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REPORTS ON THE RESULTS OF DREDGING, UNDER THE  
SUPERVISION OF ALEXANDER AGASSIZ, ON THE EAST  
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OF 1880, BY THE U. S. COAST SURVEY STEAMER "BLAKE,"  
COMMANDER J. R. BARTLETT, U. S. N., COMMANDING.

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Supts. U. S. Coast and Geodetic Survey.)

XVII. — REPORT ON THE CRUSTACEA. PART I. DECAPODA.  
BY SIDNEY I. SMITH.

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No. 1. — *Reports on the Results of Dredging, under the Supervision of ALEXANDER AGASSIZ, on the East Coast of the United States, during the Summer of 1880, by the U. S. Coast Survey Steamer "Blake,"* COMMANDER J. R. BARTLETT, U. S. N., Commanding.

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## XVII.

*Report on the Crustacea.* Part I. DECAPODA. By SIDNEY I. SMITH.

THE part of the following report relating to the Macrura was ready for the printer before Alphonse Milne-Edwards's *Description de quelques Crustacés Macroures provenant des grandes profondeurs de la Mer des Antilles* (Annales Sci. Nat., Zool., 6<sup>me</sup> série, XI. No. 4, 1881) was received, so that all the references to it have been added subsequently. The new species in this and some other recent papers of Milne-Edwards, and in Bates's recent paper on the Penæidea, are so imperfectly characterized that in several cases I have found it impossible to determine, with any approximation to certainty, whether or not they are identical with species described in the following pages. I have endeavored, however, to make the descriptions and figures of the species here described so complete, that subsequent investigators will not labor under a similar difficulty in regard to them.

Length of chela . . . . .	5.0mm.
Breadth of " . . . . .	1.7
Length of its dactylus . . . . .	2.8
" first ambulatory leg . . . . .	9.0
" dactylus . . . . .	2.0
" second ambulatory leg . . . . .	11.6
" dactylus . . . . .	3.2
" telson . . . . .	2.5
Breadth of " . . . . .	4.8

## ANOMURA.

### LITHODIDEA.

#### *Lithodes Agassizii*, sp. nov.

##### Plate I.

This species is allied to *L. maia* and *L. antarctica* in having no scale and only a single spine at the base of the antenna, and in the general form and armament of the carapax and appendages, but differs from them both conspicuously in the rostrum, which is rather short and tridentate, with the lateral spines nearly as long as the rostral spine itself. The spines upon the carapax and appendages are more numerous and much more acute than in *L. maia*, and the marginal spines of the carapax are not very much larger than the dorsal. There are only two adults, both females, in the collection, and these differ remarkably from each other, and from three very young specimens, in the number and length of the spines upon the carapax and legs.

In the larger specimen the carapax, excluding the rostrum and spines, is about nine tenths as broad as long, with a conspicuous sinus in the middle of the posterior margin. The rostrum is very short, with an acute central spine scarcely as long as the eye-stalks and with a somewhat shorter lateral spine arising either side its base and directed upward and outward. The gastric region is swollen and very high, separated from the cardiac by a very deep depression, and armed with a pair of small spines just back of the lateral spines of the rostrum, and back of these on the highest part of the region with two widely separated pairs of much larger spines, while either side there is a small spine opposite the large hepatic spine, between which and the obtusely spiniform external angle of the orbit there are two spinigerous angular prominences in the antero-lateral margin. There is a distinct notch in the antero-lateral margin at the cervical suture, but back of this the margin is regularly arcuate to the middle of the posterior margin, and is armed with about thirteen stout spines, of which the larger are about as large as the hepatic spines. The branchial region is considerably convex, and armed, in addition to those upon the margin, with about ten large spines, between which there are a consider-

able number of low obtuse spines or tubercles. The cardiac region is separated from the branchial each side by a deep sulcus, is prominent and armed with two pairs of large spines, and back of these with a single one in the middle line.

The eyes, antennulæ, antennæ, and the exposed parts of the oral appendages are very nearly as in *L. maia*. The chelipeds are nearly equal in length, but the right is much stouter than the left, are armed with comparatively few and small spines, and the digits of the chelæ are about two thirds of the entire length of the chela, slender, tapering, and strongly curved. The ambulatory legs are very long, those of the third pair being nearly three times as long as the breadth of the carapax excluding spines. The ischial, meral, and carpal segments are armed with only a very few scattered and very small spines, the meral segments in the first and second pairs are almost entirely unarmed except a few small spines or teeth along the upper edges, but the propodi, which are slender and fully as long as the corresponding meri, are armed along the edges with more numerous and very sharp but small spines. The dactyli are about half to considerably more than half the length of the corresponding propodi, slightly curved, acute, and, except near the tips, armed with small and acute spines.

The plates of the second somite of the abdomen are armed with numerous spines projecting backward and upward, and of which those upon the middle plate are longer than those upon the lateral. The plates of the succeeding somites of the abdomen are very unequally developed, the plates of the left hand side of the third, fourth, and fifth somites being greatly developed at the expense of the corresponding plates of the opposite side, so that the outer edge of the left side of the fifth segment lies beneath the bases of the cheliped and first ambulatory leg of the right side, and the small semicircular telson is beneath or a very little in front of the base of the second ambulatory leg of the right side.

In the smaller of the adult specimens (Pl. I. fig. 1) the carapax, excluding rostrum and spines, is proportionally narrower than in the larger specimen, being about eight tenths as broad as long, and the spines upon the carapax, abdomen, and appendages are much longer and more numerous, the additional spines appearing between the large ones corresponding to the spines, or in place of the tubercles, on the larger specimen. The rostral spine and the spines at its base are absolutely more than twice as long as in the larger specimen and more slender, and about the same proportion holds for all the principal spines of the carapax. The external angle of the orbit projects in a spine but little shorter than the eye-stalk, and back of it there are two nearly as large spines on the antero-lateral margin in place of the two angular prominences of the larger specimen. The large hepatic spine and the thirteen large marginal spines back of the cervical suture are most of them but little smaller than the rostral spine, are directed more upward than outward, and there are nearly as many more additional smaller spines alternating with the larger. There is a conspicuous additional spine in the middle of the gastric region, and numerous additional small spines on other parts of the carapax.

The chelipeds and ambulatory legs have about the same proportions as in the larger specimen, but are armed with very numerous acute spines, many of which are of large size. The spines upon the second somite of the abdomen are more numerous, and the larger ones much longer and more slender than in the larger specimen.

The small specimens are all immature, with the carapax excluding the rostrum and spines less than 13 mm. in length, and differ so much from the adults that they might readily be mistaken for a distinct species. These small specimens differ considerably in size, but are all essentially alike. The smallest and most perfect one is from the U. S. Fish Commission dredgings off Martha's Vineyard. In this specimen (Pl. I. figs. 2, 2<sup>a</sup>) the carapax excluding the rostrum and spines is only 12.6 mm. in length and scarcely more than seven tenths as broad as long, but all three of the rostral spines and several spines of the carapax proper are more than half as long as the carapax. The spines are much fewer in number than in either of the adult specimens, very slender and acute, and those at the base of the rostrum are just about as large as the rostrum itself. The gastric region is proportionally very much larger than in the adults, but is high and separated from the cardiac region by a deep sulcus, as in them, and is armed with six slender spines, — two pairs on the highest part of the region, of which the anterior pair are almost as long as the rostrum, but the posterior considerably shorter, and a still smaller lateral spine each side. There are two pairs of slender spines on the anterior part of the cardiac region, the anterior a little longer and the posterior a little shorter than the posterior gastric spines. The single hepatic spine each side is nearly as long as the rostrum. The external angle of the orbit projects forward in a long and slender spine, back of which are two smaller spines on the antero-lateral margin. There are about twelve slender spines on the lateral and posterior margin back of the cervical suture each side, but they are all small compared with the other spines of the carapax and about half of them are inconspicuous, and above these on either branchial region there are six much larger spines, of which two near the middle of the region are as long as the posterior gastric, but the others considerably shorter.

