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T. R. R. STEBBING,

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7.— *The Sympoda* (Part VI. of S.A. Crustacea, for the Marine Investigations in South Africa). By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Member of New Zealand Inst., Hon. Fellow of Worcester College, Oxford. (With Sixteen Plates.)

Part VI.



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7.—*The Sympoda* (Part VI. of S.A. Crustacea, for the Marine Investigations in South Africa)*.—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Member of New Zealand Inst., Hon. Fellow of Worcester College, Oxford.

THE Sympoda are a group in many ways remarkable. Its boundaries are at present as sharply defined as any systematist could possibly wish. All known Crustaceans are either clearly Sympoda or clearly not Sympoda. None hover doubtfully on the outskirts of this society. On the other hand, within its limits the relations are highly perplexing. There is so much interlacing of characters, together with so many fine gradations, that any settled standard of classification is difficult to adopt, or if adopted to uphold against reasonable objections. For distinguishing families practical convenience solicits a choice of external and easily observable features. The widely separated eyes of *Nannastacus* offered such a character, till the kindred *Cumella* was found with a single eye. The presence or absence of a distinct telson sets one group of families in a marked manner apart from another group. Yet between the greatly elongated segment in *Makrokyllindrus* and the disappearance of the segment in *Bodotria* there are not a few intermediaries, so that a comparatively short and narrow telson in *Leptostylis* leads on through a short and blunt one in *Petalosarsia* to forms in which the telsonic segment is produced between the uropods, though the produced part is not articulated, and in *Eudorellopsis biplicatus*, Calman, this unarticulated portion is marked off "by a very distinct transverse groove." In some of the appendages the third or "ischial" joint is apt to disappear. Accordingly its presence or absence seemed likely to be available for classificatory purposes. But this proved disappointing, because, though the joint is often quite definitely present, and some-

* Parts I.-III. have been published in the "Marine Investigations in South Africa"; Parts IV. and V. in Vol. VI. of the "Annals of the South African Museum." In Part V., pp. 409-418 treat of the Sympoda (olim *Cumacea*).

times quite definitely missing, there are other cases when the ring is incomplete or when coalescence with the preceding joint can only be inferred from a line of suture. The endopod or inner ramus of the uropods may be a single piece or it may be divided into two or three joints of varying relative lengths. The resulting differences are rather easy to observe, and have been, in fact, of much service in classification. But even here perplexities occasionally arise. Among the species of *Sympoda* earliest described are *Bodotria scorpoides* (Montagu) and *Bodotria arenosus*, Goodsir. These are so much alike that their generic separation is hardly to be thought of. Nevertheless the uropod of the former has a two-jointed endopod, while that of the latter is provokingly undivided.

When the question arises of arranging the families in a natural order, one would probably think precedence appropriate to those which retain the most primitive characters. Among these would be the most complete segmentation of the body and the fullest equipment of the segments with their several pairs of appendages. On the first account the families with a distinct telson should stand before those without one. But when the second point is also considered, we find the full complement of five pairs of pleopods combined with entire want of a distinct telson, or in one case with a telson of the smallest type. All other families with the telson distinct have a diminished number of pleopods, varying from three pairs to none. These differences refer only to the male sex, because, so far as at present known, all the females with singular unanimity dispense with pleopods altogether. In some families, however, the males are in this respect like the females.

The provision of exopods or swimming branches on the peræopods in the two sexes has its uses for systematic arrangement. But while in the majority of families the adult males have these branches well developed on the first four pair of peræopods, the females are never so well provided, having at most exopods well developed on the first three pairs and a rudiment on the fourth. In both sexes the exopods may be limited to the first pair of peræopods. For full advantage to be taken of these much-varying characteristics it is obviously important that both sexes should be observed. But, owing probably to the respective habits of these, it not unfrequently happens that new species have to be, or at any rate are, founded on specimens of a single sex, so that the characters of the other sex have to be guessed at or left out of count.

These are a few of the difficulties which confront the systematist in points the most readily available for his purpose. There are

plenty more in those other details of the organism which cannot well be studied without dissection and microscopic examination. The mandibles may have the trunk pointed at the base or very blunt, the molar stout or slender, spines of the spine-row numerous or very few; the palp of the first maxillæ may end in two filaments or only one, or the palp may be missing altogether; important variations in the terminal joints of the first maxillipeds are indeed more or less easily discernible, but this is not the case with the branchial apparatus which is out of view in complete specimens, but which has important differences to offer in the number and disposition of the branchial læfflets. Even the comparative uniformity of the intestine cannot be depended on, since *Cyclaspoides sarsi*, Bonnier, and *Platycuma holti*; Calman (Fisheries, Ireland, 1904, I. [1905], p. 30, pl. 3, figs. 39-56), agree with many of the Cladocera in having a coiled instead of a straight alimentary canal.

