

Fam. **Processidae.**

1896. *Processidae*, Ortmann, Zool. Jahrb., Vol. IX., p. 424.
 1898. *Processidae*, Ortmann, in Bronn's Thierreich, Vol. V.,
 Pt. 2, p. 1124.
 1901. *Lysmatidae*, M. J. Rathbun, Bull. U.S. Fish. Comm.
 for 1900, Vol. II., p. 104.
 1904. *Lysmatidae*, M. J. Rathbun, Decap. Crust. N.W. Coast
 N. America, p. 110.
 1904. *Processidae*, Nobili, Bull. Mus. d'Hist. Nat., No. 5, p. 234.

Ortmann includes in the family the two genera *Processa* and *Glyphocrangon*, transferring *Lysmata* to his family Latreutidae. For *Glyphocrangon*, A. Milne-Edwards, Alcock adopts a separate family Glyphocrangonidae, not accepting Ortmann's sub-family Glyphocrangoninae. The name *Lysmatidae* is adapted by Rathbun from the sub-family *Lysmatinae*, Kingsley, 1878, and implies the inclusion of Risso's *Lysmata* in combination with *Processa*. Miss Rathbun defines the family as having "Rostrum horizontal with the dorsal surface of the carapace; mandible without a cutting edge and without palp; first pair of trunk legs more or less chelate, and stronger than the second, but not so long; second minutely chelate, with carpus sub-divided." *Lysmata* is sharply distinguished from *Processa* by having three flagella instead of two on the first antenna, and the first four pair of trunk legs furnished with epipods, of which they are devoid in *Processa*.

Gen. **Processa**, Leach.

1815. *Processa*, Leach, Malac. Podophth. Brit., text to Pl. 41,
 published July 1, 1815.
 1816. *Nika*, Risso, Hist. Nat. Crust. de Nice, p. 84.
 1825. *Nika*, Desmarest, Consid. gén. Crust., p. 229.
 1829. *Processa*, Latreille, Règne Animal, Vol. IV., p. 95.
 1837. *Nika*, Milne-Edwards, Hist. Nat. Crust., Vol. II., p. 363.
 1849. *Nika*, de Haan, Crust. Japonica, decas sexta, pp. 181,
 182, 184.
 1852. *Nika*, Dana, U.S. Expl. Exp., Vol. XIII., pp. 533, 538.
 1853. *Nika*, Bell. Brit. Stalk-eyed Crust., p. 273.
 1860. *Nica*, Stimpson, Prodromus, in Proc. Acad. Philad.,
 p. 25 (94).
 1863. *Nika*, Heller, Crust. des südlichen Europa, p. 231.

1888. *Nika*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 525.
1890. *Nika*, Ortmann, Zool. Jahrb., Vol. V., pp. 461, 528.
1893. *Nika*, Stebbing, History of Crustacea, p. 229.
1893. *Processa*, Sharp, Proc. Acad. Philad., p. 124.
1896. *Processa*, Ortmann, Zool. Jahrb., Vol. IX., p. 424.
1901. *Processa*, M. J. Rathbun, Bull. U.S. Fish. Comm. for 1900, Vol. II., p. 104.
1904. *Processa*, M. J. Rathbun, Decap. Crust N.W. Coast N. Amer., p. 110.

Desmarest claimed priority for Risso's name, on the feeble ground that Risso had formed the genus under the name of *Nika* in 1813, though he did not publish it until 1816. Bell says that Risso "had, a short time before Leach's publication, given to the genus the name of *Nika*, of which Leach was not aware at the time. Risso's name must, therefore, be retained, on the ground of priority of publication." But that is precisely the ground which it has now been proved not to occupy.

The genus is at present fairly well distinguished by the short rostrum, the mandibles without cutting-edge or palp, the unsymmetrical first peraeopods, one member being chelate, the other simple, and the unequal second peraeopods, of which one is much longer than the other, though both alike are chelate, with multiannulate fifth joint.

Miss Rathbun has, however, discovered that among specimens from the same locality some are occasionally to be found which have both members of the first pair of legs chelate, though not otherwise appreciably different from those in which these limbs are unsymmetrical. In other respects also she finds the species most variable, as in length of rostrum, size and shape of the eyes, length of second joint in the first antennae compared with that of the third joint, and length of the antennal scale compared with that of the trunk of the carapace. Under these circumstances the discrimination of species must be subject to much uncertainty. Risso's *Nika variegata* and *N. sinuolata* have apparently not been rediscovered. De Haan distinguishes *N. edulis* from his *N. japonica*, on the ground that the former has the body less elongate, the rostrum carinate, longer than the eyes, and the last two joints of the third maxillipeds together equal to the antepenultimate. In *Processa canaliculata* (*N. edulis*), however, the rostrum is probably seldom longer than the eye. Miss Rathbun says, "The rostrum may be half as long or nearly as long as the eye." The third maxillipeds of an English specimen have the last two joints together, as compared with the preceding joint,

in the proportion of 22 to 26. In Bate's Challenger *Macrura* the figure, also from an English specimen, gives the proportion of 23 to 33. Bell gives the length of the English species as reaching two inches to two inches and a half; while de Haan for his species gives "Long. corp. $1\frac{1}{2}$ inches."

Of the breathing organs Bate says (*loc. cit.*), "There are five pleurobranchiae, which are suspended near the upper extremity of the chamber, but no other plume or mastigobranchial plates." Nevertheless he rightly figures an epipod (in his terminology, mastigobranchial plate) on the second maxilliped.

Processa canaliculata, Leach.

1815. *Processa canaliculata*, Leach, Malac. Podophth. Brit., text to Pl. 41.
 1816. *Nika edulis*, Risso, Crustacés de Nice, p. 85, Pl. 3, fig. 3.
 1825. *Nika canaliculata*, Desmarest, Consid. gén. Crust., p. 231, Pl. 39, fig. 4, 4a-g.
 1853. *Nika edulis*, Bell, Brit. Stalk-eyed Crust., p. 275, fig. in text.
 1888. *Nika edulis*, Bate, Challenger *Macrura*, Reports, Vol. XXIV., p. 527, Pl. 95 (details).
 1893. *Nika edulis*, Stebbing, History of Crustacea, p. 229.
 1901. *Processa canaliculata*, M. J. Rathbun, Bull. U.S. Fish. Comm. for 1890, p. 104.
 1904. *Processa canaliculata*, M. J. Rathbun, Decap. Crust. N.W. Coast N. Amer., p. 110.

The synonymy might easily be lengthened out. There is little doubt that it should include *Nika couchii*, Bell, and Miss Rathbun adds *N. bermudensis*, Rankin. Bate supplements the figure of his own *N. processa* with details from *N. edulis*, and remarks, after mentioning de Haan's *N. japonica*, Dana's *N. hawaiiensis*, and Stimpson's *N. macrognatha*, that "the resemblance of the species to each other appears to be great; the only appreciable distinction in the several descriptions, as given by their authors, exists in the variation of length and form of the rostrum."

According to Miss Rathbun, American specimens have the legs more slender than those of European specimens that had come under her observation, thus approaching Bell's var. *N. couchii*. It may be said of the South African specimens that they seem rather more delicate in structure than those

taken in Torbay. Between the rostrum and the spine on the front at the other side of the eyes they have the margin less boldly sinuous, and in the second trunk legs the widening of the third joint is less developed. The apex of the telson is in specimens from both localities furnished with six spines, the intermediate pair the longest and strongest, the central pair slender, much longer than the outermost. Of four dorsal pairs two are tolerably conspicuous, whereas de Haan says that in his *N. japonica* there are no dorsal spines on the telson.

Length, 35 mm.

Locality.—Off Cape St. Blaize. Depth, 40 fathoms. A small specimen about 16 mm. long, with less inflated eyes, was taken between Bird Island and the mainland in 10 to 16 fathoms. It is probably not full grown. A specimen, an inch long, was taken in 30 to 32 fathoms, Knysna Heads, N.E. by N. $\frac{1}{2}$ N., 2 miles.

Fam. Crangonidae.

1898. *Crangonidae*, Ortmann, in Bronn's Thierreich, Vol. V., Pt. 2, p. 1133.
 1900. *Crangonidae*. Stebbing, South African Crustacea, Pt. 1, p. 46.
 1901. *Crangonidae*, Alcock, Catal. Indian Macrura, p. 114.
 1902. *Crangonidae*, M. J. Rathbun, Proc. U.S. Mus., Vol. XXIV., p. 888.
 1904. *Crangonidae*, M. J. Rathbun, Decap. Crust. N.W. Coast, N. Amer., p. 111.
 1904. *Crangonidae*, Nobili, Bull. Mus. d'Hist. Nat., No. 5, p. 234.

