

Station 2143, March 23, 1884; Gulf of Darien; north latitude $9^{\circ} 30' 45''$, west longitude $76^{\circ} 25' 30''$; 155 fathoms, green mud. One female (6939).

NEW HAVEN, CONN., April 29, 1885.

ON SOME GENERA AND SPECIES OF PENÆIDÆ, MOSTLY FROM RECENT DREDGINGS OF THE UNITED STATES FISH COMMISSION.

By SIDNEY I. SMITH.

Penæus Fabricius (restricted).

Unfortunately I have not been able to examine either of the species referred to the genus by Fabricius, but in *P. carimonte*, *canaliculatus*, *Brasiliensis*, *semisulcatus*, *setiferus*, and *stylirostris* the antennular flagella are very short; the distal segment of the mandibular palpus is much larger than the proximal, very broad, and not prolonged into a narrow tip; the endognath of the first maxilla is greatly elongated and segmented; the endopod of the maxilliped is slender and composed of four segments, and the exopod is lamellar and unsegmented; both pairs of gnathopods have well-developed epipods and large exopods; all the peræopods have small exopods, but only the first, second, and third are furnished with epipods; there is a well-developed pleurobranchia on the fourteenth somite. The number and arrangement of the branchiæ and epipods are the same for all these species, and is indicated in the following formula:

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

These species also agree in having well-developed antennal and hepatic spines and conspicuous antennal and hepatic sulci; but these characters are not regarded as of generic value.

Parapenæus, gen. nov.

The species referred to the genus here proposed are at once distinguished from the species of *Penæus* proper in having the endognath of the first maxilla short and unsegmented, the second gnathopod without an epipod, and the fourteenth somite (posterior somite of the peræon) wholly without branchiæ. The species examined further agree in having none of the sulci of the carapax conspicuous except the cervical, and in having the antennular flagella shorter than the carapax. In the first three species here referred to the genus the mandibular palpi

are as in the typical species of *Penæus*, there are no exopods at the bases of any of the peræopods, and the branchio-epipodal formula is—

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

In *P. constrictus* and a Japanese species here doubtfully referred to the *P. barbatus* (De Haan) the distal segment of the mandibular palpus is slightly elongated and narrowed distally; there are very small narrow lamellar exopods at the bases of all the peræopods; and there is no pleurobranchia on the thirteenth somite, the branchio-epipodal formula being—

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	0	1	1	1	0	0	(5)
Podobranchiæ.....	0	1	0	0	0	0	0	0	1
Arthrobranchiæ.....	0	2	2	2	2	2	1	0	11
Pleurobranchiæ.....	0	0	1	1	1	1	0	0	4
									16 + (5)

These characters might be considered of generic value, but I prefer not to propose a new genus for these two species, and I am confirmed in this from the examination of two other species: a Japanese species (possibly the *P. affinis* (M. Edwards), but evidently not the species figured by Bate as the male of that species) which closely resembles the *constrictus* and *barbatus* in general appearance, but has no exopods at the bases of the posterior peræopods and has the epipods and branchiæ as in *P. longirostris*; and *P. Goodei*, described beyond, which, though resembling the *constrictus* and *barbatus* in external characters, has the mandibular palpi, epipods, and branchiæ as in *P. longirostris*, and long and slender exopods at the bases of all the peræopods.

Parapenæus longirostris.

Penæus longirostris Lucas, Explor. Algérie, Crust., p. 46, pl. 4, fig. 6, 1849.
Penæus membranaceus Heller, Sitzungsber. Akad. Wiss. Wien, xlv, p. 423, pl. 2, fig. 49, 1862; Crust. südlichen Europa, p. 296, pl. 10, fig. 11, 1863.
Penæus Bocagei Johnson, Proc. Zool. Soc. London, 1863, p. 255; *ibid.*, 1867, p. 900 (< *longirostris*).

I take this Mediterranean species, of which I have examined a specimen received from the Rev. A. M. Norman, as the type of the genus.

Judging from his description, this is apparently not Risso's *Penæus membranaceus* (Crust. de Nice, p. 98, 1816), which is probably indeterminate. He describes the rostrum as short, and again as "un petit rostre aplati et denté," which would apply better to the Mediterranean

Solenocera, but the length given would indicate a very much larger species than the *Solenocera*. It is perhaps best to drop the name *membranaceus* entirely, or at least until it can be shown with some degree of certainty to what species it really applies.

Parapenæus politus.

Penæus politus Smith, Proc. National Mus., iii, p. 444, 1881.

Several specimens, agreeing well with the single one originally described, were taken in 1881 by the Fish Hawk, off Martha's Vineyard, in 79 to 128 fathoms, and in February, 1884, a large number were taken by the Albatross, in 31 to 34 fathoms, in the Gulf of Paria.

The species is closely allied to *P. longirostris*, and some of the specimens from the Gulf of Paria have the rostrum much longer than any of the northern specimens and approach the Mediterranean species so closely that it is quite possible that a large series of specimens might show that the *politus* is only a variety of *P. longirostris*. All the specimens seen, however, are easily distinguished from the *longirostris* by the shorter rostrum, which falls much short of the tips of the antennal scales, and by the somewhat smaller eyes.

Parapenæus megalops, sp. nov.

This species is closely allied to *P. longirostris* and *politus*, but is at once distinguished from them by the broader carapax, the more numerous teeth upon the rostrum, the very much larger eyes, and by the branchiostegial spine being on, instead of a little way back from, the anterior margin of the carapax.

The surface of the carapax and pleon is naked and smooth. The carapax is about as broad as high and very little compressed anteriorly. The antennal, hepatic, and branchiostegial spines are well developed, the latter forming the antero-inferior angle of the carapax. From the hepatic spine a sharp elevation extends backward and upward, marking the posterior margin of the cervical suture, but fades out before reaching the dorsum, which is evenly rounded posteriorly but rises in front in a carina armed with a single spine in the middle of the gastric region far back from the crowded teeth of the rostrum proper, only one or two of the most posterior of which are back of the orbit. The rostrum is a little shorter than the carapax proper, reaches to the tips of the antennal scales in all of the females seen, but falls short of them in the males, is nearly horizontal or considerably arched upward in the middle, is rapidly narrowed vertically from the base to about the middle of the eyes, beyond which it is slender and gradually tapered to an acute tip, and the dorsal edge is armed with twelve to fifteen spiniform teeth which are crowded posteriorly but become gradually more and more remote and smaller toward the tip, to which they very nearly reach.