The eye-stalks and eyes are small and proportionally but little larger than in the adult, but there are two or three sharp spines projecting in front over the eye in place of some inconspicuous tubercles in the adults. The antennulæ, antennæ, and the exposed parts of the oral appendages, are nearly as in the adults.

The chelipeds are nearly as unequal as in the adults, and are armed with very much longer and more slender spines, several of those upon the distal part of the merus and upon the carpus being longer than the carpus itself. The ambulatory legs have about the same proportions as in the adults, but the spines with which they are armed are fully as long as those upon the chelipeds, the longer ones, as in the chelipeds, being upon the distal parts of the meri and upon the carpi.

The abdomen is *symmetrical*. The second somite is made up of three calci-

fed and spiny plates, nearly as in the adult female. The third, fourth, and fifth somites are soft, scarcely at all calcified, and show no distinct division into somites. The sixth is small and sunken for its whole length in the proximal somites, while the seventh is still smaller and rounded at the extremity.

Four of the five specimens seen give the following measurements :—

Station . . . . .	1029	305	329	326
Sex . . . . .	Young.	Young.	♀	♀
Length of carapax including rostrum and posterior spines . . . . .	17.5	25+	115	139
Length of carapax excluding rostrum and posterior spines . . . . .	9.1	12.6	90	123
Breadth of carapax between tips of hepatic spines, . . . . .	13.5	18+	57	64
“ “ “ “ branchial spines, . . . . .	13.0	18+	87	117
Greatest breadth of carapax excluding spines . . . . .	6.6	9.0	77	110
Length of rostrum . . . . .	7.3	9+	17	8
“ spines at base of rostrum . . . . .	7.4	11.5	16	7
“ anterior gastric spines . . . . .	7.0	10.5	12	5
“ “ cardiac . . . . .	6.3	8.0	10	5
“ right cheliped . . . . .	15.0	19.0	126	171
“ “ chela . . . . .	6.1	8.5	55	66
Breadth of “ “ . . . . .	1.9	2.5	18	25
Length of dactylus of right chela . . . . .	3.5	5.0	35	44
“ left cheliped . . . . .	15.0	20.0	126	167
“ “ chela . . . . .	6.0	8.8	50	62
Breadth of “ “ . . . . .	1.5	1.9	14	19
Length of dactylus of left chela . . . . .	3.8	5.5	36	44+
“ first ambulatory leg . . . . .	18.5	30.0	220	270
“ second “ “ . . . . .	19.5	31.5	245	310
“ third “ “ . . . . .	19.5	32.0	260	320
Greatest expanse of ambulatory legs . . . . .	43.0	65.0	560	720

Station.	N. Lat.	W. Long.	Fathoms.
305	41° 33' 15"	65° 51' 25"	810
326	33° 42' 15"	76° 0' 50"	464
329	34° 39' 40"	75° 14' 40"	603

Also taken by the U. S. Fish Commission, off Martha's Vineyard, in 1881. Stations 1028 and 1029, 410 and 458 fathoms; one young specimen in each case.



## PAGURIDEA.

## PAGURIDÆ.

*Eupagurus Krøyeri* STIMPSON.

*Eupagurus Krøyeri* STIMPSON, Ann. Lyceum Nat. Hist. New York, VII. p. 89 (43), 1859.

SMITH, Trans. Conn. Acad., III. p. 28, 1874; Ibid., V. p. 48; Proc. National Mus., Washington, III. p. 428, 1881.

*Eupagurus pubescens* KRØYER, in Gaimard, Voyages en Scandinavie, Pl. II. fig. 1, 1849 (*non* Krøyer, Naturh. Tidssk., II. p. 251, 1839).

Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
303	41° 34' 30"	65° 54' 30"	306	6
306	41° 32' 50"	65° 55' 0"	524	4
311	39° 59' 30"	70° 12' 0"	143	2 in <i>Epizoanthus</i> .

Nearly all the specimens I have seen from deep water off the Southern coast of New England are small, and the great majority of them were inhabiting carcinecia overgrown by or composed of *Epizoanthus Americanus* Verrill.

*Eupagurus politus*, sp. nov.

## Plate II. Fig. 5.

The carapax is not suddenly narrowed at the bases of the antennæ, where the breadth is equal to the length in front of the cervical suture, and not rostrated, the median lobe of the front being broadly rounded and not projecting as far forward as the external angles of the orbital sinuses, which are acute and each usually armed with a short spine.

The eye-stalks, including the eyes, are nearly four fifths as long as the breadth of the carapax in front, stout, and expanded at the very large black eyes, which are terminal, not oblique, compressed vertically, and broader than half the length of the stalks. The ophthalmic scales are small, narrow, and spiniform at the tips.

The peduncle of the antenna is about as long as the breadth of the carapax in front, and the ultimate segment about a third longer than the penultimate. The upper flagellum is much longer than the ultimate segment of the peduncle, while the lower is only about half as long as the upper, slender, and composed of ten to twelve segments. The peduncle of the antenna reaches slightly beyond the eye. The acicle is slender, slightly curved, and reaches to the tip of the peduncle, and inside its base there is a minute tooth, while outside there is a straight spine toothed or spined along its inner edge, acute at the tip and half as long as the acicle itself. The flagellum is nearly naked, and about three times as long as the carapax.

The exposed parts of the oral appendages are very nearly as in *E. bernhardus*.

The chelipeds are longer, much narrower, and more nearly equal in size than in *E. bernhardus*, and, as in that species, are almost entirely naked, but beset with numerous tubercles and low spines. The right cheliped is about as long as the body from the front of the carapax to the tip of the abdomen. The merus and carpus are subequal in length, while the chela is about once and a half as long as the carpus. The carpus and chela are rounded above and armed with numerous tubercles, which are smaller and more crowded on the chela than on the carpus, but the surface between the tubercles is smooth and polished. The dorsal surface of the carpus is limited along the inner edge by a sharp angle armed with a double line of tubercles, while the outer edge is rounded. The chela is very little wider than the carpus, and is narrowed from near the base to the tips of the digits, and both edges are rounded. The digits are rather slender, about half as long as the entire chela, slightly gaping, with acute and strongly incurved chitinous tips, and the prehensile edges armed with a very few obtuse tuberculiform teeth. The left chela is much more slender than the right, but reaches to or a little beyond the base of its dactylus. The carpus is slender, higher than broad, only slightly expanded distally, and with the narrow dorsal surface flattened and margined either side with a single line of spiniform tubercles. The chela is about a third longer than the carpus, slender, about two and a half times as long as broad, and the dactylus about two thirds the entire length. The dorsal and outer surface is tuberculose, and a low obtuse ridge extends from near the middle of the base along the propodal digit, which tapers from the base to the tip, while the dactylus is smooth except for a few fascicles of setæ, more slender than the propodal digit, and tapered only near the tip. The chitinous tips of the digits are slender, acute, and strongly incurved, and the prehensile edges are sharp, and armed with a closely set series of slender spines or setæ.

The ambulatory legs reach considerably beyond the right cheliped, and the second pair reach to the tips of the first pair. In both pairs the meri and propodi are approximately equal in length and longer than the carpi, while the dactyli are about once and a half as long as the propodi, slender, strongly curved, and distally strongly twisted. The two posterior pairs of thoracic legs and the abdominal appendages are very nearly as in *E. bernhardus*.

In life the general color of the exposed parts is pale orange, the tips of the chelæ and of the ambulatory legs white, the eyes black.

The eggs are very large, and few in number as compared with the ordinary species of the genus, being 1.0 to 1.1 mm. in diameter in alcoholic specimens, while in *E. bernhardus* they are only 0.45 to 0.50 mm. in diameter.