In the first part of the "South African Crustacea" numerous references for this family prior to 1898 have been already supplied, with a discussion of its character and constituents. To the latter should be added the genus *Prionocrangon*, Wood-Mason, 1891, distinguished from the rest by the absence of eyes, agreeing with *Sabinea* and with Nobili's new genus *Corallio-crangon*, in having the second pair of trunk-legs simple, and with *Philocheras* in having only five pairs of branchiae. In referring *Crangon nanus*, Kröyer, to the new generic name *Philocheras*, I overlooked the circumstance that Kröyer's species had been identified with *Crangon bispinosus*, Westwood (see Norman, Ann. Nat. Hist., Ser. 6, Vol. VII., p. 269, 1894). As Westwood's species was instituted in 1835, and Kröyer's not before 1842,

the correct name will be *Philocheras bispinosus* (Westwood). In 1901 Alcock defined *Parapontocaris* as a subgenus of *Aegeon*, from which it is distinguished by having the sterna of the first five pleon segments without instead of with a median spine, and by having the side-plates of the pleon wide and rounded instead of deep and pointed. Lastly, it may be mentioned that *Argis*, Kröyer, 1842, as I have ventured to maintain both in 1893 and 1900, properly takes precedence of the later *Nectocrangon*, Brandt. In this opinion I am now pleased to be confirmed by the high authority of my friends Dr. W. T. Calman, D.Sc., and Mr. C. D. Sherborn, F.Z.S., of the British Museum, who have confirmed my belief that the supposed pre-occupation of *Argis* rested only on the existence of approximately similar names, such as *Argas*, *Arges*, *Argus*. *Arga*, *Arge*, *Argo*, *Argia*, *Argya* and *Argeus* may be added to the cluster, but neither singly or together can they drive Kröyer's *Argis* out of the field.

Gen. **Pontophilus**, Leach.

1817. *Pontophilus*, Leach, Malac. Podophth. Brit., text to Pl. 37A.
 1862. *Cheraphilus* (part), Kinahan, Proc. R. Irish Acad., Vol. VIII., Pt. 1, p. 7.
 1882. *Pontophilus*, Sars, Vid. Selsk. Forhandl., Christiania, No. 18, pp. 7, 45.
 1888. *Pontophilus*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 486.
 1890. *Pontophilus*, Ortmann, Zool. Jahrb., Vol. V., pp. 530, 533.
 1890. *Pontophilus*, Sars, Arch. Naturv. Christiania, p. 153.
 1895. *Pontophilus* (part), Ortmann, Proc. Acad. Philad., p. 175.
 1898. *Pontophilus* (part), Ortmann, Bronn's Thierreich, Vol. V., Lieferung 50, p. 1133.
 1900. *Pontophilus*, Stebbing, South African Crustacea, Pt. 1, pp. 47, 49.
 1901. *Pontophilus*, Alcock, Catal. Indian Macrura, p. 115.
 1902. *Pontophilus*, Fulton and Grant, Proc. R.S. Victoria, p. 62.
 1903. *Pontophilus*, Gurney, Proc. Zool. Soc. London, Vol. II., Pt. 1, p. 28.

Among the Crangonidae this genus is distinguished by having the second peraeopods much shorter than the rest, but perfectly chelate, the fingers of the fourth and fifth peraeopods not laminar, and the branchiae in seven pairs, with several of their apices turned backward.

Pontophilus gracilis, S. I. Smith.

Plate XXV.

1882. *Pontophilus gracilis*, Smith, Bull. Mus. Comp. Zoöl. Harvard, Vol. X., p. 36, Pl. 7, figs. 2-3a.
 1886. *Pontophilus gracilis*, Smith, Rep. U.S. Fish Comm., p. 50, Pl. 11, figs. 1, 1a, 2.
 1891. *Pontophilus gracilis*, Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, Vol. VIII., p. 361.
 1895. *Pontophilus gracilis*, Ortmann, Proc. Acad. Philad., pp. 183, 186.
 1901. *Pontophilus gracilis*, Alcock, Catal. Indian Macrura, p. 115.

Various authors have noted that the species which Bate established under the name *P. gracilis* in 1888 as a new species is in fact distinct from the earlier *P. gracilis* of Smith. Nearly at the same time in 1893, Ortmann renamed Bate's species *P. challengeri* and Faxon renamed it *P. batei*.* In comparing the figures and descriptions of the numerous species which have been assigned to the present genus the student will be struck with the perplexing minuteness of the characters by which many of the species have been discriminated. The view which Dr. Doflein has recently propounded† as to the considerable variation which the eyes of deep-sea crustaceans undergo, according to their habitat as well as their age, will make ophthalmic differences less serviceable than hitherto in classification. The value of other distinctive marks will, no doubt, have to be carefully weighed in the future. The specimen here under consideration agrees more closely with Professor Smith's species above named than with any other, although there are some small details to be noticed by which it might claim to be differentiated.

The rostrum is sharp-pointed, not reaching beyond the eyes, with a pair of denticles at about a third of its length from the base. On the under margin near the apex are some setæ not mentioned in the original description. The medio-dorsal carina has two forward-pointing teeth, of which the hinder or cardiac one is fully as large as the front or gastric one, though in Smith's figures it appears to be much smaller. On either side

* Ortmann, Decap. und Schizop der Plankton-Exp., p. 49. Faxon, Mem. Mus. Comp. Zoöl., Harvard, Vol. XVIII., p. 131. Faxon's name, though slightly the earlier, had been anticipated by Kingsley's *Crangon batei*, a synonym of *Pontophilus intermedius* (Bate).

† Biol. Centralblatt, Vol. XXIII., No. 16 and 17, p. 570, 1903.

between these there is a carinate epibranchial tooth, and another (hepatic) more advanced lower down on the side. A tooth bounds the orbit externally, and an antero-lateral tooth is produced about to a level with the rostral apex. Not far behind the antero-lateral there is a little lateral denticle, figured but not mentioned by Smith. For *P. junceus* Bate does not either in figure or description introduce this denticle or the pair on the rostrum.

The first segment of the pleon has a fringe of forward-pointing setules on the front margin of its second division, the third, fourth and fifth segments have similar fringes on the hind margin directed backwards. All the segments have the lower margins setose. The long sixth segment is not clearly sulcate on the back. The long narrow, dorsally-flattened telson has on the lower half two pairs of little spines, of which Smith gives no indication, but which appear in Bate's figure of *P. junceus*. The apex carries two elongate plumose spines, flanked by a pair of strong spines scarcely a third as long, and these by a pair of quite small spines. Smith speaks of "the narrow tip armed with four very slender spines, of which the median are twice as long as the lateral." In Bate's *P. junceus* this armature is left quite indistinct.

The eyes are large, closely contiguous, the cornea extensive, the colour in formalin orange-brown.

The first antennae have the first joint more than twice as long as the second, the point of the lateral process reaching the apex, at some distance behind which the joint has a neat, almost circular orifice, probably auditory. The shorter flagellum is about as long as the peduncle, its companion by about a fourth of its own length longer, this one carrying long setae except towards the end; both flagella have the first joint elongate, the remaining joints short.

The scale of the second antennae is between three and four times as long as broad, narrowing a little to the rounded apex, which like the lateral margin is fringed with long plumose setae, the terminal tooth of the unarmed margin not being outstripped by the rounded apex. A rather long and very slender detached flagellum, grasped by the first cheliped, probably belonged to the specimen.

In the third maxilliped the last joint is a little longer than the penultimate, by no means "almost twice the length" as in Leach's original definition of the genus.

The first peraeopods have a distal tooth on the outer margin of the fourth joint, which is fringed with setae on both margins. The very short fifth joint has a tooth on the inner apex. The sixth joint is widest at the apical tooth of the inner margin,

its palmar margin thin, moderately oblique, and fringed with a few small hairs.

The second peraeopods are very slender and short, the third joint the longest, the fifth a little longer than the trunk of the sixth, the latter being somewhat shorter than thumb or finger, each of which is slender, carrying seven slender spines on the inner margin and two setæ on the outer. They meet only at the tips, each having an unguis, that of the thumb or fixed finger being considerably the larger. Smith gives no details as to this curious chela, and Bate's only intelligible figure of it refers to his *P. profundus*, in which the ungues appear to be almost exactly equal, although the juncture-line between the movable finger and its nail is omitted.

The long slender third peraeopods have the sixth and seventh joints together nearly as long as the fifth joint, in accord with Smith's account. The stiletto-like appearance of the finger is not sustained under high magnification, the apex being pellucid and not acute. The fourth and fifth pairs are comparatively robust, with strong setose fringing, the fourth joint the longest, but not much longer than the sixth (at least in the fourth pair, in the fifth the terminal joints were missing). The finger (in the fourth pair) is quite smooth, narrowly boat-shaped, the true apex being perhaps acute, but both here and in the preceding pair sheltered by a pellucid cap, after a fashion found in some of the Amphipods.

Professor Smith supposed his specimen to be a female, possibly immature, and describes the first pleopod as having its inner ramus about as long as the peduncle, "linear, and the margins not ciliated," the outer ramus "narrow-ovate, considerably longer than the inner, and of the usual structure." The specimen here described agrees fairly with these relative dimensions, but differs in having the inner ramus strongly fringed with plumose setæ on both margins. The second pleopod in the American description has the inner ramus "a little shorter and much narrower than the outer, and has a single stylet two-fifths as long as itself arising from the inner margin near the base." This coupling process or retinaculum is figured by Smith as naked, whereas in the South African specimen it is fringed with plumose setæ. Here too, the inner ramus is not at all shorter than the outer. The apical hooks in two rows, are about a dozen in number, seemingly agreeing closely in shape with those figured by Professor H. Coutière* for *Alpheus strenuus*, Dana.