The eyes are black, reniform, flattened above, and very large, apparently slightly larger in the males than in the females; the greatest

diameter being nearly half the length of the antennal scale, and from a third to fully two-fifths of the length of the carapax excluding the rostrum.

The proximal segment of the peduncle of the antennula is about half as long as the antennal scale, very broad, lamellar, slightly concave above to fit the eye, and the outer margin armed with a small tooth near the base and with a slender spine at the anterior angle; the second segment is scarcely a third as long as the proximal and nearly as broad as long; and the distal segment is fully as long as the second, slender and subcylindrical. The antennular flagella are slender, the inner approximately as long as the antennal scale, the outer slightly shorter. The antennal scale is considerably broader at base and more tapered distally than in *P. longirostris*, but otherwise the antennæ are nearly as in that species.

The peræopods are very similar to those of *P. longirostris*, but are all somewhat longer and apparently stouter; the second pair reach nearly to the second segment of the peduncle of the antennula, and the third and fifth to or a little by the tips of the antennal scales.

The anterior somites of the pleon are nearly as in *P. longirostris*, but the dorsal carina on the third, fourth, and fifth is not quite as thin and does not project in so distinct teeth at the posterior margins of the somites, and the pleura of the fifth somite project slightly more posteriorly.

The telson is a little longer than the sixth somite, conspicuously sulcated above, the margins of the sulcus carinated and terminating in a long spiniform process either side and a little way from the slender and acute tip. Below the dorsal carina there is an inconspicuous lateral carina either side joining the dorsal a little way from the base of the lateral process, in front of which there are two aculei on the edge itself. The inner lamella of the uropod reaches to about the tip of the telson, is ovate-lanceolate and between three and four times as long as broad. The outer lamella is considerably longer than the telson, about a fourth as broad as long, with the outer margin terminating, about two-thirds of the way from the base to the tip, in a small spine, beyond which the lamella is suddenly narrowed but the tip itself rounded.

The peculiar sexual appendage of the first pleopod is an elongated, approximately rectangular plate longitudinally plicated, and joining its fellow of the opposite side for nearly the whole length of the mesial edge.

Measurements in millimeters.

Catalogue number.....	7263	7262
Station	2143	2125
Sex	♂	♀
Length from tip of rostrum to tip of telson	105	140
Length of carapax including rostrum	36.5	54
Length of rostrum	16.5	25
Height of carapax	11.5	18
Breadth of carapax	11.5	17
Length of eye-stalk and eye	10.0	12
Greatest diameter of eye	8.5	10
Length of antennal scale	19.0	24
Breadth of antennal scale	5.0	7.7
Length of second gnathopod	30	45
Length of first peræopod	24	32
Length of carpus	4.8	6.5
Length of chela	5.8	8.0
Breadth of chela	1.3	1.9
Length of dactylus	3.7	4.7
Length of second peræopod	31	44
Length of carpus	10.0	14
Length of chela	5.4	7.0
Breadth of chela	1.2	1.7
Length of dactylus	3.0	4.0
Length of third peræopod	40	55
Length of merus	12	15
Length of carpus	16	22
Length of chela	6	8
Breadth of chela	1.0	1.4
Length of dactylus	3.0	3.9
Length of fourth peræopod		45
Length of merus		14
Length of carpus		11
Length of propodus		6
Length of dactylus		4
Length of fifth peræopod	42	55
Length of merus	15	18
Length of carpus	14	17
Length of propodus	5.5	7.5
Length of dactylus	3.2	4.0
Length of sixth somite of pereon	15	20
Height of sixth somite of pereon	8	11
Length of telson	17.5	22
Length of inner lamella of uropod	14.0	18.0
Breadth of inner lamella of uropod	4.0	5.0
Length of outer lamella of uropod	19.0	25.0
Breadth of outer lamella of uropod	4.8	6.1

This species was taken in 1884, at two stations in the Caribbean Sea, by the Albatross: Station 2125, February 18, south of Curaçoa, north latitude $11^{\circ} 43'$, west longitude $69^{\circ} 9' 30''$, 208 fathoms, yellow mud and sand, temperature $50^{\circ}.7$, two females; and station 2143, March 23, Gulf of Darien, north latitude $9^{\circ} 30' 45''$, west longitude $76^{\circ} 25' 30''$, 155 fathoms, green mud.

Parapenæus constrictus.

Penæus constrictus Stimpson, Ann. Lyc. Nat. Hist. New York, x, p. 135, 1871.

Numerous specimens were taken in 1881 by the Fish Hawk, off Chesapeake Bay, in 18 fathoms, and in 1884 by the Albatross, off Cape Hatteras, in 7 to 27 fathoms. I have also examined specimens from Fort Macon, North Carolina, and from Bermuda.

All these specimens agree well with Stimpson's description except that the carina of the carapax is scarcely grooved longitudinally, though distinctly flattened, at the cervical suture. The dorsal crest of the rostrum proper is armed with seven to nine equidistant teeth, and back of these, on the carina of the gastric region, there is a small tooth, de-

scribed by Stimpson as the gastric tooth, and not referred to in connection with the rostral teeth, which explains the apparent discrepancy pointed out by Miers (Proc. Zool. Soc. London, 1878, p. 304) between Stimpson's description and the specimen in the British Museum. The surface of the posterior part of the branchial regions of the carapax and of the whole of the pleon, except a very narrow and inconspicuous line of pubescence either side of the dorsal carina of the fifth and sixth somites, is entirely naked and glabrous. The dorsal carina of the fourth and fifth somites of the pleon is divided by a narrow incision like that in *P. Goodei*, but not quite as deep. The telson is shorter than the sixth somite and rather suddenly tapered to a short acuminate tip armed either side with a short and very small spine.

Variety *similis*.

There are four specimens, one male and three females, taken by the Albatross, station 2121, February, 1884, Gulf of Paria, north latitude 10° 37' 40'', west longitude 61° 42' 40'', 31 fathoms, which appear to represent a distinct species very closely allied to *P. constrictus*, but as a large series of specimens from the West Indies would very likely show them to be only a variety, I describe them here as such.

These specimens are a little larger than the largest observed specimens of *constrictus*, and the rostrum somewhat longer, more slender, and armed with eight or nine teeth in addition to the one on the gastric region. The whole surface of the carapax and of the fourth, fifth, and sixth somites of the pleon is thickly covered with very short and stiff setæ, like those on the anterior portion of the carapax of *P. constrictus*, and the surface itself, after the removal of the setæ, is thickly punctate. The telson is considerably longer than the sixth somite of the pleon, and tapers very gradually to a very long and slender tip armed either side its base with a long and very slender spine.