Three specimens give the following measurements :—

Station	306	309	309
Sex	♀	♂	♂
Length from front of carapax to tip of abdomen	25.0 mm.	40.0 mm.	50.0 mm.
“ of carapax along median line	10.0	16.0	21.0

Breadth of carapax in front . . . . .	5.5 mm.	8.6 mm.	11.0 mm.
Length of eye-stalks . . . . .	4.7	6.2	7.8
Greatest diameter of eye . . . . .	2.7	3.5	4.1
Length of right cheliped . . . . .	30.0	40.0	56.0
"    carpus . . . . .	7.3	11.3	14.5
"    chela . . . . .	12.0	16.0	22.7
Breadth of chela . . . . .	5.8	8.3	11.0
Length of dactylus . . . . .	6.1	9.1	11.9
"    left cheliped . . . . .	25.0	37.0	48.0
"    carpus . . . . .	6.1	10.0	12.0
"    chela . . . . .	9.2	13.5	17.5
Breadth of chela . . . . .	4.0	5.8	7.5
Length of dactylus . . . . .	5.8	8.8	11.2
"    first ambulatory leg, right side . . . . .	36.0		67.0
"    propodus . . . . .	7.6		14.5
"    dactylus . . . . .	11.5		22.0
"    second ambulatory leg, right side . . . . .	38.0	54.0	73.0
"    propodus . . . . .	8.8	12.0	16.0
"    dactylus . . . . .	13.0	17.0	23.0

Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
309	40° 11' 40"	68° 22' 0"	304	3
310	39° 59' 16"	70° 18' 30"	260	2
336	38° 21' 50"	73° 32' 0"	197	5

It has also been taken, and in great abundance, by the U. S. Fish Commission, off Martha's Vineyard and off the Capes of the Delaware, in 65 to 365 fathoms, and is the species which I have referred to, in Proc. National Mus., Washington, III. p. 428, 1881, as "*Ewapagurus*, sp."

#### CATAPAGURUS A. M.-EDWARDS.

*Catapagurus* A. M.-EDWARDS, Bu!l. Mus. Comp. Zoöl., VIII. p. 46, 1880 (Dec. 29).  
*Hemipagurus* SMITH, Ann. Mag. Nat. Hist., 5th ser., VII. p. 143, Feb. 1881; Proc. National Mus., Washington, III. p. 422, 1881.

I have no doubt that my genus is synonymous with that of Milne-Edwards as indicated above, but I am quite unable to tell from the description alone whether one of my species is synonymous with the single species, *C. Sharreri*, described by Milne-Edwards. *C. Sharreri* agrees more nearly in size with *H. socialis* than *H. gracilis*, but will very likely prove to be distinct from either, and until this can be determined satisfactorily, it seems best to refer both my species to *Catapagurus*.

The genus differs from *Spiropagurus* Stimpson in the form and position of the sexual appendage (formed by the permanent extrusion of a portion of the

vas deferens) of the last thoracic somite of the male, which arises from the *right coxa*, and is curved in one plane round the right side of the abdomen; while in *Spiropagurus* the appendage arises from the *left coxa*, and is spirally curved.

The carapax is short and broad, and the anterior margin is obtuse, and does not wholly cover the ophthalmic somite between the eyes. The portion in front of the cervical suture is indurated, but all the rest of the carapax is very soft and membranaceous, without any distinct induration along the cardio-branchial suture. The ophthalmic scales are well developed. The eye-stalks are short and the cornea expanded. The antennulæ, antennæ, and oral appendages are similar to those in *Eupagurus*; the exopods of all the maxillipeds are, however, proportionally much longer than in that genus. There are eleven pairs of phyllobranchiæ, arranged as in *Eupagurus bernhardus*, but the two anterior pairs connected with the external maxillipeds are very small, and composed of a few flattened papillæ. The chelipeds are slender and unequal. The first and second pairs of ambulatory legs are long, and have slender, compressed, and ciliated or setigerous dactyli; the third pair are only imperfectly subcheliform.

In the male, the second, third, and fourth somites of the abdomen bear small appendages upon the left side, as in most of the allied genera, but the fifth somite is destitute of an appendage; in the female, the appendages of the second, third, and fourth somites are biramous and ovigerous, and there is usually a rudimentary uniramous appendage upon the fifth somite, as in the allied genera.\* The uropods are very nearly or quite symmetrical, the rami of the right appendage being very nearly or quite as large as that of the left. The telson is bilobed at the extremity.

As might be expected, the unsymmetrical development of the external sexual appendages of the males of the two species here described corresponds to a like unsymmetrical development of the internal sexual organs, and the following incomplete observations, made on ordinary alcoholic specimens in which the abdominal viscera are not sufficiently well preserved for a full anatomical or histological investigation, appear of sufficient importance to notice here, especially as nothing appears to be known of the internal structure of either species of *Spiropagurus*.

The right testis and vas deferens are much larger than the left. The lower part of the right vas deferens, in all the adults examined, is much more dilated than the left, and is filled (as is also the external part of the duct) with very large spermatophores of peculiar form. The left vas deferens is slender, much as in *Eupagurus bernhardus*, terminates in a small opening in the left coxa of the last thoracic somite, as in ordinary Paguroids, and contains spermatophores somewhat similar in form and size to those of *Eupagurus bernhardus*. In alco-

\* In many of the best preserved and most perfect females of *C. socialis* examined I can find no trace whatever of this appendage of the fifth somite, while in others it is very easily seen.

holic specimens of *C. socialis* the spermatophores from the left vas deferens are approximately 0.16 mm. long and 0.035 mm. broad, with a slender neck about a third of the entire length, and a very thin and delicate lamella for a base. The spermatophores from the right vas deferens are over 2 mm. in total length; the body itself is oval, approximately 0.40 mm. long and a third as broad; at one end it terminates in a very long and slender process, two or three times as long as the body; at the other end there is a similar but slightly stouter process, a little longer than the body, and expanding at its tip into a broad and very delicate lamella, approximately 0.35 mm. long by 0.20 mm. broad.

### *Catapagurus socialis.*

*Hemipagurus socialis* SMITH, Proc. National Mus., Washington, III. p. 423, 1881.

*Male.*—The part of the carapax in front of the cervical suture is about a fifth broader than long, with the sides nearly parallel; the front margin sinuous, curving slightly forward in the middle and each side between the eye-stalks and the peduncles of the antennæ, the middle lobe thus formed being scarcely more prominent than the lateral lobes, each of which is armed with a minute spine, projecting forward just inside of the peduncle of the antenna; between these spines the edge of the front is upturned in a sharp marginal carina, which terminates each side in the spines themselves. The dorsal surface of this part of the carapax is convex in both directions, the protogastric lobes are protuberant and well marked, and nearly the whole surface is roughened and more or less tuberculose, with transverse scabrous elevations, which give rise to numerous hairs. The branchial regions are slightly swollen, so that the breadth of the carapax posteriorly is greater than in front. All the portions back of the cervical suture are smooth and membranaceous.

The eye-stalks are about half as long as the carapax in front of the cervical suture, flattened and expanded distally, where they are about three fourths as broad as long. The eye itself is black, and the cornea extends round either side so as to be crescent-shaped as seen from above. The ophthalmic scales are less than half as long as the eye-stalks, narrow, triangular, and acute.

The first and second segments of the peduncle of the antennula are subequal in length, and the ultimate segment nearly once and a half as long as the penultimate, and almost as long as the eye-stalks. The superior or major flagellum is nearly as long as the ultimate segment of the peduncle; the thick, ciliated basal portion consists of about fourteen segments, and the slender terminal portion, which is nearly once and a half as long as the basal, of about five very slender and subequal segments. The minor flagellum is about two thirds as long as the major, and composed of about eight segments. The peduncle of the antenna reaches by the eye nearly the length of the last segment, which is about as long as the greatest diameter of the eye. The acicle is slender, acute, and slightly longer than the last segment of the peduncle. The flagellum reaches beyond the tips of the ambulatory legs.