* Les Alpheidae, p. 303, fig. 373, 1899.

The uropods agree with Professor Smith's description, if allowance be made for the broken tips of the inner ramus.

The colour of the specimen in formalin was pure white, except the eyes. Wood-Mason and Alcock say of their specimens, "Colours in life transparent cloudy purple, corneae milky orange. (In spirit rich orange-coloured and opaque)."

Length, from apex of rostrum to end of telson, 34 mm. Professor Smith's specimen between the same points measured 30 mm. He had an adult male specimen, measuring 28 mm. The female specimen from 250 fathoms between the Philippines and Borneo, which Bate named *P. junceus*, was 38 mm. long. Of the species which Bate named *P. gracilis*, he had several specimens from far distant localities, and various depths. The largest, a female, measured 64 mm., but he also had females (one bearing ova) which were only 35 mm. long.

Habitat.—The specimen figured, a female with a few eggs, was taken with another at a depth of 250 fathoms, 40 miles off Table Mountain. The specimen figured by S. I. Smith was taken at 225 fathoms, N. Lat. 32° 18' 20," W. Long. 78° 43'.

The differences from the type which have been pointed out, chiefly concern the armature of the pleopods and telson. Unless supported by some considerable distinction in the second pair of chelipeds, these can scarcely justify any separation of the two forms.

Fam. Hippolytidae.

1888. *Hippolytidae*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 576.
 1893. *Hippolytidae*, Stebbing, History of Crustacea, p. 233.
 1898. *Hippolytidae*, Ortmann, in Bronn's Thierreich, Vol. V., Pt. 2, pp. 1124, 1129.
 1898. *Hippolytidae*, Borradaile, Proc. Zool. Soc. London, p. 1009.
 1900. *Hippolytidae*, Holmes, Occas. Papers California Ac. Sci., No. 7, p. 192.
 1904. *Hippolytidae*, M. J. Rathbun, Decap. Crust. N.W. Coast N. Amer., P. 56.

The definition which I gave of this family in 1893 may be here repeated :—“The rostrum is of important size, the eyes are not covered by the carapace; the mandibles may have a cutting edge and ‘palp’ or be without one or both. The

first pair of trunk legs have moderate-sized chelae ; the second pair are also chelate, with the wrist or fifth joint sometimes much and sometimes little sub-divided."

The new genus about to be described falls fairly well under this definition, although only one member of the second pair of trunk-legs might be considered chelate in the strict sense of the term, the other abnormally developed member being complexly sub-chelate. Both members have the fifth joint or "wrist" sub-divided into four articulations, by this plurality settling the genus in the legion Polycarpinea. Usually the divisions of the wrist or carpus are either more or fewer than four.

Ortmann has withdrawn some of the genera included by Bate in this family to form a new family *Latreutidae*, in which he includes *Lysmata*, Risso, formerly regarded as a member of the Nikidae. Borradaile (Willey's Zool. Results, Part 4, p. 414, 1899) expresses the opinion that "the difference between the Latreutidae and Hippolytidae will not . . . be ultimately found to be of more than sub-family value." As already noted, Miss Rathbun in 1904 places the genus *Processa*, Leach, in a family Lysmatidae, thus by implication not agreeing with Ortmann's removal of *Lysmata* from the Nikidae. In any case, however, the name of the family should not be either Nikidae or Lysmatidae, but Processidae as given by Ortmann in 1896.

Gen. *Leontocaris*, nov.

First antennae with two flagella subequal in length. Scale of second antennae broad. Mandibles with cutting edge, molar, and small one-jointed palp. First maxillipeds with exopod strongly laminar. Third maxillipeds pediform, bulbous at base, with no distinct exopod. First peraeopods slender, chelate, fifth joint elongate. Second peraeopods unsymmetrical, one slender, normally chelate, the other with sixth joint both long and broad, the finger flat, distally widened and curving over the much shorter thumb. First pleopods of the male with inner ramus short and broad, carrying a partially-separated retinaculum.

The name *Leontocaris* signifies the Lion's Shrimp, the representative species having been obtained by submarine exploration off the Lion's Head.

As Paulson's work on the Crustacea of the Red Sea appears to be rare and when available presents an obstacle to some students by being in the Russian language, I venture to translate his definition of the genus *Anchistiooides*:—"Body compressed. Peduncle of upper antennae very short; outer flagellum very thick, and at middle of its length furcate. Scale of outer antennae wide. Mandibles as in *Anchistia*. Anterior margin of cephalothorax with a single spine. Endognath of second maxillae rudimentary. Exognath of first maxillipeds laminar. Outer maxillipeds slender, without exognath, and the last two joints considerably shorter than the second (antepenultimate). The first two pairs of thoracic legs chelate, the second more strongly than the first. Inner branch of first pleopods in the male short, but sub-divided, the inner division having hooks, met with in Caridea only on appendage of the following pleopods. The second pair as in *Anchistia* and *Palaemon*. Hind margin of telson truncate, not acute."

There are thus some notable agreements in the maxillipeds and pleopods, but the triple flagellum and short peduncle of the first antennae, the palless mandibles, and the rudimentary endopod of the second maxillae, keep *Anchistiooides* very distinct from the present new genus.

Leontocaris paulsoni, n. sp

Plate XXVI.

Rostrum longer than the carapace behind it, reaching beyond the antennal scale, with eight strong teeth on the under margin, the first five closer together and more projecting than the rest; on the upper margin are two small teeth close behind the acute apex, then at intervals come four conspicuous teeth, one of which is behind the eyes, and to the rear of this the carapace has two teeth in succession near the centre. The external angle of the orbit is acute, and below this a strong submarginal tooth commences a sublateral carina, that becomes feeble to the rear. The fronto-lateral angles are rounded. The partial carina of the third pleon segment is produced over the hind margin into a tooth slightly curved downwards. The rounded postero-lateral lobes of the fifth pleon segment are produced above into a small tooth. The telson is longer than the third pleon segment, narrow, tapering, with seven pairs of lateral

spines at very unequal intervals and an apical pair, from between which a pair of setæ project.

The eyes are cylindrical, with small corneal surfaces which do not, when turned outwards, reach beyond the breadth of the antennal scales, in formalin orange-coloured over dark pigment.

In the first antennae, the peduncle just reaches end of antennal scale, first joint longer than second and third combined, with a broad but acutely ending spine-process little more than half its length. The flagella are longer than the peduncle, the upper outer one thickened and carrying transverse rows of setæ for nearly three-fifths of the length, its much more slender and slightly shorter companion maintaining its thickness for a greater extent, so as subterminally to be the stouter of the two. In one specimen out of five this inner flagellum was much shorter than the other.

The second antennae have the scale thrice as long as broad, the flatly-rounded apical margin not reaching beyond the external tooth, which is the terminal one of nineteen, fringing the outer margin for more than half its length. The flagellum is slender, about 50 mm. long.

The mandibles have a cutting edge of five teeth, three of which are in a cavity between two that are much more prominent. The molar is strong, molar-like in one point of view, in another showing a dense tuft of setules between a strong tooth and a short, six-toothed blade. The slender one-jointed palp carries four setæ.

The first maxillae have the inner plate (*lacinia media*) fringed with slender spines, the outer plate with similar spines and also two rows of short spine-teeth, five in each row; the remaining slender process, representing the fourth and fifth joints, carries two spines, of which the apical is the shorter.

The second maxillae have a rounded lobe of the first joint fringed with setæ, the second joint with a divided plate (*lacinia media*), both parts fringed with various spines, and the exopod very large, rounded at both ends and fringed with plumose setæ, the remainder of the maxilla constituted by a short, narrow piece ending in three setæ.

The first maxillipeds have an epipod narrowing upwards and downwards, shaped like the conventional flying bird in pictures. The exopod is laminar for the most part, much like that of the second maxillae, but with a short terminal lash.

The second maxillipeds have a long, slender exopod terminally sub-divided into short articulations; the last two joints of the endopod strongly reflexed, the large sixth joint having its

truncate distal margin concurrent with the base of the short, strongly-spined seventh joint.

In the third maxillipeds the second joint is externally coalesced with the following composite joint, both being hairy at the dehiscent inner margins; beyond the bulbous base of the third joint these organs are very slender, and in one specimen membranaceous, the fifth joint two-thirds the length of the terminal, the latter beset with oblique little rows of setæ, and its apex doubtfully separate as a seventh joint; the fifth and following joint or joints are together shorter than the composite third and fourth. These and the five following pairs of appendages are supplied with branchiæ.

The first peraeopods are slender, the fifth joint longer than the fourth, which in turn is longer than the third, this about equalling in length the chela; the thumb and finger are much shorter than the palm, and have their tips hidden together in a bush of setæ.