It is reasonable to suppose that the Malacostracan type of body was gradually produced in far-distant ages, but the pattern is now so wonderfully persistent and traceable under all sorts of disguises, that missing parts are almost certainly due to losses, not to inheritance of ancestral defect. Hence, as above suggested, we may be allowed to assume that the organism with the largest number of distinct parts comes nearest to the original pattern. On this principle the family Vaunthompsoniidae will stand first, having in the male five pairs of pleopods together with exopods on the first four pairs of peræopods, and in the female exopods on the first three of those pairs. The Sympodommatidae agree as to pleopods, but have exopods only on the first three pairs of peræopods in the male as well as in the female. The Bodotriidae with the same number of pleopods have well-developed exopods only on the first peræopods in each sex. The only other family with five pairs of pleopods is the Ceratocumatidae, which might claim precedence over the families already named in respect of its distinct telson, which they are without, but it is inferior to the Vaunthompsoniidae by having exopods in the male on the first two only instead of the first four pairs of peræopods, and in its only known species it has lost the fifth peræopods altogether.

The present essay proposes the adoption of fourteen new species, nine new genera, and a new name for a genus already known, but a more important innovation affects the framework of the group at large. In view of a forthcoming monograph, which avowedly aims, not at introducing novelties, but simply at recording the actual state of science, it has seemed desirable here to name a great number of

Pleopods, Pairs in Male.	Pereopods, Pairs with Exopods in		Telson.	Apical Spines of Telson.	Antennal, Accessory Flagellum.	Antenna 2 of Female, Joints.
	♂	♀				
5	4	3	0	..	very small	2
5	3	3	0	..	very small	2
5	1 or 1 + 2r	1 or 1 + 2r	0	..	very small	1 or 2
5	2	?	small	0	very small	?
3	4	3 + r	0	..	very small	3
3	4	2 + 2r	large	3 or more	well developed	4
3	4	2 + 2r	large	3	well developed	5
3	4	1	large	3	well developed	4
2	4	2 or 2 + 2r	large	2	well developed	4
2	4	2 + 2r	small	0	very small	3 or 4
2	4	2 + 2r	large	0	small	4
?	?	2 + 2r	large	3	very small	? 4
2	4	2	large	2	small	? 4
2	4	2	large	2	small	5
2	4	2	large	2	rather small	?
2 or 1 + r	4	2 + 2r	small	0	very small	1 or 2
2	4	3	0	..	very small	1, 2, or 3
1	4	3	0	..	small	3
0	4	3	0	..	small	?
0	4	2 + 2r	large	3 or more	well developed	4 or 5
0	4	?	large	0	very small	?
0	4 or 2	2	large	0 or 2r	very small	3 or 4
0	4	2 or 0	0	..	very small	1, 2, or ? 3
0	4	2	0	..	very small	?
0	4	2	0	..	very small	1
0	2	2	0	..	small	3

In the table above *r* stands for *rudimentary*. In most families the mandibles are tapering at the base and have a blunt molar, the second maxillæ are apically divided, the first maxillipeds are more than 4-jointed, and in the second maxillipeds the inner margin of the apical joint is not strongly dentate.

Mandibles.	Maxilla 1, Apical Filaments of Palp.	Maxilla 2.	Maxilliped 1.	Maxilliped 2, Apical Joint.	Uropod. Joints of Inner Ramus.	
..	2	..	..	..	2	Vaunthompsoniidae
..	2	..	..	..	2	Sympodommatidae
..	1 or 2	..	..	..	1 or 2	Bodotriidae
..	2	..	..	..	1	Ceratocumatidae
..	2	..	..	..	2	Leptocumatidae *
..	2	..	..	..	3	Hemilampropidae
..	no palp	..	..	..	3	Paralampropidae
..	no palp	..	..	..	3	Platysympodidae
..	2	..	..	..	3	Diastylidae
..	2	..	..	..	2 or 3	Colurostylidae
..	2	..	..	..	3	Oxyurostylidae
..	?	..	..	..	?	Pseudodiastylidae
broad at base	2	..	..	..	3	Diastyloididae
..	2	..	..	..	2	Ekdiastylidae
..	2	..	..	..	1	Holostylidae
..	2	..	..	..	1	Pseudocumatidae †
broad at base	1	..	..	..	2	Leuconidae
broad at base	1	..	..	..	2	Paraleuconidae
broad at base	?	..	..	..	2	Hemileuconidae
..	1 or 2	..	..	..	3	Lampropidae
..	2	..	..	..	3	Dicidae
..	2	..	..	..	2 or 1	Gynodiastylidae
..	1 or 2	..	..	..	1	Nannastacidae
molar narrow	2	..	..	{ strongly } { dentate }	1	Procampylaspidæ
molar stilliform	1 or 2	undivided	4-jointed	..	1	Campylaspidæ
broad at base	1	..	..	..	1	Heteroleuconidae