The chelipeds are slender and very nearly equal in length, but the right is very much stouter than the left. In the right cheliped the merus and carpus are subequal in length, together nearly twice as long as the carapax, and both are rough and obscurely spinous, the spines being most conspicuous on the edges of the upper surface of the carpus, which is fully three times as long as broad, flattened above, and angular, but not distinctly carinated along either side. The chela is not far from twice as long as the carpus, nearly three times as long as broad, compressed vertically, evenly rounded, smooth and nearly naked above, but clothed with long, soft hair beneath; the digits are longitudinal, not gaping, and the dactylus is about two thirds as long as the basal portion of the propodus, and its prehensile edge is armed with a broad tooth near the middle. In the left cheliped the merus and carpus are similar to those of the right, but much more slender and a little longer; the carpus is about six times as long as broad, and the edges of the upper surface are rather more sharply angular than in the right; the chela is shorter than the right, but very slender, smooth, and nearly naked; the digits are similar, longitudinal, slightly longer than the basal portion of the chela, compressed, slightly curved downward toward the tips, but the prehensile edges straight and very minutely serrate.

The ambulatory legs are very nearly equal in length, and slightly overreach the chelipeds; the merus is about as long as the left chela, and roughened with small spines on the upper and under edges; the propodus is shorter than the merus, compressed, smooth, and ciliated along the edges; the dactylus is a little longer in the second than in the first pair, but in both shorter than the propodus, very strongly compressed, very slightly twisted, about ten times as long as broad, and thickly ciliated along both edges, except for a short distance along the lower edge near the tip.

The *female* is smaller than the male, and has proportionally shorter ambulatory legs, and chelipeds very much shorter and much more alike. The right chela is only about a third longer than the carpus, little more than a third as broad as long, and the digits are slender and nearly as long as the basal portion. The left cheliped is proportionally stouter than in the male, and thus approximates to the right; the chela itself is scarcely more than a third longer than the carpus. The ambulatory legs overreach the chelipeds by nearly or quite the full length of the dactyli, but all the segments have very nearly the same relative proportions as in the male.

The eggs are few in number and very large, being about a millimeter in diameter in alcoholic specimens.

In young males the chelipeds and ambulatory legs are similar to those of the female.

Two specimens from Station 314 give the following measurements:—

Sex . . . . .	♂	♀
Length from front of carapax to tip of abdomen . . . . .	18.0 mm.	15.0 mm.
“ of eye-stalks . . . . .	2.8	2.5

Greatest diameter of eye . . . . .	2.0 mm.	1.6 mm.
Length of right cheliped . . . . .	30.0	15.0
"    chela . . . . .	11.5	5.2
Breadth of propodus . . . . .	4.4	1.9
Length of left cheliped . . . . .	26.0	14.5
"    chela . . . . .	9.5	5.0
Breadth of propodus . . . . .	2.0	1.2
Length of first ambulatory leg, right side . . . . .	32.0	19.5

The carcinœcium is very rarely a naked gastropod shell; in most of the specimens seen it is either built up by a colony of *Epizoanthus Americanus*, or is made up in a somewhat similar way by the single polyp of *Adamsia sociabilis* Verrill, the base secreted by the *Adamsia* being expanded on either side and united below so as to enclose the crab in a broadly conical cavity, with only a slight spiral curvature. The nuclei about which these polypean carcinœcia are formed are of various origins; the majority of the *Adamsia* carcinœcia appear to have been built upon fragments of pteropod shells, in some cases upon bits of worm-tubes, in one case upon the entire shell of a *Cadulus*, the greater part of the shell being left protruding from the base of the polyp. In the carcinœcia formed by *Epizoanthus* the nucleus seems usually to have been absorbed, so that nothing is left distinguishable from the colony of polyps itself. In some cases the *Adamsia* has completely overgrown a small *Epizoanthus* carcinœcium, so that when the *Adamsia* is removed a perfect *Epizoanthus* carcinœcium is found beneath as a nucleus. The carcinœcium of this species, and of *C. gracilis* as well, does not cover the animal to the same extent as is usual in the species of *Eupagurus*, the anterior part of the carapax being apparently constantly exposed, and its induration fitting the animal for such exposure. The *Epizoanthus* carcinœcia are, however, very often disproportionately large for the crabs inhabiting them, having grown out either side until they are several times broader than long. In spite of these often enormous carcinœcia, both species of the genus probably swim about by means of the ciliated dactyli of the ambulatory legs, as *Spiropagurus spiriger* has been observed to do by Stimpson (Proc. Acad. Nat. Sci. Philadelphia, 1858, p. 248 (86), 1859).

Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
311	39° 59' 30"	70° 12' 0"	143	6
313	32° 31' 50"	78° 45' 0"	75	2
314	32° 24' 0"	78° 44' 0"	142	1000±
315	32° 18' 20"	78° 43' 0"	225	4
316	32° 7' 0"	78° 37' 30"	229	1
327	34° 0' 30"	76° 10' 30"	178	8
344	40° 1' 0"	70° 58' 0"	129	40±
345	40° 10' 15"	71° 4' 30"	71	5

This species was taken in great abundance, in 51 to 250 fathoms, off Martha's Vineyard, by the U. S. Fish Commission, in 1880 and 1881.

*Catapagurus gracilis.*

*Hemipagurus gracilis* SMITH, Proc. National Mus., Washington, III. p. 426, 1881.

This is a smaller and more slender species than the last, and is readily distinguished from it by the smooth carapax, the longer and more slender eye-stalks, the long and acicular ophthalmic scales, and by the narrow dactyli of the ambulatory legs being longer than the corresponding propodi.

*Male.* — The carapax in front of the cervical suture is flat, smooth, nearly naked, and scarcely at all areolated. The anterior margin is rather more strongly sinuous than in *C. socialis*, and the lateral lobes are slightly angular and each is tipped with a minute spine, as in that species, but the marginal carina between these spines is much less distinct.

The eye-stalks are more than half as long as the carapax in front of the cervical suture, flattened and expanded distally, but only about half as broad as long. The eyes themselves are as in *C. socialis*. The ophthalmic scales are more than half as long as the eye-stalks, and are acicular and regularly acute.

The ultimate segment of the peduncle of the antennula is as long as the eye-stalk and nearly twice as long as the penultimate segment. The major flagellum is as long as the ultimate segment of the peduncle, the basal portion of about eight segments, the terminal portion three times as long and of about five subequal and very slender segments. The minor flagellum is about half as long as the major, and composed of about six segments. The antennæ are very much as in *C. socialis*.

The chelipeds are nearly equal in length and similar to those of *C. socialis*, but in the right cheliped the inner edge of the upper surface of the carpus is angular, and armed with a regular series of twelve to eighteen small spines, while the outer edge is rounded and unarmed; and the prehensile edge of the dactylus is armed with two irregular and indistinct teeth, corresponding with two irregular emarginations in the edge of the digital portion of the propodus. In the left cheliped the outer edge of the upper surface of the carpus is slightly rounded and scarcely at all spinulose, while the inner edge is armed as in the right cheliped. The left chela differs from that of *C. socialis*, in having the digital portion of the propodus considerably stouter than the dactylus, particularly toward the base.

The ambulatory legs are proportionally as long as in *C. socialis*, but more slender; in both pairs the dactylus is longer than the propodus, curved slightly near the tip, about sixteen times as long as broad, sparsely ciliated along the upper edge, and very slightly setigerous along the lower.

The *female* differs from the male as in *C. socialis*, but to a very much less extent, the chelipeds and ambulatory legs being only a little shorter than in the male, and the right cheliped only a little less stout and a little more like the left than in the male.

The eggs are few and nearly as large as in *C. socialis*.

The carcinoecia are similar to those of the last species.



Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
344	40° 1' 0"	70° 58' 0"	129	1
345	40° 10' 15"	71° 4' 30"	71	3

Also taken by the U. S. Fish Commission, in 51 to 155 fathoms, off Martha's Vineyard, in 1880 and 1881.

Two specimens from Fish Commission Station 874, 85 fathoms, give the following measurements :—

Sex	♂	♀
Length, from front of carapax to tip of abdomen	12.0 mm.	11.2 mm.
Length of eye-stalk	1.6	1.5
Greatest diameter of eye	1.1	0.9
Length of right cheliped	15.2	11.2
“ chela	6.0	4.4
Breadth of chela	2.4	1.8
Length of left cheliped	13.6	10.0
“ chela	5.0	3.6
Breadth of chela	1.1	1.0
Length of first ambulatory leg, right side	16.1	12.8

#### PARAPAGURIDÆ.

The genus *Parapagurus* differs so widely from all other Paguridea in possessing trichobranchiæ instead of phyllobranchiæ, that it ought, undoubtedly, to be separated as a distinct family on this character alone.

#### *Parapagurus pilosimanus* SMITH.\*

Trans. Conn. Acad., V. p. 51, 1879 ; Proc. National Mus., Washington, III. p. 428, 1881.

#### Plate II. Figs. 4-4<sup>a</sup>.

Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
306	41° 32' 50"	65° 55' 0"	524	1 young.
309	40° 11' 40"	68° 22' 0"	304	4
322	33° 10' 0"	76° 32' 15"	362	2 ♂

This species has also been taken, and in considerable abundance, by the U. S. Fish Commission, in deep water off Martha's Vineyard. At Station

\* A. Milne-Edwards in a recent report on the explorations of the "Travailleur," in the Comptes-Rendus of the Academy of Sciences, Paris, Dec. 1881 (Ann. Mag. Nat. Hist., 5th ser., IX. p. 42, 1882), states that his *Eupagurus Jacobii* from the "Blake" dredgings (Bull. Mus. Comp. Zool., VIII. p. 42, 1880) is identical with this species, of which specimens were sent to him last June.

947, 312 fathoms, three hundred and ninety-three specimens, nearly all adults and many of them very large, were taken at one haul of the trawl.

The carcinoecia of all the specimens seen are formed by colonies of *Epizoanthus paguriphilus* Verrill, which at first invest spiral shells which are finally absorbed by the basal cœnenchyma of the growing polyps.

## GALATHEIDÆ.

*Galacantha rostrata* A. M.-EDWARDS.

Bull. Mus. Comp. Zoöl., VIII. p. 52, 1880.

Plate IX. Figs. 2, 2<sup>a</sup>.

Station 340, N. Lat. 39° 25' 30", W. Long. 70° 58' 40", 1394 fathoms; and Station 341, N. Lat. 39° 38' 20", W. Long. 70° 56', 1241 fathoms; two males, which give the following measurements:—

Station . . . . .	341	340
Sex . . . . .	♂	♂
Length from tip of rostrum to tip of telson . . . . .	75.0 mm.	62.0 mm.
“ of carapax to bases of rostral spines . . . . .	34.5	28.8
Greatest breadth excluding spines . . . . .	27.0	23.2
“ “ including “ . . . . .	31.5	26.7
Length of rostrum above its lateral spines . . . . .	7.8	8.0
“ gastric spine . . . . .	7.7	7.8
Greatest breadth of abdomen, third somite . . . . .	24.2	24.0
“ diameter of eye . . . . .	3.0	2.4
Length of cheliped . . . . .	53.5	44.0
“ chela . . . . .	21.5	16.7
“ dactylus . . . . .	13.0	10.3
“ first ambulatory leg . . . . .	65.0	53.0
“ posterior leg . . . . .	39.0	31.0

## MUNIDOPSIS WHITEAVES.

*Munidopsis* WHITEAVES, Amer. Jour. Sci., 3d ser., VII. p. 212, 1874.

*Galathodes* A. M.-EDWARDS, Bull. Mus. Comp. Zoöl., VIII. p. 53, 1880.

*Munidopsis curvirostra* WHITEAVES.

Amer. Jour. Sci., 3d ser., VII. p. 212, 1874; Report on further Deep-sea Dredging Operations in the Gulf of St. Lawrence [in 1873], p. 17, 1874.

Plate VIII. Figs. 2, 3, 3<sup>a</sup>.

Station 325, N. Lat. 33° 35' 20", W. Long. 76°, 647 fathoms, one small male, which gives the following measurements:—

Length from tip of rostrum to tip of telson . . . . .	16.0mm.
“ of carapax . . . . .	10.4
Greatest breadth of carapax . . . . .	5.2
Diameter of eye . . . . .	0.8
Length of cheliped . . . . .	15.0
“ chela . . . . .	5.9

I have compared this specimen with the original specimens from the Gulf of St. Lawrence described by Whiteaves, and find no differences of any importance whatever. The species is perhaps identical with some one of the ten species of *Galathodes* described by Milne-Edwards, but with which, if with any, it seems impossible to determine from the descriptions alone.

### Munida, sp. indet.

*Munida Caribæa*? SMITH, Proc. National Mus., Washington, III. p. 428, 1881.

#### Plate X. Fig. 1.

Station.	N. Lat.	W. Long.	Fathoms.	Specimens.
311	39° 59' 30"	70° 12' 0"	143	1
314	32° 24' 0"	78° 44' 0"	142	50±
315	32° 18' 20"	78° 43' 0"	225	1
333	35° 45' 25"	74° 50' 30"	65	100±
335	38° 22' 25"	73° 33' 40"	89	31
336	38° 21' 50"	73° 32' 0"	197	6
344	40° 1' 0"	70° 58' 0"	129	1

Also taken in great abundance in the U. S. Fish Commission dredgings off Martha's Vineyard, in 1880 and 1881, in 65 to 200 fathoms.

This species will probably prove identical with one of the eleven species enumerated by A. Milne-Edwards in his report on the "Blake" crustacea from the West Indies, but with which one it is not possible to tell from the descriptions alone. Before the publication of Milne-Edwards's report I referred this species doubtfully, as indicated above, to *Munida Caribæa* of Stimpson, described from a single very small specimen, but it is probably not the species referred to the *Caribæa* by Milne-Edwards. It is now impossible to tell with certainty to which of the numerous Caribbean species Stimpson's really belongs, but it is perhaps best to restrict it to the one called *Caribæa* by Milne-Edwards, whatever that may be, although he gives no description whatever.

## EXPLANATION OF THE PLATES.

All the figures on Plates I., III., and V.; Figs. 1 to 4<sup>b</sup>, 5, Plate II.; Fig. 1, Plate IV.; Figs. 1, 2, 3, Plate VI.; Figs. 1, 1<sup>a</sup>, 1<sup>b</sup>, 2, 2<sup>a</sup>, 4, 4<sup>a</sup>, 5, 5<sup>a</sup>, Plate VII.; Figs. 1, 1<sup>a</sup>, 1<sup>b</sup>, 2, Plate VIII.; Figs. 1, 2, 2<sup>a</sup>, Plate IX.; Figs. 1, 2, Plate X.; Figs. 4, 5, 8, Plate XI.; Fig. 1, Plate XIII.; and Fig. 5, Plate XVI., were drawn by J. H. Emerton. All the other figures were drawn by the author.

## PLATE I.

- Fig. 1. *Lithodes Agassizii*. Dorsal view of female from Station 329, half natural size.
- " 2. Dorsal view of a young specimen taken off Martha's Vineyard by the U. S. Fish Commission, Station 1029, enlarged two diameters.
- " 2<sup>a</sup>. Lateral view of the carapax of the same specimen, enlarged two diameters.