The second peraeopods at full stretch, which in preserved specimens they resist being, are much longer than the first. In one member of the pair, left or right as the case may be, the limb is slender and partly membranaceous from the second joint onwards, the fourth joint long, a little longer than the third, the fifth nearly equal to those two combined, forming four articulations, of which the first is rather more than thrice as long as the rest together, and the fourth is two or three times as long as the two small intermediate ones combined; the chela is less than half as long as the first of these four, of the same pattern as in the preceding pair, but larger. The other member is extremely different in appearance, although the structure is almost precisely similar to the end of the first articulation of the fifth joint; this elongate slender piece is accommodated in a slightly hollowed expansion in the distal two-thirds of the great sixth joint, with which it is connected by the three articulations still to be accounted for; two of them form a sharp bend, and the last a small cup-shaped wrist, enabling the fifth and sixth joints to lie close together almost as if they were one piece. The inter-locking is helped by a sub-distal and two distal teeth on the second, and a distal one on the fourth articulation, not shown in the figure, as they only come into notice when the fifth and sixth joints are drawn asunder. As in the other member of the pair, the fifth joint also here folds closely against the fourth, which is slightly grooved, and has the margin in part feebly tuberculate. The large hand, though of considerable width at the middle, and sometimes much wider than in the specimen figured, is much

longer than wide ; it is produced distally into a short tridentate thumb, between the two inner and less produced teeth of which there fits a tooth on the inner margin of the chopper-shaped movable finger ; this joint has its widened distal end prolonged beyond the thumb, to which it presents a reflexed, more or less acute, apical point.

The third, fourth and fifth peraeopods are alike in structure, and little differing in length, the fourth a little shorter than the third, a little longer than the fifth ; they are all stouter than the first pair and the slender member of the second peraeopods ; the fourth joint is the longest, the sixth slightly curved and a little longer than the fifth ; the finger very small, curved, finely setulose.

The first pleopods in the male have the inner ramus a short oval fringed except on part of the inner margin with long setæ, but from the inner margin there is partially separated a retinaculum, beset with little curved spines, and having at its lower end a close group of the usual hooks. The outer ramus is more than twice as long as the inner, lanceolate. In the female both rami are lanceolate, the inner more than half as long as the outer, with the eggs tenaciously adherent. In the second pleopods the male has the retinaculum separated in the usual way, and another appendage of equal length between it and the main ramus, which is normally developed. Both these pairs closely approach the description and figures given by Paulson for the corresponding parts of his *Anchistioides compressus*.

The uropods reach to a very trifling degree beyond the apex of the telson. Both rami are round-ended, the inner the narrower, fringed with plumose setæ on both margins ; the outer ramus is similarly fringed on the inner margin and round its apical division. The upper division from the boundary tooth upwards has a long piece of the outer margin cut into teeth, in striking agreement with the armature of the scale in the lower antennae, here as so often elsewhere the two extremities of the animal showing a correspondence in development.

The length of the male specimen figured was 46 mm., from apex of rostrum to apex of telson.

Habitat.—The place of capture was 25 miles off Lion's Head, N. 67° E.; depth, between 131 and 136 fathoms.

The specific name is given out of respect to the Russian naturalist Paulson, and to call attention to his probably little known genus *Anchistioides*, with which the present shows some rather remarkable points of connection.

Gen. **Merhippolyte**, Bate.

1888. *Merhippolyte*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 618.
 1893. *Merhippolyte*, Stebbing, History of Crustacea, pp. 234, 237.
 1898. *Merhippolyte*, Ortmann, in Bronn's Thierreich, Vol. V., Pt. 2, Lieferung 50.

This genus appears to be well distinguished from others of the family by the combined characters of the mandibles and second peraeopods. The mandibles have a strong molar, a thin cutting edge, and a three-jointed palp; the fifth joint or wrist in the second peraeopods exhibits numerous subdivisions. Bate's *Chorismus* is said in the generic account to have a two-jointed palp to the mandible, but in the description and figure of the single species assigned to the genus the mandible is furnished with a three-jointed palp. The mandible of *Chorismus*, however, is very different from that of *Merhippolyte*, which has the three joints of the palp sub-equal, and the cutting edge quadridentate, whereas in the other genus the first joint of the palp is much shorter than the second or third, and the cutting edge is degraded to a single point. Moreover, the branchial formulae of the two genera are said to be quite distinct.

Merhippolyte agulhasensis, Bate.

1888. *Merhippolyte agulhasensis*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 619, Pl. 110, fig. 4.

The carapace has five medio-dorsal teeth, of which two are to the rear of the orbits; the teeth on the lower margin of the rostrum in our larger specimen are five in number, but six in the smaller one; in both the tip of the rostrum is bidentate, the lower point being the more advanced. This latter detail is not mentioned by Bate. In the first antennae the long tooth on the outer margin of the first joint has a small tooth at the base of its own outer margin. The broad scale of the second antennae, which has a rounded end projecting very little beyond the strong tooth at the lateral apex, does not in our specimens or even in his own illustration agree with Bate's statement that it "reaches as far as the extremity of the rostrum."

According to Bate, the third maxillipeds have no exopod, but this is a mistake, due probably to the concealment of this narrow and not very elongate appendage behind the long antepenultimate joint of the maxilliped. In the first peraeopods the second and third joints have each an apical tooth. The sixth joint of these chelipeds is a little longer than the fifth. In the next pair the chela is very small, the slender delicate wrist fifteen-jointed. The three following pairs of peraeopods are nearly alike, but the last pair has to itself a graduated row of serrate spines leading to the base of the finger, and the finger's inner margin carries six spines instead of five. In all three pairs the spine adjoining the nail is, except at the tip, much wider than the others. In addition to the three dorso-lateral pairs of spinules, the last of which is sub-apical, the telson has a larger apical pair with two intervening setae.

Length.—One specimen measured 63 mm. in length; the other, far more slender, was only 40 mm. long.

Locality.—The larger specimen was taken 25 miles off Lion's Head, between 131 and 136 fathoms, the smaller at "Gericke Point N. $\frac{3}{4}$ E., Knysna Heads E. $\frac{3}{4}$ N.," in a depth of 116 fathoms, on sand, shells and rock. Bate's specimens were dredged at a depth of 150 fathoms, south of the Cape, and his description in general fully corresponds with the features of the new examples.

Fam. *Miersiidae*.

1878. *Oplophorinae*, Kingsley, Bull. Essex Inst., Vol. X., p. 68.
 1882. *Ephyrinae*, S. I. Smith, Bull. Mus. Comp. Zoöl. Harvard, Vol. X., No. 1, p. 66.
 1885. *Ephyridae*, Sars, Norske Nordhavs Exp., Crust., Vol. I., p. 35.
 1885. *Miersiidae*, S. I. Smith, Rep. U.S. Fish. Comm. Extr., pp. 4, 63 (p. 667).
 1888. *Acanthephyridae*, Bate, Challenger Macrura, Reports, Vol. XXIV., pp. 481, 927.
 1891. *Miersiidae*, Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, Vol. VII., p. 194.
 1892. *Acanthephyridae*, Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, Vol. IX., p. 360.
 1893. *Acanthephyridae*, Stebbing, History of Crustacea, p. 242.
 1893. *Acanthephyridae*, Ortmann, Decap. und Schizop. Plankton-Exp., p. 42.

1893. *Miersiidae*, Faxon, Bull. Mus. Comp. Zoöl. Harvard, Vol. XXIV., p. 206.
1895. *Hoplophoridae*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, Vol. XVIII., p. 159.
1898. *Acanthephyridae*, Ortmann, in Bronn's Thierreich, Vol. V., Pt. 2, Lieferung 50, p. 1,123.
1901. *Hoplophoridae*, Alcock, Catal. Indian Macrura, p. 72.
1904. *Oplophoridae*, M. J. Rathbun, Decap. Crust. N.W. Coast, N. Amer., p. 27.

The choice between *Miersiidae* and *Oplophoridae* for the name of this family is difficult to make with any feeling of security. Roux in 1831 established the genus *Ephyra*, under a preoccupied name, for which Kingsley in 1879 substituted *Miersia*. In 1849 de Haan (*Crustacea Japonica, decas sexta*, p. 185) doubtfully accepted *Ephyra*, Roux, for a new species, *E. compressa*. Ortmann in 1894 (*Proc. Ac. Philad.*, p. 400) makes de Haan's *Ephyra*, Kingsley's *Miersia* and the *Paratya* of Miers, all synonyms of *Xiphocaris* von Marten's, 1872, adding a footnote on *Ephyra*, de Haan, "Non *Ephyra* Roux, *Memoir. Salicoques*, 1831, p. 24, which is identical with *Acanthephyra*, A. Milne-Edwards, and belongs to the *Acanthephyridae*." But unfortunately Risso's two species for which Roux founded the genus have not been again recognised, and Faxon accordingly proposes to leave the name *Miersia* in abeyance until they are re-discovered. On the other hand, the definition given by Roux rather favours the inclusion of his genus in this family, of which in that case it will be the earliest member. Should its claims be rejected, the next in order is *Oplophorus*, Milne-Edwards, 1837. On what grounds I myself stated in 1893 that *Acanthephyrinae* antedates *Miersiidae* I cannot now ascertain. This is of no importance to the present question, for if *Acanthephyra* should prove to be equivalent to Kingsley's *Ephyra*, it would lapse as a synonym of *Miersia* (founded on the same type), and if it be distinct from *Ephyra*, *Oplophorus* will then rank above it as the eponymous genus of the family.