Measurements of two of these specimens and of two of the largest observed specimens of the typical *constrictus* are given in the accompanying table:

Measurements in millimeters.

	<i>P. constrictus.</i>		Var. <i>similis</i> .	
Catalogue number.....	8870	7265	7265
Station.....	901	2285	2121	2121
Sex.....	♂	♀	♂	♀
Length from tip of rostrum to tip of telson	51	66	62	80
Length of carapax including rostrum	18.5	26.5	22.7	31.0
Length of rostrum	7.2	10.0	9.0	13.3
Height of carapax	7.0	9.6	8.0	11.7
Breadth of carapax	6.0	9.0	7.5	10.1
Length of eye-stalk and eye.....	4.3	6.0	5.2	7.0
Greatest diameter of eye.....	3.0	4.1	4.5	5.2
Length of antennal scale.....	8.8	11.3	11.0	13.4
Breadth of antennal scale.....	3.2	4.0	3.6	4.8
Length of first peræopod	9.5	15.0	12.5	18.0
Length of merus.....	2.4	3.6
Length of carpus.....	2.3	3.2	3.0
Length of chela.....	2.1	3.3	3.0	4.1

Measurements in millimeters—Continued.

	<i>P. constrictus.</i>		Var. <i>similis.</i>	
Breadth of chela.....	0.75	1.3	0.8	1.1
Length of dactylus.....	1.4	2.2	1.9	2.5
Length of second peræopod.....	13.0	19.5	17.5	25.0
Length of carpus.....	4.2	6.5	6.0	8.4
Length of chela.....	2.3	3.7	3.2	4.5
Breadth of chela.....	0.65	0.95	0.7	0.85
Length of dactylus.....	1.4	2.2	1.9	2.7
Length of third peræopod.....	17.5	27.0	24	36
Length of merus.....	4.5	7.0	6.4	10.0
Length of carpus.....	6.2	10.0	9.5	14.5
Length of chela.....	2.7	4.4	4.0	5.8
Breadth of chela.....	0.6	0.9	0.65	0.8
Length of dactylus.....	1.5	2.3	2.1	3.0
Length of fourth peræopod.....	15.0	21.5	20	28
Length of merus.....	3.7	5.3	4.9	7.7
Length of carpus.....	3.5	5.2	5.0	7.4
Length of propodus.....	2.3	3.5	3.3	4.8
Length of dactylus.....	1.6	3.0	2.2	3.0
Length of fifth peræopod.....	19.5	27.5	26	37
Length of merus.....	5.0	7.8	7.6	11.5
Length of carpus.....	4.9	7.5	7.5	11.0
Length of propodus.....	3.1	4.6	4.4	6.3
Length of dactylus.....	1.8	2.6	2.6	3.6
Length of sixth somite of pereon.....	6.7	8.2	8.0	10.0
Height of sixth somite of pereon.....	5.0	6.2	5.6	7.5
Length of telson.....	6.3	8.0	9.2	12.0
Length of inner lamella of uropod.....	6.4	8.4	8.0	9.7
Breadth of inner lamella of uropod.....	1.9	2.4	2.2	3.0
Length of outer lamella of uropod.....	7.5	9.6	9.0	10.8
Breadth of outer lamella of uropod.....	2.4	3.3	2.8	3.8

Parapenæus barbatus (De Haan sp.).

De Haan's species is evidently distinct from the *affinis* to which he referred it, and is apparently closely allied to *P. constrictus*. I have examined specimens from the Bay of Jeddo, Japan, which agree perfectly with De Haan's figure of *P. barbatus* and with his description, except that there is no branchiostegial spine, although the margin of the carapax projects forward in a slightly prominent angle beneath the base of the antenna. These specimens resemble *P. constrictus* closely, and agree with it perfectly in the oral appendages, the number and arrangement of the branchiæ, epipods, and exopods, and in the appendages of the first pleopods of the male, but differ in having nearly the whole surface of the carapax and pleon pubescent.

Parapenæus anchoralis (Bate sp.) is apparently closely allied to *P. constrictus*, and should undoubtedly be referred here, as should also, apparently, *P. affinis* (M.-Edwards sp.), *P. monoceros* (Fabricius sp.), and *P. velutinus* (Dana sp.). Several other of the described Pacific Ocean species probably belong to the genus, but it is impossible to determine their affinities from the published descriptions and figures.

Parapenæus Goodei, sp. nov.

This species resembles *P. constrictus*, and is apparently very closely allied to *P. velutinus* (Dana sp.), which is described as having the second and third peræopods subequal and the telson armed with minute spinules, and is figured as having the fourth peræopods fully as long as the fifth;

while in the species here described the third peræopods are very much longer than the second, the telson is armed with long spiniform lateral processes and movably articulated spines, and the fifth peræopods are much longer than the fourth. I should regard the equality in the length of the second and third pairs of peræopods as an accidental character of the type specimen did not Bate report specimens from various localities in the Challenger collections agreeing closely with Dana's description and figure. Bate states also that, in his specimens, the petasma (sexual appendage of the first pleopod of the male) of the left side is longer than that of the right, while the reverse is true of the species here described.

The carapax and pleon are everywhere densely clothed with short and rather stiff plumose setæ. The carapax is about as broad as high and very little compressed anteriorly. There is an inconspicuous supra-orbital notch, as in *P. constrictus*, and well-developed antennal, hepatic, and branchiostegial spines, the latter forming the antero-inferior angle of the carapax. The sulci are inconspicuous. The dorsum is evenly rounded posteriorly, but rises in a sharp tooth on the gastric region at the base of the rostrum, which rises suddenly above the level of the dorsum, is directed obliquely upward, is shorter than the carapax proper, and armed above with eight to ten teeth, all of which are over or in front of the orbit.

The eyes are large, reniform, flattened above, and black. The peduncles of the antennulæ are nearly as in *P. constrictus*, and the flagella are subequal in length and scarcely longer than the penultimate segment of the peduncle. The antennal scales reach to the tips of the peduncles of the antennæ, are about three times as long as broad, regularly tapered distally, and the distal portion of the thickened outer margin is armed above with a series of minute spines directed obliquely forward and outward.