## PLATE II.

- Fig. 1. *Cyclodorippe nitida* A. Milne-Edwards. Dorsal view of female, enlarged two diameters.
- " 1<sup>a</sup>. Front view of same specimen, enlarged four diameters.
- " 1<sup>b</sup>. Ventral view of same specimen, the distal portions of the legs omitted, enlarged four diameters.
- " 2. *Amathia Agassizii*. Dorsal view of the carapax of the male from Station 319, natural size.
- " 3. Dorsal view of a young specimen from Station 317, enlarged two diameters.
- " 4. *Parapagurus pilosimanus* Smith. Lateral view of the left side of the originally described male specimen, taken on a trawl line, off Nova Scotia, half natural size.
- " 4<sup>a</sup>. Dorsal view of the chelipeds of the same specimen, half natural size.
- " 4<sup>b</sup>. Dorsal view of the carapax and anterior appendages of the same specimen, natural size.
- " 4<sup>c</sup>. Appendage of the right side of the first somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.
- " 4<sup>d</sup>. Appendage of the right side of the second somite of the abdomen of the same specimen, seen from behind, enlarged four diameters.
- " 5. *Eupagurus politus*. Lateral view of left side of male, dredged by the U. S. Fish Commission off Martha's Vineyard, Station 922, natural size.

## PLATE III.

Fig. 1. *Pentacheles sculptus* Smith. Dorsal view of female, from Station 326, natural size.

## PLATE IV.

- Fig. 1. *Pentacheles sculptus* Smith. Ventral view of the cephalo-thorax of the specimen figured on the last plate, the distal portions of the appendages omitted, natural size; *a*, tubular process containing the canal of the green gland; *b*, process of the ophthalmic lobe.
- " 2. Mandible and lobe of metastome of the right side, as seen in place from below, from the male from Station 326, enlarged about two diameters.
- " 2<sup>a</sup>. Palpus of the same mandible, seen from below, enlarged about two diameters.
- " 3. First maxilla of the right side of the same specimen, seen from below, enlarged about two diameters.
- " 4. Second maxilla of the right side of the same specimen, seen from below, enlarged about two diameters.
- " 5. Diagrammatic outline of the anterior portion of the first maxilliped of the right side of the same specimen, as seen in place from below, enlarged about two diameters; *a*, proximal, and *a'*, distal lobe of the protopod; *b*, base of endopod, the terminal portion being entirely hidden by the exopod; *c*, basal portion of the exopod; *d*, *e*, terminal lobes of the exopod.
- " 5<sup>a</sup>. The same maxilliped removed from the animal, slightly compressed and seen from a little one side and below, enlarged about two diameters; *a*, *a'*, *b*, *c*, *d*, same as in last figure; *f*, *g*, epipodal lamella.
- " 5<sup>b</sup>. Terminal portion of the same maxilliped, seen from above under slight pressure, enlarged about two diameters; lettering the same as in figures 5, 5<sup>a</sup>.
- " 6. Second maxilliped of the right side of the same specimen, enlarged about two diameters.
- " 7. External maxilliped of the right side of the same specimen, enlarged two diameters; *a*, rudimentary epipod.
- " 8. Chela of the right great cheliped of the female figured on Plate III., natural size.
- " 9. Chela of the right leg of the second pair of the male from Station 326, enlarged about two diameters.
- " 10. Rudimentary chela of the right leg of the third pair of the same specimen, enlarged about two diameters.
- " 11. Rudimentary chela of the right leg of the fifth pair of the same specimen, enlarged about two diameters.
- " 12. Rudimentary chela of the right leg of the fifth pair of the female from Station 898, U. S. Fish Commission, enlarged about two diameters.
- " 13. Appendage of the left side of the first somite of the abdomen of the female figured on Plate III., enlarged about two diameters.
- " 14. Appendage of the left side of the first somite of the male from Station 326, enlarged about two diameters.

## PLATE V.

- Fig. 1. *Rhachocaris longirostra*. Lateral view of female from Station 330, enlarged two diameters.  
 " 2. *Rhachocaris Agassizii*. Lateral view of female from Station 326, natural size.  
 " 3. *Rhachocaris sculpta*. Lateral view of female from Station 339, natural size.

## PLATE VI.

- Fig. 1. *Rhachocaris longirostra*. Dorsal view of carapax and anterior appendages of the specimen figured on Plate V., enlarged two diameters.  
 " 2. *Rhachocaris Agassizii*. Dorsal view of the specimen figured on Plate V., natural size.  
 " 3. *Rhachocaris sculpta*. Dorsal view of the specimen figured on Plate V., natural size.  
 " 3<sup>a</sup>. First maxilla of the right side of the same specimen enlarged six diameters.  
 " 3<sup>b</sup>. Second maxilla of the right side of the same specimen, enlarged four diameters.  
 " 3<sup>c</sup>. First maxilliped of the right side of the same specimen, enlarged six diameters.  
 " 3<sup>d</sup>. Second maxilliped of the right side of the same specimen, enlarged four diameters.

## PLATE VII.

- Fig. 1. *Pontophilus brevisrostris* Smith. Dorsal view of adult female, enlarged two diameters.  
 " 1<sup>a</sup>. Lateral view of the carapax of the same specimen, enlarged two diameters.  
 " 1<sup>b</sup>. Dorsal view of rostrum of the same specimen, enlarged eight diameters.  
 " 2. *Pontophilus gracilis*. Dorsal view of female, enlarged two diameters.  
 " 2<sup>a</sup>. Lateral view of the carapax of the same specimen, enlarged two diameters.  
 " 2<sup>b</sup>. Appendage of the left side of the first somite of the abdomen of the same specimen, enlarged eight diameters.  
 " 2<sup>c</sup>. Appendage of the left side of the second somite of the abdomen of the same specimen, enlarged eight diameters.  
 " 3. Appendage of the left side of the first somite of the abdomen of a male taken off Martha's Vineyard by the U. S. Fish Commission, Station 1029, enlarged eight diameters.  
 " 3<sup>a</sup>. Appendage of the left side of the second somite of the abdomen of the same specimen, enlarged eight diameters.  
 " 4. *Ceraphilus Agassizii*. Dorsal view of female from Station 326, natural size.  
 " 4<sup>a</sup>. Lateral view of the carapax of the same specimen, natural size; *a*, anterior gastric spine; *b*, rostrum; *c*, orbital spine; *d*, antero-lateral angle.  
 " 5. Lateral view of carapax and abdomen of a male from Station 317, enlarged two diameters; *a*, *b*, *c*, *d*, the same as in fig. 4<sup>a</sup>.  
 " 5<sup>a</sup>. Dorsal view of carapax of the same specimen, enlarged two diameters; *a*, *c*, *d*, the same as in fig. 4<sup>a</sup>.

## PLATE VIII.

- Fig. 1. *Sabinea princeps*. Lateral view of female, natural size.
- “ 1<sup>a</sup>. Dorsal view of carapax and anterior appendages of the same specimen, natural size.
- “ 1<sup>b</sup>. Dorsal view of the terminal portion of the abdomen of the same specimen, natural size.
- “ 2. *Munidopsis curvirostra* Whiteaves. Dorsal view of male from Station 325, enlarged four diameters.
- “ 3. Appendage of the right side of the first somite of the abdomen of a male, from 220 fathoms, Gulf of St. Lawrence, enlarged eight diameters.
- “ 3<sup>a</sup>. Appendage of the right side of the second somite of the same specimen, enlarged eight diameters.