Ortmann in 1898 gives the following characters:—The mandible is only obscurely divided and carries a palp; the inner lobe of the first maxilla is blunt, scarcely curved; the sixth and seventh joints of the second maxillipeds are laterally articulated (attached broadside to broadside instead of end to end); the chelae are normal, the fifth joint (carpus) never excavated; all five pairs of trunk limbs are furnished with exopods.

He sub-divides the family into three subfamilies, Acanthephyrinae, Notostominae (Tropiocaridae, Bate), and Nematocarcininae. Faxon in 1895 retains the family Nematocarcinidae as distinct.

Gen. **Acanthephyra**, A. Milne-Edwards.

1881. *Acanthephyra*, A. Milne-Edwards, Ann. Sci. Nat., Zool., Ser. 6, Vol. XI., Art. 4, p. 12.
 1882. *Miersia*, S. I. Smith, Bull. Mus. Comp. Zoöl. Harvard, Vol. X., p. 66.
 1884. *Acanthephyra*, S. I. Smith, Rep. U.S. Fish. Comm., p. 372.
 1895. *Acanthephyra*, Faxon, Mem. Mus. Comp. Zoöl., Harvard, Vol. XVIII., p. 160.
 1901. *Acanthephyra*, Alcock, Catal. Indian Macrura, p. 75.

Other references can be found in Faxon's work or under the citations already given for the family. As already pointed out, Kingsley's *Miersia* is of earlier date than *Acanthephyra*, but there is no certainty that it represents the same genus. In 1816 Risso described a species as *Alpheus pelagicus*, which in 1826 he transferred to *Pandalus*. Of this species he says, at the latter date, "Son corselet est alongé, orné sur les côtés d'une suture courbe, avec quatre aiguillons et un rostre cannelé," etc. His original description ran:—"Son corselet est alongé, traversé par une suture courbe sur les côtés, et terminé sur le devant par quatre aiguillons, avec un rostre canelé," etc. His later figure shows a longitudinal row of four denticles on the side of the carapace, of which there is no trace in his earlier figure. Also his earlier description seems to imply that it is the front margin of the carapace which carries the teeth. In that case they might be the antennal and branchiostegal teeth which are so placed in *Acanthephyra*.

Milne-Edwards (Hist. Nat. Crust., Vol. II., p. 422, 1837), says:—"M. Roux nous apprend que ses Ephyres ont le corps comprimé latéralement, la carapace lisse, l'abdomen caréné et le rostre denté; les pates-mâchoires sont tres-alongées et les pates thoraciques portent à leur base un appendice palpiforme, mais ne paraissent pas avoir de point comme dans le genre suivant; les pates des deux premières paires sont petites, plus courtes que les suivantes, et didactyles; enfin les carpes sont simples." "The following genus" referred to is Milne-Edwards' own new genus *Oplophorus*, the description of which

does not make clear what he means by saying that the thoracic feet in *Ephyra* appear not to have any point. Apart from this obscurity the definition contains nothing antagonistic to *Acanthephyra*.

It may be worth noting that the reference which Bate gives for *Acanthephyra purpurea*, A. Milne-Edwards, the first recorded abysmal species of the genus, is erroneous. Instead of "Comptes rendus, t.xcii. p. 1396, 1881," the volume should be XCIII., and the page 933.

Acanthephyra batei, n. sp.

Plate XXIVB.

This form must take its place in a group of closely-related species, *A. purpurea*, A. Milne-Edwards, *A. agassizii*, S. I. Smith, *A. sica*, Bate, *A. sanguinea*, Wood-Mason and Alcock, *A. acanthitelsonis*, Bate. According to Alcock *A. agassizii* is a synonym of *A. purpurea*. Distinguishing features for the present species will be noted in the course of description.

The straight, slender rostrum is scarcely as long as the rest of the carapace. It has seven teeth above and four below, all well separated, the hinder ones not approximate as in *A. sanguinea*, which has the rostrum relatively much longer and curved upwards. In the other species mentioned the rostral spines are more numerous. The antennal and branchiostegal spines are distinct, not obscure as in *A. sanguinea*. The low rostral carina ends a little behind the small hindmost tooth, and the carapace is here obtusely channelled on each side of the widened base of the rostrum. The first pleon segment like the bulk of the carapace is devoid of any medio-dorsal carina, but the rest of the pleon as far as the telson is fully carinate, in this respect differing from *A. purpurea*, in which the carina is said to begin at the posterior end of the second segment. There is an apical tooth to the carina on the third to the sixth segments—largest, but not large, on the third; smallest, but distinct, on the fourth segment. The telson reaches beyond the uropods. It is hollowed beneath, and above carries five dorso-lateral pairs of spines, the first a little above the middle, the last immediately above the apex. They are not quite symmetrically placed in our specimen, and one of the last pair is missing. At the apex are two longer spines, and between these projecting from the ventral surface are a trio of spines, the central one the stoutest and slightly the longest, but all shorter than the two

outer spines, between which above there are two delicate, feathered setæ. In *A. acanthitelsonis* the telson is "armed with about forty strong articulating spines, twenty on each side, and terminating in two smaller ones at the extremity (Challenger Macrura, p. 745).

The eyes are short, tolerably broad. They are not in good condition, but show the peculiar character which Bate figures in *A. angusta* and *A. sica*, and with variations in some other species. Faxon speaks of this as "an oblong black 'ocellus' barely connected with the eye, on the dorsal surface of the ocular peduncle," occurring in some specimens of *A. agassizii* (Mem. Mus. Comp. Zoöl., p. 161, 1895). There is a small blunt projection distally on the inner margin of the peduncle.

The first and second antennae agree with Bate's generic description and with the figures he gives of *A. sica*.

The first maxillipeds also agree with Bate's figure as regards the smooth bifid epipod, the much curved, broad, setose exopod; but the endopod has a setose terminal (fourth) joint, which Bate does not indicate. Concerning the third maxillipeds Bate says, "The coxa supports externally a lunate calcified plate that articulates with a rudimentary mastigobranchia, that is independent of any branchial plume; while next it a plume is attached to the membranous articulation." He figures this appendage for *A. sica*, and in his description says, "The coxa carries a lunate disc-like plate, of which the upper horn is bifid." In our species the little horn is just above the articulation of the epipod instead of at the opposite end of the lunate plate as shown for *A. sica*. It confronts a little raised point.

The first peraeopods are stouter and shorter than the second, and have a close-set comb of short spines on the palm of the hand, and the third and fourth joints furnished with a thick fringe of short feathered setæ at right angles to the margin. The plate that bears the epipod is not lunate and has the accessory horn and confronting point somewhat concealed; at its outer extremity there is a blunt process carrying a bunch of very long flexible and distally biserrate setæ.

The second peraeopods have but few setae on the slender palm, the third and fourth joints armed as in the first pair, and the epipod of similar structure.

The last three peraeopods are supplied on both margins with long feathered setæ; the third and fourth pairs having also strong spines along the third and fourth joints, the fingers straight and thickly set with short spines along both margins. The fifth pair have a comb of short spines along the distal

part of the sixth joint, the finger short, curved, pectinate, almost hidden in a bush of spine-like setæ. They are decidedly shorter than the third and fourth pairs, not as in *A. sanguinea* "very decidedly longer." The epipod on the third pair as in the second. In the fourth pair there is no epipod, but the process with long biserrate setæ is present, and in connexion with it a small plate with small upturned process.

The setæ in many parts show rich orange and red tints. Original colour reported as red.

From the considerable curvature of the specimen the length is not easy to measure exactly. It may be taken as between 80 and 90 mm.

Locality.—Cape Point Lighthouse, S. 83° E., 35½ miles. Depth, 360 fathoms. Bottom, hard ground with black specks.

Gen. *Notostomus*, A. Milne-Edwards.

1881. *Notostomus*, A. Milne-Edwards, Ann. Sci. Nat., Ser. 6, Vol. XI., p. 7.
 1884. *Notostomus*, S. I. Smith, Rep. U.S. Fish. Comm. for 1882, p. 377.
 1886. *Notostomus*, S. I. Smith, Rep. U.S. Fish. Comm. for 1885, p. 72.
 1888. *Notostomus*, Bate, Challenger Macrura, Reports, Vol. XXIV., p. 824.
 1893. *Notostomus*, Stebbing, History of Crustacea, p. 246.
 1895. *Notostomus*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, Vol. XVIII., p. 170.
 1898. *Notostomus*, Ortmann, in Bronn's Thierreich, Vol. V., Pt. 2, p. 1126.

Bate observes that the original account of the genus given by A. Milne-Edwards requires some modification, inasmuch as the brevity of the rostrum does not apply to all species, and the excess of length imputed to the first trunk-legs as compared with the second probably applies to none of them. Ortmann places the genus in his sub-family Notostominae along with *Ephyrina*, Smith, and *Hymenodora*, Sars, distinguishing this sub-family from its two companions, as having the cephalothorax compressed only in the dorsal part, so that a sharp lofty median carina is formed, and as having the trunk-legs not strikingly elongate.

Notostomus westergreni, Faxon.

1893. *Notostomus westergreni*, Faxon, Bull. Mus. Comp. Zoöl. Harvard, Vol. XXIV., p. 208.
1895. *Notostomus westergreni*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, Vol. XVIII., p. 171, Pl. F.