The oral appendages are essentially as in *P. longirostris*.

The first and second peræopods are armed with basal spines as in *P. constrictus*, and there is in addition a small distal spine on the under side of the ischium in the first, while between the bases of the second there is a pair of long and very slender spines arising from the sternum and directed forward. The third peræopods reach as far forward as the tip of the rostrum, the full length of the chelæ beyond the second pair, and the distal portions are more slender than in the second; the carpus is about once and two-thirds as long as the merus, which is itself about as long as the carpus in the second; and the chela is scarcely stouter than the carpus and about two-fifths as long. The fourth peræopods reach about as far forward as the first, while the fifth are conspicuously longer, reaching considerably by the fourth.

The third, fourth, fifth, and sixth somites of the pleon are dorsally carinated, and on the fourth and fifth the carina is divided by a narrow and deep incision in the posterior margin, leaving an inconspicuous tooth either side which does not project above the carina of the succeeding somite. The sixth somite is strongly compressed and about once and a half as long as high. The telson is considerably longer than the sixth somite, rounded and obscurely sulcated above, regularly tapered, and armed with a long spiniform process either side of the acute tip and three pairs of movably articulated spines, of which the posterior are much the larger, arise just in front of the lateral processes, and reach beyond their tips. The lamellæ of the uropods are shorter than the telson, the outer is only slightly longer than the inner, its thickened outer margin terminates a little way from the tip, and both are narrow and obtusely rounded distally.

The appendages of the first pleopods of the male are exceedingly complicated and very different on the two sides. The left appendage is the more simple and consists of an irregularly longitudinally plicated plate which projects proximally in a curved process beyond the right appendage and to the right of the mesial line, and distally in an irregular narrow process. The right appendage is enlarged distally and divided into several irregularly curved processes projecting beyond the left appendage and partially covered posteriorly by a thin spoon-shaped lamella arising at their bases.

I have seen a single male (from which the accompanying measurements were taken), collected, with *P. constrictus*, at Bermuda, by Prof. G. Brown Goode, and several smaller specimens, both male and female, in the museum of Yale College, collected in the Bay of Panama by Prof. F. H. Bradley.

Measurements in millimeters.

Sex.....	♂
Length from tip of rostrum to tip of telson.....	57.0
Length of carapax including rostrum.....	19.4
Length of rostrum.....	9.0
Height of carapax.....	7.5
Breadth of carapax.....	7.5
Length of eye-stalk and eye.....	4.8
Greatest diameter of eye.....	4.0
Length of antennal scale.....	10.0
Breadth of antennal scale.....	3.4
Length of first peræopod.....	11.5
Length of carpus.....	2.7
Length of chela.....	2.4
Breadth of chela.....	0.7
Length of dactylus.....	1.3
Length of second peræopod.....	13.8
Length of carpus.....	4.7
Length of chela.....	2.7
Breadth of chela.....	0.6
Length of dactylus.....	1.2

Length of third peræopod.....	18.2
Length of merus.....	4.5
Length of carpus.....	7.4
Length of chela.....	3.1
Breadth of chela.....	0.55
Length of dactylus.....	1.4
Length of fourth peræopod.....	15.5
Length of carpus.....	3.8
Length of propodus.....	2.7
Length of dactylus.....	1.5
Length of fifth peræopod.....	17.5
Length of carpus.....	4.5
Length of propodus.....	3.3
Length of dactylus.....	1.5
Length of sixth somite of pereon.....	8.0
Height of sixth somite of pereon.....	5.3
Length of telson.....	9.5
Length of inner lamella of uropod.....	8.0
Breadth of inner lamella of uropod.....	1.7
Length of outer lamella of uropod.....	8.4
Breadth of outer lamella of uropod.....	2.1

Hymenopenæus Smith.

In the four species which I have examined both flagella of the antennulæ are slender and at least as long as the carapax, excluding the rostrum; the proximal segment of the mandibular palpus is larger and much broader than the distal, which is long and narrow; the endognath of the first maxilla is short and unsegmented; the second gnathopod and the first, second, third, and fourth peræopods have well-developed epipods; and there is, either side, a pleurobranchia on the fourteenth somite and two arthrobranchiæ on the thirteenth. The branchio-epipodal formula is —

Somites.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	Total.
Epipods.....	1	1	1	1	1	1	1	0	(7)
Podobranchiæ.....	0	1	0	0	0	0	0	0	1
Arthrobranchiæ.....	0	2	2	2	2	2	2	0	12
Pleurobranchiæ.....	0	0	1	1	1	1	1	1	6
									19+(7)

The species examined further agree in having antennal, hepatic, and branchiostegial spines, a fourth spine back of the orbit, and small epipods at the bases of all the peræopods.

The genus thus differs from both *Penæus* and *Parapenæus* in the elongated antennular flagella, the form of the mandibular palpus, and in the presence of two arthrobranchiæ and an epipod on either side of the thirteenth somite; it agrees with *Penæus* and differs from *Parapenæus* in having an epipod at the base of the second gnathopod; and it agrees with *Parapenæus* and differs from *Penæus* in having the endognath of the first maxilla short and unsegmented.

It is not at all improbable that this genus is the same as A. Milne-Edwards's manuscript genus *Penæopsis* referred to, but not characterized by Bate (Ann. Mag. Nat. Hist., V, viii, p. 182, 1881).

I have already described two species of the genus, *H. debilis* (Bull. Mus. Comp. Zool., x, p. 91, pl. 15, figs. 6-11, pl. 16, figs. 1-3, 1882) and *H. microps* (Report U. S. Fish Com., x, for 1882, p. 413, pl. 10, fig. 1, 1884), and I here add two others, which are conspicuously unlike them and each other.

***Hymenopenæus robustus*, sp. nov.**

This species is readily distinguished from *H. debilis* and *H. microps* by its much greater size, longer rostrum, very large, reniform, and dorsally flattened eyes, and by the pubescence-like clothing of the carapax and pleon.