## PLATE IX.

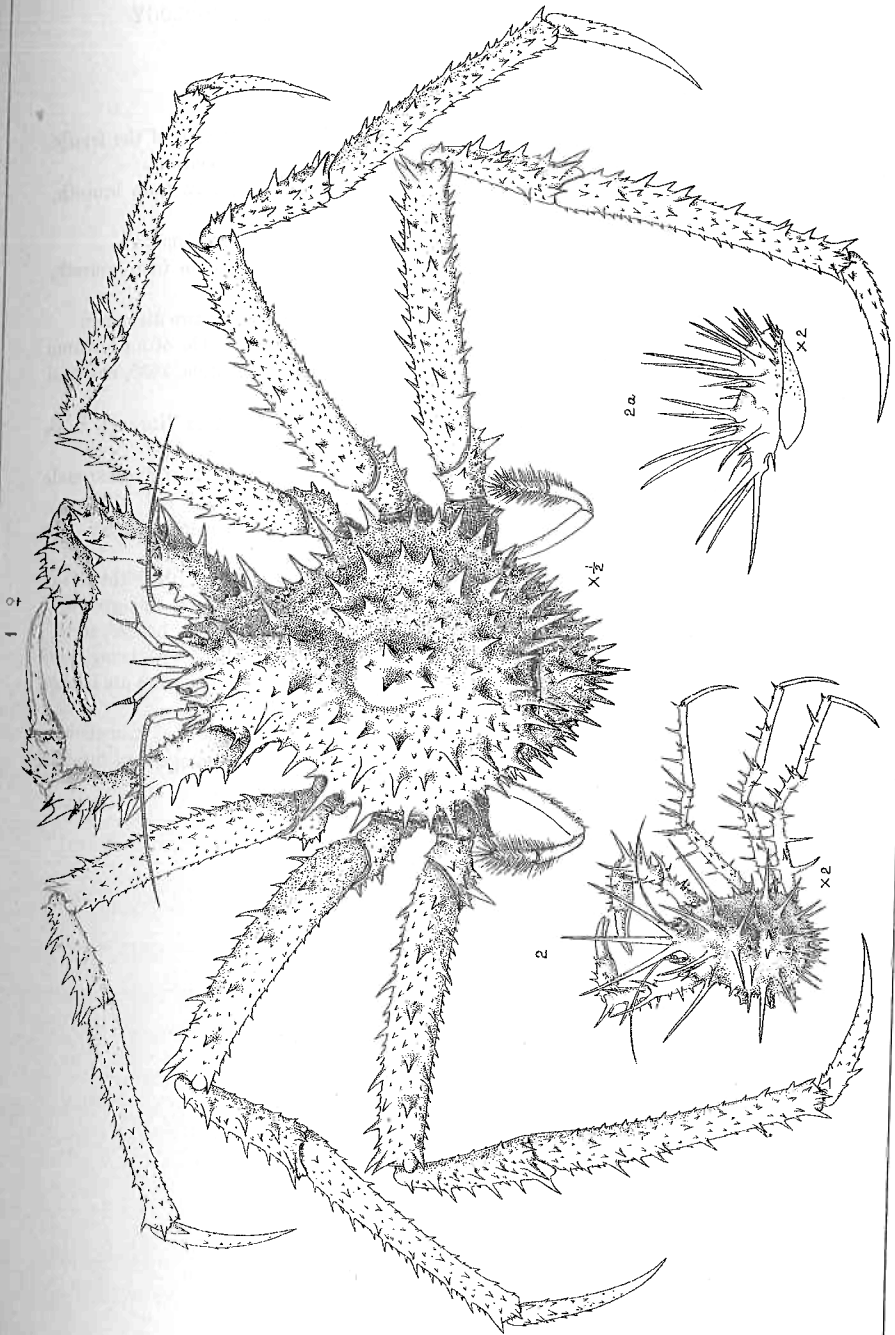
- Fig. 1. *Anchistia tenella*. Lateral view of female, enlarged four diameters.
- “ 1<sup>a</sup>. Dorsal outline view of right eye and peduncle of antennula of the same specimen, enlarged eight diameters.
- “ 1<sup>b</sup>. Outline of left antennal scale of the same specimen, enlarged eight diameters.
- “ 2. *Galacantha rostrata* A. Milne-Edwards. Dorsal view of male from Station 341, natural size.
- “ 2<sup>a</sup>. Lateral view of carapax of the same specimen, natural size.

## PLATE X.

- Fig. 1. *Munida* sp. indet. Dorsal view of a large male, taken by the U. S. Fish Commission off Martha's Vineyard, Station 877, natural size.
- “ 2. *Pandalus carinatus*. Lateral view of female, enlarged two diameters.
- “ 2<sup>a</sup>. First maxilliped of the right side of the same specimen, seen from beneath, enlarged twelve diameters.
- “ 2<sup>b</sup>. Second maxilliped of the right side of the same specimen, enlarged twelve diameters.
- “ 2<sup>c</sup>. Distal portion of right chelate leg of the same specimen, enlarged twelve diameters.
- “ 2<sup>d</sup>. Lamellæ of the appendage of the left side of the first somite of the abdomen of the same specimen, seen from behind, enlarged twelve diameters; the marginal setæ and the distal portion of the outer lamella omitted.
- “ 2<sup>e</sup>. Outline of tip of outer lamella of right uropod of the same specimen, enlarged four diameters.
- “ 2<sup>f</sup>. Tip of telson of same specimen, seen from above, enlarged twenty-four diameters.

## PLATE XI.

- Fig. 1. *Pandalus carinatus*. Right mandible of the specimen figured on Plate X., seen from in front, enlarged twelve diameters.
- “ 2. Right first maxilla of the same specimen, seen from beneath, enlarged twelve diameters.

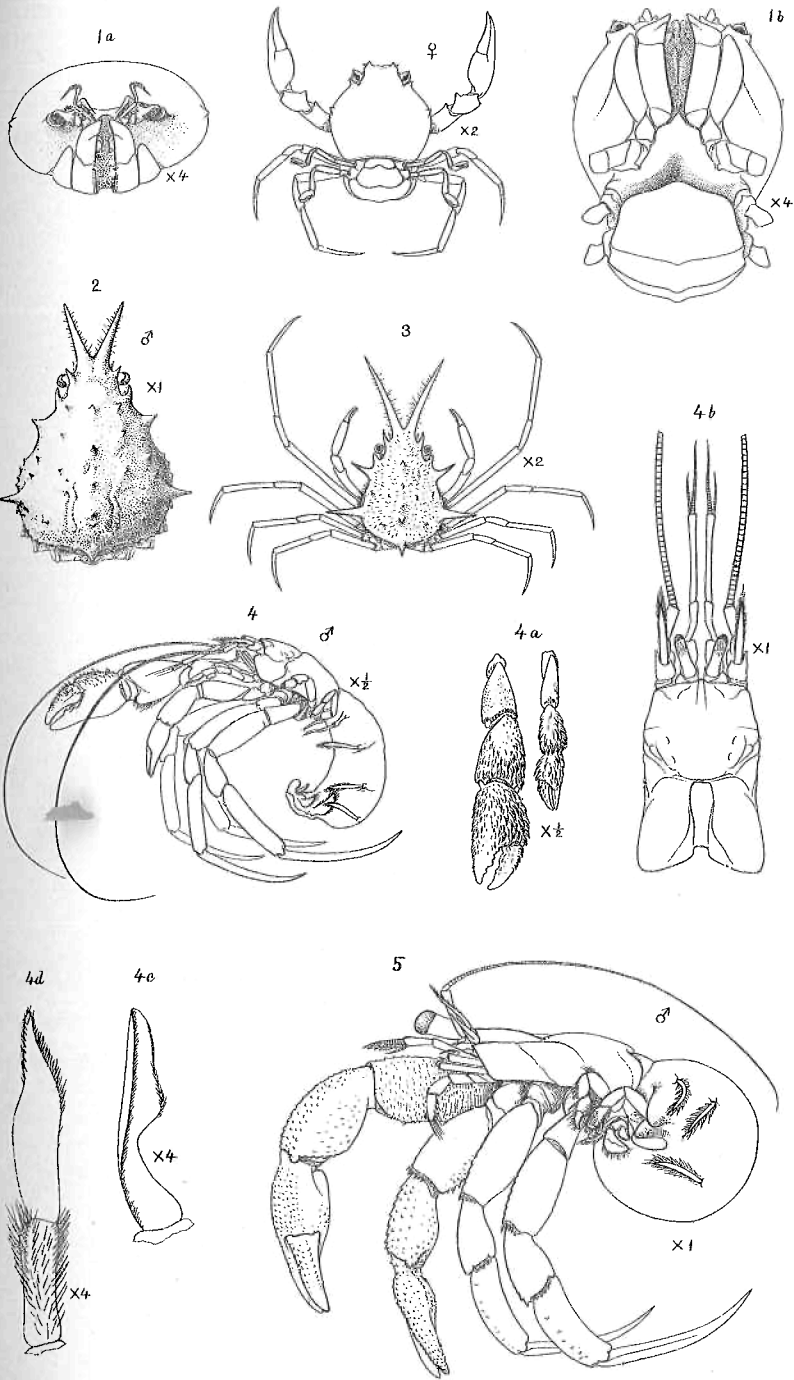


M. Escherton, from nature.

Photo. Litho. E. Crisand, New Haven, Ct.

