

The second pair of antennæ is longer than the animal, and supports a broad scaphocerite that terminates in a sharp point.

Length, entire (male),	.	.	.	.	.	120 mm. (4.7 in.).
„ of carapace,	.	.	.	.	.	38 „
„ of rostrum,	.	.	.	.	.	20 „
„ of pleon,	.	.	.	.	.	82 „
„ of third somite of pleon, including tooth (1 mm.),	.	.	.	.	.	18 „
„ of sixth somite of pleon,	.	.	.	.	.	15 „
„ of telson,	.	.	.	.	.	21 „

Habitat.—Station 310, January 10, 1876; lat. 51° 27' 30" S., long. 74° 3' 0" W.; Sarmiento Channel, Patagonia; depth, 400 fathoms; bottom, blue mud; bottom temperature, 46°·5. One specimen, male. Trawled.

This is one of the largest species of the genus, and is noticeable from having the carina on the first somite of the pleon, or at least on the posterior half, whereas in all other species this somite is free from great compression or dorsal elevation. The carina on the carapace extends to within a short distance of the posterior border, and is marked by a notch above the cardiac region. The rostrum is short, being only half the length of the carapace, and is styliform and slightly elevated anteriorly.

The scaphocerite is about the same length as the rostrum, and terminates in a sharp point formed by the tooth that arms the extremity of the outer margin. It is broader at the base than in most species, and the tooth on the distal angle of the second joint is sharp, strong, and furnished with long hairs on the lower surface.

The two anterior pairs of pereopoda are slender and chelate. The two following are slender and terminate in a styliform dactylos, and the posterior pair is short. None of them have teeth or spines on the ischium or meros, but only a fringe of hairs.

Acantheephyra acutifrons, n. sp. (Pl. CXXVI. fig. 3).

Carapace laterally compressed and dorsally carinated in its entire length but especially over the frontal region, which is produced to a short, strong, sharp, laterally compressed rostrum, reaching nearly to a level with the extremity of the scaphocerite; the under margin is furnished with a denticular prominence, from which point to the base there is a longitudinal brush of hairs; the dorsal crest is armed with eleven teeth, which extend from the gastric region to half the length of the rostrum.

The dorsal surface of the pleon is carinated from the first to the last somite, and the four posterior somites are each posteriorly produced to a strong tooth, of which the anterior is the most important.

The telson is without a carina and is slightly grooved in the median line; it is armed on each side with three or four small spinules, and four on the terminal extremity.

The ophthalmopoda suddenly enlarge from the pedicle and carry a prominent tubercle on the inner distal extremity, just behind the ophthalmus, which is of a brown colour in our preserved specimen. The other appendages do not exhibit features of any peculiar specific value.

Length, entire,	.	.	.	.	.	81 mm. (3.1 in.).
„ of carapace,	.	.	.	.	.	30 „
„ of rostrum,	.	.	.	.	.	9 „
„ of pleon,	.	.	.	.	.	51 „
„ of third somite of pleon, including tooth (2 mm.),	.	.	.	.	.	12 „
„ of sixth somite of pleon,	.	.	.	.	.	9 „
„ of telson,	.	.	.	.	.	16 „

Habitat.—Station 191, September 23, 1874; lat. 5° 41' S., long. 134° 4' 30" E.; off the Arrou Islands; depth, 800 fathoms; bottom, green mud; bottom temperature, 39°·5. One specimen, male. Trawled.

Station 213, February 8, 1875; lat. 5° 47' N., long. 124° 1' E.; near the Philippine Islands; depth, 2050 fathoms; bottom, blue mud; bottom temperature, 38°·8. One specimen, male. Trawled.

Length, 71 mm.

Station 214, February 10, 1875; lat. 4° 33' N., long. 127° 6' E.; south of the Philippine Islands; depth, 500 fathoms; bottom, blue mud; bottom temperature, 41°·8. One specimen, female (?). Trawled.

Length, 55 mm.

This species may easily be recognised by the shortness of the rostrum, which scarcely reaches beyond the extremity of the peduncle of the first pair of antennæ, and by the largely elevated character of the carina on the third somite of the pleon, the terminal point or tooth of which, instead of being directed straight backwards, is depressed.

The ophthalmi (fig 3a) are small and of a brown colour; the stalk is a little compressed on the upper side and the inner angle is anteriorly produced to a tubercle that encroaches upon the ophthalmus, but the ocellus, which is present in so many of these species, is small and connected with the ophthalmus.

There is nothing besides very distinguishing in the character of the species, except that the three posterior pairs of pereiopoda have the inferior margin armed with teeth that are longer and more spinous than usual.

Observations.—The distinction between the specimens, besides that of dimensions, appears to depend upon the character of their habitats. That which was taken from the deeper water is softer in its external tissue.

A comparison of these three specimens with each other, and with the genera *Tropirinus* and *Hymenodora*, shows how gradually varieties pass into species.

AcanthePHYra kingsleyi, n. sp. (Pl. CXXVI. fig. 4).

Carapace anteriorly compressed and longitudinally produced to a small rostrum, armed on the upper surface with four small teeth and on the lower with one on the distal portion.

Pleon carinated from the second to the sixth somite. Third somite produced to a tooth at the posterior median line.

Telson shorter than the inner plates of the rhipidura.

Ophthalmopoda pear-shaped and furnished with an ocellus (fig. 4a).

Length, entire,	61 mm. (2.45 in.).
„ of carapace,	16 „
„ of rostrum,	9 „
„ of pleon,	45 „
„ of third somite of pleon, including tooth (2 mm.),	12 „
„ of sixth somite of pleon,	9 „
„ of telson,	11 „

Habitat.—Station 104, August 23, 1873; lat. 2° 25' N., long. 20° 1' W.; Atlantic, south-west of Sierra Leone; depth, 2500 fathoms; bottom, Globigerina ooze; bottom temperature, 36°·6. One specimen, male. Trawled.

The rostrum of this species is short in comparison with that of most other species, being about half the length of the carapace. The upper margin is horizontally in a line with the carapace, but the lower margin obliquely tapers to the apex. A single tooth stands beyond the middle of the lower margin, just under the second tooth of the upper; immediately behind and in advance of the eyes is a long brush or fringe of hairs.

The peduncle of the first pair of antennæ is long, reaching to about half the length of the rostrum; the stylocerite is nearly as long, and the flagella are longer than the carapace.

The scaphocerite of the second pair is about one-third longer than the rostrum, and narrows gradually to an obtuse point that is armed on the outer side with a tooth.

The carina on the dorsal surface of the pleon is not strong and the tooth of the third somite lies so closely pressed against the surface of the fourth that, without close observation, it looks like part of the carina.

AcanthePHYra brevirostris, n. sp. (Pl. CXXVI. figs. 5, 6).

Carapace dorsally carinated and anteriorly produced to a rostrum that is about one-fourth the length of the carapace, and armed on the upper margin, from the gastric region to the apex, with nine or ten small teeth, and with or without one on the lower margin.

The pleon is smooth to the fourth somite, which dorsally projects to a small tooth in the median line, and a similar tooth is also present on the fifth.

The ophthalmopoda are short and pyriform.

The first pair of antennæ has the peduncle subequal in length with the rostrum, and the scaphocerite reaches considerably beyond it.

Length, entire,	41 mm. (1.6 in.).
„ of carapace,	14 „
„ of rostrum,	4 „
„ of pleon,	27 „
„ of third somite of pleon,	4 „
„ of sixth somite of pleon,	6.5 „
„ of telson,	8.5 „

Habitat.—Station 107, August 26, 1873; lat. $1^{\circ} 22' N.$, long. $26^{\circ} 36' W.$; Atlantic, south-west of Sierra Leone; depth, 1500 fathoms; bottom, Globigerina ooze; bottom temperature, $37^{\circ}.9$. Two specimens. Trawled.

The carapace is slightly carinated and anteriorly produced to a rostrum that is scarcely one-fourth the length of the carapace, and is armed on the upper surface with nine small teeth; the orbit is deeply excavate, and from the middle a ridge runs obliquely to the hepatic sulcus, whence it passes to the posterior margin.

The pleon has the first three somites dorsally smooth; the three succeeding somites have a minute tooth in the median line, and the telson (fig. 6z) is long, tapering, and grooved in the median line, the ridges of the groove being furnished with small spinules.

The ophthalmopoda (fig. 6a) are short, about half the length of the rostrum, pyriform in shape, and furnished with an ocellus that is only partially detached from the ophthalmus; on the outer side of the ophthalmopod, beyond the margin of the ophthalmus, is a small but prominent process.

The first pair of antennæ has the peduncle reaching beyond the apex of the rostrum, and the second pair has the scaphocerite longer than the peduncle of the first.

The pereopoda are all broken off.

The first pair of pleopoda (fig. 6p) is biramose, having the inner branch membranous.

The sixth pair has the branches slightly unequal, the inner being subequal with the telson and the outer longer.

Observations.—In the same bottle was a second specimen (fig. 6) which was found associated with it, and which differs from the preceding description in having ten teeth on the upper margin of the rostrum, and in having a small tooth on the lower margin, just beyond the distal extremity of the ophthalmopoda. In this specimen the first pair of pereopoda is preserved and shows that it is a feeble and slender chelate organ. The two specimens in all other points correspond very closely; the latter is rather larger and

generally more robust; they may be only sexually distinct from each other, and, since they were taken in the same haul together, it is difficult to believe they are more than varieties of the same species.

This species resembles *Acantheephyra kingsleyi*, which may, however, be distinguished from it by having only four teeth on the upper margin of the rostrum, which is also proportionately longer, by the peduncle of the first pair of antennæ being shorter than the rostrum, and by the presence of a strong tooth on the posterior margin of the third somite.

Acantheephyra brachytelsonis, n. sp. (Pl. CXXVI. fig. 7).

Rostrum a little longer than the carapace, obliquely elevated, armed on the upper surface near the base with six small teeth, from which point it is smooth to the apex, the lower margin has one tooth about one-third its length from the apex, and two near together about one-third from the base of the rostrum. The third somite of the pleon is posteriorly produced to a long tooth, which reaches to about three-fourths the length of the next somite when the animal is extended, at which point a small depression marks its limit. The two succeeding somites are posteriorly produced to a point, but scarcely sufficient to be called a tooth; and the sixth is produced to a small one. The telson is smooth and shorter than the outer plates of the rhipidura.

	Male.	Female.
Length, entire, . . .	65 mm. (2.5 in.).	51 mm. (2 in.).
„ of carapace, . . .	19 „	15 „
„ of rostrum, . . .	19 „	12 „
„ of pleon, . . .	46 „	36 „
„ of third somite of pleon, } including tooth (3 mm.), }	14 „ { including tooth (2 mm.), }	9 „
„ of sixth somite of pleon, .	10 „	7 „
„ of telson, . . .	13 „	10 „

Habitat.—Station 170, July 14, 1874; lat. 29° 55' S., long. 178° 14' W.; off the Kermadec Islands; depth, 520 fathoms; bottom, volcanic mud; bottom temperature, 43°. Four specimens; three males and one female. Trawled.

Station 170A, July 14, 1874; lat. 29° 45' S., long. 178° 11' W.; north of the Kermadec Islands; depth, 630 fathoms; bottom, volcanic mud. Four specimens. Trawled.

Length 75 mm.

Station 171, July 15, 1874; lat. 28° 33' S., long. 177° 50' W.; north of the Kermadec Islands; depth, 600 fathoms; bottom, hard ground; bottom temperature, 39°.5. One specimen. Trawled.

Length, 65 mm.

Station 194, September 29, 1874; lat. 4° 34' N., long. 129° 57' 30" E.; off Banda Island; depth, 200 fathoms; bottom, volcanic mud. Two specimens. Trawled.

Station 214, February 10, 1875; lat. $4^{\circ} 33' N.$, long. $127^{\circ} 6' E.$; south of the Philippine Islands; depth, 500 fathoms; bottom, blue mud; bottom temperature, $41^{\circ} \cdot 8$. Three specimens. Trawled.

Length, male 78 mm., female 67 mm.

Station 232, May 12, 1875; lat. $35^{\circ} 11' N.$, long. $139^{\circ} 28' E.$; *Hyalonema*-ground, Japan; depth, 345 fathoms; bottom, green mud; bottom temperature, $41^{\circ} \cdot 1$. Three specimens; two males and one female. Trawl and dredge both used. Variety.

Length, male 75 mm., female 46 mm.

Station 236, June 5, 1875; lat. $34^{\circ} 58' N.$, long. $139^{\circ} 29' E.$; south of Japan; depth, 775 fathoms; bottom, green mud; bottom temperature, $37^{\circ} \cdot 6$. One specimen, female. Trawled.

Length, 75 mm.

Station 318, February 11, 1876; lat. $42^{\circ} 32' S.$, long. $56^{\circ} 29' W.$; north of the Falkland Islands; depth, 2040 fathoms; bottom, blue mud; bottom temperature, $33^{\circ} \cdot 7$. Four specimens; three males, one female. Trawled.

Length, male 66 mm., female 50 mm.

In this species there is a depression on the dorsal surface of the carapace corresponding with the cervical suture, which is connected with a lateral ridge that runs longitudinally from near the posterior margin of the hepatic region, and separates it and other regions from the branchial.

The ophthalmus (fig. 7a) is brown in colour, rather small, and the ocellus is not beyond the margin of the cornea.

The scaphocerite is shorter than the rostrum, and though it terminates in a small tooth, the inner squamose portion of the plate is more produced than usual and rounded at the extremity.

Observations.—The specimens vary somewhat in the number of the small teeth situated on the posterior dorsal surface of the rostrum; of the four taken at Station 170, two had six and two had seven, and one of those that had six above had four below, the fourth being situated close to the posterior; those that had seven above had only three below. Of the three specimens taken at Station 232, one had seven teeth on the dorsal crest, and three on the lower margin of the rostrum, one had eight on the crest and three on the inferior margin of the rostrum, and the third had nine on the dorsal crest and four on the lower margin of the rostrum. Of the three specimens taken at Station 214, two had seven teeth on the dorsal crest and the third had six, and all had three on the lower margin of the rostrum.

At Station 194 two small specimens were taken that must be considered as belonging to this species, with which they correspond in most points, excepting that the rostrum is not so long as the carapace and scarcely as long as the scaphocerite.

Acanthephyra approxima, n. sp. (Pl. CXXVI. fig. 8).

Carapace dorsally compressed, and carinated from the posterior margin to the rostrum, which is broken, slender almost from the base, and armed with seven teeth on the upper surface, the four posterior of which are small and closely packed together, the other three are larger, and the most anterior corresponds with the posterior on the lower margin, at which point the rostrum is broken. The first somite of the pleon is slightly carinated on the dorsal surface, the second is conspicuously so, the third and three following are carinated and produced posteriorly to a well-developed tooth.

The telson is anteriorly slightly carinated and terminates in a small brush-like extremity that does not reach beyond the distal extremity of the inner branch of the rhipidura.

Length, entire,	.	.	.	.	.	45 mm. (1.8 in.).
„ of carapace,	.	.	.	.	.	12 „
„ of rostrum,	.	.	.	.	.	? „
„ of pleon,	.	.	.	.	.	33 „
„ of third somite of pleon, including tooth (1 mm.),	.	.	.	.	.	7 „
„ of sixth somite of pleon,	.	.	.	.	.	7 „
„ of telson,	.	.	.	.	.	8 „

Habitat.—Station 310, January 10, 1876; lat. 51° 27' 30" S., long. 74° 3' 0" W.; Sarmiento Channel, Patagonia; depth, 400 fathoms; bottom, blue mud; bottom temperature, 46°·5. One specimen. Trawled.

The carapace is dorsally carinated from the posterior to the frontal margin, where it is produced to a rostrum that is armed on the upper surface at the base with four closely compressed teeth, and with three more separated on the rostrum, and one on the lower surface corresponding with the most distal on the upper, at which point the rostrum is broken.

The frontal margin beyond the second antennal tooth obliquely recedes until it reaches a point defined by the branchial margin of the carapace abruptly forming a sharp bend that is marked by an angle, which is posteriorly increased to a ridge that traverses the carapace from the anterior to the posterior regions. On the outer side of this ridge the surface lies at right angles with the rest of the carapace.

The pleon has the lateral walls perpendicular until they recede to the dorsal carina, which commences and ends abruptly on the second somite; it recommences on the third also abruptly, but is produced posteriorly to a long tooth at the posterior margin, and this is repeated in each of the following somites, the under surface of the tooth corresponding closely with the outline of the next somite, so that when the animal is extended the denticular character becomes a knife-like edge.

The telson (fig. 8z) is long, narrow, and tapering; it is longitudinally angulate in the dorsal centre and laterally compressed, the angle formed by the lateral compression being armed with three minute spinules, and the distal extremity with several small spines.

The ophthalmopoda (fig. 8a) are too stout at the base to be defined as pear-shaped. They are rather oblong, with the ophthalmus a little broader in diameter than the peduncle, and furnished with an imperfect ocellus that is connected with the ophthalmus laterally.

The first pair of antennæ has two flagella that are subequal in length with the carapace; the upper is much more robust than the lower, and has the inferior margin narrow and thickly fringed with membranous cilia. The peduncle is three-jointed; the first joint is excavate to receive the ophthalmopod, and is furnished with a stylocerite that is subequal in length with the joint that carries it, and abruptly terminates in a sharp point; on the outer margin, at the posterior extremity of this joint, a process which is surmounted by a small tubercle crowned with hairs rises perpendicularly and projects between the outer canthus of the orbit and the first antennal tooth on the margin of the carapace, and there has the power, on the elevation of the antennæ, of being locked and supported by the short rigid antennal tooth, which stands on its outer side.

The second pair of antennæ carries a slender flagellum that is subequal with the length of the animal. The scaphocerite is about three-fourths the length of the rostrum; it is sharp-pointed and the squamous portion tapers to the apex, where it is reduced to a minimum, a circumstance that increases the efficiency of the organ as a weapon of offence, for which purpose it is rendered more effective by the manner in which it is supported in position by the teeth on the basal joint.

The oral organs have not been examined in this species, since there is only a single specimen in the collection.

The second pair of gnathopoda reaches nearly to a level with the tooth on the under surface of the rostrum, it is fringed with small hairs on the inner margin and obliquely truncate at the apex, where it is tipped with small spines.

The pereopoda are rather short, averaging a length that is subequal with the carapace, they are moderately robust and fringed on the posterior margins with hairs. The first two pairs are subequal with the others and have a long and narrow chelate hand, the fingers of which are subequal and about half the length of the palm. All the appendages, more especially the posterior, are brought close together in the median line, those on the two sides being in close contact.

The pleopoda are moderately long and robust. They possess a long, stout, laterally compressed basal joint that stands upon a rigid prominence, attached partly to the ventral surface of the pleon and partly to the inner wall of the coxal plate. The first pair has the branches unequal, in the only specimen of this species; the outer ramus is long, narrow, flexible, and rapidly tapering; the inner is short, almost rudimentary, and

furnished with a stylamblys near the apex, tipped with numerous cincinnuli. The other pleopoda have their branches subequal in length and a little broader than the first, and carry a long stylamblys, that diminishes in importance posteriorly, attached to the inner margin of the posterior branch, except in the posterior pair, which helps to form the rhipidura. The outer branch of this pair is armed with a tooth on the outer margin, coincident with the diæresis, and is as long as the telson.

Observations.—This species was taken associated with *Acantheephyra carinata*, which it resembles in the extent of the carinated condition of the dorsal surface from the rostrum to the telson, but the outline of the animal is less evenly arched, the pleon has the four posterior somites furnished each with a tooth of equal importance, and the rostrum, although broken off, is more slender at the base and proportionately longer. The ophthalmopoda are more cylindrical and the ophthalmus blacker, larger, and without a complete ocellus. The scaphocerite is not so broad at the base as in *Acantheephyra carinata*, but terminates in a point that is nearly as sharp. There is not much else in the specimen of specific importance, and if its rostrum be as long as the carapace and equally dentate, this specimen might be taken for a carinated variety of *Acantheephyra purpurea*, with the teeth on the frontal crest of the carapace a little more closely planted together.

Systellaspis,¹ n. gen.

Closely resembles *Acantheephyra*, but differs externally in the orbit being continued to the first antennal tooth and in the absence of a carina on the dorsal surface of the sixth somite of the pleon. The telson is dorsally grooved and terminates in a pointed extremity.

The ophthalmopoda are large, pyriform, furnished with an ocellus on the posterior surface and stand on long pedicles.

The scaphocerite tapers to the extremity, the inner division being rounded and the outer point being less conspicuous than in *Acantheephyra*.

A strong point or small tooth exists on the anterior margin of the first somite of the pleon, others are on the posterior margin of the fourth and fifth somites, half-way between the dorsal median line and the suture of union with the lateral coxal plates, and a pair of bolder teeth is repeated on the postero-lateral margin of the sixth somite.

Observations.—This genus is established chiefly on physiological grounds, the ova being very much larger and less numerous than in *Acantheephyra*, and I have frequently observed in closely allied forms that a difference in the size of the ovum means different stages at which the embryo quits the egg. In addition to this there are certain features in the specimen on which this genus is founded that enable us to distinguish it from

¹ συστήλλω, to compress; ἀσπίς, shield.

those species that more distinctly belong to *Acanthephyra*. Among these is the absence of a carina on the sixth somite of the pleon, which, in the type on which I establish the genus, is replaced by a longitudinal groove, also repeated on the dorsal surface of the telson. The telson, instead of being truncated as it usually is in *Acanthephyra*, has a central prolongation that tapers to a point and is armed on each side with a variable number of spines.

There is also a peculiar and prominent point that projects from the anterior margin of the first somite of the pleon.

