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**PRELIMINARY REPORT ON THE BRACHYURA AND ANOMURA  
DREDGED IN DEEP WATER OFF THE SOUTH COAST OF NEW  
ENGLAND BY THE UNITED STATES FISH COMMISSION IN 1880,  
1881, AND 1882.**

 By **SIDNEY I. SMITH.**

This report is intended to be supplementary to my preliminary notice of the crustacea dredged in the same region in 1880 (these Proceedings, iii, pp. 413-452), and to include all the species of Brachyura and Anomura obtained off Martha's Vineyard at depths greater than 50 fathoms. The crustacea dredged off the mouth of Chesapeake Bay in 1880, and off the capes of the Delaware in 1881, will be the subject of a separate report, but the specimens from these dredgings are included in the following lists of specimens examined as far as the species to which they belong are contained in the present report.

A few of the species described as new in the preliminary notice above referred to were almost simultaneously described by A. Milne-Edwards in one of the reports of the Blake dredgings, under the supervision of Alexander Agassiz, in 1877, 1878, 1879 (Bull. Mus. Comp. Zool. Cambridge, vol. viii, No. 1, December 29, 1880), of which I had no knowledge whatever until after my paper was printed (January, 1881), and which was not published until after my last proof had been returned to the Public Printer (December 24, 1880). I have had much difficulty in identifying Milne-Edwards's species, but have adopted his names wherever it was possible to recognize his species. In determining some of these species I have been greatly aided by the kindness of Prof. Walter Faxon, who has sent me for examination some of the type specimens in the Museum of Comparative Zoology.\*

The last season's dredging off Martha's Vineyard reveals the total, or almost total, disappearance of several of the larger species of crustacea which were exceedingly abundant in the same region in 1880 and 1881. The most remarkable cases are those of *Euprognatha rastellifera*, *Collodes robustus*, *Catapagurus Shurreri*, *Munida Caribæa*? Smith, and

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\* While the manuscript of this report was in the hands of the printer, the following work of Milne-Edwards was received: *Recueil de figures de Crustacés nouveaux ou peu connus*. 1ère livraison. April, 1883. A considerable number of Milne-Edwards' new species are provisionally figured in this work, but it does not seem to make any changes in the proofs of the following pages necessary, except under *Anoplonotus politus*, which was doubtfully referred to *Elasmonotus* in the original manuscript, but for which the new generic name has been inserted in the proof.—May 29, 1883.

*Pontophilus brevirostris*, all of which were exceedingly abundant in 1880 and 1881; but of the first two not a specimen was taken the past season, of the *Munida* only a single specimen, and that on the last trip, and of the other species only a very few specimens. *Lambrus Verrillii*, *Acanthocarpus Alexandri*, *Latreillia elegans*, *Homola barbata*, and *Anoplomotus politus*, which were each taken several times in 1880 and 1881, were none of them taken in 1882; they were far less abundant than the other species, however, and the non-occurrence of some of them was very likely accidental; but the disappearance of part of them at least was undoubtedly due to the same causes which occasioned the disappearance of the more abundant species. The disappearance of these species was undoubtedly connected directly with the similar disappearance of the tile-fish (*Lopholatilus*) from the same region, and on this account specially I give in detail, for many of the species enumerated beyond, the tables of specimens examined from the region explored by the Fish Commission; and to these I have usually added the specimens which I have examined from the collection made by Alexander Agassiz on the Blake in 1880. All the species mentioned above as having disappeared in 1882 were specially characteristic of the narrow belt of comparatively warm water (approximately 50° F.), in from 60 to 160 fathoms, which has a more southern fauna than the colder waters either side. Professor Verrill has suggested (*Amer. Jour. Sci.*, III, xxiv, p. 366, 1882) that there was a great destruction of life in this belt, caused by a severe storm, in the winter of 1881-'82, which agitated the bottom-water and forced outward the cold water that even in summer occupies the great area of shallow sea along the coast, thus causing a sudden lowering of the temperature along the warmer belt inhabited by the tile-fish and the crustacea referred to.

In the following tables of specimens examined the latitude and longitude, depth, nature of bottom, &c., are copied from the list of dredging stations of the Fish Commission for 1880, 1881, and 1882, in the Bulletin of the Fish Commission, vol. ii, pp. 119 to 131, 1882, where further details in regard to temperature, &c., are given. In indicating the nature of the bottom, the Coast Survey system of abbreviations is used. 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.

## BRACHYURA.

## MAIOIDEA.

*Amathia Agassizii* Smith, Bull. Mus. Comp. Zool., Cambridge, x, p. 1, pl. 2, figs. 2, 3, 1882.

*Specimens examined.*

Station No.	Locality.						Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.		
	N. lat.			W. long.						♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.											
939	39	53	00	69	50	30	264	gn. S. M.	1881. Aug. 4	1		
1032	39	56	00	69	22	00	208	yl. M.	Sept. 14	1	1 y.	
1113	39	57	00	70	37	00	192	gn. M.	1882. Aug. 22	1		
1154	39	55	31	70	39	00	193	S. M.	Oct. 4	3		

In the original description above referred to it is stated that this species resembles *Amathia Carpenteri* Norman (*Scyramathia Carpenteri* A. M.-Edwards); it is, however, probably not closely allied or even congeneric with that species, but apparently closely allied to *Amathia crassa* A. M.-Edwards, and possibly identical with it. I was misled in regard to the armament of the carapax of *Scyramathia Carpenteri* by the woodcut given in the Depths of the Sea (no description of the species has yet appeared), for Milne-Edwards states that the species is closely allied to *Scyra umbonata* Stimpson, certainly a very different species from *Amathia Agassizii*, and has united them in his new genus *Scyramathia*.

As indicated above, all the specimens seen are males. One of these is much larger than the larger of the two original specimens described and figured in my report above referred to, but differs very little from it, although the spines of the horizontal series on the branchial region, above the bases of the cheliped and first ambulatory leg, are considerably longer, and there are two well-developed spines, instead of two or three small ones, on the lateral margin back of the anterior angle of the buccal area. Measurements of this specimen are given in the last column of the accompanying table of measurements. The other specimens show all gradations between this and the young specimens originally described.