The entire surface of the carapax, pleon, and many of the appendages is thickly covered with a close velvety coat of very short curved setæ. The carapax is slightly compressed, but little higher than broad and slightly narrowed in front. The hepatic and cervical sutures are deep and the latter is conspicuous, extends nearly to the middle of the dorsum, and is marked posteriorly by a high and almost carinate margin. The dorsum is carinated nearly to the posterior border, but back of the cervical suture the carina is very low and the dorsum broadly rounded, while in front it gradually rises to the base of the rostrum, which is five to seven eighths as long as the carapax proper, nearly straight, and horizontal to near the slightly upturned and unarmed tip, back of which there are six to eight low teeth in front of the orbit and three or four similar ones on the carina of the carapax proper. There is an obscure supraorbital tooth and a stout antennal spine on the anterior margin, which retreats below the latter to the slightly produced inferior angle, a little way back from which there is an acute branchiostegial spine, rather larger than the hepatic and still larger than a small spine a little way back of and slightly above the antennal.

The eyes are black, reniform, flattened above, and very large, the greatest diameter being from a fourth to a third the length of the carapax excluding the rostrum.

The proximal segment of the peduncle of the antennula is fully half as long as the antennal scale, very broad, lamellar, and the outer margin armed with a small tooth and its anterior angle spiniform; the second segment is nearly half as long as the proximal, somewhat triquetral, more than half as broad as long, and densely hairy above and on the outer side; the distal segment is much shorter than the second and subcylindrical. The antennular flagella are nearly cylindrical, long, and slender, the inferior nearly or quite as long as the carapax including the rostrum, and its proximal portion densely hairy in the male, and the superior much longer and nearly naked in both sexes.

The antennal scale is two-thirds to three-fourths as long as the cara-

pax excluding the rostrum, fully a third as broad as long, the inner margin broadly curved distally, and the tip rounded. The flagellum is very nearly naked and three or four times as long as the rest of the animal.

The second gnathopods are slender, regularly tapered, and reach to about the tips of the antennal scales; the ischium and carpus are approximately equal in length and a little longer than the merus, which is slightly longer than the propodus, which in turn is longer than the dactylus.

The first peræopods reach to or a little by the middle of the carpi of the second gnathopods and are somewhat compressed: the basis and ischium are each armed with a small distal spine and there is a similar spine on the middle of the merus; the carpus and merus are approximately equal in length, and the chela is about two-thirds as long as the carpus. The remaining peræopods are unarmed. The second reach by the middle of the antennal scales: the merus is shorter than the carpus and subcylindrical; the carpus is twice as long as in the first and tapered distally; the chela is approximately as long as in the first, but much more slender and a little more than a third as long as the carpus. The third reach to about the tips of the antennal scales and are similar to the second, though the carpus is proportionally still longer. The fourth reach to about the middle of the antennal scales: the merus and carpus are approximately equal in length, but the carpus is much the more slender; the propodus is less than half as long as the carpus; and the dactylus is about three-fifths as long as the propodus, strongly compressed, with the edges sharp and a longitudinal carina on the middle of each surface. The fifth are similar to the fourth, but more slender, and reach to about the tips of the antennal scales; the propodi are proportionally longer than in the fifth, and the dactyli actually shorter, being less than a third as long as the propodi.

The dorsum of the second somite of the pleon is broad and rounded, but with a low and indistinct median carina, which becomes distinct on the third somite and sharp and high upon the compressed fourth, fifth, and sixth somites, and ends in a small tooth on the posterior margin of the sixth. The postero-inferior angles of the first and second pleura are rounded, while those of the third, fourth, and fifth are obtusely right-angled. The sixth somite is between a fourth and a third longer than the fifth, and rather more than three-fourths as high as long.

The telson is once and two-thirds to once and three-fourths as long as the sixth somite, regularly tapered, with a very shallow dorsal sulcus margined with slight carinæ which terminate in a pair of small spini-form lateral processes a little way from the acutely triangular tip.

The inner lamella of the uropod is about as long as the telson and nearly or quite three times as long as broad. The outer lamella is

about a sixth longer than the inner, rather less than three times as long as broad, and the thickened outer margin extends very nearly to the tip.

In the male the appendages of the first pleopods are very large squarish lamellar plates with the outer and distal margins slightly thickened, the latter somewhat irregularly lobed, and the mesial portion very thin and longitudinally plicated. There are three stiff chitinous stylets at the base of the inner ramus of the second pleopods, the usual pair on the mesial side and a single small one on the opposite side, the anterior of the two mesial ones is much the larger and is stout and deeply channeled for the reception of the inner, which is shorter and much more slender.

Taken by the Albatross in the Caribbean Sea, station 2125, February 18, 1884, north latitude $11^{\circ} 43'$, west longitude $69^{\circ} 9' 30''$, 208 fathoms, yellow mud and sand, temperature $50^{\circ}.7$. Fourteen males and four females (6907 and 6908).

Measurements in millimeters.

Catalogue number.....	6907	6907	6907
Station.....	2125	2125	2125
Sex.....	♂	♀	♀
Length from tip of rostrum to tip of telson.....	148	186	190
Length of carapax including rostrum.....	55	80	84
Length of rostrum.....	22	34	37
Height of carapax.....	19	27	28
Breadth of carapax.....	17	23	23.5
Length of eye-stalk and eye.....	13	15	16
Greatest diameter of eye.....	11	12	12
Length of antennal scale.....	26	31	34
Breadth of antennal scale.....	8.8	11.2	12
Length of second gnathopod.....	52	70	72
Length of first peræopod.....	35	47	49
Length of carpus.....	8.8	12	13.5
Length of chela.....	6.1	8.6	8.8
Breadth of chela.....	2.0	2.5	2.7
Length of dactylus.....	4.2	5.8	5.8
Length of second peræopod.....	46	62	64
Length of carpus.....	18	25	26
Length of chela.....	6.4	7.7	8.0
Breadth of chela.....	1.5	2.0	2.1
Length of dactylus.....	3.8	4.7	4.7
Length of third peræopod.....	59	80	84
Length of merus.....	15	21	22
Length of carpus.....	25.5	36	38
Length of chela.....	6.4	8.6	8.9
Breadth of chela.....	1.2	1.7	1.8
Length of dactylus.....	3.6	4.5	4.5
Length of fourth peræopod.....	54	67	72
Length of merus.....	15	19.3	22
Length of carpus.....	16	21	23
Length of propodus.....	7.8	9.0	10
Length of dactylus.....	5.0	5.8	6.0
Length of fifth peræopod.....	73	80	94
Length of merus.....	22	22.5	29
Length of carpus.....	21	24	29
Length of propodus.....	14	14	17
Length of dactylus.....	4.0	4.7	5.0
Length of sixth somite of pereon.....	17	19	19.3
Height of sixth somite of pereon.....	12.8	15	15
Length of telson.....	21	25	26
Length of inner lamella of uropod.....	20	23	24
Breadth of inner lamella of uropod.....	6.0	6.9	8.0
Length of outer lamella of uropod.....	25	29	30.5
Breadth of outer lamella of uropod.....	7.5	9.1	9.3

Hymenopenæus modestus, sp. nov.