Acanthephyra debilis, A. Milne-Edwards (judging by the figures and description of the author) belongs to this genus, since he remarks that the eggs are large in size and few in number. The Challenger species, however, differs from his, which is figured as having four teeth only on the dorsal crest and nine upon the upper surface of the rostrum, whereas *Systellaspis lanceocaudata* has seven teeth on the crest and seven on the rostrum. *Acanthephyra debilis* has the posterior margin of the fourth and fifth somites crenated, while on those of *Systellaspis lanceocaudata* there is but one small tooth between the dorsal median line and the ridge of the coxal plates. A. Milne-Edwards does not say whether the sixth somite is dorsally channelled or not, but he figures it as being without a carina or a tooth on the posterior margin.

Geographical Distribution.—Only two species are known. *Systellaspis lanceocaudata* was taken off the southern coast of Japan in 345 fathoms, and *Systellaspis (Acanthephyra) debilis*, A. Milne-Edwards, was taken in the West Indies at 500 fathoms.

Systellaspis lanceocaudata, n. sp. (Pl. CXXIV. fig. 7).

Carapace carinated on the anterior portion only and produced to a slender rostrum that is longer than the carapace; armed on the upper surface at the base with a crest of seven teeth close together, and beyond with seven on the rostrum that are more distant from each other; and on the lower margin with seven similar teeth.

The pleon has the first two somites without a carina; the third and fourth are slightly carinated and centrally produced to a small tooth, of which the anterior is the longer, and the two following are flanked with a small tooth on each side. The sixth somite is dorsally grooved, as also is the telson, which terminates in a long median point flanked by four or five small spines.

The ophthalmopoda are pear-shaped, narrow at the base, and carry a large ophthalmus, with an oval ocellus and two small tubercles close together on the inner side and one on the outer that invades the ophthalmus.

The chelæ of the two anterior pairs of pereopoda are short, narrow, and slender, the third and fourth pairs terminate in a long styliform dactylos, and the fifth pair in one that is short, curved and pointed.

Length, entire (female),	.	.	.	.	.	73 mm. (3 in.).
„ of carapace, .	.	.	.	.	.	17 „
„ of rostrum, .	.	.	.	.	.	21 „
„ of pleon, .	.	.	.	.	.	56 „
„ of third somite of pleon, .	.	.	.	.	.	5 „
„ of sixth somite of pleon, .	.	.	.	.	.	13 „
„ of telson, .	.	.	.	.	.	13 „

Habitat.—Station 232, May 12, 1875; lat. 35° 11' N., long. 139° 28' E.; *Hyalonema*-ground, off Japan; depth, 345 fathoms; bottom, green mud; bottom temperature, 41° 1. One specimen, female. Associated with *Acantheephyra brachytelsonis*. Trawl and dredge both used.

This species is interesting from its intermediate condition and from its resemblance in some points to the genus *Oplophorus*. It has a sharp and prominent tooth on the anterior margin of the first somite of the pleon, that is supported and strengthened by a small tubercle; this tooth, with the anterior margin, overlaps the posterior margin of the carapace. The orbital tooth is wanting, but the first antennal is large and projecting, as is also the second antennal tooth. There is no carina on the first and second somites of the pleon, but the third, fourth, and fifth somites are slightly carinated, the carina running to a posteriorly projecting tooth which decreases in size successively in each. The sixth somite is dorsally grooved and terminates without a tooth in the median line, but a well-formed tooth projects from the lateral margin half-way between the middle of the dorsal surface and the lateral articulation of the rhipidura.

The rostrum is narrow, long, depressed at the base, and then elevated to the apex, and strongly dentate with sharp spine-like teeth that are more closely placed over the frontal region than on the rostrum proper.

The ophthalmopoda are large and pear-shaped and supported on a slender stalk. They are situated at some distance from the median line, and on the outer side of the ophthalmus support a prominent tubercle, while on the corresponding inner side there are two small tubercles, and near the middle of the posterior surface, in a notch of the ophthalmus, stands an oval-shaped ocellus.

The first pair of antennæ is deeply excavate and carries a broad and laterally elevated stylocerite, the anterior margin of which is elevated into a transverse crest fringed with hairs, the whole of which forms a deep cup in which the eye lies and rests protected. The two succeeding joints of the antennæ are short and the flagella reach to half the length of the animal.

The second pair of antennæ has the scaphocerite tapering to the apex, but the squamous portion exists as a rounded extremity beyond the apical tooth, which is short and strong; at its base, standing on the second joint, is a long and powerful tooth, above which is a notch into which the scaphocerite falls when laterally extended, but there is no

strong ridge or tubercle on the under surface by which it is retained in position, as in the genus *Oplophorus*.

The fingers of the chelæ of the first two pairs of pereiopoda are long and slender, while the dactylos of the third and fourth pairs is long and styliform, and that of the fifth pair is short, stout, curved, unguiculate, serrate, and hidden amongst a brush of hairs more or less serrate and one strong spine at the extremity of the propodos.

The telson (fig. 7z) is subequal in length with the outer branch of the rhipidura, and terminates in a long and lance-like point of extreme sharpness, on each side of which are several small sharp spinules and one large one, from which the telson anteriorly gradually widens to the base. The dorsal surface is deeply grooved and the sides are compressed, the ridges so formed being armed with two distant rudimentary spinules.

Observations.—This species exhibits several features that are not common to those of the genus *Acantheephyra*, and are suggestive of an approximation to *Oplophorus*, but the resemblance is not complete.

It has some resemblance to *Acantheephyra purpurea*, but may readily be distinguished by the character of the orbit, the largeness of the eyes, the lateral teeth on the anterior margin of the first somite and on the posterior margins of the fourth and fifth somites of the pleon, by the dorsal groove and the absence of a tooth in the median line of the sixth somite, and by the form of the telson.

It closely resembles *Systellaspis* (*Acantheephyra*) *debilis*, A. Milne-Edwards, from which it may be determined by the number of the teeth on the dorsal crest of the carapace and by the absence of a crenated margin at the posterior dorsal surface of the fourth and fifth somites of the pleon.

Oplophorus, Milne-Edwards.

Oplophorus, Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 423.

Animal laterally compressed. Carapace about one-third the length of the body, dorsally carinated, and supported on each side by a subcarina, and anteriorly produced to a long and slender rostrum that is serrate on the upper and lower margins. Outer angle of the orbit defined by the first antennal tooth, which is curved inwards between the ophthalmopoda and the second pair of antennæ. The second antennal tooth is directed forwards and the fronto-lateral angle is produced to a tooth that is directed forwards and outwards, whence the lateral margin is abruptly directed inwards and so continues until it unites again, at the posterior angle, with a strongly projecting tooth. The posterior margin is but slightly produced laterally, and is compressed so as to be overlapped by the first somite of the pleon, and has a tubercle that corresponds

and is interlocked and articulates with the anterior margin of the first somite of the pleon.

The third and following somites of the pleon are posteriorly produced in the median line to long teeth, that correspond in form with the dorsal surface of the animal, so that when it is extended they rest upon the back in the form of a strong carina.

The telson terminates in a sharp point.

In some species there is also a tooth at the inferior margin of the coxal plate of the first somite of the pleon, which acts as a buffer against which the projecting tooth of the posterior angle of the carapace strikes when the animal rolls itself up.

The frontal surface of the margin near the orbit turns inwards and forms a sulcus, posteriorly narrowing to the hepatic region; anteriorly the outer canthus of the orbit appears to be lost or is coincident with the first antennal tooth, which is directed inwards and downwards and meets a small process attached to the upper surface of the peduncle of the second pair of antennæ, and so acts that when the scaphocerite is extended laterally it resists its return. The tooth that corresponds with the second pair of antennæ also assists in supporting the scaphocerite in an extended position. From the second antennal tooth to the fronto-lateral angle the margin descends vertically and is produced to a strong tooth that is directed outwards and forwards, the margin then turns abruptly inwards at right angles, and so continues along the lateral margin to a largely developed tooth at the posterior angle of the carapace. Near the middle of the lower border of the carapace there is a depression, not in the margin itself, but in the angle produced by a bent longitudinal curvature of it.

The ophthalmopoda are short and carry a large ophthalmus that has a circular ocellus closely impacted in its margin; on each side a small tubercle projects into the ophthalmus, and on the inner side, distant from the others, there is a small tubercle.

The first pair of antennæ has a short peduncle and carries two long flagella.

The second pair carries a long, strong scaphocerite, that tapers to a sharp point and is capable of being rigidly locked in position and unfixed at will, and a long and slender flagellum.

The mandibles have the psalistoma connected with a small molar process and support a synhipod of three joints.

The first pair of gnathopoda is subpediform, and has the terminal joints reflexed.

The second pair is five-jointed; the ischio-meral joint is flattened, strongly curved, and the basis carries a long and flat ecphysis.

The first two pairs of pereopoda are short, subequal, robust, and chelate, having the carpos short and uniarticulate. The following three pairs are short and terminate in a styliform dactylos, of which that of the posterior pair is somewhat the shortest; all carry a straight and rather broad basephysis, and attached to the coxa of each, except the posterior pair, is a small mastigobranchia that passes between the branchiæ.

The branchiæ consist of five pleurobranchial, five arthrobranchial, and one podobranchial plumes, as shown in the following table:—

Pleurobranchiæ,	.	.	.	...	...	1	1	1	1	1
Arthrobranchiæ,	.	.	.	...	1	1	1	1	1	...
Podobranchiæ,	.	.	.	1	...	...	...	...	...	...
Mastigobranchiæ,	.	.	.	1	1	1	1	1	1	...
				h	i	k	l	m	n	o

In its branchial arrangement it agrees with *Acanthephyra* and *Notostomus*.

Geographical Distribution.—The original specimens described by Milne-Edwards were received from New Guinea, and those of the Challenger were taken off the Fiji, Philippine, and Admiralty Islands. Another species has been described by A. Milne-Edwards, from a specimen taken off the Island of St. Domingo.

Observations.—This genus is a very interesting one. Judging from their appearance, the species are active and pugnacious animals. The long, sharp, and bayonet-like scaphocerites must be capable of inflicting a deep wound, and their power is increased by the serrate condition of the outer margin, a feature that is seen in *Thalassocaris* also. Their power of progression must also be great, as may be seen from an examination of the leading features. The teeth upon the dorsal surface of the pleon can be tightly compressed against the body; the appendages not utilized are capable of being drawn close to the animal, and its narrow form and polished sides seem fitted to enable it to shoot through the water. With the rostrum and outstretched scaphocerites it will be capable of a formidable attack on animals larger than itself. In regard to its power of defence the dermal tissue is strong and rigid, and when at rest with the pleon curved under the ventral surface, the dorsal teeth extended, and the scaphocerites and rostrum pointed outwards and forwards, it cannot be easily approached, and by the manner in which the posterior teeth on the lateral margins of the carapace are supported by those on the lower margin of the first somite of the pleon, the animal appears to be capable of resisting a strong charge from an attacking enemy.

Oplophorus typus, Milne-Edwards (Pl. CXXVII. fig. 1).

Oplophorus typus, Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 424, pl. xxv. bis, figs. 6, 7.

Rostrum subequal in length with the carapace, armed on the upper surface with six small teeth and on the lower with seven.¹ The tooth at the infero-posterior angle of the carapace is directed obliquely backwards and outwards.

Pleon subcarinated; posterior margin of the first two somites rounded, that of the three following produced into long and sharp-pointed teeth. Anterior margin of the

¹ Milne-Edwards says seven or eight little teeth on each border, but as some of them are rudimentary the number probably varies.

coxal plate of the first somite elevated to a strong rib, inferior margin smooth and rounded.

Telson slightly longer than the lateral plates of the rhipidura.

Ophthalmopoda short, pyriform, and furnished with a small circular ocellus.

First pair of antennæ having the stylocerite reduced to a small tooth.

Second pair of antennæ having the scaphocerite subequal in length with the rostrum, sharp pointed, and serrate on the outer margin; flagellum about half the length of the animal.

Length, entire (female),	.	.	.	.	.	46 mm. (1.8 in.).
„ of carapace,	.	.	.	.	.	14 „
„ of rostrum,	.	.	.	.	.	15 „
„ of pleon, .	.	.	.	.	.	32 „
„ of third somite of pleon, including tooth (7 mm.),	.	.	.	.	.	12 „
„ of sixth somite of pleon,	.	.	.	.	.	4 „
„ of telson, .	.	.	.	.	.	9 „

Habitat.—Station 196, October 13, 1874; lat. $0^{\circ} 48' 30''$ S., long. $126^{\circ} 58' 30''$ E.; near the Philippine Islands; depth, 825 fathoms; bottom, hard ground; bottom temperature, $36^{\circ} 9$. One specimen, female, laden with ova. Trawled.

Station 220, March 11, 1875; lat. $0^{\circ} 42'$ S., long. $147^{\circ} 0'$ E.; north of New Guinea; depth, 1100 fathoms; bottom, Globigerina ooze; bottom temperature, $36^{\circ} 2$. One specimen, female, laden with ova. Trawled.

This species was described by Milne-Edwards from specimens brought home by Quoy and Gaimard from New Guinea, but there are several points in it to which the author has not drawn attention, and which are of interest, and, so far as I am aware, peculiar to this form.

All the specimens in the collection are extremely compressed, and the sides deep and flattened, although Milne-Edwards says that “Le corps n'est pas comprimé.” The rostrum is produced obliquely upwards, and is sharp and styliform, and armed on both upper and under surfaces with several small teeth, of which those on the lower side are the more important. The anterior margin corresponding with the outer canthus of the orbit is pointed and curved inwards; the tooth that corresponds with the second pair of antennæ is long, spinous, and directed anteriorly, while that at the fronto-lateral angle is directed forwards and outwards; from this point to the posterior angle the inferior margin is abruptly bent inwards, forming a longitudinal ridge that is anteriorly confluent with the fronto-lateral tooth, and posteriorly with the tooth at the posterior angle of the carapace. But the most remarkable feature of the carapace is a lateral process on the posterior margin that projects and lies beneath a corresponding process of the anterior margin of the first somite of the pleon, and bolts down the carapace so securely that it is difficult to elevate it. On each side of the dorsal carina corresponding

with the gastric region is a small longitudinal crest which continues to the anterior margin.

The ophthalmopoda (fig. 1a) are of moderate proportions, projected on a short stalk or pedicle and furnished with a small marginal ocellus at the posterior surface of the ophthalmus, while at the inner and outer surfaces there is a small tubercle.

The first pair of antennæ (fig. 1b) has the peduncle very short; the first joint is deeply excavate and carries only a rudimentary stylocerite; the two succeeding joints are extremely short, and both flagella are long, the inner being very stout at the base, and suddenly narrowing to a slender filament.

The second pair of antennæ (fig. 1c) is remarkable for the peculiar styliform character of the scaphocerite, which is subequal in length with the rostrum; the outer margin is serrate, and the inner fringed with closely packed hairs to within one-third of the length from the apex; near the base of the outer margin on the under side is a curved process, and near the hinge another lying parallel to it. On the second joint there is a large sharp-pointed and rigid tooth, at the base of which is a notch or groove upon the upper surface, which corresponds with the small tubercles or curved processes on the under side of the scaphocerite, so that when the latter is thrown outwards these curved processes fall into the notch at the base of the tooth, while the inner shoulder of the scaphocerite lies under the posteriorly directed antennal tooth, and thus the scaphocerite becomes locked rigidly in a position that makes it a strong bayonet-like weapon of offence.

The mandibles (fig. 1d) consist of a concavo-convex psalistoma or incisive plate having a closely serrate margin of regular dentition—the central tooth and the one at the anterior extremity being the largest—terminating with the molar process, into the hollow formed by which the synnhipod falls; the latter organ is three-jointed, the terminal joint being short, broad, and fringed with hairs.

The first pair of gnathopoda (fig. 1h) is short and has the terminal joints broad, flat, and reflexed, fringed on the inner side with hairs and stiff spines; the basis carries a long ecphysis that is flat and fringed with long hairs, and to the coxa is attached a small and almost rudimentary mastigobranchial plate, and a similarly developed podobranchial plume.

The second pair of gnathopoda (fig. 1i) is subpediform, having the ischium long, flattened, curved, and fused with the meros, the carpos and propodos subequal, the latter terminating in a point and fringed with soft hairs. The basis is short and carries a long, flat ecphysis, fringed with hairs. The coxa carries a rudimentary mastigobranchial plate that at the anterior extremity is produced to a straight tooth and at the posterior to a curved one.

The first two pairs of pereopoda are chelate (fig. 1k), and are remarkable for the fusion of the meros and ischium into one joint, and the shortness of the carpos. The

first pair is shorter than the second and carries a longer basecphysis. The three terminal pairs of pereopoda are subcylindrical and terminate in a styliform dactylos; they all carry a basecphysis, which gradually decreases posteriorly, and each a mastigobranchial appendage, except the posterior pair. The mastigobranchiæ are small, but cannot be considered as rudimentary, since they carry a membranous plate that passes to a considerable distance between the branchial plumes, except the penultimate pair, which has only the rudimentary stalk. The branchiæ are long, the posterior pleurobranchial and arthrobranchial plumes being particularly so; the foliaceous plates are long and narrow.

The first two somites of the pleon are dorsally smooth and laterally broad, deep, and rounded anteriorly; the third, fourth, and fifth are dorsally produced posteriorly into a styliform tooth that is subequal in length to the next succeeding somite, against the surface of which they lie, forming a sharp carina when the animal is extended, but when the rhipidura is compressed against the ventral surface of the pereion the dorsal teeth are elevated into formidable defensive weapons. The lateral coxal plates attached to these three somites are lunate, being excavated on the anterior margin and convex on the posterior, so that they are produced to a point at the infero-anterior margin.

The pleopoda are all biramose and subfoliaceous, the inner margin of the anterior plate being furnished with a broad and flat stylamblys in the female, to which sex all our specimens belong. The posterior pair, which helps to form the rhipidura, is shorter than the telson; the inner plate is narrow and pointed, the outer is broad and carries a diæresis armed with a small tooth on the outer angle.

The telson is long, sharp, and style-like, dorsally flat and laterally compressed, with one or two obsolete spines.

The ova are large, somewhat ovate, and about one-eighth of an inch in length; they are not numerous, being about a dozen in number, and the embryo appears to quit the ovum in the Zoea condition.

Oplophorus longirostris, n. sp. (Pl. CXXVII. fig. 2).

Like *Oplophorus typus*, but it differs in having the rostrum nearly as long again as the carapace, having eleven teeth on the upper surface and eight on the lower, the tooth at the postero-inferior angle of the carapace pointed outwards and forwards, the scaphocerite much shorter than the rostrum, and the antero-inferior margin of the coxal plate of the first somite of the pleon slightly excavate and the inferior margin produced to a point or tooth.

The dorsal teeth on the third, fourth, and fifth somites of the pleon are posteriorly elevated. In all other points this species agrees with the type.

Length, entire,	55 mm. (2.2 in.).
„ of carapace,	17 „
„ of rostrum,	23 „
„ of pleon,	38 „
„ of third somite of pleon, including tooth (10 mm.),	17 „
„ of sixth somite of pleon,	4 „
„ of telson,	10 „

Habitat.—Station 174c, August 3, 1874; lat. $19^{\circ} 7' 50''$ S., long. $178^{\circ} 19' 35''$ E.; off Kandavu, Fiji Islands; depth, 610 fathoms; bottom, coral mud; bottom temperature, 39° . One specimen, female. Trawled.

Observations.—This species agrees very closely with that described by A. Milne-Edwards as *Oplophorus gracilirostris*, taken in 118 fathoms off the Island of St. Domingo in the West Indies, but as the author is silent upon what appears to be a distinguishing feature of this species, namely, the inferior margin of the first somite of the pleon being produced to a point or tooth, I think that this specimen is very probably different from that found in the West Indies, but a wonderfully close representative of it at the antipodes.

There is only one specimen in the collection, and it has been attacked by a parasite that is attached to the pleon, and fills the ventral space from the first to the third somite with a number of small egg-like bodies united in strings, end to end, increasing in size as they proceed, which will be reported on by Dr. Hoek in the Appendix.

Oplophorus brevirostris, n. sp. (Pl. CXXVII. fig. 3).

Rostrum short, about two-thirds the length of the carapace, armed on the upper surface with eight small teeth and seven on the lower; postero-inferior angle of the carapace having the tooth directed outwards and forwards, and having the scaphocerite longer than the rostrum.

First somite of the pleon having the antero-inferior margin of the carapace excavate but not inferiorly produced to a point or tooth; the teeth on the pleon are parallel with the dorsal surface when extended. In most other points this species agrees with *Oplophorus typus*.

Length, entire,	40 mm. (1.5 in.).
„ of carapace,	14 „
„ of rostrum,	8 „
„ of pleon,	26 „
„ of third somite of pleon, including tooth (5.5 mm.),	10 „
„ of sixth somite of pleon,	4 „
„ of telson,	9 „

Habitat.—Station 207, January 16, 1875; lat. $12^{\circ} 21'$ N., long. $122^{\circ} 15'$ E.; off Tablas Island; depth, 700 fathoms; bottom, blue mud; bottom temperature, $51^{\circ} 6$. One specimen. Trawled.

This species in its general characters is very close to *Oplophorus typus*, only differing in such slight features that it is difficult to consider it as being more than a variety.

One peculiar feature worthy of notice is the translucent character of the carapace over the branchial region, so much so that the branchial plumes may be seen distinctly through it and their form determined.

Campylonotus, n. gen.¹

Carapace longitudinally ribbed, anteriorly produced to a strong, laterally compressed, and deep rostrum, armed on the upper and lower margins with strong teeth; frontal margin having a first and second antennal tooth strongly developed at the anterior extremity of the longitudinal ridges, which are most conspicuous at the anterior extremity of the carapace. There is no supraorbital or hepatic tooth, and the rest of the carapace is smooth except for a small more or less dentate carina on the dorsal crest.