*Measurements in millimeters.*

	Station—			
	1032.	939.	1113.	1154.
Sex .....	Young.	♂	♂	♂
Length of carapax, including rostral and posterior spines .....	15.5	21.5	26.3	53.5
Length of carapax from base of rostral to tip of posterior spines .....	10.0	14.0	18.0	42.5
Length of carapax, excluding rostral and posterior spines .....	9.1	12.1	16.5	40.5
Length of rostral horns or spines .....	5.7	8.0	9.0	12.0
Breadth of carapax, including lateral spines .....	11.5	16.0	19.5	39.5
Breadth of carapax, excluding lateral spines .....	6.8	9.0	12.3	32.0
Length of branchial spine .....	3.1	4.8	5.2	6.0
Length of cheliped .....	11.0	15.0	21.5	62.0
Length of chela .....	4.6	6.4	10.0	28.5
Breadth of chela .....	0.9	1.3	1.6	4.0
Length of dactylus .....	2.0	2.5	3.8	5.4
Length of first ambulatory leg .....	18.0	25.0	37.0	.....
Length of dactylus .....	3.5	4.0	6.7	.....
Length of second ambulatory leg .....	15.0	22.5	31.5	95.0
Length of dactylus .....	3.2	4.8	6.0	17.5

**Amathia Tanneri**, sp. nov.

Allied to the last species, but readily distinguished from it by the narrower carapax with longer and less diverging rostral horns and fewer and more nearly equal spines, and by having a single spine only on the base of the antenna.

*Male*.—The carapax, excluding the rostral horns and the spines, is about as broad as long. The rostral horns are nearly straight, much less divergent than in *A. Agassizii*, and, in the larger of the two specimens seen, much more than half as long as the rest of the carapax. The supraorbital spine and the postorbital process are as in *A. Agassizii*, but the basal segment of the antenna is unarmed except by a single spine at the distal end. There are four long and approximately equidistant spines on the mesial line of the carapax, the two anterior on the gastric region and smaller than the others, which are on the cardiac region, the posterior being near the posterior margin and projecting slightly backward over it. There are no prominent spines on the gastric region except the two median, but there is a minute tubercle or rudimentary spine either side about equidistant from the two median, and on the cardiac region there are no spines or tubercles whatever except the two median. There is a single long hepatic and a great branchial spine, as in *A. Agassizii*, but there are no other spines or tubercles on the branchial region except two, about as long as the cardiac spines, and about equidistant from each other and from the great branchial, the posterior gastric, and the anterior cardiac. The anterior angle of the buccal area projects in a dentiform process either side, as in *A. Agassizii*, and back of this the prominent margin of the pleural region is armed with three small tubercles or rudimentary spines. There are no spines or tubercles on the side of the branchial region above the basis of the cheliped and first ambulatory leg, and no tubercles whatever on the postero-lateral margins.

The chelipeds and ambulatory legs are essentially as in *A. Agassizii*.

The number and arrangement of the dorsal spines of the carapax appear to be nearly as in *A. hystrix* Stimpson, as figured by A. Milne-Edwards (Crust. Région Mexicaine, p. 134, pl. 28, fig. 1, 1878), except that the lateral spines of the gastric region are obsolete in *A. Tanneri*; but all the spines are very greatly longer in *hystrix*, which appears to be a very distinct species.

Measurements in millimeters.

	Station—	
	1038.	1043.
Sex	♂	♂
Length of carapax, including rostral and posterior spines	15+	28.0
Length of carapax from base of rostral to tip of posterior spines	11.0	18.0
Length of carapax, excluding rostral and posterior spines	10.2	16.2
Length of rostral horns or spines	4+	11.0
Breadth of carapax, including lateral spines	10.0	18.0
Breadth of carapax, excluding lateral spines	6.7	11.2
Length of branchial spine	1.9	4.0
Length of cheliped	12.0	20.0
Length of chela	5.5	9.0
Breadth of chela	1.1	1.8
Length of dactylus	2.0	3.5
Length of first ambulatory leg	21.0	35.0
Length of dactylus	3.7	6.2
Length of second ambulatory leg	16.0	27.0
Length of dactylus	3.0	5.9

Specimens examined.

Station No	Locality.		Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
	N. lat.	W. long.				♂	♀
1038	OFF MARTHA'S VINEYARD.		146	S. Sh.	1881. Sept. 21	1 y.	
	° ' 39 58	° ' 70 06					
1043	OFF DELAWARE BAY.		130	S.	1881. Oct. 10	1	
	° ' 38 39	° ' 73 11					

*Hyas coarctatus* Leach.

Taken at a number of stations off Martha's Vineyard, in 86 to 158 fathoms, and also in much shallower water near Block Island and off No Man's Land. Four male specimens were taken off Chesapeake Bay in 1880, station 900, N. lat. 37° 19', W. long. 74° 41', 31 fath., sand—the farthest south the species has been noticed.

*Collodes robustus*, sp. nov.

*Collodes depressus* Smith, Proc. National Mus., iii, p. 414, 1881 (non A. M. Edwards.)

A careful examination of one of the type specimens of *C. depressus* convinces me that the specimens which I have referred to that species

are really a distinct but closely allied and much larger species. Very small specimens, 10<sup>mm</sup> or less in length of carapax, resemble the *depressus* very much, but are distinguished from Milne-Edwards's figures and the type specimen referred to by the less regularly triangular outline of the carapax, the hepatic and branchial regions being much more protuberant; by the acute rostral horns, more widely separated at their tips; by the much longer interantennular spine, which is fully as long as in *Eu-prognatha rastellifera*; by the short and conical or even tuberculiform gastric and cardiac spines; by the spine of the first somite of the abdomen being directed backward instead of upward; and by the more slender chelæ.