The long, straight, or very slightly sinuous rostrum, measured to the base of the eye, is three-sevenths of the total length of the carapace (rostrum included). Its under margin has fifteen teeth, not evenly spaced, and beginning some little distance in advance of the eyes. On the upper margin, there are twenty-eight teeth, ascending the slope but not fully reaching the level part of the carina, which is finely serrate behind the teeth almost completely up to the hind margin. In Faxon's specimen the rostrum was defective. Apart from this his lucid description of the carapace with its numerous carinae minutely tallies with our specimen, the only difference being that the dorsal median line of the carapace might here be described as rather considerably, instead of "but moderately," elevated above the level of the rostrum.

The antennal scale in our specimen agrees fairly well with that figured on Faxon's plate, but the outer apical tooth is much longer on the left scale than on the right. The flagellum of the second antennae and the upper branch in the first antennae are of great length.

Of the pleon, Faxon says, "All the abdominal segments are carinated in the dorsal median line, and the third, fourth and fifth are armed with a posterior tooth; the first and second segments are notched posteriorly in the dorsal median line. The telson is channeled on the dorsum, and furnished with about four pairs of dorsal, but no marginal spines; its tip is broken off and its armature thus obliterated." The South African specimen has the sixth segment posteriorly toothed just as strongly as the preceding three, and if Faxon's species be without this fourth tooth, some suspicion might be justified in regard to the identity of the two forms. But according to the figure *N. westergreni* has the sixth segment toothed, though less sharply than the companion segments, a circumstance on which little stress can be laid, seeing that both telson and rostrum were damaged, and any outstanding point may easily have been likewise blunted.

The telson is fringed with setæ for the distal two-thirds of its length, carries five pairs of very small dorsal spines external to the bicarinate median channel, and a pair at the very narrow but not sharp-pointed apex. This apex reaches a little beyond

the inner ramus of the right uropod, but falls a little short of that on the left side, this want of symmetry corresponding with that observed in the antennal scales. The outer ramus of the uropods is considerably longer than the inner, and has a well-marked lateral tooth.

The total length may be estimated at 144 mm. if the inflexed part of the pleon were straightened out, the carapace with rostrum measuring 74 mm. in length by 39 mm. in greatest height.

Locality.—Under date August 19th, 1903, Dr. Gilchrist writes concerning this specimen, "A deep sea prawn of a bright red colour. The original colour will probably be retained when you get it, as we have had it for over a fortnight without any change being observed. Procured in a fine tow net attached to beam trawl. Loc. Cape Point, N. 70° E., 40 miles. Depth, about 800 fathoms. Bottom, green mud." After a year the fine red colouring remains, as depicted in Faxon's plate by Westergren.

SCHIZOPODA.

Fam. *Thysanopodidae*.

1852. *Euphausiidae*, Dana, U.S. Expl. Exp., Vol. XIII., p. 636.
 1863. *Thysanopodea*, Claus, Zeitschr. wiss. Zool., Vol. XIII., Pt. 3, p. 442.
 1885. *Euphausiidae*, Sars, Challenger Schizopoda, Reports, Vol. XIII., pp. 10, 62.
 1900. *Euphausiidae*, Stebbing, Proc. Zool. Soc. London, p. 537.

Consistency requires that this family should take the name *Thysanopodidae* from the premier genus *Thysanopoda*, Milne-Edwards, 1830 (Ann. Sci. Nat., Vol. 19).

Gen. *Euphausia*, Dana.

1852. *Euphausia*, Dana, U.S. Expl. Exp., Vol. XIII., p. 637.
 1885. *Euphausia*, Sars, Challenger Schizopoda, Reports, Vol. XIII., p. 63.
 1900. *Euphausia*, Stebbing, Proc. Zool. Soc. London, p. 538.

Under the last reference a rather full discussion of this genus is given, which need not be here repeated.

Euphausia latifrons, Sars.

1883. *Euphausia latifrons*, Sars, Vid. Selsk. Forhandl. Christiania, No. 7, p. 19.
1885. *Euphausia latifrons*, Sars, Challenger Schizopoda, Reports, Vol. XIII., p. 95, Pl. 16, figs. 17-23.
1900. *Euphausia latifrons*, Stebbing, Proc. Zool. Soc. London, p. 544.

This small and delicate species appears to be well marked by the broad, sub-quadrate, distally-truncate rostrum. The third segment of the pleon is not produced dorsally to a tooth. The sixth segment is longer than the preceding, and forms a very small dentiform projection. The preanal spine is small, simple, unguiform. The first joint of the first antennae carries distally a short membranous lobe and has the outer margin prolonged into a strong tooth. The branchiae are divided into comparatively few lobules.

According to Sars the carapace is without any lateral denticle. Of the South African specimens only one or two could be found answering to this character. The greater number have a well-marked, forward-pointing denticle on each margin, at about three-fourths of its length from the front. As this denticle seems to be strongest in specimens which from the quadrate apex of the telson are seen to be immature, it is possible that at full maturity it may disappear. In two other respects the specimens differ from the form described by Sars. The broad rostrum is somewhat convex on either side at the base, instead of passing with an uninterrupted concave sweep to the apical tooth of the lateral margin, and there are only two pairs of minute dorsal spines on the telson, instead of three, as figured by Sars. These small differences do not seem to warrant the institution of a distinct species, at any rate while the facts of the development remain uncertain.

Length, scarcely exceeding 8 mm. in the largest specimens.

Locality.—Cape St. Blaize, N. 10° W., 33 miles. Specimens abundant in coarse trawl net attached to trawl. Sars in 1885 speaks of the species as being seemingly "restricted to the Australian Seas and those of the Indian Archipelago."

Gen. *Nyctiphanes*, Sars.

1883. *Nyctiphanes*, Sars, Vid. Selsk. Forhandl. Christiania, No. 7, p. 23.
 1885. *Nyctiphanes*, Sars, Challenger Schizopoda, Reports, Vol. XIII., p. 114.
 1889. *Nyctiphanes*, Gerstaecker, in Bronn's Thierreich, Vol. V., Pt. 2, p. 669.
 1893. *Nyctiphanes*, Stebbing, History of Crustacea, p. 263.

Whereas in *Euphausia* both the fourth and fifth pairs of peraeopods are rudimentary, in *Thysanopoda* and *Nyctiphanes*, it is only the fifth pair that is absolutely degraded, but while in *Thysanopoda* the fourth pair resembles those which precede it, in *Nyctiphanes* the terminal three joints are wanting. The flagella in both pairs of antennae are elongate, and in the first pair the first joint carries a peculiar "leaflet" or process reflexed over the eye. The female is characterized by the presence of a double ovisac.

Nyctiphanes australis, Sars.

1883. *Nyctiphanes australis*, Sars, Vid. Selsk. Forhandl. Christiania, No. 7, p. 24.
 1885. *Nyctiphanes australis*, Sars, Challenger Schizopoda, Reports, Vol. XIII., pp. 115, 150, Pl. 20, Pl. 21, figs. 1-7, Pl. 28.

The rostrum is triangular, not elongate; the carapace is without lateral denticles, with the hind margin produced on either side beyond an emarginate central lobe. The eyes are large, pyriform. The outer margin of the first joint in the first antennae is produced into a sharp tooth, and the leaflet has its apex acute, upturned. The scale of the second antennae does not reach the end of the peduncle. The limbs are slender, the third and fourth peraeopods in the female being devoid of an exopod, which in the male they carry. The rudimentary fifth peraeopods consist of a broad basal joint surmounted by another that is slender, curved, obtuse-ended, and soft. The third joint in the appendages from the first maxillipeds to the fourth peraeopods is successively longer; but in the third peraeopods the terminal three joints, which in the preceding appendages have a combined length greater or not less than that of the fourth joint, fall abruptly short of that length, preparatory as it were to disappearing altogether from the fourth

peraeopods. These gradations seem to negative what might otherwise be a natural suggestion that in the fourth peraeopods not a loss but a coalescence of joints may have occurred. The rounded apex of the telson is transparent.

Length, about 11 mm. in both sexes. Two of the specimens carried eggs, in one example the two longitudinal packets being easily separable.

Locality.—Ten miles off Cape St. Blaize, in 40 fathoms, “where fish were plentiful.”

The specimens from which Sars drew his elaborate illustrations reached a length of 17 mm. “in the male sex, in the female somewhat less.” After mentioning the localities from which they were obtained, he says:—“The species would accordingly appear to be wholly confined within the limits of the Australian Seas.” The South African specimens do not, however, appear to differ in any material respect except size. Sars states that the first two pleon segments have the posterior margin slightly produced in the middle. This production I cannot perceive. The sixth segment has the produced point which Sars figures, but does not mention.

Fam. **Mysidae.**

1885. *Mysidae*, Sars, Challenger Schizopoda, Reports, Vol. XIII., pp. 11, 172.
 1887. *Mysidae*, Hansen, Vid. Medd. Kjöbenhavn, p. 209.
 1892. *Mysidae*, Norman, Ann. Nat. Hist., Ser. 6, Vol. X., p. 143.
 1893. *Mysidae*, Stebbing, History of Crustacea, p. 266.
 1893. *Mysidae*, Ortmann, Decap. und Schizop. Plankton-Exp., p. 21.