* A new family for the genus *Leptocuma*, Sars, 1873, with the species *L. kinbergii*, Sars, 1873, and *L. minor*, Calmar, 1912.

† Name modified from Pseudocumidae, instituted by Sars to receive his genus *Pseudocuma*, 1865, and allied genera.

families among which all the genera of the group will in that monograph be distributed. The accompanying tabulation of several characters will give the student an opportunity of understanding at a glance and criticising at his leisure the proposed arrangement. There are several obvious weaknesses. Besides those which depend on unavoidable want of information, there are those due to alternative characters, to reliance on features of little significance, and to the use of indefinite terms such as large and small. In defence it may be pleaded that the case is essentially one in which convenience should be studied and compromise accepted, since Nature makes a mock of our pragmatistical divisions and is continually supplying the links which the evolutionist desires and the systematist abhors.

The naturalist who happens to be a grammarian, or the grammarian who happens to be a naturalist, will find among the names of *Sympoda*, as among the names in almost any other branch of zoology, a plentiful supply of false concords. This arises from the tiresome and ridiculous idea that the termination of a generic name can make a species masculine, feminine, or neuter. How Nature must laugh! As though because of the Latin words *Aquila* and *Vultur* an eagle must be a hen and a vulture a cock! Since some one must make a beginning, if so inconvenient and unnatural a rule is to be discountenanced and discarded, I here brave reproof and reproach by making all the species of *Sympoda* of one and the same gender, and that the masculine. In due time, if editors are graciously pleased to allow it, the virtue of simplicity will be recognised and common sense will win a victory over a vexatious custom.*

FAMILY VAUNTHOMPSONIIDÆ.

1879. *Vaunthompsoniidae*, G. O. Sars, Arch. Naturv. Kristian., vol. iv., p. 63.

In this family, though there is no distinct telson, the telsonic segment is notably produced between the peduncles of the uropods, this being especially the case in the genus *Gaussicuma*, Zimmer, 1907. In that genus the pseudorostral lobes do not meet in front of the eyelobe, thus distinguishing it from *Bathycuma*, Hansen, 1895, in which they do meet. Both these genera agree in having the second joint of the third maxilliped strongly produced at the outer distal

* See "Knowledge," vol. xxxiii., pp. 259 and 470, 1910, for a fuller discussion of this subject.

angle—a feature not possessed by the typical genus *Vaunthompsonia*, Bate, 1858.

GEN. BATHYCUMA, Hansen.

1895. *Bathycuma*, H. J. Hansen, *Ergebn. Plankton-Exp.*, vol. ii., G.c., p. 55.
 1905. *B.*, Calman, Fisheries, Ireland, for 1904, I., p. 17.
 1905. *B.*, Calman, *Siboga-Exp.*, vol. xxxvi., p. 9.
 1908. *B.*, Zimmer, *Deutsch. Tiefsee-Exp.*, vol. viii., p. 164–166.
 1912. *B.*, Calman, *Proc. U.S. Mus.*, vol. xli., p. 614.

General form elongate. Pseudorostral lobes meeting in the front. First pedigerous segment short, but well exposed. Telsonic segment produced between the bases of the uropods. Eye wanting. Mandible with long spine-row and strong molar. First maxillæ with bisetose palp. First maxillipeds comparatively broad, the epipod furnished with several branchial leaflets. Third maxillipeds with second joint distally produced, the fourth little expanded. First four peræopods in male, only the first three in female, carrying exopods. All five pairs of pleopods in male well developed.

To this genus Dr. Calman in 1905 transferred *Leucon brevirostris*, Norman, 1879, and also in 1905 described a new species, *Bathycuma longirostris*, to which he added *Bathycuma longicaudatus* in 1912, calling it "*Bathycuma* (?) *longicaudata*."

BATHYCUMA NATALENSIS, n. sp.

Plate XLIX.