*Male*.—In large males over 20<sup>mm</sup> in length of carapax, the carapax is a little over three-fourths as broad as long, and thickly covered, as well as nearly all other parts of the animal except the chelæ, with strongly curved hairs or setæ, which, in every specimen seen, persistently retain a thick coating of soft mud. The rostral horns are slender and separated by a rounded sinus, at the bottom of which the interantennular spine, or true rostrum, which is much longer than the rostral horns and grooved longitudinally in front, projects downward and about as far forward as the rostral horns. The basal segment of the antenna is armed with a lateral and an inferior ridge, each divided into three to five short spiniform teeth. The postorbital processes are broad, but acutely triangular, and project as far as the tips of the eyes. The dorsal surface is thickly covered with granular tubercles, and there is a slight tubercular elevation, but little more prominent than the tubercles of the general surface, on the gastric region, and another on the cardiac, in place of the spines in the young. The hepatic region is divided obliquely near the middle by a deep sulcus into two lobes, of which the superior projects in a rounded prominence, which is very conspicuous as seen from above, while the inferior is crossed longitudinally by the pleurotergal suture and below it armed with a short series of small tuberculiform spines. The branchial regions are prominent, swollen, and evenly tuberculated.

The chelipeds are stout and approximately once and a half as long as the carapax; the merus is triquetral with the angles armed more or less with tubercles or tuberculiform spines; the whole outer surface of the carpus is similarly armed. The chela is approximately two-thirds as long as the carapax, naked, smooth, polished, and unarmed, except a very few tubercles on the inner surface and near the proximal ends of the upper and under edges; the body is nearly as long as the digits, thick and swollen; and the digits are compressed, somewhat grooved longitudinally, very slightly curved, gaping at the bases, and with the prehensile edges slightly and irregularly crenate. The ambulatory legs are hairy to very near the tips, but are otherwise unarmed and smooth throughout, and all the segments are subcylindrical; the first are about two and a half times as long as the carapax, the others successively

shorter, and the last considerably less than twice as long as the carapax; the dactyli are considerably curved, slender, and tapered near the acute chitinous tips.

The sternum is tuberculose, like the dorsal surface of the carapax, except upon the concave portion between the bases of the chelipeds, where it is smooth.

The first somite of the abdomen is tuberculose, like the carapax, and armed with a low tuberculiform prominence, in place of the spine in the young. The second somite is very short and scarcely wider than the first. The third is widest of all, and from it the abdomen is regularly narrowed to the seventh somite, which is ankylosed with the sixth, as in *Euprognatha rastellifera*, triangular, with the tip obtuse, and nearly as broad as long.

*Female*.—The females appear not to attain the adult sexual characters until the carapax is about 12<sup>mm</sup> in length, apparently never attain as great size as the males, and as usual resemble the young, although they lose the gastric, cardiac, and abdominal spines fully as early as the males. The carapax is slightly more convex and the branchial regions somewhat less swollen than in the male. The chelipeds remain small and weak, the chelæ slender as in the young, and the ambulatory legs proportionally shorter than in the male.

The proportions of the carapax, chelipeds, and ambulatory legs in the young and adults of both sexes are well shown by the accompanying table of measurements.

*Measurements in millimeters and hundredths of length of carapax.*

	Station—									
	874	949	940	940	940	940	873	1036	950	940
Sex.....	♂*	♂	♂	♂	♂	♂	♀*	♀*	♀	♀
Length of carapax, including frontal teeth.....	9.7	12.5	14.8	23.3	25.7	27.0	8.2	10.7	13.3	18.3
Greatest breadth of carapax.....	6.6	9.1	10.8	17.9	20.7	21.2	5.8	7.0	10.3	14.1
Same in hundredths of length of carapax.....	68	73.	73	77	77	78	71	68	70	77
Length of cheliped.....	11.0	16.0	18.0	34.0	38.0	40.0	9.5	11.0	14.0	19.0
Length of chela.....	4.8	6.2	7.8	14.8	17.6	18.5	3.5	4.5	5.5	7.9
Same in hundredths of length of carapax.....	49	50	53	64	66	68	41	42	42	43
Height of chela.....	1.2	2.1	2.7	6.6	7.5	8.0	0.9	1.1	1.4	2.1
Same in hundredths of length of carapax.....	12	17	18	28	29	30	11	10	11	12
Length of dactylus.....	2.7	3.6	4.4	8.0	9.1	10.2	2.1	2.6	3.2	4.7
Length of first ambulatory leg.....	20.0	28.0	34.0	58.0	65.0	68.0	15.0	19.0	24.0	32.0
Length of propodus.....	5.0	6.5	8.5	14.5	15.5	17.0	3.1	4.1	6.0	7.5
Length of dactylus.....	3.9	5.4	7.0	12.0	13.4	14.5	2.7	3.9	5.2	7.0
Length of fourth ambulatory leg.....	17.0	22.0	27.0	42.0	46.0	47.0	.....	15.5	20.0	25.0
Length of propodus.....	3.8	5.0	6.9	10.1	12.0	12.6	.....	2.9	4.8	6.7
Length of dactylus.....	3.8	5.0	6.3	9.2	10.0	10.2	.....	2.8	4.7	6.2

\* Immature individuals.

The number and arrangement of the branchiæ are the same as in *Euprognatha rastellifera*, but there are well-developed epipods on all



three pairs of maxillipeds, those on the second being narrow, but as long as the merus of the endopod, so that the formula is:

	Somite—								Total.
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	
Epipods .....	1	1	1	0	0	0	0	0	(3)
Podobranchiæ .....	0	1	1	0	0	0	0	0	2
Arthrobranchiæ .....	0	0	2	0	0	0	0	0	2
Pleurobranchiæ .....	0	0	0	2	1	1	0	0	4
									8+(3)