Ortmann supplies a synoptic view of nineteen of the genera included in this family, defining for the first time *Chlamydopleon* and *Caesaromysis*.

Gen. **Caesaromysis**, Ortmann.

1893. *Caesaromysis*, Ortmann, Decap. und Schizop. Plankton-Exp., pp. 22, 24.

Ortmann gives a definition to the following effect:—

Body plump, spinose. Cephalothorax not completely covering the thorax behind, the rostrum produced, spiniform. Marsupium of the female formed of two pairs of lamellae.

Eyes normal (not lamellar), large, on tolerably long and thin peduncles. Scale of second antenna very short, subulate (not laminar), shorter than the penultimate joint of the peduncle. The second and third maxillipeds and five following pairs of limbs nearly alike, beset with strong setæ. Sixth joint tri-articulate, finger well developed. First maxillipeds without exopod. Pleopods in the female rudimentary, in the male all five well developed. Telson small, ovoid, truncate at the end. Inner branch of the uropods shorter than the outer. Auditory organ well developed.

By the reduction of the antennal scale, Ortmann considers that his genus approaches *Anchialus*, Kröyer, and *Arachnomysis*, Chun, the former having the scale laminar, the eyes on short stalks, and the telson apically furcate, whereas in *Caesaromysis*, the scale is subulate, the eyes are on long stalks, and the telson is truncate.

Caesaromysis hispida, Ortmann.

1893. *Caesaromysis hispida*, Ortmann, Decap. und Schizop. Plankton-Exp., p. 24, Pl. I, figs. 8, 8a, b, c, d, e, f, g, l, z.

A single specimen, male, of this remarkable species fully agrees with the description and figures supplied by Dr. Ortmann, except that the four-spined apex of the telson is less decidedly truncate, and from the base of each of the last pair of legs there is ventrally an obtuse process, about thrice as long as broad, directed backwards, which is not mentioned by Ortmann. The numerous long spines lateral to the rostrum and dorsal on carapace and pleon give the creature a larval appearance. The large swollen eyes, set at right angles to the slender peduncles, with the larger corneal group looking straight forward, and another smaller and quite separate group facing outward on either side, produce a remarkable effect. It is not without a parallel in the young of Euphausiidae, but is perhaps even more closely comparable with the eyes in the Amphipod *Phronima*. The animal, as preserved, is pellucid except in regard to the eyes. The length, from apex of rostrum to apex of telson, is 6.5 mm. The largest male in Ortmann's collection was 9 mm. long.

Locality.—Lion's Head, S. 72° E., 47 miles. Depth, 190 fathoms. Bottom, green sand and black specks. Taken by townet on beam of trawl.

CRUSTACEA ENTOMOSTRACA.

COPEPODA PARASITICA.

Fam. Lernaeidae.

1815. *Lernäen*, Oken, Lehrbuch der Naturgeschichte, Dritter Theil. Zoologie., p. 357.
1832. *Lernäen*, von Nordmann, Mikrographische Beiträge, zweites Heft, p. 49.
1840. *Lernocériens*, Milne-Edwards, Hist. Nat. Crust., Vol. III., p. 521.
1853. *Penellidae*, Dana, U.S. Expl. Exp., Vol. XIII., p. 1448.
- 1859 (1862). *Lernaeidae*, Thorell, K. Vet. Akad. Handlingar, Vol. III., No. 8, p. 14.
1865. *Lernaeina*, Heller, Reise der Novara, Crustaceen, p. 244.
1866. *Lernaeidae*, Bate, Zool. Record for 1865, p. 364.
- 1866-1879. *Lernaeodea*, Gerstaecker, Bronn's Thierreich, Crustacea, Vol. V., Pt. 1, p. 726.
1889. *Lernaeodea*, G. M. Thomson, Trans. New Zealand Inst., Vol. XXII., p. 368.
1899. *Lernaeidea*, Bassett-Smith, Proc. Zool. Soc. London, pp. 441, 480.

Oken, who makes the *Lernaeidea* a "Sippschaft" of the "Armwürmer," gives the following definition of the family:—"Leib walzig und unförmlich, kein Unterschied zwischen Brust und Bauch, hinten meist freie Eierschnüre, geiselförmig oder als Saum einer Haut, keine Stummelfüße, keine Fühler, keine Augen, kein Rückenschild, Schmarotger." The modern definition is given in Mr. Bassett-Smith's exceedingly useful summary. That summary, however, is limited to the genera and species parasitic on fishes. It does not, therefore, mention *Ive balanoglossi*, Mayer, or *Pennella balaenopterae*, Koren and Danielssen. It may be added that, according to Richiardi, Atti. Soc. Toscana, Vol. II., p. 190, 1876, Cornalia's *Taphrobia pilchardi*, described in Atti Soc. Ital. Sci. Nat., Vol. XVIII., fasc. 2, p. 197, is identical with, but of later date than Heller's *Peroderma cylindricum*. It should also be noted that in 1864 Kröyer described a genus *Therodamas*, not *Therodamus*.

Gen. *Pennella*, Oken.

1815. *Pennella*, Oken, Lehrbuch der Naturgeschichte, Dritter Theil. Zoologie, p. 357.
1822. *Lerneopenna*, de Blainville, Principes d'Anatomie comparée, Vol. I., Tab. 7.
1830. *Pennella*, Cuvier, Règne Animal, Vol. III., p. 256.
1832. *Pennella*, von Nordmann, Mikrograph. Beiträge, zweites Heft, pp. 52, 121.
1840. *Penellus*, Milne-Edwards, Hist. Nat. Crust., Vol. III., p. 522 (*Penella*, p. 632).
1853. *Penella*, Dana, U.S. Expl. Exp., Vol. XIII., p. 1448.
1860. *Baculus*, Lubbock, Trans. Linn. Soc. London, Vol. XXIII., Pt. 1, p. 190.
1861. *Pennella*, Steenstrup and Lütken, K. Danske Vid. Selsk. Skr., Ser. 5, Vol. V., p. 408.
1864. *Pennella*, von Nordmann, Bull. Soc. Imp. Moscou, Vol. XXXVII., p. 485.
1865. *Pennella*, Heller, Reise der Novara, Crustaceen, p. 244.
1876. *Pennella*, Richiardi, Atti. Soc. Toscana, Vol. II., p. 190, Vol. III., p. 198.
1883. *Hessella*, Brady, Challenger Copepoda, Reports, Vol. VIII., p. 136.
1889. *Penella*, Thomson, Trans. New Zealand Inst., Vol. XXII., p. 368.
1895. *Pennella*, Mrázek, Sitzungsber. Böhmisch. Gesellsch., Art. 44, 1895.
1899. *Penella*, Bassett-Smith, Proc. Zool. Soc. London, p. 482.

Oken gave the following definition:—"Pennella; Leib walzig, hinten gefiedert nebst zwei langen Eierschnüren, Kopf kolbig, abgestutzt, mit zwei knorpeligen, graden Hörnern nach hinten." With this may be compared the definition supplied by Mr. Bassett-Smith:—"Head large, globose, tuberculate, with arm-like projections directed backwards; the neck is long and straight, not distinctly segmented, united with the elongated genital segment in the same line. Abdomen penniform. Four pairs of limbs are present, placed close behind the head and together; the first two are biramose, the third and fourth uniramose, each branch with two joints. Male minute, not elongated."

The feathered termination of the body sufficiently explains the generic name, and makes the variation in spelling less easy to account for.

In *P. crassicornis*, Steenstrup and Lütken, and in *P. histiophori*, Thomson, the arm-like processes behind the head are

represented as directed at right angles to the body, not backward. In adult stages the limbs appear to become quite rudimentary. Steenstrup and Lütken think it probable that the description of the male given by Milne-Edwards is not derived from his own observation, but based on a misapprehension of von Nordmann's figure of the male of an *Anchorella*.

Richiardi states that Milne-Edwards' *Lernaeonema Lesueurii* (*Lerneopenna Blainvillii*? Lesueur) is only a young individual of *Pennella Blainvillii* (Lesueur). Similarly Mrázek has decided that *Hessella cylindrica*, Brady, and *Baculus elongatus*, Lubbock, belong to the genus *Pennella*, being young forms of the female. He points out that Lütken already in 1892 had advanced this opinion in regard to *Baculus*, and that Thomas Scott in 1894 had suggested that Brady's species was probably identical with Lubbock's. Bassett-Smith makes *P. blainvillii* a synonym of *P. exocoeti* (Holten), 1802, in opposition to Steenstrup and Lütken, who consider them very distinct.

Linnaeus, in the *Systema Natura*, Ed. 10, Vol. I., p. 819, 1758, gave the following account of his *Pennatula filosa* :—

“P. stirpe rachi utrinque pennata; basi tentaculis duobus.

“*Bocc. mus.* 1674, p. 286. t. 286.