The pleon is smooth and the somites subequal, the third being dorsally arcuate and the sixth a little longer than the preceding.

The telson is long, gradually tapering to a point, dorsally smooth, and laterally compressed.

The ophthalmopoda are short and have a large subglobose ophthalmus, but carry no distinct ocellus.

The first pair of antennæ is biflagellate, and carries a strong stylocerite that is produced to a sharp point.

The second pair of antennæ carries a long, slender flagellum, and a scaphocerite that is broad, well developed, and strengthened by a longitudinal ridge that traverses the middle of the plate.

The mandibles are short, robust, and deeply inserted within the oral cavity, have the molar process and psalistoma connected by a serrate ridge, and carry a biarticulate synnhipod.

The first pair of gnathopoda has the terminal joints large and reflexed against the inner side of the preceding. The basal joint carries a long and slender ephysis, and the coxa a small mastigobranchial plate that supports a podobranchial plume.

The second pair of gnathopoda is pediform, six-jointed, carries a multiarticulate basecephysis, and the coxa supports a small mastigobranchia but no podobranchial plume; a small arthrobranchial plume arises from the membranous articulation connecting the leg with the somite.

The first two pairs of pereopoda are chelate, the anterior pair being smaller than the second. The three succeeding pairs are simple, and a small rudimentary mastigobranchia that terminates in a strong curved point is attached to the coxa of each pair of pereopoda excepting the posterior. None of the pereopoda carry a basecephysis.

¹ καμπύλος, curved; ὠψος, back.

The ventral surface of the pereion is armed with three pairs of styliform teeth situated between the coxa of the two or three anterior pairs of pereiopoda.

Observations.—This genus corresponds much with *Gonatonotus*, A. Milne-Edwards, described from specimens taken in the West Indies by M. A. Agassiz during the expedition of the "Blake," and which he says approximates to *Oplophorus*.

Campylonotus differs, however, in general appearance from *Gonatonotus* in having no carinated tubercle on the third somite of the pleon, and in not having a finely serrate carina on the dorsal median line of the carapace, but three or four large teeth in place of it. It also differs structurally in having no basecephysis ("petit palpiform appendice") attached to the pereiopoda, while small basecephyses exist on all the pereiopoda of *Gonatonotus*, and in having the propodos of the second pair articulated near the middle and not inserted into an excavation in the anterior margin of the carpos.

It corresponds with Goës' genus *Caridion*, except in not having the carpos biarticulate. In *Caridion* also, judging by the European type, the second pair of pereiopoda is longer than, but not so stout as, the first, and the carpos is as short, and articulates with the propodos as in *Campylonotus*.

The branchiæ correspond more nearly with those of several genera of the Polycarpidea, such as *Pandalus*, *Heterocarpus*, and *Merhippolyte*, in which the mastigobranchiæ are short and rudimentary, rather than with those in its nearer congeners, *Palæmon* and *Oplophorus*, among the Monocarpidea. The arrangement of the branchiæ is given in the following table:—

Pleurobranchiæ,	.	.	.	...	r	1	1	1	1	1
Arthrobranchiæ,	.	.	.	...	1	1	1	1	1	...
Podobranchiæ,	.	.	.	1	...	...	...	...	...	...
Mastigobranchiæ,	.	.	.	1	r	r	r	r	r	...
				h	i	k	l	m	n	o

The mastigobranchial plate of the second pair of siagnopoda extends posteriorly as far as the penultimate pleurobranchiæ, and has the extremity tipped with long hairs that reach to the posterior limit of the branchial chamber.

Geographical Distribution.—The specimens of this genus were taken most abundantly in the channels among the rocky islands off the western coast of Patagonia, some specimens having been taken at every station at which the Challenger dredged in that locality.

The sexes are nearly equally abundant, but the males are smaller than the females, and the ova are moderately large and numerous.

Campylonotus semistriatus, n. sp. (Pl. CXXVIII. figs. 1, 2).

Carapace one-fourth the length of the animal, anteriorly produced to a rostrum subequal to it in length, dorsally carinated from the posterior margin, and armed with

four teeth on the upper margin and three on the lower. Laterally striated on each side with two obtuse carinæ, the upper corresponding with the first antennal tooth, the lower with the second antennal tooth.

Pleon smooth and dorsally rounded, terminating in a gradually tapering telson, which is slightly truncated at the extremity.

Ophthalmopoda short and globose.

First pair of antennæ subequal with the rostrum in length.

Second pair as long as the animal.

First pair of pereopoda slender, the propodos scarcely stouter than the carpos. Second pair twice the length of the first, the chela being long, narrow, and a little more robust than the carpos. Third, fourth, and fifth pairs having the carpos and propodos subequal in length and terminating in a short serrate dactylos surrounded by a brush of ciliated hairs.

Pleopoda biramose; posterior pair subequal in length with the telson.

	Female (from Stn. 307).	Female (from Stn. 309).	Male (from Stn. 307).
Length, entire, . . .	83 mm. (3.2 in.).	88 mm. (3.4 in.).	54 mm. (2.1 in.).
" of carapace, . . .	23 "	23 "	14 "
" of rostrum, . . .	28 "	28 "	16 "
" of pleon, . . .	60 "	65 "	40 "
" of third somite of pleon, .	15 "	14 "	8 "
" of sixth somite of pleon, .	8 "	14 "	8.5 "
" of telson, . . .	17 "	18 "	11 "
" of first pereopod, . . .	31 "	32 "	18 "
" of second pereopod, . . .	50 "	51 "	35 "
" of fifth pereopod, . . .	43 "	48 "	32 "
" of sixth pleopod, . . .	19 "	20 "	11 "

Habitat.—Station 309, January 8, 1876; lat. 50° 56' S., long. 74° 15' W.; Puerto Bueno, Patagonia; depth, 40 fathoms; bottom, blue mud; bottom temperature, 47°. Three specimens, females.

Station 305A, January 1, 1876; lat. 47° 48' 30" S., long. 74° 47' 0" W.; Messier Channel; depth, 125 fathoms; bottom, blue mud. Six specimens; three males, three females. Trawled.

Station 306A, January 2, 1876; lat. 48° 27' S., long. 74° 30' W.; Messier Channel; depth, 345 fathoms; bottom, blue mud; bottom temperature, 46°. Three males, largest 68 mm. Trawled.

Station 307, January 4, 1876; lat. 49° 24' 30" S., long. 74° 23' 30" W.; off Port Grappler; depth, 140 fathoms; bottom, blue mud. Forty specimens; sexes about equally abundant. Trawled.

Station 308, January 5, 1876; lat. 50° 8' 30" S., long. 74° 41' 0" W.; off Tom Bay;

depth, 175 fathoms; bottom, blue mud. Nine specimens; seven females, two males. Trawled.

Station 310, January 10, 1876; lat. $51^{\circ} 27' 30''$ S., long. $74^{\circ} 3' 0''$ W.; Sarmiento Channel; depth, 400 fathoms; bottom, blue mud; bottom temperature, $46^{\circ}.5$. Six specimens; three males, three females. Trawled.

Station 311, January 11, 1876; lat. $52^{\circ} 45' 30''$ S., long. $73^{\circ} 46' 0''$ W.; off Port Churruca; depth, 245 fathoms; bottom, blue mud; bottom temperature, 46° . Four specimens; one female, three males. Trawled.

The carapace is dorsally carinated in the median line from the post-cardiac region to the anterior extremity, which is produced to a laterally compressed rostrum that is rather longer than the carapace, and armed above with four or sometimes five large teeth, two of which are posterior to the frontal margin and the others placed widely apart on the rostrum; the under margin is suddenly deeply produced and armed with three strong teeth. The rest of the carapace is smooth and polished, excepting for two short carinae on each side, the upper of which commences at the frontal margin in the first antennal tooth and loses itself in the carapace, gradually lessening in intensity towards the posterior extremity; the second commences in the second antennal tooth, which stands just within the frontal margin, and loses itself just behind the hepatic region.

The posterior margin of the carapace is laterally overlapped by the anterior margins of the coxal plates of the first somite of the pleon.

The plastron or ventral surface of the pereion is triangular, rather broader at the posterior portion in the females than in the males. The two somites that carry the gnathopoda are so narrow that the appendages are almost in contact, but on the next somite, or that which carries the first pair of pereopoda, there arises from the posterior margin on each side of the median line a long, sharp, and slender tooth, which from the base curves downwards and obliquely forwards (fig. 2).

On the next somite, or that which supports the second pair of pereopoda, a second pair of teeth exists which are longer and broader at the base. On the next somite the teeth are shorter and exist more in the form of broad and obliquely planted plates, though in some specimens, especially from other stations, they are prolonged to flattened sharp-pointed teeth. Similar plates exist, but less conspicuously developed, on the two posterior somites, but in the specimens from Station 306A, which are males, they are both prominent and pointed.

The pleon is dorsally smooth, has no carina, and has the lateral plates large and deep. The third somite is slightly arcuate and dorsally compressed in a manner suggestive of an obsolete tubercle, such as exists in *Gonatonotus*; the posterior margin is slightly produced in the median line beyond the anterior margin of the following somite. The three posterior somites are narrower than the preceding, the fourth somite like the preceding

has the postero-lateral angle rounded, but that of the fifth is produced to a sharp angle, and above, just below the articulation of this somite with the sixth, is a projecting tooth. The sixth somite is longer than the preceding two and subequal with the third, gradually narrows posteriorly, is subcylindrical, and has the posterior margin produced to a sharp point between the sixth pair of pleopoda and the telson.

The telson tapers to a truncated apex that is fringed with fine hairs; the dorsal surface is flattened, the lateral margin depressed, and the longitudinal angle thus produced is furnished with five short spinules on each side.

The ophthalmopoda are short and supported at the extremities of the ophthalmic somite, which is partially protected by a projection of the metope that is produced to an obtuse point in the median line. *The ophthalmus is large and reniform and the peduncle is reduced to a minimum; there is no distinct ocellus, but on the outer margin of the ophthalmus there is a projection of the pigment from the margin of the ophthalmus that looks like a rudimentary or obsolete organ of this kind.*

The first pair of antennæ has the first joint long, broad, deeply excavate, and furnished with a stylocerite that is strong, sharp, and reaches beyond the distal extremity of the joint; the second joint is short and cylindrical, and the third, which is still shorter, supports two flagella that are subequal in length and reach a little beyond the apex of the rostrum.

The second pair of antennæ carries a scaphocerite that reaches beyond the peduncle of the first pair, but not to the extremity of the rostrum; it is broad and rounded distally, foliaceous on the inner and ridged on the outer margin, which terminates in a small sharp tooth; the flagellum is flexible and subequal in length to the animal.

The mandibles are strong and have the molar process connected with the psalistoma, the former being triangulate and the latter serrate, and having at the base a biarticulate synhipod, the first joint of which is long and the second short and fringed with hairs.

The first pair of siagnopoda is three-branched; the two branches at the base are broad, foliaceous, and fringed with strong hairs, the third is curved, slender, tapering, and bifid at the extremity, the inner lobe supporting a long, stout, and strong hair, and the outer having several long, slender, and ciliated hairs.

The second pair of siagnopoda consists of two branches and a mastigobranchial plate; the branch nearest the base is broad, flat, and two-lobed, the inner margin being fringed with stiff hairs; the second branch is broad at the base and narrow at the apex, short and smooth; *on the outer side is a long mastigobranchial plate, it projects anteriorly beyond the central branch and also projects posteriorly, gradually tapering to a point that is fringed with long hairs furnished with slender cilia that exist mostly towards their distal extremities.*

The third pair of siagnopoda consists of a broad, foliaceous, concavo-convex plate, the margins of which are fringed with hairs, the inner being rigid and distally produced to a

long and tapering lash, and from its base originates a narrow plate conformable to the margin of the preceding, and on the inner side is a short, narrow, foliaceous branch of great tenuity; on the outer side, attached to the base, is a mastigobranchial plate that is constricted near its middle, one-half of which is directed anteriorly and the other posteriorly.

The first pair of gnathopoda is subpediform and six-jointed; the coxa carries a mastigobranchia with a small podobranchial plume; the basis supports a long and slender ecpysis that is covered with a thick brush of hairs at its base; the terminal two joints are coalesced together, reflexed against the preceding joints, and furnished on the inner surface with a thick brush of hairs, and at the lower distal angle, which corresponds with the extremity of the dactylos, with two strong stout spines.

The second pair of gnathopoda is pediform and five-jointed; the coxa carries a mastigobranchia with a short and rigid base supporting a membranous continuation of rudimentary character, but there is no branchial plume connected with it, although two small arthrobranchiæ are attached to the membranous articulation; the basis carries a short slender ecpysis, and the other joints are long, gradually taper to a truncated extremity, and are fringed with numerous slender hairs that gradually become spine-like at the extremity.

The first pair of pereiopoda is slender, reaching nearly to the extremity of the scaphocerite; the coxa carries a short, rigid mastigobranchia, tipped with a sharp tooth and fringed with hairs; the basis in this as in the other pereiopoda is destitute of an ecpysis, even of a rudimentary kind; the ischium is connected with the meros by an oblique and overlapping articulation; the carpos is short, slightly increases distally, and corresponds in diameter to the propodos, the palm of which is a little longer than the pollex and dactylos that lie in opposition to each other. The second pair of pereiopoda is constructed on the same plan as the first, differing only in being longer and slightly more robust. The third, fourth, and fifth pairs are simple, long and cylindrical, having the anterior distal angle of the carpos produced to overlap the propodal articulation, and terminating in a sharp-pointed serrate dactylos that articulates with the propodos in a thick brush of hairs.

The pleopoda are biramose, the two plates resembling each other, being broad, flat, and leaf-like, and nearly equal in length, the inner being the shorter, and both are fringed with long multiarticulate and ciliated hairs. The first pair differs from the others both in the male and female. In the latter the inner plate is shorter, broader, stiffer, and sparsely fringed with short hairs, and the outer is still shorter, more narrow, with a sparsely ciliated margin, and articulates at nearly a right angle with the inner, and when at rest generally lies directed outwards between the posterior extremity of the pereion and the anterior of the pleon. The second pair carries two stylamblydes, both of which are short, the outer is cylindrical, and terminates in a group of short cincinnuli, and the inner

smoothly pointed and fringed with a few flexible hairs. The three succeeding pairs carry a single stylamblys on the inner margin of the inner plate, which lessens in size posteriorly. In the male the inner plate is larger than in the female, and is broad, smooth, and membranous, the outer being narrow, short, and rigid.

The second pair of pleopoda, in the male, has the two branches nearly equal; the inner plate carries two unequal stylamblydes, the outer of which is the shorter, cylindrical, and bears a terminal lobe that is obliquely crowned with a circular group of short cincinnuli; and the inner, which is nearly as long as the plate to which it is attached, is flat, slightly curved, smooth on the inner side, and armed with short strong spinules on the outer, which increase in length towards the distal extremity, which is tipped with one short and two long and strong hairs, bordered with a short pilose fur. The third and succeeding pairs correspond with the second, excepting that there is but a single stylamblys, the short and cincinnulated one being retained.

The sixth pair forms the lateral plates of the rhipidura; they reach a little beyond the extremity of the telson, are rounded at the extremity, and fringed with ciliated hairs, the outer plate being armed with a short tooth on the outer margin.

Observation.—All the specimens of this species from the various localities were taken during the month of January, and none of the specimens were found with ova, although there are thirty-seven females in the collection.

Campylonotus capensis, n. sp. (Pl. CXXVIII. fig. 3).

Animal generally resembling *Campylonotus semistriatus*, having the dorsal carina armed with five teeth, three of which are on the carapace posterior to the frontal margin, and two upon the rostrum, the most anterior being small and subapical. The under surface is deep and armed with four teeth, of which the distal is small and subapical, but a little posterior to the most anterior on the upper margin. The first and second antennal teeth are posteriorly continued in the form of gradually decreasing carinæ.

		Female.		Male.
Length, entire, . . .	66	mm. (2.65 in.).	48	mm. (1.5 in.).
„ of carapace, . . .	17	„	13	„
„ of rostrum, . . .	15	„	12.5	„
„ of pleon, . . .	49	„	35	„
„ of third somite of pleon,	10.5	„	7	„
„ of sixth somite of pleon,	9	„	6	„
„ of telson, . . .	14	„	10	„

Habitat.—Station 145, December 27, 1873; lat. 46° 43' S., long. 38° 4' 30" E.; off Marion Island; depth, 140 fathoms; bottom, volcanic sand. Five specimens; three males, two females, one laden with ova. Dredged.

Station 122, September 10, 1873; lat. $9^{\circ} 5' S.$, long. $34^{\circ} 50' W.$; off Pernambuco; depth, 350 fathoms; bottom, red mud. Two specimens, males. Trawled.

Carapace having the dorsal carina armed with three strongly developed, anteriorly directed teeth, posterior to the frontal margin, and two upon the rostrum, which gradually decrease anteriorly, so that the one nearest the apex is very small. The lower margin deepens abruptly towards the base and is armed with four well-formed teeth, of which the one near the apex is the smallest; the rostrum gradually curves upwards, but at the extremity turns slightly forwards, it is laterally compressed to very considerable tenuity, but is strengthened by a longitudinal rib from the base to the tip. The first antennal tooth is long, straight, and sharp-pointed, forming the anterior extremity of the upper carina that traverses the lateral wall of the carapace, and gradually diminishes in importance until it nearly reaches the posterior margin. The tooth that corresponds with the second antenna stands a little within the frontal margin, it is strong, sharp, and continuous with the lower carina that lies subparallel with the inferior margin of the carapace, and gradually dies out as it approaches the posterior margin.

On the ventral surface of the pereon, between the coxæ of the second and third pairs of pereopoda, are two pairs of spine-like teeth, those between the second pair being the longer and more slender, while those between the coxæ of the third pair are shorter and broader, and more so in the females than in the males.

The pleon is dorsally rounded, having the third somite arcuate and overlapping the fourth, the fifth somite is laterally produced to a sharp point, and the posterior margin on each side of the median line is produced to a small tooth. The sixth somite is cylindrical and but little longer than the fifth; it is posteriorly furnished with a tooth both above and below the articulation of the sixth pair of pleopoda.

The telson is dorsally rounded and armed on each side near the posterior extremity with five or six almost obsolete spinules, and with two larger ones, and a few hairs, at the extremity on each side of a small median tooth.

The ophthalmopoda are pear-shaped, and the external margin of the pigment of the eye is dorsally waved, but there is no distinct ocellus.

The first pair of antennæ has the first joint dorsally excavate from the base to the distal extremity, and is armed on the outer side with a flat and distally pointed stylocerite that reaches to half the length of the second joint, which is cylindrical; the third joint is short, cylindrical, and carries two flagella that reach a little beyond the extremity of the rostrum.

The second pair of antennæ carries a scaphocerite that is about the same length as the rostrum, and terminates in a flagellum that is subequal with the length of the animal.

The first pair of gnathopoda is short, but tolerably robust.

The second pair has the basis and ischium compressed, the former is broad and slightly produced anteriorly on the inner margin, while the outer margin carries a branch that is half the length of the succeeding joint or ischium, which is broad at the base and gradually narrowed towards the distal extremity, and as it narrows is correspondingly strengthened by an upwardly curved edge on the outer margin, which is fringed with a row of hairs on its inner side.

The first pair of pereopoda is slender, and carries a long-fingered chela. The second pair is more robust and longer. The three succeeding pairs are moderately strong, have the carpos subequal in length with the propodos, and terminate in a short, curved dactylos that is serrate on the inner margin.

The pleopoda in both sexes closely resemble those of *Campylonotus semistriatus*, those of the first pair have the branches unequal, the outer being small and foliaceous in the female, but filamentous in the male, while the inner is more membranous in the male than in the female.

The posterior pair, which helps to form the rhipidura, is subequal in length with the telson. The diæresis is one-third the length of the plate from the distal extremity, and is protected by a single tooth on the outer margin.

Observation.—There was only one female of this species taken that was laden with ova, which were numerous and of moderate size.

Campylonotus vagans, n. sp. (Pl. CXXII. fig. 3).

Carapace anteriorly carinated and produced to a rostrum that is longer than the carapace, armed on the gastric and frontal regions with four large teeth, of which the anterior two stand on the base of the rostrum, which is otherwise quite smooth to the apex except for two small subapical points; the under margin is armed with eight teeth. The first antennal tooth is well defined, but the second is only determined by a short ridge.

The pleon is smooth; the third somite is arcuate and produced posteriorly over the fourth; the sixth somite is short.

The telson tapers to a truncated point.

Length, entire,	83	mm. (3.2 in.).
„ of carapace,	22	„
„ of rostrum,	33	„
„ of pleon,	61	„
„ of third somite of pleon,	14	„
„ of sixth somite of pleon,	9	„
„ of telson,	12.5	„

Habitat.—Station 308, January 5, 1876; lat. 50° 8' 30" S., long. 74° 41' 0" W.; off Tom Bay, Patagonia; depth, 175 fathoms; bottom, blue mud. One specimen, female. Trawled.

The carapace is about one-third of the length of the animal, and is anteriorly produced to a laterally compressed rostrum that is once and a half as long as the carapace. The dorsal surface is carinated over the gastric region and armed with two large teeth, one on the pyloric and the other on the gastric region, and two others, equally distant from each other, stand on the base of the rostrum, from the anterior tooth of which the rostrum is smooth to near the apex, which is gradually curved upwards and furnished near the extremity with two very small teeth. The under margin is largely excavate near the ophthalmopoda, where it is very deep, and gradually narrows to the apical extremity, and is armed with a series of eight teeth gradually decreasing in size anteriorly. The frontal margin has no orbital tooth; the first antennal is well developed, but the second antennal is small and the fronto-lateral angle is rounded off. The rest of the carapace is smooth, but evidences of lateral carinæ exist in a rudimentary condition, corresponding with the first and second antennal teeth.