*Specimens examined.*

Station No.	Locality.		Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.		
	N. lat.	W. long.				♂	♀	With eggs.
OFF MARTHA'S VINEYARD.								
	° ' "	° ' "			1880.			
865	40 05 00	70 23 00	65	fne. S. M.	Sept. 4	1	1	1
871	40 02 54	70 23 40	115	fne. S. M.	Sept. 4	3	1	0
872	40 05 39	70 23 52	86	S. G. Sh. sponges.	Sept. 4	1	1	0
873	40 02 00	70 57 00	160	sft. M.	Sept. 13	3	3	0
874	40 00 00	70 57 00	85	sft. M.	Sept. 13	4	4	0
875	39 57 00	70 57 30	126	sft. M.	Sept. 13	1	1	0
878	39 55 00	70 54 15	142	sft. M.	Sept. 13	1	1	1
1881.								
921	40 07 48	70 43 54	67	gn. M.	July 16	4	1	0
922	40 03 48	70 45 54	71	gn. M. S.	July 16	2	2	0
940	39 54 00	69 51 30	134	hrd. S. sponges.	Aug. 4	34	9	5
941	40 01 00	69 56 00	79	hrd. S. M.	Aug. 4	8	9	9
949	40 03 00	70 31 00	100	yl. M.	Aug. 23	5	5	5
950	40 07 00	70 32 00	71	S. Sb. M.	Aug. 23	3	2	2
1036	39 58 00	69 30 00	94	S.	Sept. 14	2	1	0
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	1		
1040	40 00 00	70 06 00	93	S. Sh.	Sept. 21	1		
OFF DELAWARE BAY.								
1043	38 39 00	73 11 00	130	S.	Oct. 10	5		
1046	38 33 00	73 18 00	104	S.	Oct. 10	1		
1047	38 31 00	73 21 00	156	S.	Oct. 10	1		
OFF CHESAPEAKE BAY.								
1880.								
896	37 26 00	74 19 00	56	S. Sh.	Nov. 16	7	1	1
899	37 22 00	74 29 00	57	S.	Nov. 16	11		

The type specimen of *C. depressus* which I have examined is from the Straits of Florida, and is labeled "Bache, Apr. 2, 5th cast, 54 fms., off Sombrero." This specimen gives the following measurements in millimeters and hundredths of the length of the carapax:

Sex .....	♂
Length of carapax .....	7.0
Breadth of carapax .....	5.2
Same in hundredths of length .....	74
Length of cheliped .....	8.0

Length of chela.....	3.3
Same in hundredths of length of carapax.....	47
Height of chela.....	1.2
Same in hundredths of length of carapax.....	17
Length of dactylus.....	1.9

Neither Stimpson nor Milne-Edwards mentions the presence of an interantennular spine in any of the species of *Collodes*, and both of them speak of it in *Euprognatha* as specially distinguishing that genus from its near allies; but in the two species which I have examined the spine is well developed, though less prominent, and not projecting forward at all in *C. depressus*.

**Euprognatha rastellifera Stimpson.**

Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 123, 1870.

A. M.-Edwards, Crust. Région Mexicaine, p. 183, pl. 33, fig. 2, 1878; Bull. Mus. Comp. Zool. Cambridge, viii, p. 7, 1880.

Smith, Proc. Nat. Mus., iii, p. 415, 1881; Bull. Mus. Comp. Zool. Cambridge, x, p. 4, 1882.

*Specimens examined.*

Station No.	Locality.		Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.						
	N. lat.	W. long.				♂	♀	With eggs.				
OFF MARTHA'S VINEYARD.												
	°	'	"	°	'	"						
865	40	05	00	70	23	00	65	fne. S. M.	Sept. 4	100+	+	
869	40	02	18	70	23	06	192	fne. S.	Sept. 4	6	.....	
871	40	02	54	70	23	40	115	fne. S. M.	Sept. 4	1,000+	+	
872	40	05	39	70	23	52	86	S. G. Sh. sponges.	Sept. 4	50+	+	
873	40	02	00	70	57	00	100	Sft. M.	Sept. 13	500+	+	
874	40	00	00	70	57	00	85	Sft. M.	Sept. 13	1,000+	+	
877	39	56	00	70	54	18	126	Sft. M.	Sept. 13	20+	+	
878	39	55	00	70	54	15	142	M.	Sept. 13	300+	+	
1880.												
1881.												
920	40	13	00	70	41	54	63	gn. M.	July 16	7	.....	
921	40	07	48	70	43	54	67	gn. M.	July 16	1,500+	+	
922	40	03	48	70	45	54	71	gn. M. S.	July 16	250+	+	
923	40	01	24	70	46	00	96	S.	July 16	37	+	
925	39	55	00	70	47	00	229	S. M.	July 16	5	.....	
940	39	54	00	69	51	30	134	hrd. S., sponges.	Aug. 4	.....	.....	
941	40	01	00	69	56	00	79	hrd. S. M.	Aug. 4	2,000+	+	
949	40	03	00	70	31	00	100	yl. M.	Aug. 23	500+	+	
950	40	07	00	70	32	00	71	S. Sh. M.	Aug. 23	150+	+	
1036	39	58	00	69	30	00	94	S.	Sept. 14	1	.....	
1038	39	58	00	70	06	00	146	S. Sh.	Sept. 21	2	.....	
1040	40	00	00	70	06	00	93	S. Sh.	Sept. 21	20+	+	
OFF DELAWARE BAY.												
1043	38	39	00	73	11	00	130	S.	Oct. 10	10	.....	
1047	38	31	00	73	21	00	156	S.	Oct. 10	7	.....	
OFF CHESAPEAKE BAY.												
1880.												
896	37	26	00	74	19	00	56	S. Sh.	Nov. 16	3	1	+
899	37	22	00	74	29	00	57	S.	Nov. 16	6	4	+

I have also examined specimens taken by Alexander Agassiz on the Blake in 1880, at the following stations :

Station.	N. lat.			W. long.			Fathoms.	Specimens.
	°	'	"	°	'	"		
335	38	22	25	72	33	40	89	1♂
345	40	10	15	71	4	30	71	70♂ ♀
346	40	25	35	73	10	30	44	1♀

Among the vast number of specimens examined there are very few sexually immature individuals. Both sexes ordinarily attain maturity before the carapax is 6<sup>mm</sup> in length, and the scarcity of immature specimens in the collections may be due to their small size causing them to be overlooked in the great mass of material brought up in the trawl. The largest females seen do not exceed 10<sup>mm</sup> in length of carapax, and differ very little from the smallest in the form and proportions of chelipeds and ambulatory legs, though the carapax is a little broader in proportion and the spines with which it is armed are much lower, or reduced to tubercles, in the larger specimens. The males attain much greater size than the females, the carapax often exceeding 14<sup>mm</sup> in length, and there is a very marked and constant increase in the size of the chelipeds, particularly in the height and the thickness of the body of the chelæ, well shown in the accompanying table of measurements. In both sexes there is considerable variation in the length of the spines of the carapax, even in specimens of the same size, and there is a marked decrease in the length of the spines with the growth of the individual. In large specimens the spines upon the orbital arches, upon the gastric, cardiac, and the summits of the branchial regions, and upon the basal segment of the abdomen, are usually reduced to low, and often inconspicuous, tubercles.

