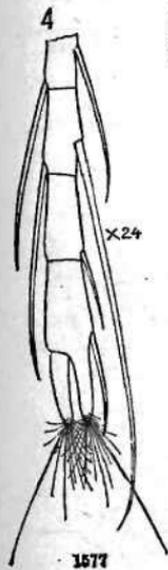
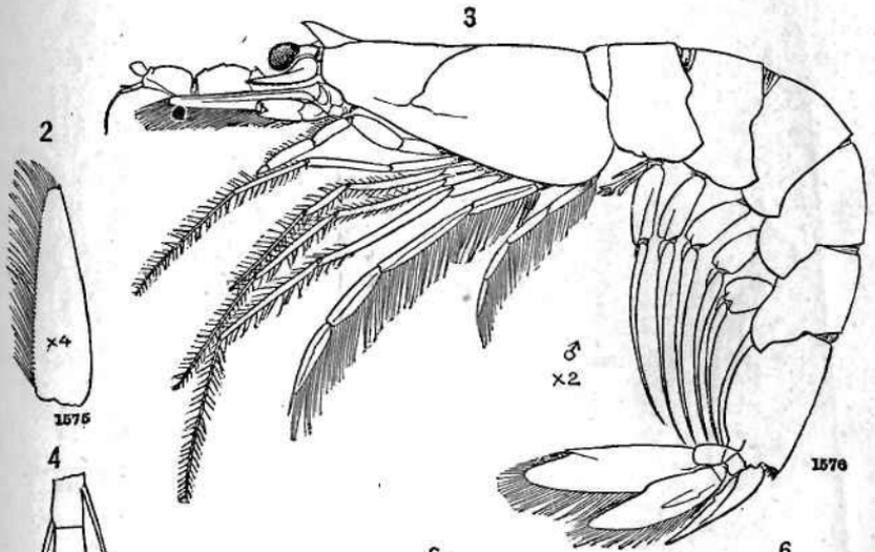
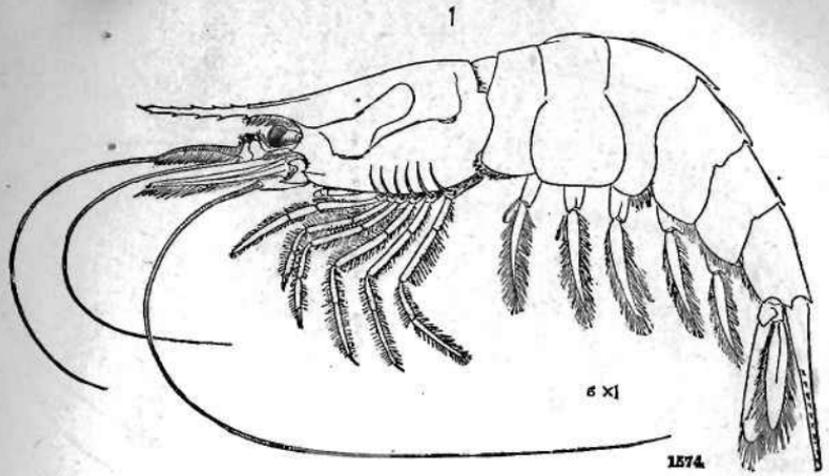


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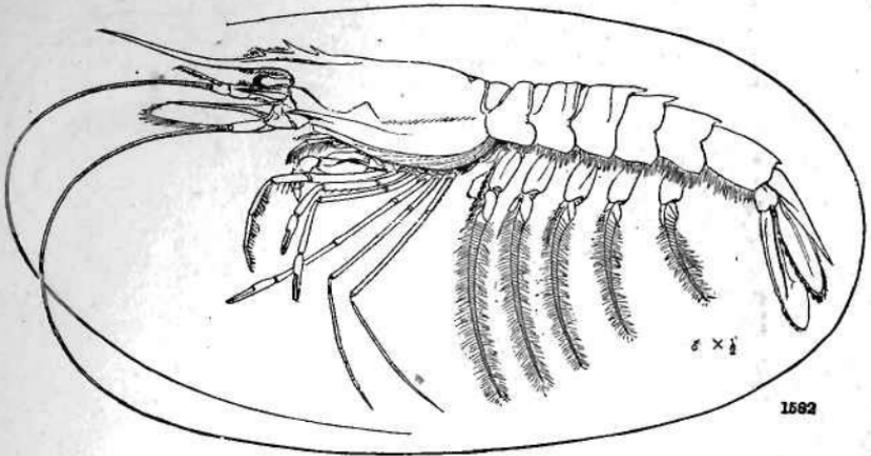


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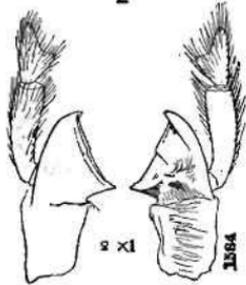
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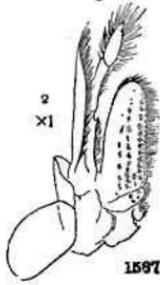
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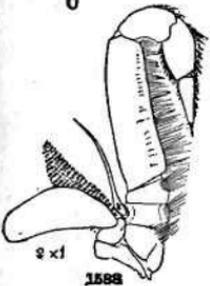
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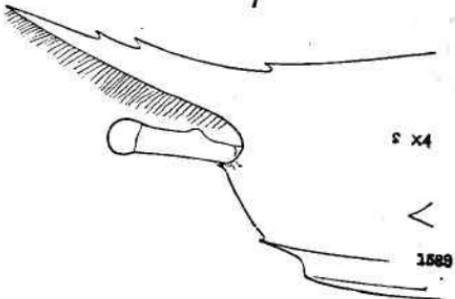