The pleon is dorsally smooth, excepting that the third somite, which is longer than any of the others, projects posteriorly over the fourth. The three anterior somites have the postero-lateral angle rounded, the fourth has it slightly angular, the fifth has it sharply angular, and the sixth, which is longer than the fifth, is posteriorly produced to a sharp tooth, anterior to which there is a deep excavation to receive the sixth pair of pleopoda.

The telson gradually tapers to a rounded apex, the dorso-lateral angles being armed with three small equidistant spinules.

The ophthalmopoda are short and pyriform.

The first pair of antennæ (fig. 3*b*) has the first joint of the peduncle excavate on the upper surface, and furnished with a long stylocerite that reaches beyond the extremity of the first joint; the two succeeding joints are together shorter than the first, cylindrical, and unequal, the third being the shorter; the flagella are nearly equal in length and shorter than the rostrum.

The second pair of antennæ (fig. 3*c*) carries a long and gradually narrowing scaphocerite, the extremity of which is armed with a strong tooth; the flagellum is broken off at less than the length of the rostrum.

The mandibles (figs. 3*d*, 3*d'*) have a broad and bluntly serrate psalistoma, the anterior angle of which consists of a large tooth, and the whole is continuous with the molar tubercle, which is smooth on the anterior and coarsely serrate on the posterior margin; from the outer angle a two-jointed synhipod arises which carries a strong bunch of short hairs at the base, and similar hairs also stud the distal spatuliform joint.

The first pair of siagnopoda (fig. 3*e*) is three-branched; the inner branch is short, rounded, and fringed with soft hairs and a few stout spines; the second or middle branch is broad, wider at the distal margin than at the base, and fringed with two or three rows of strong spines; the third or outer branch is short, curved, and bifid, one extremity carrying a single fringed hair and the other several hairs.

The second pair of siagnopoda (fig. 3f) is four-branched, and carries a mastigobranchial plate that extends backwards as a long and narrow process, fringed on the inner side with long hairs that reach to the posterior extremity of the branchial chamber. The other branches are short, foliaceous, and fringed with hairs.

The third pair of siagnopoda (fig. 3g) is three-branched, and carries a bilobed mastigobranchia; the inner branch is broad, foliaceous, and fringed with fine hairs, the middle branch is triarticulate and fringed with fine hairs, the third or outer is broad and foliaceous at the base and suddenly narrows distally to a long and tapering flagellum fringed with hairs.

The first pair of gnathopoda (fig. 3h) is subpediform and seven-jointed; the propodus is broad and reflexed; the basis carries a long and slender ecephysis and the coxa supports a short membranous mastigobranchia without a branchia, but a short arthrobranchial plume is attached to the membranous articulation.

The second pair of gnathopoda (fig. 3i) is long, slender, and pediform. The coxa carries a short and rigid mastigobranchia, armed with a small hook but without a podobranchial plume, but an arthrobranchia is attached to the membranous articulation; the basis carries a well-developed but not long ecephysis, and the distal joints are fringed with minutely ciliated hairs.

In the only specimen all the pereopoda were broken off previously to my finding it among a number of specimens of *Campylonotus semistriatus*, excepting one of the third and one of the fifth pairs on the right side; these are moderately long, tolerably robust, and terminate in a short and simple unguiculate dactylos.

The pleopoda are biramose, the first pair has the rami unequal, the inner being the shorter. The others are subequal and the inner branch carries a stylamblys.

The rhipidura is well developed, the lateral plates being longer than the telson, and the outer has a diæresis.

Observations.—A careful comparison of this species with others of its own genus, and of *Chorismus* and *Merhippolyte*, is instructive as throwing light upon the mysteries of specific variation.

If we compare the external form of *Campylonotus vagans* with that of *Chorismus tuberculatus*, we perceive that it corresponds more nearly to it than to its generic ally *Campylonotus semistriatus*. The only external distinction between them that may be considered to be specific is that *Campylonotus vagans* has the sixth somite of the pleon comparatively longer, and there is a prominence on the anterior margin of the first and on the posterior margin of the fourth somites of the pleon, but an examination of the branchial apparatus shows that, while *Chorismus* has only seven branchial plumes on each side, *Campylonotus* has twelve, and in this respect agrees with *Merhippolyte*.

Had the solitary specimen of *Campylonotus vagans* been a perfect one there would have been little difficulty in determining its generic position, but the first two pairs

of pereopoda being broken off, we can only be certain whether it belongs to the Polycarpidea or the Monocarpidea by consideration of the value of certain structural details. Thus the mandibles agree with those of *Campylonotus* and differ from those of *Chorismus* and *Merhippolyte*. The ventral surface of the pereion corresponds generically with *Campylonotus*, although it differs specifically from *Campylonotus semistriatus* in having a pair of teeth between the second pereopods only, whereas in *Campylonotus semistriatus* there is a pair between the first as well as the second pair of limbs, but in *Chorismus* and *Merhippolyte* there are none. On these grounds it seems more likely to belong to the Monocarpidea than to the Polycarpidea.

Our specimen was a solitary one among a large number of *Campylonotus semistriatus*.

Palæmon, Fabricius.

Palæmon, Fabricius, Suppl. Entom. Syst., p. 402.

„ Leach, Malacos. Pod. Brit., pl. xiv.

Palemon, Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 387.

Leander, Desmarest, Ann. Soc. Entom. France, tom. vii. sér. 2, p. 87, 1849.

„ Stimpson, Proc. Acad. Nat. Sci. Philad., p. 109, 1860.

Carapace less than a third the length of the animal, posteriorly smooth, rounded, slightly compressed anteriorly, elevated into a crest over the frontal region, and produced to a long, laterally compressed rostrum that is armed above and below with teeth varying in number according to the species. The orbital notch is well defined, but has no tooth. At the outer canthus a strong first antennal tooth projects; below it and still further down a second tooth stands within the margin on a level with the second pair of antennæ, and above the line of the fronto-lateral angle (“*spina branchiostegiana*” of Stimpson). There is no tooth on the hepatic region, but a depression or fissure thence to the upper side of the inferior marginal tooth is conspicuous.

The pleon is smooth, and like the carapace dorsally rounded and laterally compressed.

The telson is similarly characterised, tapers gradually to a central tooth, and is furnished with dorso-lateral spines.

The ophthalmopoda are short, broad, uniarticulate, and supported on a slender pedicle; the ophthalmus is hemispherical, and has an ocellus that is sometimes distinct, but in the typical species is involved within its margin.

The first pair of antennæ has the first joint compressed above and beneath, and armed on the outer margin with a sharp, short stylocerite, and at the anterior distal angle with a strong flattened tooth; the second joint is thicker than the first, shorter on the upper surface than on the lower, and articulates obliquely with the third

joint, which terminally supports two long flagella, of which the upper and outer sends off a third that is shorter than the others.

The second pair of antennæ is armed with a tooth at the outer and lower distal angle of the first joint of the peduncle, carries a scaphocerite that is about two-thirds the length of the carapace, and terminates in a long flagellum.

The mandible consists of a strong molar process projecting at right angles with the apophysis, and separated from a strongly dentate psalistoma, at the outer side of the base of which stands a three-jointed synphipod of considerable tenuity.

The second pair of gnathopoda is pediform, having only three joints exposed, of which the terminal is the shortest and ends in an obtuse point, and the basis carries a rather slender ecphysis.

The first pair of pereiopoda is slender and chelate, the carpos being long, slender, and uniarticulate. The second pair of pereiopoda resembles the first in form, but is longer and larger, and has the carpos uniarticulate. The three following pairs resemble each other in form and proportions, and approach in length that of the second pair; the dactylos is uniungiculate, the propodos long and cylindrical, and the carpos has the anterior distal angle produced beyond the carpal joint of the propodos.

The pleopoda are robust, foliaceous and biramose.

The rhipidura has the outer branch with a diæresis.

The branchiæ consist of seven pairs arranged as in the following table:—

Pleurobranchiæ,	.	.	.	...	...	1	1	1	1	1
Arthrobranchiæ,	.	.	.	...	1	...	...	...	...	...
Podobranchiæ,	.	.	.	1	...	...	...	...	...	...
Mastigobranchiæ,	.	.	.	r	...	...	...	...	...	...
				h	i	k	l	m	n	o

Observations.—This genus was first founded by Fabricius, in 1798, for those species of *Macrura* that had “four, unequal, pedunculated antennæ. The first (superiores) pair the shorter, trifid, setaceous, the middle branch being the shortest (lacinia intermedia brevior). The second (inferiores) antennæ very long, setaceous, and simple.”

In his list the following species and habitats are given:—

<i>Palæmon carcinus</i> , American Rivers.	<i>Palæmon tranquebaricus</i> , East India.
<i>Palæmon lar</i> , East India.	<i>Palæmon squilla</i> , European Seas.
<i>Palæmon longimanus</i> , East India.	<i>Palæmon locusta</i> , Ocean.
<i>Palæmon brevimanus</i> , East India.	<i>Palæmon serratus</i> , Norwegian Sea.
<i>Palæmon coromandelianus</i> , East India.	<i>Palæmon fucorum</i> , Ocean weed.”

Of these *Palæmon carcinus*, *Palæmon squilla*, and *Palæmon locusta* appear in Linnæus' *Systema Naturæ* under the general carcinological name of “*Carcinus*,”

while *Palæmon serratus* was described and figured under the name of *Astacus serratus*, in 1770, by Pennant, in his *British Zoology*, vol. iv. pl. xvi. fig. 28.

This well-known European form, *Palæmon serratus*, has ever since been accepted as typical of Fabricius' genus by Cuvier, Leach (1817), Desmarest (1825), Milne-Edwards (1837), and Bell (1853); and Leach, Desmarest, and Bell have, besides their descriptions, given accurate figures of the animal.

Its chief characteristics are as follows:—A laterally compressed rostrum, serrate on the upper and lower margins; the dorsal surface of the carapace not carinated posterior to the frontal crest; the frontal margin armed with two teeth, one corresponding with the first pair of antennæ, and the other, close behind the frontal margin, corresponding with the second pair of antennæ; the rest of the carapace smooth, the lateral margins being strengthened by a longitudinal rib, and the posterior margin laterally inserted beneath the coxal plates of the first somite of the pleon.

This description has been drawn up from a British specimen, and compared with the type in the British Museum, and it corresponds with the figures of Leach, Desmarest, and Bell.

I have endeavoured to be as accurate as possible in the diagnosis of this genus, because Dr. Stimpson¹ describes the *Palæmon* of Fabricius as "*Carapax spina hepatica armata*." This description corresponds with *Palæmon carcinus*, Fabricius, but not with either *Palæmon serratus* or *Palæmon squilla*. The figures of Leach, Desmarest, and Bell distinctly show the two marginal teeth, and Milne-Edwards, in his description of his first division of *Palæmon*, places the two marine species just mentioned under it because "they are armed on the anterior border of the carapace on each side with two teeth, one above, the other below the insertion of the second (externes) pair of antennæ."

Surely all this is sufficiently clear in description and priority to settle that the typical forms of the genus are *Palæmon squilla* and *Palæmon serratus*.

By the expression "*species omnes fluvicolæ*," it would appear that Stimpson intended to confine the genus to those fresh-water forms that have been found in many of the rivers, lakes, and mountain streams in tropical regions, and which Milne-Edwards has arranged in his second division of the genus, having the frontal margin of the carapace armed with a single tooth, but with a second tooth posterior to it in the same horizontal line.

Dr. Stimpson altogether excludes the typical species, or those on which the earlier carcinologists founded the genus, but transfers them to the genus *Leander*, which was proposed by Eugène Desmarest on features that are not of the slightest specific value, namely, on the dorsal surface of the pleon being strongly curved, or, to quote his own words:—"L'abdomen est très grand, et se rétrécit graduellement vers le bout; sa

¹ *Proc. Acad. Nat. Sci. Philad.*, p. 110, January 1860.

face supérieure est fortement *arquée* et comme *bossue*," which the following table represents :—

Palémoniens : Ayant les ant. int. terminées par	{	Trois filets multiarticulés.	{	Pattes de la deuxième paire filiformes et à carpe multiarticulé,	{		<i>Lysmata</i> .
				Pattes de la deuxième paire plus fortes que les antérieures, et n'ayant pas le carpe divisé		Abdomen bossu en dessus, .	<i>Leander</i> .
						Abdomen non bossu en dessus, .	<i>Palæmon</i> .

Stimpson accepted the genus *Leander* of Desmarest, but established it upon totally different characters from those of the author.¹ His words are :—"Genus *Leander*, E. Desmarest. Carapax spina antennali et spina branchiostegiana armatus; spina hepatica nulla, species plerumque maricolæ. Typus *Palæmon natator* M. Edwards."

This will be seen to correspond with the description of *Palæmon*, which has the "spina branchiostegiana" and has no "spina hepatica," according to Leach's type still preserved in the British Museum.

Synopsis of the Genera included in the original Genus Palæmon of Fabricius.

<i>Palæmon</i> ,	Rostrum deep, serrate above and below.	{ Having the frontal margin of the carapace armed with two antennal teeth, one above the other. Second pair of pereopoda with carpos long. Type, <i>Palæmon serratus</i> (Pennant) and <i>Palæmon squilla</i> (Linné).
<i>Palæmonella</i> , 1852,	Rostrum slender, serrate above and below.	{ Having one tooth on the frontal margin, and a second on the hepatic region in nearly the same horizontal line. Second pair of pereopoda with carpos not long. <i>Palæmonella tenuipes</i> , Dana.
<i>Bithynis</i> , 1836,	Rostrum deep, serrate above and below.	{ Having one tooth on the frontal margin, and a second on the hepatic region nearly in the same horizontal line. Second pereopod with the carpos long. Type, <i>Bithynis lar</i> (Fabricius).
<i>Brachycarpus</i> , n. gen.,	Rostrum deep, serrate above and below.	{ One tooth on the frontal margin, and a second on the hepatic region, below the horizontal line. Second pereopod with the carpos short. Type, <i>Brachycarpus savignyi</i> (Pl. CXXIX.).

Palæmonella, *Bithynis*, and *Brachycarpus* can only be considered as varieties of *Palæmon*, yet they are such decided forms that they may be easily distinguished.

Geographical Distribution.—The species of this genus as defined in this Report are among the best known of the European species, and form one of the most favourite delicacies of the table.

Most of the species recorded by Milne-Edwards are from the coasts of Europe, but *Palæmon quoiianus* is from New Zealand, *Palæmon natator* is found in the Indian Ocean, and has since been found in the middle of the Atlantic upon floating weed.

¹ *Loc. cit.*, p. 109.

Palæmon longirostris comes from the mouth of the Ganges, *Palæmon vulgaris*, Say, belongs to North America, and *Palæmon tenuirostris*, Say, to the coast of Newfoundland.

Under the name of *Leander* Stimpson records several species from the coasts of China and Japan, and one from Australia.

Palæmon affinis, Milne-Edwards (Pl. CXXVIII. fig. 5).

Palemon affinis, Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 391.

Palæmon affinis, Dana, U.S. Explor. Exped., Crust., p. 584, pl. xxxviii. figs. 5a-g.

Closely resembles *Palæmon squilla* of Fabricius (the *Cancer squilla* of Linnæus and most European authors), and only appears to be recognisable from that species in having the apex of the rostrum bifid and four teeth instead of three on the under margin. The specimen from which Milne-Edwards defined the species was not sufficiently preserved to enable him to give a complete description. But Dana has been more fortunate and says that "Although very near to the *P. squilla*, the coalesced flagella of the inner antennæ are united to a longer distance from the base of these organs."

	Male.	Female.
Length, entire, . . .	24 mm. (0·9 in.).	33 mm. (1·3 in.).
„ of carapace, . . .	6·5 „	10 „
„ of rostrum, . . .	6·5 „	9 „
„ of pleon, . . .	17·5 „	23 „
„ of third somite of pleon, .	5 „	5 „
„ of sixth somite of pleon, .	4 „	4 „
„ of telson, . . .	5 „	6·5 „

Habitat.—Port Jackson, Sydney, June 1874. Sixteen specimens; eight males and eight females, the latter bearing ova.

The carapace is less than one-third the length of the animal, it is crested over the frontal region and anteriorly produced to a rostrum that is equal to the length of the dorsal surface of the carapace, bifid at the apex, and armed on the upper margin with seven teeth, the posterior being on the gastric region and the anterior a little distance from the apex, and on the lower margin with four teeth, the distal being the smallest and nearer the apex than the corresponding tooth on the upper margin. The orbit is defined by an angle on the inner side of the first antennal tooth, below which on the receding frontal margin stands the second antennal tooth; the surface of the carapace is otherwise smooth.

The pleon is dorsally rounded and laterally compressed, the third somite, being slightly arcuate, projects posteriorly above the fourth, which with the two succeeding is considerably narrower in the female. The sixth somite is but little longer than the

preceding, and rather shorter than the telson, which is dorsally rounded and gradually tapers to the extremity; on each side within the margin are three small spinules, and the distal extremity is fringed with a few hairs.

The ophthalmopoda (fig. 5a) are short and robust; the ophthalmus is but little broader than the stalk, and furnished beyond the margin of the ophthalmus with a minute, round ocellus. In this it differs from the European type of the genus, which has the ocellus enclosed within the margin of the ophthalmus instead of being isolated.

The first pair of antennæ has the basal joint of the peduncle so deeply excavate on the upper surface for the reception of the ophthalmopod, that the appendage is translucent in the centre; the outer margin is furnished with a sharp-pointed stylocerite that is about half the length of the joint, at the distal extremity of which, on the same side, is another sharp flat point or tooth; the second and third joints are short, cylindrical, and fringed with fine short hairs, and terminally support two flagella, the inner of which is long and slender, while the outer is stout and flat as far as a point equal to the length of the peduncle, when it divides into two slender branches, the inner being short and rigid, the outer long, slender, flexible, and subequal with the inner flagellum. It is remarkable that neither of the flagella of this pair of antennæ has attached to it any of the membranous cilia so common in the order.

The second pair of antennæ is furnished with a broad scaphocerite that reaches to the extremity of the rostrum, and a slender flagellum that is rather longer than the body of the animal.

The mandible (fig. 5d) consists of a stout molar process, a separate psalistoma that is serrate at the extremity with four teeth, of which the two middle ones are the smaller, and on the outer side, at the base, a slender three-jointed synhipod that does not reach to the length of the psalistoma.

The second pair of gnathopoda (fig. 5i) is short, not reaching much beyond the ophthalmopoda; it is five-jointed; the coxa supports a small podobranchia, and the basis a short ecphysis; the three following joints are thickly furred with hairs, the terminal ending in an obtuse point.

The first pair of pereopoda is long and slender, the carpos being twice the length of the propodos. The second pair is long and slender, the carpos being nearly as long as the palm of the propodos, and the chela about half the length of the palm. The succeeding three pairs are subequal, and fringed with small hairs; the carpos is anteriorly produced beyond the near extremity of the propodos, which is cylindrical and terminates in a slightly curved, sharp-pointed dactylos.

The pleopoda are biramose, the inner distal angle of the basal joint projecting beyond the articulation with the branches.

The ova attached to the females are small, numerous, and round, and appear to have the embryo generally well advanced in development.

The terminal pair, which helps to form the rhipidura, is a little longer than the telson, and has a diæresis armed on the outer margin with a well-defined tooth.

Observation.—It is interesting to notice the close approximation of this species to *Palæmon squilla*, the habitats being the antipodes of each other.

Palæmon natator, Milne-Edwards (Pl. CXXVIII. figs. 6, 7).

Palæmon natator, Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 393.

Leander erraticus, Desmarest, Ann. Soc. Entom. France, tom. vii. sér. 2, p. 87, 1849.

Leander natator, Stimpson, Proc. Acad. Nat. Sci. Philad., p. 109, 1860.

Male.—Carapace about one-third the length of the animal and anteriorly produced to a rostrum that is subequal in length to the carapace, and armed on the upper margin with nine or ten teeth and on the lower with six; frontal margin armed with an antennal and a branchiostegal tooth.

The pleon has the third somite longer than the others, dorsally arcuate, and projecting posteriorly in the median line over the succeeding somite.

The ophthalmopoda are robust and largely project beyond the pedicular attachment; the ophthalmus is hemispherical, and is furnished with a distinct ocellus on the posterior surface, in contact with the margin.

The first pair of antennæ has the flagella long and slender, the upper and outer being nearly as long as the animal, and the inner and lower about two-thirds the length of the outer; the third or secondary branch of the outer is about half the length of the inner, much stouter than either of the two, and continues the same almost to the extremity; the first joint of the peduncle is longer than the second and third together, it is broadly dilated, of great tenuity, and armed with a stylocerite that reaches to half its length, and a sharp-pointed tooth on the outer distal angle; the third and fourth joints are cylindrical and short.

The second pair of antennæ is as long as the animal and has the flagellum as slender as those of the upper; it carries a scaphocerite that is equal in length to the rostrum or carapace, and armed on the outer distal angle with a sharp tooth, whence the anterior foliaceous margin advances obliquely forwards beyond the apex of the external tooth; the inner margin is subparallel with the outer, and the basal joint is armed with a strong, sharp tooth near the base of the scaphocerite.

The mandible resembles that of *Palæmon serratus* in character, but has the molar process more strongly dentate and the psalistoma broader and strongly serrate; the synphipod is shorter than the psalistoma and of extreme tenuity.