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

	Somite—								Total.
	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	
Epipods.....	1	0	1	0	0	0	0	0	(2)
Podobranchiæ.....	0	1	1	0	0	0	0	0	2
Arthrobranchiæ.....	0	0	2	0	0	0	0	0	2
Pleurobranchiæ.....	0	0	0	2	1	1	0	0	4
									8 + (2)

The sixth and seventh somites of the abdomen of the male are ankylosed completely, as they are also in *Euprognatha rastellifera*, Col-

*lodes depressus*, *C. robustus*, and *Lispognathus furcatus*, though neither Stimpson nor Milne-Edwards mentions it, and Milne-Edwards even apparently figures them as separate in *E. rastellifera* and *C. depressus*.

*Measurements in millimeters and hundredths of length of carapax.*

	Station—									
	865	865	865	878	878	922	865	865	869	878
Sex	♂*	♂	♂	♂	♂	♂	♀	♀*	♀	♀
Length of carapax, including rostrum.	3.2	5.1	5.6	6.8	11.3	14.4	5.8	6.0	7.2	9.5
Breadth of carapax, excluding spines.	2.3	3.6	4.1	5.0	8.9	12.0	4.4	4.5	5.5	7.7
Same in hundredths of length of carapax.	72	71	73	74	79	83	76	75	76	81
Length of cheliped	4.0	6.5	7.5	10.0	21.0	29.0	6.8	7.0	8.0	11.8
Length of chela	1.5	2.7	3.1	4.2	10.0	12.8	2.6	2.8	3.2	4.7
Same in hundredths of length of carapax.	47	53	55	62	88	89	45	47	44	49
Height of chela	0.3	0.6	0.8	1.3	2.7	3.6	0.6	0.6	0.7	1.0
Same in hundredths of length of carapax.	10	12	14	19	24	26	10	10	10	11
Length of dactylus	0.6	1.3	1.6	2.0	4.0	5.0	1.2	1.4	1.6	2.3
Length of first ambulatory leg	5.7	11.0	13.0	16.0	32.0	35.0	11.0	8.5	13.5	19.8
Length of propodus	1.5	3.1	3.5	4.4	9.5	10.0	2.8	2.0	3.3	5.3
Length of carpus	1.0	2.0	2.2	2.7	5.2	5.5	2.0	1.5	2.2	3.3
Length of fourth ambulatory leg	8.0	9.0	10.8	20.0	22.0	9.0	6.2	9.5	14.0	
Length of propodus	2.3	2.5	3.2	5.8	6.0	2.5	1.6	2.5	4.0	
Length of carpus	1.7	1.8	2.1	3.7	4.1	1.7	1.0	1.8	3.0	

\* Immature specimens; the others all adult, the females with eggs, even in the case of the smallest. The first and fourth ambulatory legs in the immature female are apparently reproduced appendages, which may, perhaps, account for the retardation in the sexual development of the individual.

The specimens in the Fish Commission collections and in the Blake collection of 1880 appear to agree much more closely with those originally described by Stimpson and those figured and described by Milne-Edwards than they do with a few Caribbean specimens which I have examined and which were labeled by Milne-Edwards as this species and returned to the Museum of Comparative Zoology. These specimens, two males and five females, are from the Blake collection of 1878-79, station 134, off Santa Cruz, 248 fathoms, and, though fully adult, are all very much smaller than any other adult specimens examined. They are also considerably smaller than the specimens described by Stimpson or Milne-Edwards. The carapax is slightly narrower than in the northern specimens, with the tubercles of the surface larger and all the spines longer and more slender; the postorbital process is slender and spiniform instead of dentiform; there is a small conical spine, much more acute and more prominent than in the northern specimens, on the eye, at the emargination of the cornea; and the ambulatory legs are more slender and armed with small spiniform tubercles which are much more conspicuous than in the northern specimens. In the males the chelæ are proportionally larger, with the bodies stouter and more swollen; and in both sexes the chelæ and other parts of the chelipeds are armed with larger and more scattered tubercles, many of which, especially on the carpus and merus, become spiniform and conspicuous. Some of these differences are well shown in the following measurements (in mil-

limeters and hundredths of length of carapax) of four of the specimens from off Santa Cruz:

	1.	2.	3.	4.
Sex.....	♂	♂	♀	♀
Length of carapax, including rostrum.....	5.3	5.6	5.4	6.0
Breadth of carapax, excluding spines.....	3.6	3.8	3.9	4.4
Same in hundredths of length.....	68	68	74	73
Length of cheliped.....	8.0	9.0	5.7	.....
Length of chela.....	3.4	3.5	2.6	.....
Same in hundredths of length of carapax.....	64	62	48	.....
Height of chela.....	0.8	1.0	0.5	.....
Same in hundredths of length of carapax.....	15	18	9	.....
Length of dactylus.....	1.6	1.7	1.2	.....

These Caribbean specimens are apparently specifically distinct, but a series of specimens from different parts of the West Indian region would perhaps show them to be a geographical or local variety.

***Lisopognathus furcatus* A. M.-Edwards.**

*Lisopognathus furcatus* A. M.-Edwards, Bull. Mus. Comp. Zool. Cambridge, vii, p. 9, 1880.

? *Lisopognathus furcillatus* A. M.-Edwards, Rapport sur la Faune sous-marine dans les grandes profondeurs de la Méditerranée et de l'Océan Atlantique (Arch. Missions Sci. et Littéraires, ix), pp. 16, 39, 1882 (no description).