All the five species assigned to this genus show signs of very near relationship. It is an inconvenient circumstance that in two cases only the male is known, and in two others only the female. Only in the case of *B. brevirostris* (Norman) is the situation saved by Dr. Calman's decision that *Vaunthompsonia cæca*, Bonnier, 1896, is a synonym of Norman's species. From Norman's account of the female the form about to be described differs in respect to the third maxillipeds, the telsonic segment, and the uropods. From Bonnier's description and figures of the young male it differs further in regard to the first and second maxillipeds. From *B. longirostris*, Calman, founded on a young male, it differs strikingly in characters of the pseudorostral lobes, and from *B. longicaudatus*, Calman, founded on an immature female, it differs conspicuously by inferior size and in the proportions of the first antennæ. From the typical species, *B. elongatus*, Hansen, also described from an immature

female, it differs in the proportions of the mandibles and the uropods.

The pseudorostral lobes meet for a short distance in front of the little triangular eyelobe; seen from the side they project a little upwards in an acute point, and laterally are truncate, meeting the serrate lower margin without forming any produced tooth; seen from above they show a slightly serrate sinuous front. The carapace is about one-fourth of the total length from pseudorostral point to end of telsonic segment; the medio-dorsal line is carinate, the first third showing the alternating spinules in double line commencing on the eyelobe and seemingly fading away into a single line obscurely continued to the hind margin. High magnification shows an extensive distribution of minute denticles, each projected from one of the irregular hexagonal cells of the surface, most of these cells having an internal marking suggestive of their capacity to produce a denticle.

The first pedigerous segment appears to be firmly united to the carapace. The four following segments are bordered below with firm edges. The lower borders of the first five pleon segments are flattened out. The produced part of the telsonic segment is almost semicircular, with a little serration on each side of the middle of the apical border. Norman assigns to *B. brevirostris* "telson very short, semiovalate, smooth." Bonnier figures the part in question as semiovalate, but rather long in relation to the antecedent part of the segment.

As in all species of the genus, the eye is wanting. The first antennæ have a geniculate first joint, the second shorter than the third, the two-jointed flagellum shorter than the third joint of the peduncle, its first joint being dilated near the base and fringed with long filaments, the shorter second joint carrying the usual annulated setæ and others; the minute two-jointed accessory is provided with a close-set fascicle of very long setæ. That this rather striking apparatus is not mentioned in the other species is no doubt due to the sex of the female specimens and probably to the immaturity of the males. The second antennæ have characters commonly found in male Sympoda, unless the interlocking of the third and fourth joints of the peduncle may prove to be exceptional (but Sars has figured something similar in *Bodotria* and *Leucon*); the short penultimate joint pushes up a small lobe between the two widely separated lobes of the antepenultimate; the flagellum was not complete in any specimen, but the proximal portion showed a very great number of short joints furnished with setules.

The upper lip is emarginate. The mandibles have the basal section longer than the part on the other side of the strong molar; a spine-row of twenty-one spines leads on to a very narrow cutting plate, which in one mandible is accompanied by a narrow accessory. In Hansen's *B. elongatus* the basal section of the mandible is, contrary to custom, shorter than the spiniferous portion. The first and second maxillæ are normal.

The first maxillipeds have a long second joint, the third missing, the fourth and fifth broad, closely united, the fifth fringed with a row of eight bifid teeth, the two following joints small; the branchial apparatus with eight leaflets agrees better with Hansen's account for *B. elongatus* than with Bonnier's figure and description of this part in his *Vaunthompsonia cæca*. The second maxillipeds have a slender, sinuous, strongly ridged second joint twice the length of the rest of the limb, with the third joint scarcely forming a complete ring, instead of a joint twice as long as broad as represented in Bonnier's figure. The third maxillipeds have the second joint well produced and serrate on inner side of the apical process, but without the strong armature of spines described by Norman for his species. After the small third joint the rest of the limb is missing.

The first peræopods were available only to the end of the second joint; the exopod has a remarkably broad basal joint, the flagellar part having a first joint not very long, but succeeded by no less than seven short joints. The second peræopods have the second joint serrate, the third short, the much-spined seventh about as long as the fifth with the little sixth.

The pleopods have the peduncle little longer than the subequal rami, the one-jointed endopod with its lateral process little produced across the two-jointed exopod, of which the second joint, like the endopod and peduncle, is amply provided with setæ.