The succeeding oral appendages are of generic value only, and closely resemble those of *Palæmon serratus*.

The first pair of gnathopoda carries a very rudimentary mastigobranchial appendage and a small podobranchial plume.

The second pair of gnathopoda has the antepenultimate joint, which I take to be the ischium and meros united, deeply arched downwards; the basis is furnished with an ecphysis that reaches to the distal extremity of the meros, and connected with the appendage is a small branchial plume that appears to be attached to the coxal articulation, and is, therefore, arthrobranchial in character.

The first pair of pereopoda is slender, chelate, and extends to a point subequal with the apex of the rostrum; the fingers are longer than the palm, and the carpos is as long as the propodos, including the palm and dactyloid process. The second pair is longer and more robust than the first; it is chelate and has the fingers longer than the palm, which is subcylindrical, and subequal in length with the carpos. The three succeeding pairs are uniform in size and character; the meros is longer than the ischium, the carpos is a little more than half the length of the meros and projects at the anterior distal angle over the propodal articulation; the propodos is twice the length of the carpos, and is furnished with several solitary spines on the anterior and posterior margins; the dactylos is curved, smooth, and uniunguiculate.

The branchiæ correspond in arrangement with those of *Palæmon serratus*.

Female.—Differs from the male in being shorter and more robust generally, and in having the rostrum shorter in proportion to the length of the carapace, and deeper anteriorly, assuming more the shape "*d'un fer de lance*" mentioned by Milne-Edwards.

	Female.	Male.
Length, entire,	23 mm. (0.9 in.).	26 mm. (1 in.).
„ of carapace,	6 „	7 „
„ of rostrum,	7 „	8 „
„ of pleon,	17 „	19 „
„ of third somite of pleon,	4 „	5 „
„ of sixth somite of pleon,	3 „	3.5 „
„ of telson,	4 „	5 „

Habitat.—Gulf-weed, Atlantic, April 1873. One hundred and thirteen specimens, females rather preponderating.

The original specimen from which Milne-Edwards drew up his description was found in the Indian Ocean, upon some floating weed. Desmarest obtained his specimen (*Leander erraticus*) from the Atlantic, at about 100 to 150 leagues off the coast of Guadeloupe. Dr. Stimpson's specimen, which he takes to be the same as *Leander* of Desmarest, was found to be common amongst the Sargasso-weed in the Atlantic, between 30° and 35° north of the equator.

It was from this region that the specimens in the Challenger collection were also taken, and they correspond both generally and in detail with the description given by Milne-Edwards, excepting that they have nine teeth on the upper surface of the rostrum in the male, and four on the lower margin, and twelve on the upper margin in the

female, and six on the lower; but, as Milne-Edwards' specimens were obtained from floating weed in the Indian Ocean, the two sexes in that region may more closely resemble each other in their ornamentation, and thus the rostrum may have eleven teeth on the upper margin of the rostrum and be scarcely dentate at all on the lower. The serrature in our typical specimens is not very strong, and in many it is feeble enough to fulfil the description of Milne-Edwards.

Desmarest describes and figures his species, *Leander erraticus*, as being strongly dentate above and "au contraire sans dents en dessous." In all other features both the figure and the description correspond with *Palæmon natator*, Milne-Edwards, and it is probably a variety in which the armature on the lower margin of the rostrum is more than usually undefinable.

Palæmonella, Dana.

Palæmonella, Dana, U.S. Explor. Exped., Crust., p. 582.

„ Kingsley, Proc. Acad. Nat. Sci. Philad., p. 425, 1879.

Resembles *Palæmon*, but has the rostrum long, thin, and slender, the first two pairs of pereopoda chelate, the second one longer than the first. Mandibles furnished with a two-jointed synhipod. Two of the flagella of the first pair of antennæ united nearly to their tips.

The carapace is furnished with two teeth below the orbit, in nearly the same horizontal line.

The second pair of gnathopoda is slender, as in *Palæmon*.

The first pair of pereopoda is very slender. The second pair is moderately robust, with the hand nearly cylindrical, and hardly stouter than the preceding part of the leg.

The foregoing is a close transcription of Dana's diagnosis of the genus. Kingsley¹ appears to determine the genus as distinct from *Palæmon* by the synhipod being biarticulate, and the first pair of antennæ biflagellate, one flagellum having the apex bifid; he says that in *Palæmon* it is triflagellate, which is not the case, as may be seen in the typical species as well as in *Palæmon affinis* (p. 783).

Observations.—There is but a single specimen, and that a young one, in the Challenger collection, and I therefore have not had an opportunity of examining the oral appendages in detail; but I accept the genus on the character of the mandibles, the form of the rostrum, and the presence of a hepatic tooth on the carapace, as given by Dana and Kingsley.

Geographical Distribution.—There are but two species known, and these were both taken in the Oriental seas.

¹ *Loc. cit.*, p. 425.

Palæmonella orientalis, Dana (Pl. CXXVIII. fig. 4).

Palæmonella orientalis, Dana, U.S. Explor. Exped., Crust., p. 582, pl. xxxviii. figs. 4a-d.

Carapace less than one-third of the length of the animal, anteriorly produced to a slender rostrum, that is armed on the upper surface with six teeth and on the lower with a small tooth near the apex.

Pleon smooth.

Telson long, narrow, and tapering.

Length, 5 mm. (0.2 in.).

Habitat.—Station 200, October 23, 1874; lat. 6° 47' N., long. 122° 28' E.; off Sibago, Philippine Islands; depth, 250 fathoms; bottom, green mud. One specimen; probably taken at or near the surface. Trawled.

The carapace is smooth and anteriorly produced to a rostrum that is subequal in length with the dorsal surface of the carapace; it is armed above with six equidistant teeth, the posterior of which is above the orbital margin and the anterior close to the apex of the rostrum, and below with one small tooth near the distal extremity, the rest of the lower margin being smooth and parallel with the upper; beyond the orbit on the frontal margin is a first antennal tooth, and, according to Dana, another tooth is situated in nearly the same parallel line, and therefore must be the hepatic tooth.

The pleon is smooth and the somites subequal, the sixth being longer than the preceding, and the telson subequal in length with it.

The ophthalmopoda are pyriform and rather large.

The first pair of antennæ is furnished with a short stylocerite, has the peduncle subequal in length with the rostrum, and supports two moderately robust flagella, the outer of which after two rather large articuli divides into two unequal branches, the longer about half the length of the animal, the shorter about one-fourth the length of the other, but more robust, and supporting a series of membranous or sensory cilia.

The second pair of antennæ is subequal in length with the animal, and supports a scaphocerite that reaches beyond the distal extremity of the rostrum.

The second pair of gnathopoda is short, five-jointed, and furnished with a basecephysis that reaches as far as the carpal articulation; the terminal two joints are more slender than the preceding and fringed with hairs, of which those at the distal extremity are stiff and spine-like (fig. 4i).

The first pair of pereopoda is long, slender, and chelate. The second pair is longer, larger, and similarly formed. The three succeeding pairs are subequal in length, moderately robust, and have the carpos distally produced beyond the propodal articulation; the propodos is cylindrical, slightly curved, and fringed with small fasciculi of hairs; the dactylos is curved and terminates in two unequal unguis.

The pleopoda and rhipidura correspond with those of the genus *Palæmon*.

Observations.—The solitary specimen in the collection is only about a third of the length of that described by Dana, but it appears to have its parts completely developed. It corresponds so closely with the description of Dana's species that I have no doubt of its identity with it, and I attribute certain differences to the young condition of the specimen under examination; but it is difficult to completely examine it without injuring it. In the Challenger specimen the ophthalmus is much larger in proportion than in Dana's figure, and, with the utmost care, I have not been able to detect the hepatic tooth on the carapace, nor has Dana shown it in his figure or alluded to it in his description of this species, although he mentions it in his generic diagnosis. The dactylos of the posterior three pairs of pereopoda is biunguiculate, a fact that is overlooked by Dana.

Bithynis, Philippi.

Bithynis, Philippi, Wiegmann's Archiv f. Naturgesch., Jahrg. xxvi. p. 161, 1860.

Macrobrachium, Spence Bate, Proc. Zool. Soc. Lond., p. 363, 1868.

Palæmon (*pars*), Dana, U.S. Explor. Exped., Crust., p. 584.

„ Stimpson, Proc. Acad. Nat. Sci. Philad., p. 110, 1860.

„ (Division 2), Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 395.

Like *Palæmon*, but differing in having a tooth on the hepatic region and no tooth corresponding with the second antennæ (the “spina branchiostegiana” of Stimpson), in having the carpos of the second pair of pereopoda long and cylindrical, and this appendage developed in the adult to a greater length than that of the entire animal, and more or less unequal, and in having the pleon shorter in proportion to the length of the carapace.

Geographical Distribution.—Species of this genus are more or less present in the fresh-water streams of tropical Asia, America, and Africa; when they have been taken in the sea it has been only at the mouths of the rivers they are found to inhabit.

Mr. Kingsley¹ says that this form is far from being uncommon in salt water, and instances several species, as *Bithynis spinimanus*, *Bithynis grandimanis*, *Bithynis jamaicensis*, *Bithynis forceps*, &c. Milne-Edwards says that *Bithynis ornatus*, *Bithynis carcinus*, and other long-armed forms are found in different parts of the Indian Ocean, and that *Bithynis jamaicensis* inhabits the Antilles.

There is undoubtedly a peculiarity belonging to this group that distinguishes it at once from the typical form of *Palæmon*, and although there is evidence of specimens having been taken in the sea, yet in several instances they are supposed to be marine, because the locality to which they belong has been alone recorded, without any special notice of their having been found in fresh water as their normal habitat. *Bithynis*

¹ Bull. Essex Inst., vol. x. p. 88.

jamaicensis was first described and figured by Sir Hans Sloane¹ in 1725, and again by Parra in 1787, as "*Camaron de agua dulce*." Dr. Leach refers to it under the name of *Palæmon carcinus*,² and states that it lives in fresh water, and Mr. Osbert Salvin³ has obtained it from Lake Amatitlan, where it reaches a large size and forms an important article of commerce in the market at Guatemala. Dr. Semper⁴ says that in the British Museum there are numerous specimens of different sizes from Brazil, West Indies, Surinam, British Guiana, Bahia, and the Cape Verde Islands, and that those from Surinam and British Guiana came from fresh water.

Bithynis (Palæmon) ornatus, which Milne-Edwards says has been found in different places in the Indian Ocean, inhabits the East Indies, the Mollucca and Philippine Islands, Australia, and the Fiji Islands, and has been taken in fresh-water rivers in these regions; whereas *Bithynis grandimanus*, a small but not very dissimilar species, exists in fresh water in the Society Islands, and supplies the markets of Honolulu. Hilgendorf⁵ records three specimens of *Bithynis (Palæmon) idæ*, Heller, from Zanzibar, and remarks "that until now this species was only known as a fresh-water species from the Indian Archipelago. The large extent of geographical distribution is very remarkable."

Bithynis (Palæmon) hirtimanus, Oliver, has also been obtained in the Mauritius, and Heller⁶ records several species from the Australasian group which appear to be young forms, since they possess all the characters of the genus except the great length of the second pair of pereopoda—e.g., *Bithynis (Palæmon) spectabilis*, *Bithynis (Palæmon) scabriculus*, *Bithynis (Palæmon) superbus*, and *Bithynis (Palæmon) sinensis*.

Bithynis lar (Fabricius) (Pl. CXXIX. fig. 1).

Palæmon lar, Fabricius, Suppl. Entom. Syst., p. 402.

" " Olivier, Encyclop., tom. viii. p. 659.

" " Milne-Edwards, Hist. Nat. Crust., tom. ii. p. 397.

Carapace more than one-third the length of the animal, dorsally rounded, anteriorly crested and produced to a rostrum that is about half the length of the carapace, laterally compressed, and traversed by a ridge on either side from the orbital margin to the apex; it is armed on the upper margin with eight teeth, of which the posterior is on the gastric region, and the anterior near the apex, and in the space between each two teeth is a

¹ Voyage to the Island of Madeira, vol. ii. p. 271, pl. ccxlv. fig. 2.

² Zool. Misc., vol. ii. p. 92, pl. xcii.

³ On a new genus, with four new species, of Fresh-water Prawns, by C. Spence Bate; under the name of *Macrobrachium americanum*, loc. cit., p. 364.

⁴ Proc. Zool. Soc. Lond., p. 585, 1869.

⁵ Crustaceen in V. d. Decken's Reisen in Ost-Afrika, Bd. iii., p. 102, Tab. vi. fig. 5, 1869.

⁶ Reise der Novara, Zoolog. Theil., Bd. ii., Crust., pp. 113, 117, 118, 119, 1868.

series of ciliated hairs that are generally worn off, excepting where the projecting tooth protects it. The lower margin is furnished with two teeth which are situated near the middle, between the orbit and the apex of the rostrum, and the whole edge is fringed with small hairs. The orbit is defined at the outer canthus by a prominent rounded lobe, beyond which stands a conspicuous antennal tooth, and behind and beneath it a conspicuous hepatic tooth. The fronto-lateral angle is rounded and unarmed.

The pleon is dorsally rounded and laterally compressed. The third somite is not longer than the second and is not arcuate, and the sixth somite is but a little longer than the fifth.

The ophthalmopoda stand upon a short pedicle; the ophthalmus is hemispherical, and has a small ocellus beyond the margin.

The first pair of antennæ is nearly as long as the second, and two-thirds the length of the animal; the first joint is excavate to receive the ophthalmopod, and has the margin fringed with hairs, those on the anterior wall of the excavation being directed posteriorly; the stylocerite is short, and so closely impacted against the margin of the joint that it ceases to be an offensive weapon; the outer distal angle is armed with a strong but short tooth; the second and third joints are subcylindrical, and articulate with each other obliquely, the inner distal angle of the second joint being produced on the under surface nearly to the extremity of the third joint. The outer flagellum is stout at the base and soon sends off a secondary branch that is slender, and as long as the inner flagellum.

The second pair of antennæ is longer than the animal and supports a large scaphocerite that reaches to the extremity of the rostrum, it is armed on the outer side with a tooth that is closely impacted into the margin, and does not reach to the extremity of the appendage. The base of the peduncle is armed on the outer and lower angle with a strong tooth, above which is a lobe, and between this and the tooth there is a groove into which the scaphocerite falls when projected backwards.

The oral appendages correspond with those of *Palæmon serratus*.

The first pair of gnathopoda closely resembles that of *Palæmon*.

The second pair terminates in a sharp unguis and has the sides thickly furred with short, stiff hairs, and the coxa bears a short and broad calcified process.

The first pair of pereiopoda is slender, and when extended reaches considerably beyond the apex of the rostrum; it is chelate, the pollex and dactylos being nearly as long as the palm of the propodos and impinging in their entire length, and furnished with numerous fasciculi of hair; the propodos is narrow, not broader than the carpos, and about half its length; the carpos is long, narrow, and cylindrical; the meros is three-fourths the length of the carpos, cylindrical, and slightly more robust; the ischium is short, about half the length of the meros, and on the inner side for nearly the entire length of the joint

there is developed a broad and slightly curved plate, the concave surface of which looks upwards, the margin being tufted with a thick mat of hairs; the basis is shorter than the ischium and like it has a flattened process, also tufted with hairs. These two processes form a point of support for the distal joints of the long appendage when reflexed and at rest. The limb being bent at the mero-carpal articulation, the lengths of the proximal and distal joints are equalised so that the chela when so bent reaches the mouth and is enabled to supply it with food. The coxa is short and robust.

The second pair of pereiopoda is extremely long and forms the distinguishing feature of this genus; it is about one-third longer than the entire animal, so that a specimen that measures 130 millimetres from the orbit to the extremity of the telson carries a pair of these limbs nearly 200 millimetres long. The coxa and basis are short, the ischium is longer and slightly compressed horizontally; the meros is twice the length of the ischium and subequal with that of the carpos; the propodos is twice and a half as long as the carpos, and the palm once and a half longer than the carpos; the pollex is subequal to the dactylos, cylindrical, and but very slightly larger in diameter than the distal extremity of the carpos, it is curved downwards in gradual continuation of the lower margin of the palm, and is armed on the inner surface near the base with two tubercles situated near together, the anterior being the larger and directed obliquely backwards.

The dactylos is long and slender, resembling the pollex, being slightly curved to correspond and lie parallel with it, it is armed on the inner surface about one-third from the articulation with a large flattened conical cusp, which with those on the pollex prevent the fingers from impinging close together, whereas the apices of the two pass each other when the chela is closed. The entire limb is finely granulated except on the dactylos and pollex, where the granulations are coarser and more pointed, and on the under surface of the propodos and carpos, where there are a few small tubercles.

The posterior three pairs of pereiopoda are short, subequal, furnished with hairs, and terminate in an unguiculate dactylos.

The pleopoda are biramose and subfoliaceous; the first pair has the inner branch pointed and half the length of the outer, all the others are subequal; the posterior pair helps to form the rhipidura, the outer branch of which is longer than the inner, and is divided by a diæresis, that is protected on the outer margin by a point that lies close against the distal portion of the plate.

The telson is one-third shorter than the outer ramus of the rhipidura and gradually tapers to an obtuse point; the dorsal surface is smooth and rounded, the distal half being dorso-laterally furnished with two equidistant solitary short spines, and the extremity is fringed on the under surface with a row of short stiff hairs, and at the outer angles on each side with a long and short spine.

Length, entire (male),	.	.	.	.	.	116 mm. (4.5 in.).
„ of carapace,	.	.	.	.	.	39 „
„ of rostrum,	.	.	.	.	.	25 „
„ of pleon,	.	.	.	.	.	77 „
„ of third somite of pleon,	.	.	.	.	.	13 „
„ of sixth somite of pleon,	.	.	.	.	.	13 „
„ of telson,	.	.	.	.	.	19 „

Habitat.—Tahiti. From a river at Papeuriri. Five specimens, full-grown males. Length, about 125 mm. (5 in.).

Kandavu and Ovalau, Fiji Islands. Twenty-three specimens; twenty-two males, one female. Length, male, 110 mm. (4.3 in.); female, 69 mm. (2.7 in.).

Pasananca, Mindanao, and near Samboangan, Philippine Islands. Five specimens; four full-grown males, and one female. Length, male, 125 mm. (5 in.); female, 78 mm. (3 in.).

Banda Island. Three specimens, females. Length, 52 mm. (2 in.).

Observations.—This species and that described by Olivier, under the name of *Palæmon ornatus*, are probably identical with that which Fabricius named *Palæmon longimanus*, and Milne-Edwards says that it has been taken at Amboina, Waigou, and several places in the Indian Ocean. A considerable number was brought home by the Challenger from the localities given above; and a close comparison of the numerous specimens leads to the conclusion that they all belong to the same species, although those from each locality show a variation in some unimportant feature that is peculiar to them alone.

Most of those procured from the river Papeuriri in Tahiti are about 125 mm. long, measured from the margin of the orbit to the extremity of the telson, and the long chelate second pair of pereopoda is 275 mm. in length, or one-third longer than the animal.

The dorsal surface is of a purple colour, and it is probable that the whole animal may have been of a similar hue before it was placed in spirits, excepting probably the long arms, which are darker, the digital processes being almost black.

The finest specimen from Tahiti is rather larger, being 15 mm. longer and more robust, and the only trace of the purple colour that remains is to be found on the posterior margin of the teeth on the rostral crest. The long arms are of a brownish colour, deepening to a purple on the long, digital processes of the chela, and they are about 220 mm. in length. Those obtained at Ovalau and Kandavu are smaller, being only 110 mm. long, and not quite so robust. The chelate pereopoda are about the same length, and of a brownish colour, the digital processes having the colour broken into spots. The purple hue still remains on the posterior margin of the teeth on the rostral crest.

The largest male specimen from Pasananca, Mindanao, Philippine Islands, is rather larger, being 128 mm. in length, and corresponds very nearly with the specimen from Ovalau, the most important distinction being in the size of the teeth on the rostral crest, which are somewhat larger and bolder. This is more apparent in some specimens than in others, and when the teeth are larger their number is reduced to six or seven, and when not so large, increased to seven or eight. In the specimens from this locality the chelate processes are more distinctly mottled.

The specimens from Banda are only three, and these are all small, the largest being only 52 mm. long; they are probably only young animals. I consider them to be of the same species as the preceding, but they differ in having the second pair of pereopoda shorter in comparison, not being so long as the animal; the dactylos impinges in its entire length against the pollex, and there is no dental protuberance between them, a condition that pertains chiefly to full-grown animals.

Bithynis grandimanus (Dana) (Pl. CXXIX. figs. 2, 3).

Palæmon grandimanus, Dana, U.S. Explor. Exped., Crust., p. 588, pl. xxxviii. fig. 12.

Male.—Carapace four-fifths the length of the animal, dorsally rounded posteriorly, anteriorly carinated over the frontal region and produced to a rostrum that is rather more than half the length of the carapace, and armed on the upper margin with fifteen or sixteen teeth, and on the under with four or five. The outer canthus of the orbit is rounded, the antennal tooth is well defined, and behind it, almost in a horizontal line, stands the hepatic tooth.

The pleon is smooth; the third somite is scarcely longer than the fourth, and the sixth is not longer than the fifth and shorter than the fourth.

The telson is laterally compressed and tapering; the dorso-lateral angle is furnished on either side with two solitary minute spines and a fasciculus of hairs on the medio-dorsal surface near the base, the apex is centrally pointed and armed on either side with a long and a short spine, and on the under surface of the margin with a fringe of hairs.

The ophthalmopoda are pyriform, and carry an ocellus within a curve in the margin of the ophthalmus.