To this species I refer, with considerable hesitation, two specimens dredged off Martha's Vineyard: Station 951, N. lat. 39° 57', W. long. 70° 31' 30'', 225 fath., mud, Aug. 23, 1881 (male); station 1096, N. lat. 39° 53', W. long. 69° 47', 317 fath., soft green mud, Aug. 11, 1882 (female carrying eggs).

The carapax, excluding the rostral and lateral spines, is about four-fifths as broad as long in the male, and slightly broader and much thicker and more swollen in the female. The rostral horns are acicular, very slightly divergent, and slightly ascending, and in the male nearly three-tenths as long as the rest of the carapax. The three erect gastric and the postorbital spines are subequal and very slender and acute, and the postorbital spine each side is situated slightly in front of a line from the middle to the lateral gastric. The cardiac spine is considerably stouter and a little higher than the gastric spines, and either side of it on the dorsal part of the branchial region there is a much smaller erect spine, and on a line between this and the lateral gastric there is a similar spine in the female, but only a minute spine or tubercle in the male. There are two or three minute spines or tubercles on the protuberant superior lobe of the hepatic region, and about as many more back of these on the side of the branchial region, while on the inferior hepatic lobe, opposite the middle of the buccal area, there is a much larger spine directed downward, and back of this a smaller one, near the base of the cheliped. The supraorbital spine is slender and about as long as the gastric spines, and in the male the interantennular is fully as long, stouter, and directed downward and curved slightly forward. The basal

segment of the antenna is irregularly armed beneath with small spines or teeth, and in the male with a slender spine at the distal end. The eyestalk is armed with a minute spine or tubercle in front, and above with a small tubercle at the emargination of the cornea. The exposed surface of the ischium and merus of the external maxillipeds is armed conspicuously with marginal and submarginal spines, of which one on the inner edge of the merus is very long.

The chelipeds in the male are stout and nearly twice as long as the carapax, including the rostral horns; the merus is a little shorter than the chela and triquetral, with all three of the angles thickly armed with very long and slender spines; the carpus is rounded externally, but armed like the merus; the chela is longer than the carapax, excluding the rostral horns, and naked and unarmed except by a few spines along the proximal part of the dorsal edge; the body is stout and swollen, and the digits slightly shorter than the body, nearly straight vertically but strongly curved laterally, very much compressed, grooved longitudinally on the sides and on the rather broad dorsal edge of the dactylus, and the prehensile edges crenately serrate and in contact throughout. In the female the chelipeds are only about once and a half as long as the carapax, including the rostral spines, much more slender than in the male, and armed with proportionally longer spines; and the chela is much shorter than the carapax, excluding the rostral horns; the body is scarcely at all swollen, and is armed with slender spines along both edges and with minute spines or tubercles on the sides, and the digits are proportionally longer and narrower than in the male.

The ambulatory legs are very long and slender, clothed to the tips of the dactyli with numerous curved setiform hairs which persistently retain mud and other foreign substances, and each is armed with a slender spine on the upper side of the distal end of the merus.

In the male the abdomen is much broader relatively to the sternum than in *Euprognatha rastellifera*, and has a low tuberculiform elevation on each somite. The first and second somites are narrow, the third broadest of all, the fourth and fifth successively a very little narrower, the fifth fully twice as broad as long, and the sixth and seventh consolidated as in *Euprognatha* and *Collodes*, together much broader than long and very broad and obtuse at the tip. The appendages of the first somite reach nearly to the tip of the abdomen, and their tips are stout and curved outward very strongly.

The eggs are numerous, nearly spherical, and approximately 0.6<sup>mm</sup> in diameter in alcoholic specimens.

## Measurements in millimeters.

	Station—	
	951.	1096.
Sex .....	♂	♀
Length of carapax, including rostral spines .....	12.0	12+
Length of carapax, excluding rostral spines .....	9.3	10.8
Breadth of carapax, including spines .....	7.6	9.6
Breadth of carapax, excluding spines .....	7.6	9.3
Breadth of front between orbits .....	2.0	2.1
Length of cheliped .....	23.0	19.0
Length of chela .....	10.0	8.0
Breadth of chela, excluding spines .....	3.1	2.1
Length of dactylus .....	4.6	4.0
Length of first ambulatory leg .....	41.0	38.0
Length of propodus .....	13.5	12.0
Length of dactylus .....	8.6	8.0
Length of second ambulatory leg .....	37.0	34.0
Length of propodus .....	10.8	9.9
Length of dactylus .....	7.0	6.8
Length of fourth ambulatory leg .....	31.0	30.0
Length of propodus .....	9.0	8.0
Length of dactylus .....	5.5	6.0

*Lumbrus Verrillii* Smith, Proc. National Mus., iii, p. 415, 1881.

## Specimens examined.

Station No.	Locality.		Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
	N. lat.	W. long.				♂	♀ With eggs.
	OFF MARTHA'S VINEYARD.						
	o / "	o / "			1880.		
865	40 05 00	70 23 00	65	fine. S. M.	Sept. 4	2	0
872	40 05 39	70 23 52	86	S. G. Sh. Sponges.	Sept. 4	3	0
					1881.		
940	39 54 00	69 51 30	134	hrd. S. Sponges.	Aug. 4	1	0
949	40 03 00	70 30 00	100	yl. M.	Aug. 23	2	0
950	40 07 00	70 32 00	71	S. Sh. M.	Aug. 23	4	2

## Measurements in millimeters and hundredths of length of carapax.

	Station—									
	950	949	950	950	949	949	950	940	950	872
Sex .....	♂	♂	♂	♂	♂	♂	♀ <sup>2</sup>	♀	♀	♀
Length of carapax .....	15.7	16.7	17.3	20.5	20.9	25.0	17.2	18.5	20.4	32.8
Breadth, including lateral spines .....	19.3	20.0	20.9	25.0	26.0	31.2	20.7	22.3	25.0	41.0
Same in hundredths of length .....	123	120	121	122	124	125	120	121	123	125
Breadth, including lateral spines .....	17.0	17.9	18.0	22.0	22.0	27.2	17.8	19.5	22.0	35.3
Length of cheliped fully extended .....	39.0	42.0	43.0	55.0	59.0	.....	40.0	48.0	50.0	85.0
Same in hundredths of length of carapax .....	248	252	249	268	282	.....	233	260	245	259
Length of merus of cheliped .....	14.5	15.3	15.5	20.0	22.0	.....	14.0	16.3	18.0	32.0 <sup>a</sup>
Length of propodus of cheliped .....	19.0	20.0	20.0	26.0	28.0	.....	19.0	19.0	23.0	39.0