LITHODES AGASSIZII.

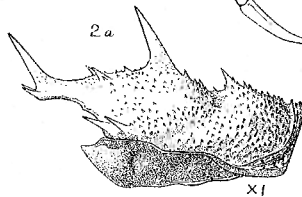
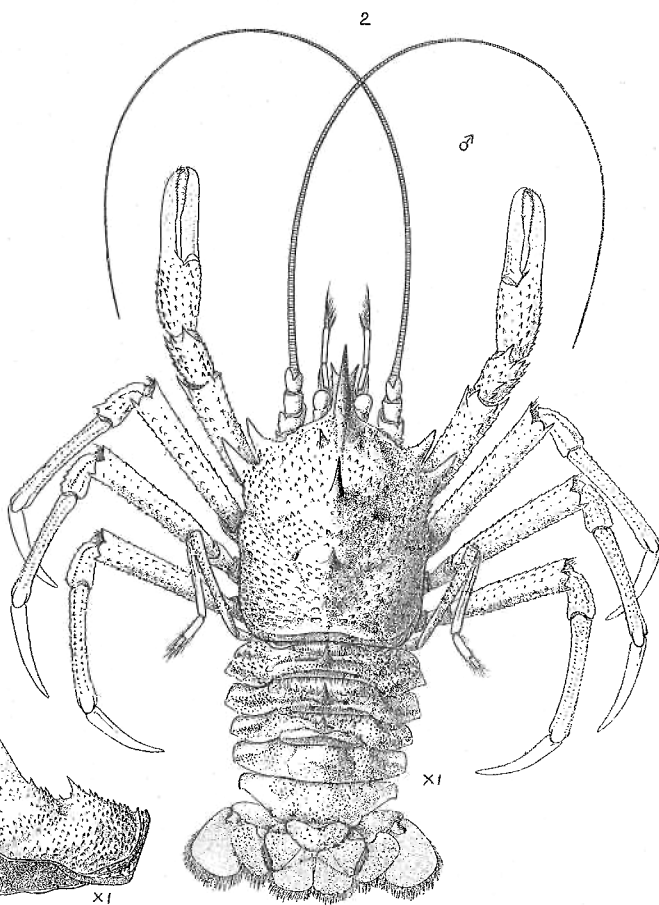
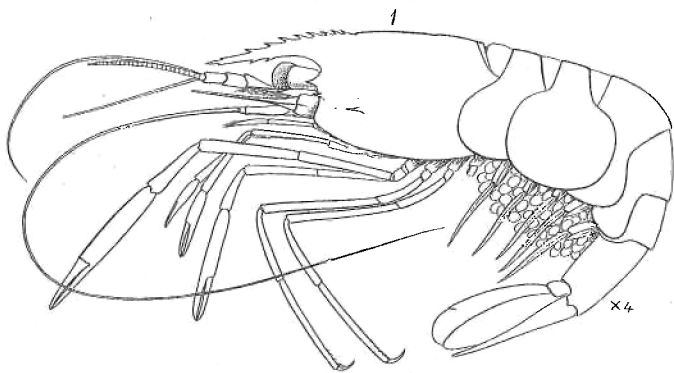




Emerson and Smith from nature.

Photo. Litho. E. Crisand, New Haven, Ct.

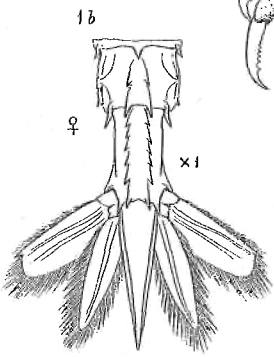
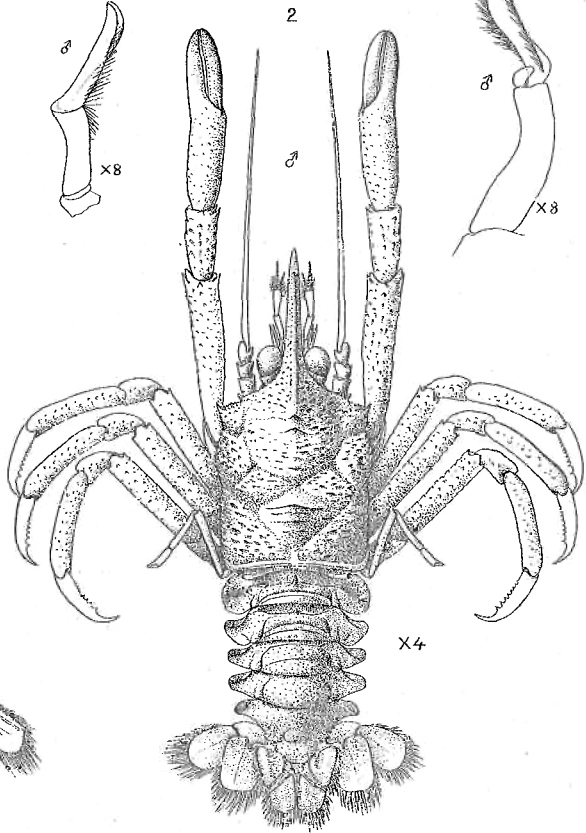
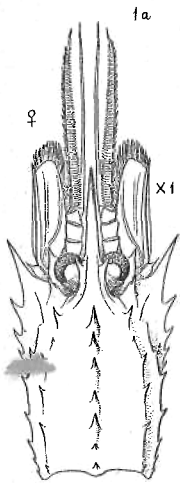
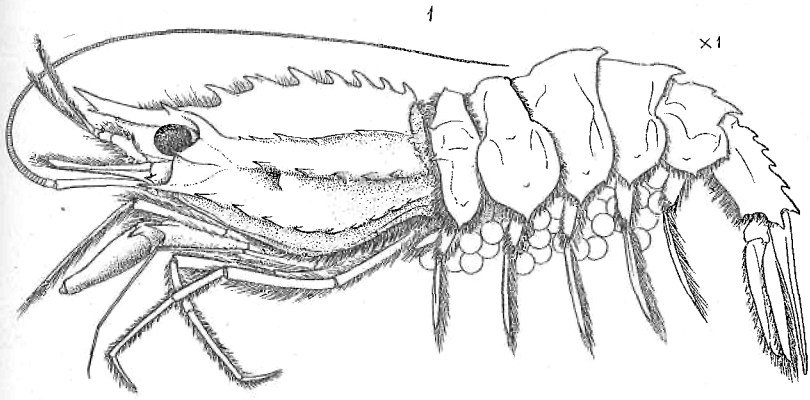
CYCLODORIPPE, AMATHIA, PARAPAGURUS, EUPAGURUS.



Emerton and Smith from nature.

Photo. Litho. E. Crisand, New Haven, Ct.

ANCHISTIA TENELLA. GALACANTHA ROSTRATA.



Emerton and Smith, from nature.

Photo Litho. E. Crisand, New Haven, Ct.

SABINEA PRINCEPS. MUNIDOPSIS CURVIROSTRA.