The first pair of antennæ has the peduncle one-third shorter than the rostrum; the first joint is equal in length to the second and third together, is excavate on the upper surface, and armed on the outer margin with a short stylocerite and a strong tooth at the distal angle; the two following joints are cylindrical, subequal, and support two flagella, the inner of which is slender and half the length of the animal, the outer is stouter at the base and divides into two branches, of which the inner is half the length of the outer, which equals the entire animal in length.

The second pair of antennæ carries a scaphocerite of the generic form that reaches to the extremity of the rostrum, and a flagellum that is twice the length of the animal.

The second pair of gnathopoda terminates in a sharp unguis and reaches as far as the distal extremity of the peduncle of the first pair of antennæ.

The first pair of pereopoda is slender and cylindrical, the propodos being not broader than the distal extremity of the carpos, which is as long as the ischium and meros together; the basis is cylindrical, the inner margin not being developed into a plate as in *Bithynis lar*. The second pair has the two limbs unequal. The right is the larger and different in form; it is as long as the animal, and has the meros, carpos, palm of the propodos and dactylos subequal in length, the propodos being subcylindrical near the base and flattened towards the fingers; the pollex is serrate in the central axis as well as on the inner and outer margin, and armed with a broad, conical cusp about one-third its length from the articulation; the dactylos resembles the pollex, against which it impinges from the apex to the cusp, where there is a corresponding excavation to receive each. The cusp on the dactylos is smaller and more advanced in position than that on the pollex. The left limb is about two-thirds the length of the right, has the fingers of the chela longer than the palm, the margins parallel and closely impinging throughout their entire length, unarmed, and fringed with long hairs. The three following pairs of pereopoda terminate in an unguis that is sharp and suddenly narrows from the dactylos; the propodos is long, cylindrical, and armed with a few short spines on the posterior margin.

The outer plates of the rhipidura are longer than the telson.

Female.—Resembles the male in general form but differs in size, and in the relative importance of the second pair of pereopoda. These are equal in length on the two sides and resemble the smaller limb in the male, excepting that they are not hirsute, the tubercular cusps in the right being reduced to a minimum; they are about three-fourths the length of the animal.

Several specimens were laden with numerous, small, oval eggs, some of which appear to be approaching maturity.

	Male.	Female.
Length, entire,	64 mm. (2.5 in.)	48 mm. (1.9 in.)
„ of carapace,	22 „	15 „
„ of rostrum,	15 „	12 „
„ of pleon,	42 „	33 „
„ of third somite of pleon,	10 „	7 „
„ of sixth somite of pleon,	6 „	5 „
„ telson,	10 „	8 „

Habitat.—Honolulu. About fifty specimens were bought in the market, having been obtained from the fresh-water rivers on the island.

Four specimens were also procured from the same locality, associated with the others, and having a close specific resemblance in all parts, excepting the left arm of the second pair of pereiopoda, the hand of which, instead of being small with the fingers parallel and impinging, has them twice the length of the palm, curved and gaping from base to apex, and thickly covered with long hairs. In every case the right arm is broken off, and I could not discover among the detached arms any that appeared to belong to this variety. The length of the arm is proportionate to the animal and is also much longer than in the typical specimen.

The large chelate pereiopoda in this specimen has the right and left very unequal, the left being more slender and shorter than the right.

In some specimens the left hand, which is generally the smaller, has the fingers gaping and only meeting at the apex, while in others, which Dana considers to be the younger, the fingers meet in their entire length. In both they are somewhat hirsute but more especially in those in which the fingers are convex.

Brachycarpus, n. gen.

Resembles *Palæmon*. The outer cauthus of the orbit is defined, the first antennal tooth being distinct from it; there is no second antennal tooth, but there is one on the hepatic region, which instead of being in the same horizontal line with the first antennal tooth, as in *Palæmonella* and *Bithynis*, is situated obliquely below and posterior to it.

The second pair of gnathopoda is unguiculate.

The first pair of pereiopoda has the carpos long and cylindrical, and the propodos short. The second pair has the carpos shorter than the meros and triangulate, and the propodos long and cylindrical.

The branchial arrangement is the same as in *Palæmon*.

Geographical Distribution.—Specimens of this genus have been found in the North Atlantic and South Pacific.

Brachycarpus savignyi, n. sp. (Pl. CXXIX. fig. 4).

Rostrum horizontal, dorsally crested with seven strong teeth, of which three are posterior to the orbital margin, and four anterior to it, and having three on the lower margin; one large tooth is situated outside the orbital angle, and one of less importance on the hepatic region. The rest of the carapace is smooth, as are also all the somites of the pleon.

The ophthalmopoda are short and the ophthalmus hemispherical.

The first pair of antennæ has a short stylocerite.

The second pair of pereiopoda is long and stout, and the inner margin of the pollex and dactylos is thickly fringed with stout hairs.

The telson is shorter than the branches of the rhipidura, dorsally flanked on each side within the margins by two distant small spines, and a long and a short one on the margin on each side of the terminal extremity.

Length, entire,	50 mm. (2 in.).
„ of carapace,	14 „
„ of rostrum,	9 „
„ of pleon,	36 „
„ of third somite of pleon,	9 „
„ of sixth somite of pleon,	4 „
„ of telson,	7 „

Habitat.—Bermuda, shallow water.

The carapace is nearly one-third the length of the animal; the frontal region is crested and anteriorly produced to a rostrum that is about two-thirds the length of the carapace, and armed on the upper margin with seven large teeth, of which the most anterior is the smallest and stands near the apex, and the posterior is situated above the pyloric region. The frontal margin has the orbital notch traversed by a lunate lacuna, and the canthus is situated inside of the first antennal tooth, which in this species is well defined by a slight projection; behind and a little beneath stands the hepatic tooth, which is the only other tooth on the frontal surface of the carapace, the fronto-lateral margin sloping away from the lower portion of the second pair of antennæ.

The pleon is dorsally rounded and laterally compressed, the third somite is longer than the second and longitudinally arcuate; the sixth somite is but slightly longer than the fifth, which is shorter than the fourth.

The ophthalmopoda are short and stout and the ophthalmus is large, ovate, laterally compressed, and furnished with an ocellus within its posterior margin.

The first pair of antennæ has the first joint of the peduncle nearly twice as long as the second and third together, excavate on the upper surface, laterally extended, and of great tenuity; it is armed near the base with a short flat stylocerite that reaches to less than half the length of the joint, and furnished at the outer distal angle with a strong, flat, sharp tooth. The second and third joints are short, cylindrical, and terminally support two flagella, the inner of which is very slender, and the outer stout at the base, and continuing a distance nearly equal to the length of the peduncle before sending off the secondary ramus. Beyond the point of bifurcation, the two rami are slender and thread-like; length undetermined.

The second pair of antennæ supports a strong scaphocerite that reaches beyond the extremity of the rostrum, and carries a long and slender flagellum that is about half the length of the animal.

The mandibles are like those of *Palæmon*, and appear not to differ specifically from those of *Palæmon serratus*; the psalistoma is broader at the base than at the extremity, the molar process is angular and well developed, and the synhipod is very slender, three-jointed, and not longer than the psalistoma.

The oral appendages closely resemble those of *Palæmon*, exhibiting no conspicuous variation.

The gnathopoda also correspond with those of *Palæmon serratus*, excepting that the second pair has the extremity terminating in a long and sharp-pointed unguis, and the appendage is more thickly fringed with hairs in numerous fasciculi.

The first pair of pereopoda is long, slender, and chelate, and formed on the same type as that of *Palæmon serratus*; the coxa is produced on the inner side and supports a brush of hairs; the basis and ischium are both short, the latter being narrower at the basal articulation than at the meral; the meros and carpos are long and subequal; the propodos is shorter than the carpos, the palm being subequal with the dactylos; the dactylos and pollex are parallel, impinging throughout their entire length, and having their extremities rounded on the outer margins. This pair of appendages corresponds with that of the typical *Palæmon*. The second pair of pereopoda is very long and very large; it has the carpos short, the propodos long and cylindrical, the palm about twice the length of the pollex, and the pollex slightly curved and furnished on the inner margin with two strong, obtusely pointed teeth or tubercles; the dactylos is also curved, and a trifle longer than the pollex, and each of these joints terminates in a sharp, strong, opposing unguis, and has the inner margin broad and fringed with a closely packed row of strong but short hairs, so that when the chela is closed the intervening space is filled with a brush of hairs. The three posterior pairs of pereopoda are robust and not very long; the meros is longer than the ischium, and the carpos is one-third shorter than the meros and overlaps the propodal articulation on the anterior surface; the propodos is a third longer than the carpos, and furnished with two or three solitary spinules on the posterior margin; the dactylos is short, curved, and terminates in a curved, bifid unguis, both points being sharp.

The pleopoda are foliaceous, biramose, and have the basal joint broad and flat.

The rhipidura has the outer plate furnished with a short tooth, and a longer spine at the outer extremity of the diæresis, the inner plate is subequal with the outer, and both longer than the telson.

The telson is broad at the base, narrow and pointed at the extremity, and has the dorsal surface flattened; the dorso-lateral angle on each side is armed with two solitary, short, stout spines, one behind the other, and the posterior angle on each side with a short spine, immediately to the inner side of which is a second spine about one-eighth the length of the telson; between these spines on the under surface the margin is fringed with hairs subequal with the larger spines.

Observation.—This species bears a very close relationship to *Palæmon beaupressii* of Savigny and Audouin, as well as to *Palæmon petitthouarsii* of the same authors.

Brachycarpus audouini, n. sp. (Pl. CXXIX. fig. 5).

Animal robust, carapace produced anteriorly to a lanceolate rostrum, upper and lower margins serrate with many teeth, of which the posterior on the dorsal surface is separate from the rest and corresponds with the pyloric region; the orbit is clearly defined, and the first antennal tooth is sharp and distinct, as is also that on the hepatic region.

The three first somites of the pleon are deeper than the carapace, the four succeeding are shorter, less deep, and more compressed; the sixth somite is only a little longer than the fifth, and projects to a tooth, flanking the telson on each side.

The telson is long, tapering, and armed with three spinules on each side.

The second pair of antennæ is longer than the animal.

The first pair of pereopoda is slender, small, and differing a little on the two sides. The second pair has only the left limb preserved; it is about two-thirds the length of the animal, and has the propodos, including the chela, five times as long as the carpos. The posterior pereopod on the right side is the only one of the posterior three pairs that is preserved; it is slender, moderately long, and terminates in a long, sharp, unadorned dactylos.

Length, entire (female),	.	.	.	.	.	16 mm. (0.6 in.).
„ of carapace,	.	.	.	.	.	5 „
„ of rostrum,	.	.	.	.	.	3 „
„ of pleon,	.	.	.	.	.	11 „
„ of third somite of pleon,	.	.	.	.	.	3 „
„ of sixth somite of pleon,	.	.	.	.	.	2 „
„ of telson,	.	.	.	.	.	3 „

Habitat.—Station 167A, June 27, 1874; lat. 41° 4' S., long. 174° 19' E.; off New Zealand; depth, 10 fathoms; bottom, mud. One specimen, female, laden with small ova. Dredged.

The carapace is about one-third the length of the animal, anteriorly produced to a laterally compressed rostrum, the upper margin of which is in a line with the dorsal surface of the carapace and a little more than half its length; it is armed with nine teeth, of which the posterior corresponds with the post-gastric region and is more distant from the next than the preceding are from each other, the latter becoming gradually closer and smaller as they approach the apex, the anterior being very minute; on the under margin there are six teeth, of which the posterior is the largest and the anterior the smallest, corresponding in size and position with those on the upper margin.

The frontal margin is armed with an obtuse orbital, and a sharp antennal, tooth,

and behind and below this a hepatic tooth; the frontal and lateral margins of the carapace meeting at a slightly obtuse angle, which, however, is not produced to a tooth.

The pleon is dorsally rounded and laterally compressed, has the third somite longer than the others and dorsally arcuate; the sixth somite is nearly twice as long as the preceding.

The ophthalmopoda are short and pyriform, and the ophthalmus is round, with a distinct ocellus on the margin.

The first pair of antennæ has the first joint of the peduncle longer than the two succeeding joints, and is furnished with a stylocerite that is half the length of the joint, which is armed on the outer distal angle with a sharp tooth. The second and third joints are cylindrical and support two flagella, the inner of which is long and slender, and the outer stout at the base and soon dividing into two branches, of which the shorter is the chief and the more robust, and carries a series of membranous cilia; the secondary branch is as slender as the inner flagellum, and subequal to it, both being as long as the carapace.

The second pair of antennæ is longer than the animal and supports a scaphocerite that reaches beyond the extremity of the rostrum, and is armed on the outer margin with a tooth that is behind the level of the anterior margin.

The second pair of gnathopoda is short, slender, and pediform; it carries a basephysis that reaches nearly to the penultimate articulation, and has the terminal joint fringed and tipped with long, serrate hairs or spinules.

The first pair of pereopoda when extended reaches as far as the apex of the rostrum, and is slender and chelate; the carpos is as long as the meros and longer than the propodos, inclusive of the pollex. The fingers are as long as the palm and impinge closely together in their whole extent. The second pair is nearly twice as long as the first; the propodal articulation of the carpos, and the extremity of the dactylos, reach as far again; the meros is long and narrow, with the margins parallel; the carpos is narrow at the meral extremity and wide at the propodal; the propodos is subcylindrical, forms about half the length of the appendage, and is not much broader than the distal extremity of the carpos; the pollex is scarcely half the length of the palm, and the dactylos is more curved than the pollex; they meet together in their entire length. The three succeeding pairs, so far as may be judged from the solitary member of the posterior pair, are slender and not very long, the upper angle of the carpal extremity overlapping the propodal articulation; the propodos is long, straight, and cylindrical, and the dactylos is long, slender, curved, and uniunguiculate.

The pleopoda are biramose, long, narrow, and foliaceous. The rhipidura has the lateral plates longer than the telson, and the outer extremity of the diæresis is armed with a tooth and a spine.

The telson is dorsally smooth, laterally compressed, and has the dorso-lateral angle

armed with two short solitary spinules, placed longitudinally on each side, and terminating in two long lateral and one central spine.

Observations.—This species bears a close relationship to *Brachycarpus savignyi*, which was taken at Bermuda, also in comparatively shallow water. It differs, however, in several points of specific value, notably in the form of the dactylos of the posterior pereopoda, which in this species is single-pointed, while in *Brachycarpus savignyi* it is bifid. The fingers of the large chela in *Brachycarpus savignyi* are broad and gaping, the gap containing tubercles and a mass of hairs, while in *Brachycarpus audouini* the fingers impinge in their entire length, and are devoid of hairs or tubercles.

Nematocarcinus, A. Milne-Edwards.

Nematocarcinus, A. Milne-Edwards, Ann. d. Sci. Nat., sér. 6, tom. ix. p. 14, 1884.

Dorsal surface of the carapace and pleon continuously smooth and even. Carapace anteriorly produced to a laterally compressed rostrum that is finely and more or less abundantly serrate on the upper surface and smooth on the lower, or at most armed with very small teeth. Frontal margin furnished with one tooth, corresponding with the outer angle of the first pair of antennæ, and a second at the fronto-lateral angle, from whence the inferior margin immediately recedes.

The ophthalmopoda are short, and the ophthalmus globular.

The first pair of antennæ has the first joint deeply excavate, and furnished with a stylocerite; the second and third joints are short and robust, terminating in two extremely long and slender flagella, the outer of which is stout near the base.

The second pair of antennæ carries a long scaphocerite, and terminates in an extremely long and slender flagellum.

The mandibles have the psalistoma and molar processes distinct, and carry a two-jointed synhipod.

The first pair of gnathopoda has the terminal joints reflexed, and carries a long basecephysis and a well-formed mastigobranchial plate.

The second pair of gnathopoda terminates in a long spatuliform joint, and is furnished with a long basecephysis.

The first two pairs of pereopoda are slender and perfectly chelate, the second being much longer than the first, and having the carpos about four times the length of the propodos. The three following pairs are extremely long, and are remarkable for the peculiar overlapping articulation between the ischium and meros, in having the carpos many times longer than the propodos, and terminating in a short and sharp dactylos.

The telson is subequal with the inner branch of the rhipidura.

This genus is remarkable for the great length of the antennæ, more especially those of the first pair, which are frequently three or four times the length of the animal; and the

great length of the pereiopoda, more especially the three posterior pairs, which is chiefly caused by the enormous length of the ischium, meros, and carpos. The articulation between the ischium and meros is, moreover, of peculiar and unique character, and seems probably adapted for the great muscular strain consequent upon the length of the joints. The extremity of the ischium lies longitudinally under the meros, so that these joints overlap and support each other. The propodos, coxa, and basis are very short, and the last supports a short two-jointed ecphysis.

The ventral surface of the pereion in the male carries on each of the three posterior somites a flat anteriorly projecting plate or process on each side of the median line, and the female carries a similar process on the fourth somite, but not on either the fifth or sixth.

The branchial arrangement consists of a series of pleurobranchiæ and rudimentary mastigobranchiæ, as may be seen from the following table:—

Pleurobranchiæ, . . . . .	...	...	1	1	1	1	1
Arthrobranchiæ, . . . . .	...	1	1	1	1	1	...
Podobranchiæ,	1	...	...	...	...	...	...
Mastigobranchiæ,	1	1	r	r	r	r	...
	h	i	k	l	m	n	o

Geographical Distribution.—Several species of this genus have been found in different parts of the globe. It was first taken by the Challenger in the Southern Indian Ocean at the depth of 1200 fathoms, and again near the Kermadec Islands and the Fiji Islands at 600 fathoms; in the narrows between Borneo and Celebes, specimens are recorded from 255 fathoms. Off Yedo in Japan others were taken at depths of 350, 560, and 1875 fathoms. Specimens have also been recorded from the Gulf of Mexico and the Mediterranean by A. Milne-Edwards. In all instances excepting one the bottom was either mud or ooze; in the exceptional case it was rocky. The bottom temperature varied from 35°·3 to 41°·8.

I am inclined to believe that the animals live at an average depth of between 300 and 500 fathoms in mid-water.

Nematocarcinus undulatipes, n. sp. (Pl. CXXX.).

Rostrum horizontally straight, one-third the length of the carapace, armed on the upper margin with twelve or thirteen small teeth, and on the lower margin with one small tooth near the apex; beyond this tooth the margin suddenly curves towards the extremity.

Ophthalmopoda short and orbicular.

First pair of antennæ having the peduncle short and stout, and the flagella subequally slender, extending to about three times the length of the animal.

Second pair of antennæ having a scaphocerite as long again as the rostrum, and carrying a flagellum that is subequal with those of the first pair.

Second pair of gnathopoda terminating in a long spatuliform joint fringed with short hairs.

First pair of pereopoda slender, chelate, and as long again as the second pair of gnathopoda. Second pair slightly more robust than the first, and about twice its length. Posterior three pairs much longer and increasing in length posteriorly, the meros being armed with a strong tooth at the carpal extremity, where it is slightly enlarged to receive the carpos, which is considerably longer than any of the other joints of the leg; the dactylos is long and waved in the third and fourth pairs, and stunted and rudimentary in the fifth, where it is lost in a brush of long hairs.

The third somite of the pleon is dorsally arcuate, and the telson long, narrow, and tapering.

	Female.	Male.
Length, entire, . . .	78 mm. (3 in.).	58 mm. (2.2 in.).
„ of carapace, . . .	23 „	18 „
„ of rostrum, . . .	7 „	4 „
„ of pleon, . . .	55 „	40 „
„ of third somite of pleon, .	10 „	9 „
„ of sixth somite of pleon, .	13 „	10 „
„ of telson, . . .	11 „	12 „
„ third pair of pereopoda, .	105 „	54 „
„ fifth pair of pereopoda, .	...	100 „
„ first antenna, . . .	300 „	150 „

Habitat.—Station 200, October 23, 1874; lat. 6° 47' N., long. 122° 28' E.; off Sibago, Philippine Islands; depth, 250 fathoms; bottom, green mud. Fifteen specimens; five males, ten females. Trawled.

Station 171, July 15, 1874; lat. 28° 33' S., long. 177° 50' W.; north of the Kermadec Islands; depth, 600 fathoms; bottom, hard ground; bottom temperature, 39°·5. Three specimens, males. Trawled.

Length, male, 113 mm. (4.4 in.).

Station 194, September 29, 1874; lat. 4° 34' S., long. 129° 57' 30" E.; off Banda Island; depth, 200 fathoms; bottom, volcanic mud. One specimen, female. Dredge and trawl both used.

Station 214, February 10, 1875; lat. 4° 33' N., long. 127° 6' E.; south of the Philippine Islands; depth, 500 fathoms; bottom, blue mud; bottom temperature, 41°·8. Three specimens, one female. Trawled.

The rostrum is short and horizontal, about one-third of the length of the carapace, and is serrate with numerous small teeth above and with one minute tooth below near the apex, but which is omitted in the figure on the plate. The anterior margin is furnished

with a first antennal tooth, situated near the outer canthus of the orbit, and a second corresponding with the antero-lateral angle of the carapace, from which the anterior margin directly recedes posteriorly in a horizontal line.

The pleon has the dorsal surface smooth, with a small gibbous prominence near the posterior margin of the third somite.

The ophthalmopoda are short and orbicular, scarcely reaching beyond the antennal tooth.

The first pair of antennæ has the peduncle tolerably robust; the first joint is deeply excavate to receive the eye, and carries a stiff sharp stylocerite, and the second and third joints are short and cylindrical. From the extremity of the third joint, which extends but little beyond the apex of the rostrum, arise two flagella, the outer and upper of which is stout at the base, multiarticulate, and from three to four times the length of the animal; the inner flagellum is slender, cylindrical, and equals the outer in length.