The specimens taken in 1881 are much smaller than the type specimens taken in 1880; none of the females are fully adult, and the largest males, though adult, are apparently not fully grown. The largest of the males differ very little from the females originally described, except that the chelipeds are proportionally a little larger. In the smaller specimens of both sexes there are rather fewer small tubercles upon the carapax, and the teeth of the lateral margins of the carapax and angles of the chelipeds are, perhaps, smaller and less lacinated proportionally, but the differences are very slight, and there is no approach to *L. Pourtalesii* as figured by A. Milne-Edwards. The accompanying table of measurements shows the slight variations in the proportions of the carapax and chelipeds better than description. In some specimens the chelipeds are slightly unequal, but in none conspicuously so, and when the difference was noticeable in the specimens measured the measurements of the cheliped were made from the larger one.

**CANCROIDA.**

**Cancer borealis** Stimpson.

Taken off Martha's Vineyard, in 1880, 1881, and 1882, at a great number of the stations, in 51 to 317 fathoms, and also in shallow water; off Delaware Bay, 1881, stations 1047 and 1049, 156 and 435 fathoms; and off Chesapeake Bay, 1880, stations 896, 897, 899, and 901, 18 to 157 fathoms. Most of the deep-water specimens taken by the Fish Commission are small, but much larger specimens, among them several from 100 to 130 millimeters in breadth of carapax, were taken in 1880, by Alexander Agassiz, on the Blake, off the Carolina coast, in 142 to 233 fathoms. The largest of these specimens were from Blake station 314; N. lat. 32° 24', N. long. 78° 44', 142 fathoms.

*Cancer irroratus* has not been taken in any of the deeper dredgings off Martha's Vineyard, although it is a common littoral and shallow-water species on the whole New England coast, and was taken by Alexander Agassiz at several stations, in 65 to 178 fathoms, off the Carolina coast, even occurring with *C. borealis* at station 314, just mentioned.

**Geryon quinquegens** Smith.

Trans. Conn. Acad., v, p. 35, pl. 9, figs. 1, 2, 1879; Proc. National Mus., iii, p. 417, 1881; Bull. Mus. Comp. Zool. Cambridge, x, p. 6, 1862.

*Specimens examined.*

Station No.	Locality.						Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.		
	N. lat.		W. long.							♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.											
	°	'	"	°	'	"			1880.			
881	39	46	30	70	54	00	325	M.	Sept. 13	1		
893	39	52	20	70	53	00	372	sft. bn. M. sml. St.	Oct. 2		1	0



## Specimens examined—Continued.

Station No.	Locality.						Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.		
	N. lat.		W. long.							♂	♀	With eggs.
OFF MARTHA'S VINETARD Continued.												
	°	'	"	°	'	"			1881.			
937	39	49	25	69	49	00	616	gn. S. M.	Aug. 4	4		
945	39	58	00	71	13	00	207	gn. M. S.	Aug. 9	1	1	0
946	39	55	30	71	14	00	247	gn. M. S.	Aug. 9		1	0
947	39	53	30	71	13	30	319	S. M.	Aug. 9	2	2	0
952	39	55	00	70	28	00	396	yl. M. S.	Aug. 23		1	0
994	39	40	00	71	30	00	368	M.	Sept. 8	1		
1029	39	57	06	69	16	00	458	yl. M. S.	Sept. 14	1		
1882.												
1124	40	01	00	68	54	00	640	fne. S. gn. M.	Aug. 26	3	2	1
1125	40	03	00	68	56	00	291	S. M.	Aug. 26			
1140	39	34	00	71	56	00	374	sft. M. P.	Sept. 8	7	2	0
1142	39	32	00	72	00	00	322	S. M. P.	Sept. 8	1	4	0
1143	39	29	00	72	01	00	452	sft. M.	Sept. 8	1		
OFF DELAWARE BAY.												
1043	38	28	00	73	22	00	435	M.	1881. Oct. 10	2	1	

In the Blake dredgings of 1880 the species was taken at the following stations:

Station.	N. lat.			W. long.			Fathoms.	Specimens.
	°	'	"	°	'	"		
325	33	35	20	76	0	0	647	1 ♂
332	35	45	30	74	48	0	263	2 ♂
334	38	20	30	73	26	40	395	2 ♂
337	38	20	8	73	23	20	740	Fragments only.
343	39	45	40	70	55	0	732	3 ♀ with eggs.
309	40	11	40	68	22	0	304	1 ♂, 1 ♀
312	39	50	45	70	11	0	466	1 ♂

This species grows to be by far the largest brachyuran in our waters. The largest specimen which I have seen is from the Blake collection of 1880, and was taken off Cape Hatteras. This specimen, measurements of the carapax of which are given in the last line of the following table of measurements, is more than six inches across the carapax and two feet across the outstretched legs. Very large individuals differ considerably from the specimens originally described. In all the large specimens the teeth of the antero-lateral margin of the carapax become reduced to angular tubercles, and in some of the larger ones the fourth tooth becomes entirely obsolete. Specimens of the same size vary much, particularly the larger ones, in the prominence of the anterolateral teeth, so that the proportional breadth of the carapax, including the teeth or spines, varies much more than the breadth excluding the teeth or spines, as shown in the table of measurements. This variation is partially due to the wearing away of the teeth, which probably takes place rapidly on account of the softness of the exoskeleton, which is much less calcareous than usual, the branchial regions of the carapax being so soft as to be readily bent or indented with the finger.

Measurements of the carapax in millimeters and lengths of carapax.