Nearly the whole surface of the carapax is more or less pubescent, but the pubescence is very inconspicuous except in front of the cervical sulcus, where it is especially noticeable either side of the dorsal carina and along the margins of the orbits. The surface of the pleon is almost entirely naked and glabrous. The carapax is considerably compressed, slightly narrowed in front, and the dorsum is rounded and without a carina back of the cervical sulcus, while in front there is a low dorsal crest terminating in a small and nearly horizontal rostrum which is slightly more than a fourth as long as the rest of the carapax, does not reach as far forward as the eyes, terminates in an acute tip, and is armed above with three small teeth in front of the orbit and with four others in the dorsal crest back of the orbit, while beneath it is ciliated and unarmed. There is a shallow hepatic sulcus and the cervical sulcus is conspicuous, reaches nearly to the middle of the dorsum, and is bordered posteriorly by a sharp and slightly carinated margin. There is no perceptible supraorbital tooth, the antennal spine is small and less conspicuous than the one a little back of and very slightly above it, and there is a small branchiostegial spine a little way back from the evenly rounded antero-lateral angle.

The eyes including the stalks are about a fourth as long as the carapax excluding the rostrum, and the eyes themselves are black, rather small, and approximately hemispherical, but considerably compressed vertically.

The peduncle of the antenna is nearly as long as the antennal scale: the proximal segment reaches considerably beyond the eyes and the outer margin is armed with a median tooth and distal spine; the second segment is approximately three-fourths as long as the proximal, somewhat triquetral and hairy; and the distal segment is less than half as long as the second and subcylindrical. The flagella are nearly cylindrical, subequal in length, and scarcely as long as the carapax including the rostrum: the superior is slightly but suddenly narrowed about a fourth of its length from the base, and beyond this point is exceedingly slender; and the inferior is very much stouter than the superior and sparsely hairy.

The antennal scale is a little less than three-fourths as long as the carapax excluding the rostrum, slightly more than a fourth as broad as long, and uniformly tapered from the base to the very narrow but rounded tip, which reaches considerably beyond the peduncle of the antenna.

The distal segment of the mandibular palpus is approximately as long as the proximal but very narrow, being about four times as long as broad. The second gnathopods reach beyond the tips of the antennal scales by nearly the full length of the dactyli.

The first peræopods are strongly compressed and reach beyond the bases of the antennal scales by about the length of the dactyli; the

merus and carpus are subequal in length; and the chela is fully three-fourths as long as the carpus. The second peræopods are slightly compressed and reach to about the middle of the antennal scales; the carpus is slightly longer than the merus, and the chela is more slender and slightly longer than in the first pair, and a little more than half as long as the carpus. The third peræopods are much more slender than the second, and reach to about the tips of the antennal scales; the carpus is about a fourth longer than the merus, and the chela is much longer and more slender than in the second and less than half as long as the carpus. The fourth peræopods reach slightly by the bases of the chelæ of the third; the carpus is very little shorter than the merus; the propodus less than half as long as the carpus, and the dactylus is about three-fourths as long as the propodus. The fifth peræopods are more slender and more than a half longer than the fourth; the merus, carpus, and propodus are approximately equal in length, and the dactylus only slightly more than a fourth as long as the propodus, although very little longer than in the fourth.

The third somite of the pleon is compressed dorsally, the fourth, fifth, and sixth are sharply carinated, and the posterior margins of the third, fourth, and fifth are incised in the middle. The sixth somite is very short, not more than a fourth longer than the fifth, and about five-eighths as high as long.

The telson is about as long as the sixth somite, has a conspicuous dorsal sulcus, which becomes broad and shallow posteriorly, and the margins of which terminate in a small spiniform process either side of the long and rather broad but apparently acute tip. The inner lamella of the uropod is shorter than the telson, ovate-lanceolate, and a little more than a fourth as broad as long. The outer lamella is a little longer than the telson, about a third as broad as long, and semi-elliptical, the outer margin being straight.

Measurements in millimeters.

Catalogue number	7267
Station	1047
Sex	♀
Length from tip of rostrum to tip of telson	50
Length of carapax including rostrum	16.8
Length of rostrum	3.6
Height of carapax	8.8
Breadth of carapax	7.0
Length of eye-stalk and eye	3.3
Greatest diameter of eye	2.2
Length of antennal scale	9.2
Breadth of antennal scale	2.5
Length of second gnathopod	23
Length of first peræopod	16.5
Length of carpus	4.0
Length of chela	3.1
Breadth of chela	0.95

Length of dactylus.....	2.0
Length of second peræopod	20
Length of carpus	6.0
Length of chela.....	3.4
Breadth of chela	0.8
Length of dactylus	2.1
Length of third peræopod	28
Length of merus	7.2
Length of carpus	9.0
Length of chela.....	4.2
Breadth of chela	0.75
Length of dactylus.....	2.6
Length of fourth peræopod.....	25
Length of merus	7.5
Length of carpus	7.2
Length of propodus	3.4
Length of dactylus.....	2.5
Length of fifth peræopod.....	40
Length of merus	10.0
Length of carpus.....	11.0
Length of propodus.....	10.0
Length of dactylus.....	2.7
Length of sixth somite of pereon.....	7.0
Height of sixth somite of pereon.....	4.5
Length of telson	7.2
Length of inner lamella of uropod	6.5
Breadth of inner lamella of uropod	1.8
Length of outer lamella of uropod	7.8
Breadth of outer lamella of uropod	2.6

I have seen only a single specimen, apparently a female, taken by the Fish Hawk, off Delaware Bay, October 10, 1881, station 1047, north latitude $38^{\circ} 31'$, west longitude $73^{\circ} 21'$, 156 fathoms, sand, temperature 49° .

The remarkable resemblance of this species to *Solenocera siphonocera* is referred to under that species.

Solenocera Lucas.

Excepting the remarkable structure of the antennulæ, which distinguishes it from all other known Penæidæ, and the form of the mandibular palpi, in which the distal segment is as broad at base as the proximal but elongated and much narrowed distally, this genus is like *Hymenopenæus*, with the species of which it agrees in the number and position of the branchiæ, epipods, and exopods, and in the form of the maxillæ, maxillipeds, gnathopods, and peræopods.