The second pair of antennæ has a short peduncle, and supports a scaphocerite that is rounded at the extremity and strengthened at the outer margin by a longitudinal ridge which terminates in a sharp tooth near the distal extremity. The flagellum is very long and slender, being subequal with those of the first pair.

The mandible is strong and has the psalistoma dentate and separate from the molar process, and it carries a two-jointed synhipod, of which the distal joint is ovate and fringed with hairs.

The siagnopoda exhibit nothing of specific value.

The first pair of gnathopoda is six-jointed; the terminal joint is long-ovate; the basis carries a long slender ecphysis, and the coxa supports a membranous mastigobranchial plate, to which is attached a short podobranchial plume.

The second pair of gnathopoda is long and pediform, and terminates in an ovate spatuliform joint; the basis carries a slender ecphysis, and the coxa the rudiment of a mastigobranchial plate without any modification of a podobranchial plume.

The first pair of pereopoda is chelate, the chela being small; the propodos is slender and short; the dactylos is minute; the carpos is long, slender, cylindrical, and smooth; the meros and ischium are long, slender, and united by a peculiar, long, overlapping joint, and armed on the lower margin with a series of long spine-like teeth. The second pair, which is about twice the length of the first, is chelate, the chela having the dactylos cylindrical and the pollex concave; the propodos is long and subcylindrical, but short compared with the carpos, which is about four times as long and half the diameter; the meros and ischium are together about equal in length to the carpos, and are united by a long overlapping joint and armed on the lower margin with a few teeth. The three following pairs of pereopoda are about as long again as the second; the third and fourth terminate in a comparatively long and waved dactylos, while that of the fifth pair is short and rudimentary. The propodos is short, broader at the distal than at the carpal extremity, and carries a brush of hairs at the distal extremity, amongst which in the

posterior pair the dactylos is embedded; the carpos is long, slender, and cylindrical, being about fourteen times longer than the propodos, and nearly as long as the meros and ischium united; these two joints are united by a long overlapping articulation, and are both fringed with spine-like teeth, and the meros is armed with a strong tooth at the anterior distal angle that projects above the carpal articulation.

The telson equals in length the inner branch of the rhipidura, and is smooth and unarmed.

Observations.—This species appears to be the most common form; the females carry a considerable number of small round ova. The specimens taken at Station 200 were numerous, and were associated with several other genera, such as *Pontophilus*, *Heterocarpus*, *Solenocera*, *Palæmonella*, &c. Three of the specimens here taken were attacked by a species of *Bopyrus*.

The three specimens taken at Station 171 differ in size and in some minor points from the others, but belong I believe to this species. They are all males and are larger than the largest female taken elsewhere, measuring 113 mm. The carapace is 31 mm., and the rostrum 9 mm. long. They are also furnished with twelve or thirteen points on the frontal crest and upper margin of the rostrum, and with one small one near the apex on the lower margin, which appears to be a feature more common in the males than females, although seen in some of these also, and when not present the rostrum is thicker towards the apex, which is perhaps its normal condition.

The female specimen taken at Station 194 has the subapical tooth on the under margin of the rostrum developed into a strong and well-formed denticle, and much more conspicuous than in any of the numerous specimens which are typical in form from other localities.

This species differs from *Nematocarcinus gracilis* chiefly in having a less number of teeth on the upper surface of the rostrum.

Nematocarcinus lanceopes, n. sp. (Pl. CXXXI.).

Rostrum projecting anteriorly, nearly as long as the carapace, armed on the upper surface with a series of very small teeth, about twenty-six in number, and on the lower with eight teeth and no fringe of cilia.

Ophthalmopoda short and embayed in a deep orbital notch, which is armed at the outer angle with a sharp antennal tooth.

First pair of antennæ having the peduncle about half the length of the rostrum; first joint excavate to receive the ophthalmopoda and the other two short and cylindrical; the flagella are long and slender, the outer being a little larger at the base than the inner.

Second pair of antennæ carrying a scaphocerite that is nearly as long as the rostrum, and a long and slender flagellum.

Second pair of gnathopoda terminating in a long spatuliform joint.

First two pairs of pereopoda chelate, the propodos being rather less than half the length of the carpos, which corresponds in length with the meros and ischium combined. Two succeeding pairs of pereopoda missing. Posterior pair long, and terminating in a short, broad, and lanceolate dactylos, which articulates with the propodos in the centre of a cup-shaped hollow fringed with long hairs; the propodos is short and cylindrical, but four times as long as the dactylos; the carpos is long and cylindrical, being about twelve times as long as the propodos and a little longer than the meros, which is not armed with a prominent tooth at the carpal extremity, but is sparsely fringed with spine-like teeth on the posterior margin, and is connected with the ischium by an overlapping articulation. All the pereopoda, excepting the last pair, carry a basiphysis, and also a rudimentary mastigobranchial plate.

Telson subequal with the outer plate of the rhipidura, dorsally flat, smooth, and fringed with a few hairs at the extremity, and short spinules on the latero-dorsal angle.

	Female.	Male.
Length, entire, . . .	106 mm. (4.1 in.).	90 mm. (3.5 in.).
„ of carapace, . . .	31 „	25 „
„ of rostrum, . . .	25 „	24 „
„ of pleon, . . .	75 „	65 „
„ of third somite of pleon, .	12 „	12 „
„ of sixth somite of pleon, .	19 „	16 „
„ of telson, . . .	21 „	18 „

Habitat.—Station 152, February 11, 1874; lat. 60° 52' S., long. 80° 20' E.; Antarctic Sea; depth, 1260 fathoms; bottom, Diatom ooze. Three specimens; one male, two females. Associated with *Pentacheles*. Trawled.

This species was originally named from a belief that the posterior three pairs of legs terminated in a dactylos that was short and lanceolate in form, but the specimens are damaged, and although in my original notes I have recorded the three pairs as being so shaped, my drawing represents only two. I think that there is a possible error in the description, inasmuch as I had not at the time observed that the posterior pair in many and probably all species is rudimentary, so as to make it a distinction of generic value. The dactylos in this pair is short, broad, and lost among a mass of stiff hairs that fringe the distal margin of the propodos; it is lanceolate in form, but whether the preceding two are so or not I cannot determine.

The females were laden with ova of an oval form, and much larger than those of other species in which eggs have been observed. The pereopoda that are preserved attached are not quite so long proportionately as in some other species, a circumstance that is due to the carpos being not quite so long in relation to the meros to which it is attached.

The third somite of the pleon is slightly arcuate at the posterior portion, and the telson is slightly longer than in some species. Most of the other features are only of generic value and unimportant in the determination of species.

Nematocarcinus longirostris, n. sp. (Pl. CXXXII. fig. 2).

Rostrum slender, elevated anteriorly, and produced to a length that surpasses that of the carapace; armed on the upper surface with a large number of minute teeth and spinules, from thirty-eight to forty in number, of which those at the posterior extremity are very minute and closely-packed articulating spinules, and those towards the anterior extremity are fewer in number and more widely separated, and as they increase in size they lose their articulated condition and become tooth-like in character. The under surface is armed with five small rigid teeth.

Telson subequal in length with the lateral plates of the rhipidura.

Most of the specimens have the appendages broken off so that it is difficult to determine the characters further.

	Male.	Female.
Length, entire,	87 mm. (3.4 in.).	124 mm. (4.9 in.).
„ of carapace,	25 „	35 „
„ of rostrum,	26 „	48 „
„ of pleon,	62 „	89 „
„ of third somite of pleon,	13 „	15 „
„ of sixth somite of pleon,	15 „	20 „
„ of telson,	17 „	20 „

Habitat.—Station 237, June 17, 1875; lat. 34° 37' N., long. 140° 32' E.; near Yokohama, Japan; depth, 1875 fathoms; bottom, blue mud; bottom temperature, 35°·3. Ten specimens; three males, seven females, one bearing ova. Associated with *Nematocarcinus proximatus* and *Nematocarcinus parvidentatus*. Trawled.

This species corresponds very closely with *Nematocarcinus lanceopes*, so far as can be determined. Unfortunately, however, the pereiopoda are more or less broken off in all the specimens, and the definition of the species must be chiefly founded on the relative proportions of the body given in the above table.

The rostrum, which has the apex broken off, is about one-third of the length of the animal, and is the chief distinguishing feature of this species. It is proportionally longer and more slender than in *Nematocarcinus lanceopes*, and carries a greater number of teeth and spinules on the upper margin and fewer on the lower.

The branchial region is defined from the cardiac and hepatic regions by a longitudinal elevation external to a furrow, and from the antennal region by a similar furrow.

The ophthalmopoda are large and pyriform, having the ophthalmus hemispherical.

The first pair of antennæ has the peduncle about one-fourth the length of the rostrum, and carries at its base a stylocerite that is at first broad and then suddenly sharp pointed, and about half the length of the first joint; the succeeding two joints are short and subcylindrical, and terminate in two flagella that are broken off short.

The second pair of antennæ carries a scaphocerite that reaches to about half the length of the rostrum; it is waved on the outer margin, which is stout and rigid, and terminates in a small latero-apical tooth; it is separated from a median ridge by a longitudinal furrow, and the inner margin is also strengthened by a ridge that becomes stronger as it approaches the base, and is fringed with long and sparsely ciliated hairs.

The first pair of gnathopoda is generic in character.

The second pair is also chiefly generic; the terminal joint does not reach quite to the distal extremity of the scaphocerite, and is long, narrow, lanceolate, and hirsute; the penultimate is rather longer, cylindrical, and smooth; the antepenultimate suddenly increases in diameter, gradually widens and flattens towards the base, and probably represents the ischium and meros united; the basis is short and carries an ecphysis that is three-fourths the length of the antepenultimate joint; the coxa is short and supports a thick disc-like plate projecting from the outer side of the posterior surface, from which a rigid mastigobranchial rod also projects.

All the pereopoda except the posterior pair carry a moderately long ecphysis, and a short, ovate, mastigobranchial plate.

The third somite of the pleon projects dorsally to a point that lies close against the surface of the fourth somite, and the sixth, which is longer than the two preceding, is laterally compressed.

The telson is subequal with the outer branch of the rhipidura, and armed on each side, on the dorso-lateral angle, with seven small spinules.

All the specimens are more or less damaged, but one female was heavily laden with ova, which are small and round, therefore clearly demonstrating the species to be specifically distinct from *Nematocarcinus lanceopes*, which was taken in the Indian Ocean.

Other specimens that I have placed under separate specific names were taken associated with *Nematocarcinus longirostris*, and bear to it a considerable resemblance in all points excepting the relative length of the rostrum, and the consequent amount of ornamentation on it. This is more apparent in those that depart slightly from the exact form of the type specimen.

There were nine or ten specimens taken, all of them well grown, though none quite so large as the one selected for description. Each of these varies in some degree, especially in the length of the rostrum as compared with that of the carapace, and in some instances in the number of the teeth also, but in all these instances the teeth on the lower margin have the posterior subequal with or in advance of the distal extremity of the peduncle of the first pair of antennæ.

Nematocarcinus proximatus, n. sp. (Pl. CXXXII. fig. 3).

Rostrum as long as the carapace, armed on the upper surface with thirty-three or thirty-four small teeth and spinules, and one on the lower margin.

Telson about as long as the outer plates of the rhipidura.

Length, entire,	106 mm. (4.1 in.).
„ of carapace,	30 „
„ of rostrum,	31 „
„ of pleon,	76 „
„ of third somite of pleon,	15 „
„ of sixth somite of pleon,	18 „
„ of telson,	20 „

Habitat.—Station 300, December 17, 1875; lat. 33° 42' S., long. 78° 18' W.; west of Valparaiso; depth, 1375 fathoms; bottom, Globigerina ooze; bottom temperature, 35°·5. Three specimens, females. Associated with *Willemoesia*. Trawled.

Station 146, December 29, 1873; lat. 46° 46' S., long. 45° 31' E.; near Marion Island; depth, 1375 fathoms; bottom, Globigerina ooze; bottom temperature, 35°·6. Two specimens, females; 63 mm. and 100 mm. long. Trawled.

Station 188, September 10, 1874; lat. 9° 59' S., long. 139° 42' E.; Arafura Sea; depth, 28 fathoms; bottom, green mud. Fifteen specimens; eight males, seven females. Trawl and dredge both used.

Station 237, June 17, 1875; lat. 34° 37' N., long. 140° 32' E.; near Yokohama, Japan; depth, 1875 fathoms; bottom, blue mud; bottom temperature, 35°·3. One specimen, female. Trawled.

Station 302, December 28, 1875; lat. 42° 43' S., long. 82° 11' W.; off the west coast of America; depth, 1450 fathoms; bottom, Globigerina ooze; bottom temperature, 35°·6. Three specimens; one male, one female, bearing ova; one doubtful, probably a young male. Trawled.

This species differs from *Nematocarcinus longirostris* only in the length of the rostrum and in the variation in the number of teeth upon it, more especially on the lower margin, which in the typical specimen of this species bears only one, and that somewhat distant from the extremity of the rostrum, while in *Nematocarcinus longirostris* there are five, and the distal one approaches near the apex of the rostrum. In a young male specimen from Station 188, and in a female, bearing ova, from Station 302, there are two teeth on the lower margin, thus showing a tendency to vary in this character, and although for the sake of the convenience of classification I call them by different specific names, I cannot help feeling that they are mere variable forms of one deep-sea species. Unfortunately, every specimen of both *Nematocarcinus longirostris* and *Nematocarcinus proximatus* is more or less mutilated, and the posterior pereopoda, from

their long and slender character, are particularly liable to be broken. The consequence is that there is only one specimen, a male, out of the three taken at Station 300, in which any of the pereopoda are preserved; this specimen is smaller than the one from which the measurements are taken.

The rostrum in the smaller specimen is only two-thirds the length of the carapace, and is 20 mm. long, while the carapace measures 28 mm. The ophthalmus is more globular than in *Nematocarcinus longirostris*. The peduncle of the first pair of antennæ is about half the length of the rostrum, and the scaphocerite reaches to a point but little short of the apex of the rostrum, while in the larger specimen it falls short by about one-third of its length. The first pair of pereopoda has the chela long and the dactylos slender and as long as the palm. The second pair of pereopoda has the chela short and the dactylos half the length of the palm, and reaching a little beyond the extremity of the scaphocerite, while that of the first pair falls short of the same. The only other pereopod that has been preserved is the right penultimate, in which the carpos is seen to be a little longer than the meros and more slender; the propodos is also slender and comparatively long, and the dactylos is long, slender, and curved, and is also embedded in a fasciculus of straight and long hairs.

The rest of the animal differs little from other allied species.

Nematocarcinus altus, n. sp. (Pl. CXXXII. fig. 4).

Rostrum long and slender, nearly of the same length as the carapace, armed on the upper surface with ten small spinules close together on the frontal crest, posterior to the orbits, and with five or more teeth on the rostrum proper, and on the under surface with two or more small ones.

Telson shorter than the outer branch of the rhipidura.

Length, entire,	.	.	.	.	.	115 mm. (4.5 in.).
„ of carapace,	.	.	.	.	.	35 „
„ of rostrum,	.	.	.	.	.	31 „
„ of pleon,	.	.	.	.	.	80 „
„ of third somite of pleon,	.	.	.	.	.	15 „
„ of sixth somite of pleon,	.	.	.	.	.	22 „
„ of telson,	.	.	.	.	.	20 „

Habitat.—Station 198, October 20, 1874; lat. 2° 55' N., long. 124° 53' E.; south of the Philippine Islands; depth, 2150 fathoms; bottom, blue mud; bottom temperature, 38°·9. One specimen, male. Trawled.

Only one specimen of this species was procured, from which all the appendages are wanting, and the rostrum is broken near the apex. The number of teeth is not nearly so great as on the rostrum of *Nematocarcinus longirostris* or even of *Nematocarcinus*

proximatus. The chief distinctive feature, however, exists in the very decided difference, both in position and character, of the armature on the frontal crest posterior to the orbits, and which consists of ten small movable spinules closely planted together, from that on the rostrum anterior to the orbits, which consist of eight low-lying fixed teeth, that are placed widely apart. The portion of the rostrum which was broken off has been found, so that its length can be accurately determined to be over two-thirds the length of the carapace, or a little longer than the scaphocerite, and it gradually narrows from the base to the extremity. On the under side of the rostrum there are not any very conspicuous teeth, but five small points can be determined by close observation amidst a fringe of hairs.

The branchial region is defined by fossæ from the cardiac and hepatic regions, and the latter from the gastric and frontal.

The third somite of the pleon is dorsally produced to a point that reaches, when the animal is extended, to about two-thirds the length of the succeeding somite.

Observations.—The specimen is too much damaged to enable me to describe any other important distinctions from closely allied species, such as *Nematocarcinus lanceopes*, *Nematocarcinus proximatus*, and *Nematocarcinus longirostris*.

This species may be at once recognised by the number and position of the frontal teeth, and by the shortness of the telson, which does not quite equal the length of the inner branch of the sixth pleopod, and is considerably shorter than the outer, the apex being on a level with the diæresis.

Nematocarcinus productus, n. sp. (Pl. CXXXII. fig. 5).

Rostrum about half the length of the carapace, anteriorly elevated and gradually tapering; upper or dorsal margin armed with eighteen or nineteen teeth, of which those on the frontal crest are the more closely placed, while those towards the distal extremity of the rostrum are more separated; lower margin smooth and fringed with closely packed cilia.

Third somite of the pleon dorsally arcuate and posteriorly produced so as to cover half the fourth somite, when the pleon is fully extended; posterior three somites obtusely carinated dorsally.

Telson long, narrow, and tapering posteriorly to a truncated apex which is furnished with three or four long stiff hairs or spines.

	Female.	Male.
Length, entire,	91 mm. (3.5 in.).	75 mm. (2.9 in.).
„ of carapace,	26 „	22 „
„ of rostrum,	15 „	8 „
„ of pleon,	65 „	53 „
„ of third somite of pleon,	13 „	10 „
„ of sixth somite of pleon,	16 „	12 „
„ of telson,	16 „	12 „

Habitat.—Station 205, November 13, 1874; lat. $16^{\circ} 42' N.$, long. $119^{\circ} 22' E.$; off Luzon, Philippine Islands; depth, 1050 fathoms; bottom, blue mud; bottom temperature, 37° . Six specimens; two males, four females, one laden with ova. Trawled.

Station 195, October 3, 1874; lat. $4^{\circ} 21' S.$, long. $129^{\circ} 7' E.$; off Banda Island; depth, 1425 fathoms; bottom, blue mud; bottom temperature, 38° . One specimen, female. Trawled.

Station 237, June 17, 1874; lat. $34^{\circ} 37' N.$, long. $140^{\circ} 32' E.$; near Yokohama, Japan; depth, 1875 fathoms; bottom, blue mud; bottom temperature, $35^{\circ} \cdot 3$. One specimen, female. Trawled.

Station 176, August 15, 1874; lat. $18^{\circ} 30' S.$, long. $173^{\circ} 52' E.$; off the New Hebrides; depth, 1450 fathoms; bottom, Globigerina ooze; bottom temperature, $36^{\circ} \cdot 2$.

All the specimens from Station 205 were much damaged, and none of them had any of their appendages preserved, so that I am only able to determine the distinctness of the species by the length, form, and armature of the rostrum, and by the third somite of the pleon being posteriorly produced to an obtuse point over the dorsal surface of the next succeeding somite.

The ophthalmus is less globular than in *Nematocarcinus undulatipes*.

The peduncle of the first pair of antennæ is considerably shorter than the rostrum, and the scaphocerite of the second pair reaches beyond the distal extremity of the rostrum.

Observations.—The ova are ovate in form, very numerous, and in an advanced stage of development. Three of the specimens are undoubtedly of the same species and are females, but two of the others are males and vary in size and other important details. Their lengths are respectively 88 mm. and 75 mm.; they differ also in the depth of the carapace at the genital region, which is 12 mm. and 10 mm. respectively. The length of the rostrum also differs; in one it is 13 mm. and in the other 11 mm., it is more curved upwards in the larger and typical specimen, and the number of teeth on the upper surface is eighteen, the lower margin is free from teeth from the base to the apex, while in the smaller there are twenty-three teeth on the upper surface and a small tooth on the lower near the apex, the rest of the under surface in both forms being fringed with hairs.

It would therefore appear that in the series of teeth on the dorsal crest, a uniform number is certainly not an essential feature of specific distinction, and I am not certain that the solitary tooth on the lower surface in the smaller specimen is a fixed condition, inasmuch as in certain undoubted species, as *Nematocarcinus undulatipes*, there are indications of a tendency to vary in this. But what drew my attention first to the possible distinction of specific condition is the form of the plates on the ventral surface of the males, and that of the inner branch of the first pair of pleopoda. The ventral plates are well developed in each, but the posterior plate in the large form has the lateral processes less developed than in the smaller, and the inner branch of the first pair of

pleopoda, which in the smaller specimen is short, broad, and foliaceous, is in the larger narrow, thick, and lanceolate in form, and about two-thirds the length of the outer branch, assuming much the condition of the same part in the female.

From the imperfect condition of the specimens at my command, I have not been able to make a full comparison, but I am inclined to think that the smaller variety is the more active form of the male animal, whereas the larger variety is one of those older specimens that are becoming effete, and putting on certain appearances which are more generally conspicuous in the females.

A solitary much-damaged female specimen, laden with numerous small ova, was trawled halfway between the Fiji Islands and the New Hebrides at a depth of about a mile and a half from the surface, which I consider as belonging to this same species. Half of the rostrum is broken off, and all the appendages are gone, but the armature of the frontal crest, and the projection to an obtuse point of the posterior dorsal margin of the third somite of the pleon, show its near relationship to the present species.

Nematocarcinus tenuipes, n. sp. (Pl. CXXXII. fig. 6).