Station.	Sex.	Length of carapax.		Breadth, including teeth.		Breadth, excluding teeth.	
		Mm.	Length.	Mm.	Length.	Mm.	Length.
1142	♂	11.7	15.5 = 1.32	13.9	13.9 = 1.19		
947	♂	23.0	30.5 = 1.33	25.3	25.3 = 1.10		
952	♂	33.0	42.0 = 1.27	36.3	36.3 = 1.10		
1049	♂	35.3	44.4 = 1.26	39.0	39.0 = 1.10		
947	♂	37.0	46.5 = 1.26	42.0	42.0 = 1.14		
1140	♂	43.7	56.1 = 1.28	50.0	50.0 = 1.14		
1140	♂	46.9	61.3 = 1.31	53.0	53.0 = 1.13		
1140	♂	95.0	113.0 = 1.20	108.0	108.0 = 1.14		
994	♂	97.0	114.0 = 1.18	105.0	105.0 = 1.08		
937	♂	100.0	117.0 = 1.17	109.0	109.0 = 1.09		
1029	♂	102.0	123.0 = 1.21	116.0	116.0 = 1.14		
1140	♂	103.0	120.0 = 1.17	113.0	113.0 = 1.10		
1143	♂	103.0	124.0 = 1.20	115.0	115.0 = 1.11		
1140	♂	106.0	125.0 = 1.18	117.0	117.0 = 1.10		
937	♂	106.0	126.0 = 1.19	115.0	115.0 = 1.08		
1049	♂	114.0	132.0 = 1.16	124.0	124.0 = 1.09		
937	♂	114.0	133.0 = 1.17	125.0	125.0 = 1.09		
1140	♂	114.0	129.0 = 1.13	123.0	123.0 = 1.08		
937	♂	115.0	134.0 = 1.17	125.0	125.0 = 1.09		
1142	♀	11.2	15.5 = 1.38	12.3	12.3 = 1.10		
1049	♀	11.7	15.4 = 1.32	14.0	14.0 = 1.20		
1142	♀	11.7	15.5 = 1.32	13.9	13.9 = 1.19		
1142	♀	15.2	22.2 = 1.46	17.3	17.3 = 1.14		
1142	♀	15.6	21.1 = 1.35	17.5	17.5 = 1.12		
947	♀	37.0	48.4 = 1.31	42.0	42.0 = 1.14		
1142	♀	66.0	80.0 = 1.21	73.0	73.0 = 1.10		
946	♀	69.0	85.0 = 1.23	78.5	78.5 = 1.14		
1140	♀	95.0	110.0 = 1.16	104.0	104.0 = 1.09		
332	♀	130.0	152.5 = 1.17	144.0	144.0 = 1.11		

*Bathynectes longispina* Stimpson.

*Bathynectes longispina* Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 146, 1870 (young ♂); A. M.-Edwards, Crust. Région Mexicaine, p. 234, pl. 42, fig. 1, 1879 (young ♂); Smith, Proc. National Mus., iii, p. 418, 1881.  
*Bathynectes brevispina* Stimp., loc. cit., p. 147, 1870 (large ♀); A. M.-Edwards, op. cit., p. 235, 1879 (= Stimpson).

Specimens examined.

Station No.	Locality.						Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.		
	N. lat.			W. long.						♂	♀	With eggs.
	OFF MARTHA'S VINEYARD.											
	o	'	"	o	'	"						
871	40	02	54	70	23	40	115	fine S. M.	1880.			
872	40	05	39	70	23	52	86	S. G. Sh. sponges.	Sept. 4	2 y.	.....	
874	40	00	00	70	57	00	85	sf. M.	Sept. 4	2 y.	.....	
879	39	49	30	70	54	00	225	S. bu. M.	Sept. 13	1 y.	.....	
									Sept. 13	1 y.	.....	

## Specimens examined—Continued.

Station No.	Locality.		Depth in fathoms.	Nature of bottom.	When collected.	No. of specimens.	
	N. lat.	W. long.				♂	♀
	OFF MARTHA'S VINEYARD —Continued.						
940	39 54 00	69 51 30	134	hrd. S. sponges.	1881. Aug. 4	1	....
1038	39 58 00	70 06 00	146	S. Sh.	Sept. 21	1	....
1097	39 54 00	69 44 00	158	Fne. S.	1882. Aug. 11	1	....
1152	39 58 00	70 35 00	115	S.	Oct. 4	1	....
	OFF DELAWARE BAY.						
1043	38 39 00	73 11 00	130	S.	1881. Oct. 10	2	0

Stimpson's *B. longispina* was based on very young males, the length of carapax in his measurement of a single specimen being equal to 14.5<sup>mm</sup>, and the *B. brevispina* on a very large female in which the carapax was 49<sup>mm</sup> in length. A. Milne-Edwards's specimens were evidently small, although he apparently translates the measurements given by Stimpson and does not indicate the exact size of the specimen figured. In the series of specimens which I have examined the largest are connected with the smallest by a complete series, and though none of the specimens are as large as the type of Stimpson's *brevispina*, the larger ones, both male and female, approach it closely enough in the length of the lateral spines of the carapax, etc., to make it clear that the forms described by Stimpson belong to the same species. The accompanying table of measurements will show this quite as well as any description.

In specimens shortly after being placed in alcohol, and before the colors had changed materially from those in life, the dorsum of the carapax was dull red, the color being almost wholly upon the tubercles and granules, while the ground between was grayish, though the spines and teeth of the margin were brighter red than the general surface from a slight deposit of color between the tubercles and granules. The ventral surface of the carapax, the antennulæ, antennæ, external maxillipeds, sternum, abdomen, and the proximal portions of the ambulatory legs were pale red or tinged with red. The chelipeds were specked and slightly mottled with red; the terminal third of the digits scarlet, some what obscured at the tips by blackish. The meral and carpal segments of the first three pairs of ambulatory legs, and the meral, carpal, and propodal segments of the posterior pair were specked and mottled with scarlet; the propodal segments of the first three pairs, except a narrow band at the distal end, and the whole of the dactyli of all four pairs were bright scarlet.