The efferent branchial tube formed by the two pairs of antennular flagella is well described by Philippi, except that the inferior flagella enter somewhat unequally into its walls, the superior flagella being considerably narrower than the inferior, forming only approximately a sixth of the periphery of the tube, which is very little narrowed distally. The antennular peduncles and the antennal scales form a posterior continuation of the tube which extends backward as a broad channel

between the bases of the peduncles of the antennæ, where it is closed in below by the mandibular palpi, and separates either side of the labrum into the passages from the branchial chambers.

Solenocera siphonocera Miers.

Penæus membranaceus M.-Edwards, Hist. Nat. Crust., ii, p. 417, 1837 (non Risso?).

Peneus siphonoceros Philippi, Archiv Naturgesch., vi, p. 190, pl. 4, fig. 3, 1840.

Penæus siphonocerus Heller, Crust. südlichen Europa, p. 295, pl. 10, fig. 12, 1863.

Solenocera siphonocera Miers, Proc. Zool. Soc. London, 1878, p. 301, 1878.

Solenocera membranacea Bate, Ann. Mag. Nat. Hist., V, viii, p. 184, 1881.

Albatross collection, Gulf of Paria, station 2121, February 3, 1884, north latitude $10^{\circ} 37' 40''$, west longitude $61^{\circ} 42' 40''$, 31 fathoms, mud, temperature 67° . Three females.

I can find no characters by which to distinguish these American specimens from the Mediterranean species as described and figured by Philippi and Heller, although a direct comparison might show them to be of a distinct species.

The entire surface of the carapax and pleon is naked and glabrous. The carapax is slightly compressed laterally, and a little narrowed in front. There is a broad and shallow hepatic sulcus, and the cervical sulcus is very deep, reaches to the middle of the dorsum, where it slightly notches the dorsal carina, and is bordered posteriorly by a sharp and slightly carinated margin. There is a distinct supraorbital tooth, the antennal spine is stout and dentiform, the inferior angle ends in an acute spine about as large as the hepatic, and back of the orbit and above the antennal spine there is a large, prominent, and acute spine. Back of the cervical sulcus the dorsal carina is prominent and sharp nearly to the posterior margin, and in front it rises rapidly in a high crest terminating in the nearly straight rostrum, which is rather high, strongly compressed at base, and regularly tapered to an acute tip, and which is armed above nearly to the tip with four to six teeth, besides two to four upon the dorsal crest back of the orbit.

The eyes are black, large, swollen, approximately hemispherical, and very slightly flattened above.

The tube formed by the flagella of the antennulæ is a little longer than the carapax including the rostrum, and its diameter about that of the penultimate segment of the antennular peduncle. The antennal scale is approximately half as long as the carapax including the rostrum, and more than a third as broad as long. The antennal flagellum is slender, subcylindrical, and at least twice as long as the rest of the animal.

The proportions of the peræopods are sufficiently indicated in the accompanying table of measurements.

The third, fourth, fifth, and sixth somites of the pleon are dorsally carinated, the carina is sharp and high on the last three somites, and

the posterior margins deeply incised in the middle on the third, fourth, and fifth. The sixth somite is short, not more than a fourth longer than the fifth, and fully three-fourths as high as long. The telson is much longer than the sixth somite, has a conspicuous dorsal sulcus, which becomes broad and shallow posteriorly, and of which the margins terminate in a small spiniform process either side of the long and rather broad but acute tip. The inner lamella of the uropod is shorter than the telson, ovate-lanceolate, and about a third as broad as long. The outer lamella is approximately as long as the telson, more than a third as broad as long, and semi-elliptical, the outer margin being straight and extending to the extreme end of the lamella.

In general appearance this species strikingly resembles *Hymenopencus modestus*, described above. The form of the carapax is very similar, although there are marked differences in the rostrum, dorsal carina, and the spines of the anterior margin, as shown in the descriptions. The pleon alone would be scarcely distinguishable from that of the *Hymenopencus*.

Measurements in millimeters.

Catalogue number	7266	7266
Station	2121-2	2121-2
Sex		
Length from tip of rostrum to tip of telson	43	69
Length of carapax including rostrum	14.0	23.4
Length of rostrum	3.5	7.6
Height of carapax	8.0	11.3
Breadth of carapax	6.0	8.5
Length of eye-stalk and eye	4.0	6.0
Greatest diameter of eye	3.1	5.0
Length of antennal scale	7.2	11.7
Breadth of antennal scale	2.6	4.1
Length of second gnathopod	21	32
Length of first peræopod	14	22
Length of carpus	3.7	6.0
Length of chela	2.7	3.8
Breadth of chela	0.8	1.1
Length of dactylus	1.7	2.6
Length of second peræopod	20	31
Length of carpus	7.0	12
Length of chela	3.0	4.4
Breadth of chela	0.6	0.9
Length of dactylus	1.8	2.8
Length of third peræopod	26	43
Length of merus	6.5	12.0
Length of carpus	11.7	20.0
Length of chela	3.5	5.2
Breadth of chela	0.5	0.8
Length of dactylus	2.0	2.9
Length of fourth peræopod	21.5	33
Length of merus	5.0	8.0
Length of carpus	5.7	9.7
Length of propodus	3.7	5.2
Length of dactylus	2.6	4.0
Length of fifth peræopod	31	44
Length of merus	7.5	11.5
Length of carpus	8.0	12.0
Length of propodus	8.0	12.7
Length of dactylus	3.0	5.0
Length of sixth somite of pereon	5.0	7.5
Height of sixth somite of pereon	3.7	6.5
Length of telson	6.0	11.5
Length of inner lamella of uropod	4.8	9.0
Breadth of inner lamella of uropod	1.6	3.0
Length of outer lamella of uropod	6.2	10.0
Breadth of outer lamella of uropod	2.4	3.9

Bate incorrectly gives "Fabr." as authority for the name *membranacea*, and, apparently not having read Philippi's description, misapprehends the structure and purpose of the antennular flagella.

Xiphopeneus Smith.