Carapace anteriorly produced to a rostrum that is slightly elevated from the base to the apex, and armed on the upper surface with two and twenty small spinules and teeth, and upon the lower surface with one tooth near the extremity.

Pereiopoda long and slender, and terminating in a dactylos that is as long as the propodos.

Telson longer than the inner, and shorter than the outer, plates of the rhipidura.

	Female.	Male.
Length, entire,	92 mm. (3.6 in.).	71 mm. (2.8 in.).
„ of carapace,	26 „	21 „
„ of rostrum,	15 „	8 „
„ of pleon,	66 „	50 „
„ of third somite of pleon, . .	11 „	10 „
„ of sixth somite of pleon, . .	14 „	12 „
„ of telson,	15 „	12 „

Habitat.—Station 235, June 4, 1875; lat. 34° 7' N., long. 138° 0' E.; south of Japan; depth, 565 fathoms; bottom, green mud; bottom temperature, 38°·1. Six specimens; four males, two females. Trawled.

Station 218, March 1, 1875; lat. 2° 33' S., long. 144° 4' E.; near the Admiralty Islands; depth, 1070 fathoms; bottom, blue mud; bottom temperature, 36°·4. One specimen (damaged), male. Associated with *Polycheles helleri*. Trawled.

Station 232, May 12, 1875; lat. 35° 11' N., long. 139° 28' E.; *Hydronema*-ground, Japan; depth, 345 fathoms; bottom, green mud; bottom temperature, 41°·1. Six specimens; three males, three females. Trawl and dredge both used.

The specimens taken at Station 235 bear a close resemblance to *Nematocarcinus parvidentatus*, which was obtained at Station 237, about two hundred miles distant. In the females the carapace is armed with ten small spinules on the frontal crest or posterior portion of the rostrum; there being twelve small teeth on the rostrum, that become more distant from each other towards the apex. On the under surface there is one small denticle or point at a short distance from the apex, posterior to which a series of small hairs fringe the margin to the base; the frontal margin is armed with a small antennal tooth and a well-defined one on the antero-lateral angle. The regions on the surface of the carapace are but slightly defined, and the third somite of the pleon is not much produced posteriorly on the dorsal surface.

The ophthalmopoda are short, and the ophthalmus rather small and somewhat reniform.

The first pair of antennæ has the peduncle about two-thirds the length of the rostrum, and the flagella are longer than the animal.

The second pair has a scaphocerite reaching about two millimetres beyond the extremity of the rostrum.

The second pair of gnathopoda reaches as far as the extremity of the rostrum, and has the meros and ischium hirsute.

The pereopoda are long and slender. The first two pairs are broken off, but a detached portion of the second pair shows the carpos to be very long and slender, and the propodos narrow, with short digits; the meros is sparsely armed with sharp teeth on the posterior margin, and the ischium is armed with one strong sharp tooth near the distal or meral extremity. The third pair is long, reaching by nearly half the length of the animal beyond the apex of the rostrum; the ischium is long, slender, and cylindrical, armed on the posterior margin near the meral joint with one solitary tooth, and the ischio-meral joint is rather more than usually stout; the meros is about a fourth longer than the ischium, and is armed on the posterior margin with three or four sharp teeth distantly situated from each other; the carpos is considerably more slender than the preceding joint, and is about one-fourth longer; the propodos is short and narrow, and the dactylos slender and straight. The fourth and fifth pairs resemble the third, but the joints increase in length in each pair in succession, except the dactylos, which is small and feeble in the fifth pair.

The anterior four pairs of pleopoda are in the typical specimens laden with numerous small ova. The sixth pair helps to form the rhipidura, of which the outer rami are about a millimetre longer than the telson.

The male differs from the female in being smaller and more slender. The rostrum has the same number of spinules and teeth as in the female, and similarly situated, and in most other points the two correspond in relative proportions. Two of the smaller specimens taken at Station 232, which lies between the stations at which the typical

specimens and the nearly allied species *Nematocarcinus parvidentatus* were taken, differ in having the rostrum somewhat shorter than in the more typical form, the apex scarcely reaching beyond the distal extremity of the third joint of the peduncle of the first pair of antennæ; in this variation some approach is made to *Nematocarcinus parvidentatus*.

Nematocarcinus parvidentatus, n. sp. (Pl. CXXXII. fig. 7).

Rostrum horizontal, less than half the length of the carapace, furnished with about two and twenty small teeth and spinules, the spinules being most crowded over the dorsal crest, and the teeth on the rostrum less closely planted. Lower margin unarmed and fringed in its entire length with a row of thickly-set cilia.

Ophthalmus rather smaller than in other species.

Peduncle of the first pair of antennæ subequal in length to the rostrum, and supporting two flagella, very unequal in diameter.

Telson subequal in length to the sixth pleopod, and furnished with a horizontal row of several small spinules placed widely apart on the dorso-lateral angle.

Length, entire (male),	.	.	.	.	.	87 mm. (3·4 in.).
„ of carapace,	.	.	.	.	.	23 „
„ of rostrum,	.	.	.	.	.	9 „
„ of pleon, .	.	.	.	.	.	64 „
„ of third somite of pleon,	.	.	.	.	.	11 „
„ of sixth somite of pleon, .	.	.	.	.	.	15 „
„ of telson, .	.	.	.	.	.	13 „

Habitat.—Station 237, June 17, 1875; lat. 34° 37' N., long. 140° 32' E.; near Yokohama, Japan; depth, 1875 fathoms; bottom, blue mud; bottom temperature, 35°·3. Nine specimens; four males, five females. Associated with *Nematocarcinus productus*. Trawled.

The specimens are considerably damaged, none of the pereopoda or antennæ being preserved attached; the rostrum is produced in a line horizontal with the dorsal surface of the carapace, and is armed on the upper surface with about twenty-two spinules, of which the anterior are only imperfectly transformed into teeth; each little spinule has a lobe posterior to it, with which it has an imperfect articulation.

The upper margin is depressed anteriorly, while the lower is straight, so that the apex is formed by the upper surface descending to the lower, which gives it an arched appearance; the frontal margin has a well-developed antennal tooth, but the fronto-lateral tooth appears to be entirely absent.

The ophthalmus is rather smaller than usual and somewhat reniform in shape.

The first pair of antennæ has the first joint of the peduncle deeply excavate, and

armed on the outer surface with a broad sharp-pointed stylocerite; the second and third joints are short and cylindrical, reaching to a level with the apex of the rostrum, and supporting two unequally sized flagella.

The second pair of antennæ carries a scaphocerite that is about half as long again as the rostrum, and slightly tapers to the extremity, where it is abruptly truncated at a level with a small external tooth.

The second pair of gnathopoda reaches to the extremity of the rostrum but falls short of that of the scaphocerite; it has the terminal joint long, narrow, and lanceolate, and nearly as long as the preceding.

All the other appendages are damaged, so as to be valueless in specific diagnosis.

Observations.—The specimens are males and females, and the antero-lateral processes on the ventral plates of the posterior three somites of the pleon are well developed. The pleopoda are long, those of the first pair having the internal or foliaceous petasma broad, while the second pair carries a thick stylamblys attached to the main branch, the third and fourth pairs carrying one that is small and slender.

Nematocarcinus gracilis, n. sp. (Pl. CXXXII. fig. 8).

Body slender, rostrum horizontal and short, being about one-fourth the length of the carapace, and armed on the upper surface with about twenty spinules and teeth and with one large tooth near the apex on the lower margin.

Scaphocerite more than half the length of the carapace, and nearly twice as long as the rostrum.

Third pair of pereiopoda longer than the entire animal.

Telson as long as the outer branch of the rhipidura.

Length, entire (male),	.	.	.	.	.	59 mm. (2.3 in.).
„ of carapace,	.	.	.	.	.	15 „
„ of rostrum,	.	.	.	.	.	4 „
„ of pleon, .	.	.	.	.	.	44 „
„ of third somite of pleon, .	.	.	.	.	.	9 „
„ of sixth somite of pleon, .	.	.	.	.	.	10 „
„ of telson, .	.	.	.	.	.	11 „

Habitat.—Station 174c, August 3, 1874; lat. 19° 7' 50" S., long. 178° 19' 35" E.; off Kandavu, Fiji Islands; depth, 610 fathoms; bottom, coral mud; bottom temperature, 39°. Two specimens, males. Associated with *Nematocarcinus paucidentatus* and *Pentacheles*. Trawled.

Station 171, July 15, 1874; lat. 28° 33' S., long. 177° 50' W.; north of the Kermadec Islands; depth, 600 fathoms; bottom, hard ground; bottom temperature, 39°.5. One specimen, damaged. Trawled.

The rostrum, which dips downwards a little anteriorly, is armed with sixteen spinules in one specimen, and twenty in another; all the spinules articulate excepting perhaps the first two or three, and even they appear to have a line of articulation, and the posterior margin of each, as well as the lobe to which it is articulated, appears to be thickened for the purpose of supporting a fasciculus of small hairs. On the lower margin, not far from the apex of the rostrum, stands one rigid tooth that is directed straight forwards, and from this the lower margin ascends to the apex.

The ophthalmopoda are three-fourths the length of the rostrum, and the ophthalmus is comparatively large.

The first pair of antennæ has the peduncle a little longer than the rostrum, and the scaphocerite of the second pair is still longer.

The second pair of gnathopoda reaches beyond the extremity of the rostrum but falls short of that of the scaphocerite.

The first pair of pereopoda is long and slender, and reaches considerably beyond the scaphocerite, the carpos being as long as the ischium and meros together. The second pair is wanting. The third pair is damaged, being broken at the propodal joint of the carpos, from which to the coxa it measures 80 mm., and therefore is nearly five times longer than the entire animal. The fourth pair is broken off, but a detached limb that I take to have belonged to it is correspondingly longer than the third, and resembles it in all points, so far as the two can be compared, excepting that the meros of the detached leg is armed with two rows of distant spines which are more conspicuous than those on the attached limb. The carpos of the detached appendage is as long as the meros and half the ischium.

The anterior plate on the ventral surface of the pereion is very narrow as compared with those posterior to it.

Nematocarcinus paucidentatus, n. sp. (Pl. CXXXII. fig. 9).

Carapace one-third the length of the animal, exclusive of the rostrum and telson; anterior dorsal surface slightly carinated and horizontally produced to a laterally compressed rostrum that is about one-fourth the length of the carapace, armed on the upper surface with nine sharp spinules, and on the lower with one fixed tooth near the apex and a fringe of cilia between.

Pleon from the posterior half of the third somite to the telson laterally compressed. Telson dorsally flattened, and the sides depressed, the longitudinal angle armed with seven or eight small spinules on each side.

Length, entire (male),	.	.	.	.	.	100 mm. (3.9 in.).
" of carapace,	.	.	.	.	.	25 "
" of rostrum,	.	.	.	.	.	6 "
" of pleon,	.	.	.	.	.	75 "
" of third somite of pleon,	.	.	.	.	.	11 "
" of sixth somite of pleon,	.	.	.	.	.	15 "
" of telson,	.	.	.	.	.	15 "

Habitat.—Station 174c, August 3, 1874; lat. $19^{\circ} 7' 50''$ S., long. $178^{\circ} 19' 35''$ E.; off Kandavu, Fiji Islands; depth, 610 fathoms; bottom, coral mud; bottom temperature, 39° . One specimen, damaged. Trawled.

The only specimen of this species is unfortunately mutilated, being deprived of all the appendages excepting the smaller ones in relation to the mouth.

The rostrum is horizontal on the upper surface, and armed with nine small articulating spines, while the lower margin is furnished with a tooth near the apex, and a fringe of hairs reaching from it to the base; behind the armature on the dorsal surface the rostral crest continues as a smooth carina to the cervical fossa, at the posterior margin of the gastric region, on each side of which a lengthened oblique lateral protuberance is directed towards the fronto-lateral angle.

The ophthalmopoda extend to about half the length of the rostrum, and support an ophthalmus that is tolerably large and round.

The first pair of antennæ has the stylocerite short, with a terminal sharp tooth; the third joint of the peduncle reaches to a level with the apex of the rostrum.

The second pair of antennæ has the scaphocerite reaching considerably beyond the extremity of the rostrum, and terminating in a squarish extremity.

The pleopoda are long and apparently strong, and exhibit the petasma and stylamblydes common to the males in this genus, without any specific feature.

The telson is damaged.

Nematocarcinus tenuirostris, n. sp. (Pl. CXXXII. fig. 10).

Rostrum one half the length of the carapace, projecting horizontally forwards, slender, styliform, armed on the upper surface with seven points and on the under margin near the apex with one small tooth.

First pair of antennæ having the peduncle one-third shorter than the rostrum, and the flagella two or three times as long as the animal. Second pair of antennæ having the scaphocerite reaching considerably beyond the extremity of the rostrum, and four times the length of the animal.

Second pair of gnathopoda reaching as far as the extremity of the rostrum.

All the other exposed appendages are wanting.

The telson is as long as the sixth somite of the pleon, and equal with the length of the outer plates of the rhipidura.

Length, entire (female),	87 mm. (3.4 in.).
„ of carapace,	24 „
„ of rostrum,	12 „
„ of pleon,	63 „
„ of third somite of pleon,	11 „
„ of sixth somite of pleon,	14 „
„ of telson,	15 „

Habitat.—Station 174c, August 3, 1874; lat. $19^{\circ} 7' 50''$ S., long. $178^{\circ} 19' 35''$ E.; off Kandavu, Fiji Islands; depth, 610 fathoms; bottom, coral mud; bottom temperature, 39° . Two specimens, female. Trawled.

Station 214, February 10, 1875; lat. $4^{\circ} 33'$ N., long. $127^{\circ} 6'$ E.; south of the Philippine Islands; depth, 500 fathoms; bottom, blue mud; bottom temperature, $41^{\circ} 8$. Five specimens. Trawled.

This species is rather slender; the cervical fossa is well defined on the dorsal surface of the carapace, and immediately anterior to it a small crest-like carina commences and runs into the rostrum, which projects horizontally forwards and terminates in a styliform point; the upper surface of this crest is smooth for nearly half its length; the posterior half in advance of the orbit has three long sharp teeth, and posterior to the orbit are four that are closely planted together; these latter are movable spinules, while those on the rostrum are more distant from each other and immovable.

The carapace is ornamented on the dorsal surface with a slight carina commencing anterior to the cervical crest, and armed on the frontal region and upper surface of the rostrum with seven spinules, of which the posterior are closely planted together, the others becoming more and more separated as they approach the apex, which is distant from the most anterior tooth by nearly half the length of the rostrum; the under surface is armed with one small tooth situated about halfway between the apex and the most anterior tooth on the dorsal surface. The frontal margin is furnished with a short, strong, antennal tooth, and a long and slender one at the fronto-lateral margin.

The ophthalmopoda are of moderate proportions, and scarcely more than one-fourth the length of the rostrum.

The first pair of antennæ has the first joint deeply excavate and furnished with a stylocerite that is sharp-pointed and nearly as long as the ophthalmopod; the third or terminal joint of the peduncle reaches to about two-thirds the length of the rostrum, and supports two long flagella, the inner one of which is alone preserved and reaches to rather more than twice the length of the animal, where it is broken off, leaving a stout extremity.

The second pair of antennæ carries a scaphocerite that is about one-fourth longer than the rostrum, and has its sides subparallel and fringed with long hairs. The flagellum in

its present condition is about twice the length of the animal, and is broken off at a point where it is still thick.

The second pair of *gnathopoda* reaches to a level with the apex of the rostrum.

All the *pereiopoda* are broken off, but one or two unattached limbs that appear to belong to this species are preserved. They are long, the *carpos*, probably of the fourth pair, being specially so, very nearly equalling the combined lengths of the *meros* and *ischium*; the *ischium* is slender, cylindrical, 22 mm. long, and armed near the meral joint with two long teeth, one on the upper, the other on the lower and inner surface; the *meros* is 48 mm. in length, and armed on the upper surface with a row of distant teeth, of which the most anterior stands close to the carpal joint, and a second row of rather smaller teeth, in position intermediate with the others, on the lower; the *carpos* is 63 mm. in length and 0.2 mm. in diameter, or 7 mm. shorter than the *meros* and *ischium* together, it is cylindrical and smooth from the meral to the propodal joint, at which it increases in diameter from one-fourth to one-half of a millimetre; the *propodos* is 2 mm. long, and increases in diameter from the carpal to the dactylar joint, where it terminates in an oblique margin that is about 0.5 mm. in length; the *dactylos* is 3 mm. in length and waved as in *Nematocarcinus undulatipes*.

There is also a detached cheliped which I believe to belong to the second pair of *pereiopoda* of one of the specimens of this species. The several joints have the following dimensions:—*carpos*, 40 mm.; *meros*, 28 mm.; *ischium*, 19 mm.; *chela*, 4 mm. and 0.8 mm. broad; *digits*, 1.5 mm. The *meros* is armed with small teeth and the *carpos* is smooth.

The penultimate pair of *pereiopoda* may therefore be considered to be rather more than twice the length of the animal.

The third *somite* of the *pleon* does not project much over the fourth, and the posterior *somites* are not much compressed.

The *telson* is equal in length to the sixth *somite*, as well as to the outer *rami* of the *rhîpidura*.

Nematocarcinus serratus, n. sp. (Pl. CXXXII. fig. 11).

Rostrum more than half the length of the carapace, slightly elevated from the base to the apex, and furnished with thirty-two teeth or spinules on the upper surface and with none on the lower.

Ophthalmopoda rather small.

First pair of antennæ having the peduncle one-third shorter than the rostrum.

Second pair of antennæ having the scaphocerite subequal to or scarcely longer than the rostrum.

Telson wanting.

Length, entire (female),	100 mm. (3.9 in.).
„ of carapace,	26 „
„ of rostrum,	15 „
„ of pleon,	74 „
„ of third somite of pleon,	14 „
„ of sixth somite of pleon,	15 „
„ of telson,	15 „

Habitat.—Station 169, July 10, 1874; lat. 37° 34' S., long. 179° 22' E.; off New Zealand; depth, 700 fathoms; bottom, blue mud; bottom temperature, 40°. One specimen. Associated with *Acanthephyra purpurea*. Trawled.

The rostrum gradually slopes upwards from a dorsal carina that commences at the scarcely distinguishable cervical fossa, and continues smooth to the frontal crest, where it is furnished with a series of spinules that are persistent to the apex; the lower margin is smooth throughout its length, and is fringed with hairs from base to apex. The regions of the carapace are but imperfectly defined, and the frontal margin is furnished with a tooth at the antennal and fronto-lateral angles.

The ophthalmopoda are rather small.

The first pair of antennæ has the peduncle shorter than the rostrum by one-third of its length, and supports a sharp-pointed stylocerite that reaches to the distal extremity of the ophthalmus.

The second pair of antennæ has a scaphocerite that is subequal in length with the rostrum.

The second pair of gnathopoda does not reach to the extremity of the rostrum.

The first pair of pereopoda reaches by the length of the propodos beyond the extremity of the scaphocerite; it has the carpos smooth, the meros armed with two teeth, of which the anterior stands near the middle, and the posterior halfway between it and the ischial articulation; the ischium is furnished with two teeth on the inner side near the meral articulation, and one at the base near the basal articulation. The other pereopoda are broken off, but one of the fourth pair has the ischial joint attached, and a detached leg is present in the same bottle, broken off at the ischial articulation, and therefore probably the other part of it. As compared with that of some other species it is rather short, the carpos being not one-third longer than the meros, which is sparsely armed with a few sharp teeth; the propodos is slender and the dactylos slightly waved.

The pleon is laterally compressed and has the third somite rather long and somewhat produced over the fourth.

The rest of the animal is too imperfect for description, since the posterior moiety of the pleon and the rhipidura are broken off.

Nematocarcinus hiatus, n. sp. (Pl. CXXXII. fig. 12).

There is only a fragment of this species. The carina on the gastric region of the carapace is feeble; the frontal crest is adorned with six spinules, and after a short hiatus there are twenty-three or twenty-four teeth continuous as far as the broken extremity of the rostrum; on the lower margin there are six teeth, of which the anterior corresponds with the fracture.

The ophthalmopoda are short.

The first pair of antennæ has the peduncle reaching to about half the length of the rostrum.

The second pair of antennæ has a scaphocerite reaching as far as the fractured extremity of the rostrum, and it therefore falls short of the apex in a perfect specimen.

The first pair of gnathopoda is preserved, but there is nothing to enable us to determine the character of the fragment beyond the form of the rostrum. In the number of the teeth on the rostrum this species approximates to *Nematocarcinus longirostris*, but the free length of the unarmed portion in *Nematocarcinus longirostris*, and the appearance and position of the teeth on the lower margin, at once show that the two are distinct.

Length of carapace,	.	.	.	.	.	18 mm. (0.7 in.).
„ of rostrum (broken),	.	.	.	.	.	12 „

Habitat.—Station 169, July 10, 1874; lat. 37° 34' S., long. 179° 22' E.; off New Zealand; depth, 700 fathoms; bottom, blue mud; bottom temperature, 40°. A fragment only. Trawled.

Nematocarcinus intermedius, n. sp. (Pl. CXXXII. fig. 13).

Rostrum two-thirds the length of the carapace, armed on the upper surface with very small spinules, twelve or thirteen of which are closely planted together on the dorsal crest, and eleven or twelve more widely separated from each other and continuous to the apex.

Ophthalmopoda tolerably large.

First pair of antennæ having the peduncle about half the length of the rostrum.

Second pair of antennæ having the scaphocerite reaching to a level with the apex of the rostrum.

Second pair of gnathopoda not reaching as far as the extremity of the scaphocerite.

Posterior three pairs of pereopoda having the carpos as long as the ischium and meros combined; that of the preceding pairs is shorter.