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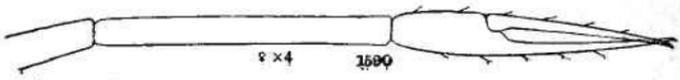
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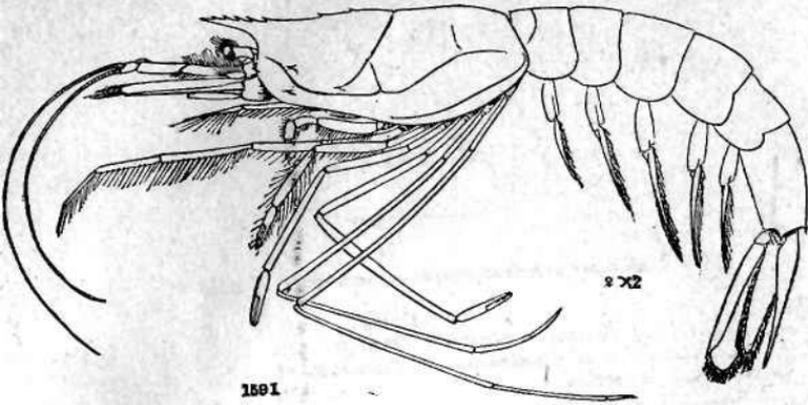
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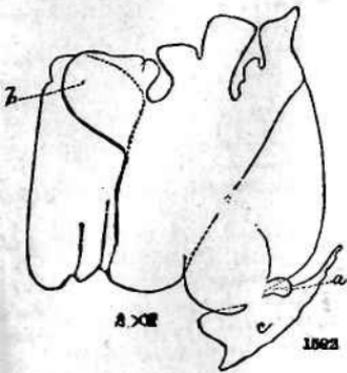
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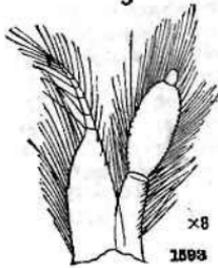
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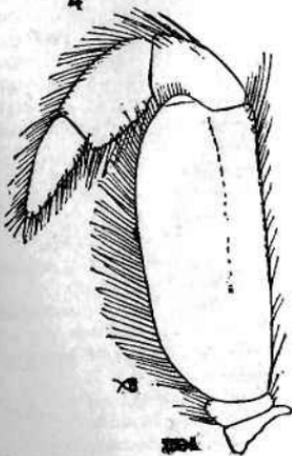
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