“*Habitat in M. Mediterranei Xiphiis.*

“*Setæ 2, rubrae, ad basin rachios pennatae insertae, ipsaque rachi longiores.*”

The two setæ are evidently the filiform ovigerous tubes. Cuvier, *Règne Animal*, Vol. III., p. 257, still in 1830 retains the species among Zoophytes, in “*Les cavitaires*,” first order of “*Les Intestinaux*.” To his definition of *Pennella* he adds, “Il y en a dans la Méditerranée une espèce (*Pennella filosa*; *Pennatula filosa*, Gmel.) Boccone, *Mus.*, 286, Ellis, *Trans. phil.*, LXIII., xx., 15, longue de sept à huit pouces, qui pénètre dans la chair du xiphias, du thon, de la mole, et les tourmente horriblement.” But as yet there seems to be no evidence and no particular probability that it is the same species which infests all the fishes here named. Steenstrup and Lütken say, “Should several approximate species prove to have been confused under the old name *P. filosa* (Linn.)—which is easily possible—we may remark that the Mediterranean *Pennella* from the sword-fish must be regarded as the type of the species.” The description given by Linnaeus can scarcely be said to have any specific value, apart from the name of the host, so that no injury is done him by leaving his specific name in abeyance until a *Pennella* infesting a Xiphias has been again observed. For the parasite of the sunfish an appropriate name is available, which appears to have escaped recent attention.

Pennella orthagorisci, Wright.

- 1829-1843. *Pennella filosa*, Guérin-Méneville, Iconographie du Règne Animal, Zoophytes, p. 11, Pl. 9, fig. 3.
 1870. *Pennella orthagorisci*, Wright, Ann. Nat. Hist., Ser. 4, Vol. V., p. 43, Pl. 1.
 1897. *Penella filosa* (part), Bassett-Smith, Proc. Zool. Soc. London, p. 483.

Guérin-Méneville, who follows Cuvier in the classification of this genus, does not specify the fish from which his undescribed figure of the species was taken. Steenstrup and Lütken observe that all the large individuals of *Pennella*, which the Copenhagen Museum in their day possessed from *Orthagoriscus*-like fishes, had three horns, whereas Guérin's figure seems to represent a two-horned animal. Guérin's figure certainly shows no indication of a third post-cephalic process, nor is there any in the specimen with which we are now concerned. In sending it, Dr. Gilchrist wrote as follows:—"It was found imbedded in the tissue at the base of the dorsal fin of a sun fish (*Orthagoriscus mola*) caught in Table Bay. The colourless half of the animal was imbedded, the coloured part with the attached barnacle being free. The bend which you will observe was quite the same when cut out from the flesh of the sun fish. The head with the two barb-like projections was in a small pocket of abnormal tissue."

The correspondence with Guérin's figure is too close to admit of any doubt as to the specific identity. At the same time the proportions do not exactly agree. The part answering to the imbedded "neck" is in his figure only an inch and three-fifths long, the remainder two inches and a third, giving with the head a total of four inches. In the South African specimen the "neck" is two inches and a third in length, the remainder two inches, the total four inches and a half. In each case the penniform abdomen is about three quarters of an inch long, but Guérin represents the filaments as more thread-like than they are in our specimen, and without the branching which can, upon close inspection, be seen in the latter, in some correspondence with the figure assigned by Steenstrup and Lütken to *P. filosa*. The specimen described by Dr. E. P. Wright, which was taken in 1869 from an *Orthagoriscus mola* in Cork Harbour, had a total length of seven inches, the thoracic region being five inches and three quarters long. The cephalic horn-like appendages were each an inch and a half in length, and the ovisacs eleven inches long. Figure 6 on Dr. Wright's plate is explained as "Head of second specimen, showing the compara-

tively short horns." This specimen was from the same sun fish, so that there can be no reasonable doubt that it is of the same species as the long-horned specimen. To judge by the parallel case of *Sphyrion laevigatum*, these deeply-imbedded parasites vary greatly from specimen to specimen in the measurement of their imbedded parts.

Dr. Wright in his description mentions an eye-spot, in which he could find no appearance of a corneal structure or of the three cornea-like portions described by Claus for a species of *Pennella* (Beobachtungen über *Lernaeocera*, *Peniculus* und *Lernaea*, 1868). He further mentions a pair of minute antennules, antennae obscurely three-jointed, with the "distal joint cheliform," and surrounding the oral opening a number of small cauliflower excrescences. The chelate second antennae are figured for their *Pennella varians* by Steenstrup and Lütken, by Lubbock for the juvenile *Baculus elongatus*, and by Brady for the likewise juvenile *Hessella cylindrica*.

In the specimen from Table Bay the head is not very large, globular, with a circular group of close-set tubercles round the mouth opening. The blunt arms are directed slightly backwards, and are not much longer than the diameter of the head. On the "neck" between the arms are the four pairs of microscopical pointed processes representing the limbs. Attached at the point where the pale imbedded part of the specimen meets the brownish purple free portion is a specimen of *Conchoderma virgatum* (Spengler), of which some juvenile examples are attached at the other extremity of the genital segment, adjacent to the ovigerous tubes. It is said that *Pennella balaenopterae*, Koren and Danielssen, attached to a *Balaenoptera rostrata* (Fabr.) on the coast of Norway was also found associated with this same Thyrostracan species (Zool. Record for 1877, Crustacea, p. 34). The pale "neck" near the centre has four or five more or less joint-like constrictions. The dark part is rugose with close-set circular ridges, which are in part finely tuberculate. The ovigerous sacs were broken.

"The resemblance which the free part of this copepod bears to a sea-feather is quite striking enough to explain its inclusion by Linnaeus in the genus *Pennatula*. Probably there are very few marine animals that care to feed on Alcyonarians compared with the number to which crustaceans are palatable. It may therefore be presumed that the resemblance of the *Pennella's* exposed part to a *Pennatula* is protective, and that the attached barnacles also profit indirectly by a disguise which was at least artful enough to deceive Linnaeus.

PLATES
AND
EXPLANATIONS OF PLATES.

*The Plates are numbered consecutively to those of "South African Crustacea,"
Part II.*

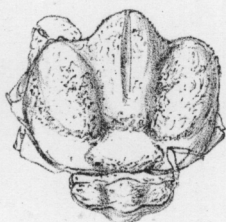
PLATE XVII.

Dynomene platyarthrodes, n. sp.

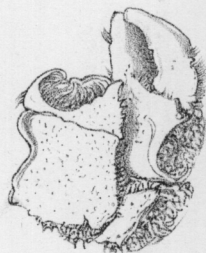
- n.s. Dorsal view of female, natural size.
- oc., a.s., a.i., mxp. 3. Ventral view of head, showing the rostrum, epistome, eyes, first and second antennae, and one of the third maxillipeds; flagella of second antennae omitted.
- f.s. Sternal sulci of the female between the bases of the first four peraeopods; the genital openings seen on the bases of the third peraeopods.
- Pl. D. Dorsal view of the last three segments of the pleon.
- T.V., urp. Ventral view of telson and uropods.
- mxp. 2, mxp. 3. Second and third maxillipeds.
- prp. 1, 3, 4, E. and I. First peraeopod or cheliped, and third and fourth peraeopods, each viewed from the exterior surface (E.), and from the adpressed surface (I.).
- prp. 5. Fifth peraeopod, seen from the outer surface, as lying on the back of the carapace.
- urp. Uropod or platelet of sixth pleon segment, ventral view, greatly magnified.



prp. 1. E.



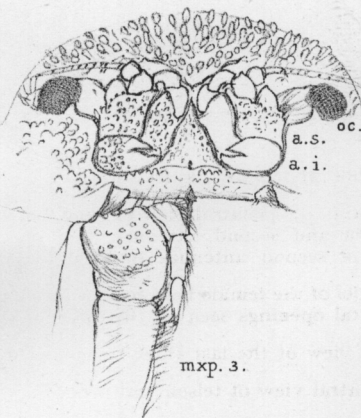
n. s.



prp. 1. I.



prp. 4. I.



mxp. 3.



prp. 3. I.



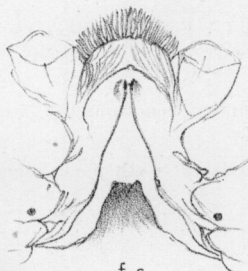
prp. 4. E.



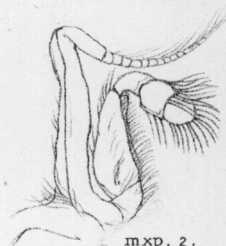
prp. 3. E.



mxp. 3.



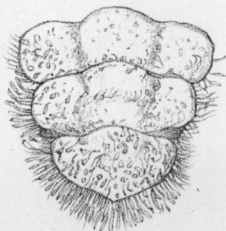
f. s.



mxp. 2.



prp. 5.



Pl. D.



urp.



T. V.

PLATE XVIII.

Exodromidia spinosa (Studer).

- n.s. Dorsal view of male specimen, natural size.
- Pl. D. Dorsal view of pleon magnified, from a smaller male specimen; some of the setæ omitted on the left side.
- Pl. V., s. 1-4. Ventral view of the first four segments of the same pleon, showing on the left of the figure the first pleopod, and on the right the second.
- T. Ventral view of fifth and sixth segments and telson of the same pleon, showing the rudimentary pleopods.
- Pl. V., s. 3, 4. Ventral view of third and fourth pleon segments more highly magnified, and showing on one side the rudimentary pleopods.
- mxp. 1, mxp. 2. The first and second maxillipeds.
- plp. 1, 2. The first and second pleopods of the smaller male specimen, from which all the detail figures have been drawn.