This genus, which has been united with *Penæus* by Miers and Kingsley and is not referred to by Bate, is apparently a valid one. It differs from the three genera already defined in the great length of the fourth and fifth peræopods, of which the propodi are multiarticulate and flagelliform, as in *Benthæcetes*. [This is characteristic of the female as well as the male.] It agrees with *Penæus* and *Parapenæus* and differs from *Hymenopenæus* in the form of the mandibular palpus. It agrees with *Parapenæus* and *Hymenopenæus* and differs from *Penæus* in the short and unsegmented endognath of the first maxilla and in having no branchiæ on the fourteenth somite; and it agrees with *Hymenopenæus* and differs from *Penæus* and *Parapenæus* in the long flagella of the antennulæ. The branchio-epipodal formula is the same as in *Parapenæus constrictus*. In the type species the epipod of the maxilliped is prolonged in a slender but not segmented tip, and there are exopods at the bases of all the peræopods.

Xiphopeneus Kroyeri.

Penæus Kroyeri Heller, Sitzungsber. Acad. Wiss. Wien, xlv, p. 425, pl. 2, fig. 51, 1862.

Xiphopeneus Harttii Smith, Trans. Conn. Acad., ii, p. 28, pl. 1, figs. 1-1b, 1869.

I have seen only the type specimens of my *X. Harttii*.

Aristeus ? foliaceus.

? *Penæus foliaceus* Heller, Sitzungsber. Akad. Wiss. Wien, xlv, p. 424, pl. 2, fig. 50, 1862.

Station 2143, March 23, 1884, Gulf of Darien, north latitude $9^{\circ} 30' 45''$, west longitude $76^{\circ} 25' 30''$, 155 fathoms, green mud. One male (7264).

This specimen represents a species congeneric with my *Aristeus ? tridens*, but specifically very distinct from it. I refer it doubtfully to the Mediterranean species described by Heller as *Penæus foliaceus*, although it agrees well with the outline figure of the carapax and the short description given by that author.

The carapax is similar to that of *A. ? tridens*, but the rostrum is longer and armed with many more teeth, there is a well-developed hepatic spine, and the anterior margin retreats very much more from the antennal to the branchiostegial spine. The rostrum is longer than the rest of the carapax, with a high dorsal crest extending further forward than in *A. ? tridens* and armed with five long spiniform teeth directed forward, of which the second is highest and over the posterior part of the margin of the orbit, and the fifth considerably in front of the eye, while the terminal portion of the rostrum beyond the fifth tooth is nearly straight, directed slightly upward and armed with four

teeth, the last of which is some distance from the acicular tip. The rostrum is unarmed below. The surface of the carapax, and parts of that of the pleon also, are clothed with very short and dense pubescence.

The eyes are much larger than in *A. ? tridens*, nearly spherical, much larger than the slender and nearly cylindrical stalks, and black.

The proximal segment of the peduncle of the antennula is deeply excavated above and armed with a slender lateral process tipped with an acicular and slightly out-curved spine, just in front of which there is a similar spine terminating the distal angle of the segment itself. The antennæ are very nearly as in *A. ? tridens*.

The crowns of the mandibles are as in *A. ? tridens*, but the palpi differ conspicuously, the proximal segment being slightly shorter and the distal very much longer, nearly as long as the proximal, with the lateral expansion at the base narrow and more prominent, and the distal portion twice as long as broad. The palpus is in fact more like Miers's figure of the palpus of *A. Edwardsianus* than that of *A. ? tridens*. The maxillæ are as in *A. ? tridens*. The protopod and the two proximal segments of the endopod of the maxilliped are also as in that species, but the third segment of the endopod is less than half as broad as long, the terminal segment is a third as long as the penultimate and scarcely half as broad as long, and the exopod terminates in a short but acuminate, slender, multiarticulate and flagelliform tip. The endopod of the first gnathopod is like that of *A. ? tridens*, but the exopod is large, as in the typical species of *Penæus*, being nearly twice as long as the endopod, and stout. The second gnathopod is very nearly as in *A. ? tridens*.

The number and arrangement of the branchiæ are the same as in *A. ? tridens*, but the pleurobranchia of the eighth somite is rudimentary and that of the ninth small. There are no exopods at the bases of any of the peræopods, which in other respects are very similar to those of *A. ? tridens*.

The general form of the pleon is very similar to that of *A. ? tridens*, but the dorsal spines of the third and fourth somites are very small, no larger than that of the fifth somite, and the pleura of the third, fourth, and fifth are evenly rounded instead of angulated posteriorly.

The telson is nearly a third longer than the sixth somite, regularly and acutely triangular, dorsally and laterally sulcated to near the very slender and acute tip, and armed with three or four pairs of lateral spinules which increase in size distally, and of which the last pair are approximately twice their length from the tip. The inner lamella of the uropod is nearly as long as the telson, ovate-lanceolate, and nearly four times as long as broad. The outer lamella is more than a third longer than the inner, more than four times as long as broad, and ovately pointed.

The pleopods are nearly as in *A. tridens*, but the sexual appendage of the first pair in the male is smaller, much narrower, and apparently not fully developed, the specimen probably being immature. The sterna of the four anterior somites of the pleon are each armed with a laterally compressed median tooth, which is very prominent on the first and diminishes in size successively on the succeeding somites.

Measurements in millimeters.

Sex.....	♂
Length from tip of rostrum to tip of telson.....	110
Length of carapax including rostrum	56
Length of rostrum	31.3
Height of carapax	12.0
Breadth of carapax.....	10.5
Length of eye-stalk and eye	5.6
Greatest diameter of eye	4.0
Length of antennal scale	15.0
Breadth of antennal scale	6.3
Length of second gnathopod.....	33
Length of first peræopod	27
Length of chela	6.6
Breadth of chela	1.3
Length of dactylus.....	3.7
Length of second peræopod.....	35
Length of chela.....	7.5
Breadth of chela	1.2
Length of dactylus.....	4.5
Length of third peræopod	41
Length of merus	13.5
Length of carpus.....	12.5
Length of chela.....	8.6
Breadth of chela	1.2
Length of dactylus.....	5.1
Length of fourth peræopod.....	41
Length of merus	13
Length of carpus.....	9.5
Length of propodus	8.9
Length of dactylus.....	3.8
Length of fifth peræopod.....	42
Length of merus	12.7
Length of carpus.....	9.5
Length of propodus	9.4
Length of dactylus.....	3.7
Length of sixth somite of pereon	11.3
Height of sixth somite of pereon	8.0
Length of telson	14.0
Length of inner lamella of uropod	13.0
Breadth of inner lamella of uropod	3.5
Length of outer lamella of uropod	19.5
Breadth of outer lamella of uropod	4.5

NEW HAVEN, CONN., April 29, 1885.



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