The exopod of the uropods is about three-fourths as long as the peduncle, and has eight slender spines on its inner margin. The scarcely shorter endopod is fringed with about seventeen little spines and four larger on the inner margin of its large first joint: the much thinner second joint, more than half as long, has a dozen little spines on the inner margin, on which the peduncle has a varied assortment of a score.

Length of male 11 mm. Female unknown.

Locality. Cape Natal N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY SYMPODOMMATIDÆ, n.

Without distinct telson; with exopods only on the first three pairs of pereopods in both sexes; with five pairs of pleopods in the male.

SYMPODOMMA, n. g.

General form slender, elongate, width diminishing gradually from carapace to pleon. Eyelobe narrowly linguiform, separating the pseudorostral lobes, in which the sinus is well defined by the produced antero-lateral angle. All five pedigerous segments dorsally exposed, the first short. Pleon elongate; telsonic segment produced between the bases of the uropods. First antenna with both flagella slight. Third maxilliped with second joint distally much produced, fifth not much distally widened. First three pairs of pereopods in both sexes with exopods, fourth and fifth pairs without any. Five pairs of pleopods in the male. Uropods with both rami two-jointed.

The name of the genus is compounded of the tribal name and ὄμμα, an eye.

Under this genus I group the new species *Sympodomma africanus*, and three previously known under other names: 1. *S. anomalus*, assigned by G. O. Sars in 1871 and 1873 with much hesitation to the genus *Leucon*, but in 1879 and 1887, again with some doubt, transferred to *Vaunthompsonia*; 2. *S. weberi*, described by Calman in 1905 as *Heterocuma? weberi*, and 3. *S. diomedea*, the species described by Calman in 1912 as a companion of the preceding species in the genus *Heterocuma*.

SYMPODOMMA AFRICANUS, n. sp.

Plate L.

The present species bears a close resemblance to that recently described by Dr. Calman from Japan under the name *Heterocuma diomedea* (Proc. U.S. Mus., vol. xli., p. 612, text figs. 6-9, 1912), but is distinguished by the different armature of the carapace and by the proportions of the uropods.

The pseudorostral lobes are kept quite apart by the advanced eye-lobe, the slightly expanded pellucid apex of which appears to be occupied by numerous small lenses; an angular antennal sinus is formed by the well-advanced antero-lateral angle, from which commences a serration carried some way along the lower margin. A

median carina, beginning on the eyelobe, is carried right through to the hind margin, on the frontal lobe carrying three conspicuous forward-pointing teeth just as in the Japanese species, but not as there behind these teeth dividing into two tuberculated ridges, nor are the sides of the carapace here tuberculate except for a single pair of tubercles anteriorly outside the frontal lobe. Microscopic denticles can be made out along the centre of the carina and scattered over the minutely squamose surface of the carapace.

The pedigerous segments after the first are laterally keeled, and after the second have a median pair of carinæ. There is a slight interlocking laterally between the third and fourth segments. No ventral spine was found on these segments. The first five pleon segments have each a dorsal and lateral pair of carinæ, but the telsonic segment though elevated in the middle is scarcely to be called carinate; its rounded end is well produced between the bases of the uropods.

In the first antennæ the geniculate first joint is as long as the subequal second and third joints combined; the small flagellum is three-jointed, with the third joint minute, the sensory filaments long; the accessory flagellum with its two joints is not nearly as long as the first joint of the principal. The second antennæ of the specimen had the usual character for a male not fully adult, giving promise, however, of very numerous joints.

The mandibles have a strong molar, finely toothed on the apical margin; the spine-row contains at least a score of spines. The first maxillæ show an elongate palp, with two unequal terminal filaments. The second maxillæ with the usual armature appear to be longer than usual. The first maxillipeds have the marginal teeth of the ante-penultimate joint apparently simple, although a spine projecting from below under a low magnification makes the upper tooth seem bifid; the second joint at the apex of its inner margin shows a tooth of unusual size. In the second maxillipeds the slender second joint is much longer than the five following joints combined. The second joint of the third maxilliped is more than twice as long as the five following joints combined, wider at both ends than in the middle, much produced apically; the fourth joint is also produced, but is little longer than broad; the three following joints are narrow. The long first peræopods have the sixth joint less than twice the fifth and not a fourth longer than the seventh. In the short second pair the sixth joint is not longer than the third, the seventh as long as fifth and sixth combined. Exopods to the third pair were not satisfactorily made out, but may be presumed, as they occur in both sexes of the allied Japanese species.

The five pairs of pleopods were without swimming setæ, the one-jointed inner branch having a narrow process across the line of junction between the two joints of the outer branch. In the uropods the endopod is about two-thirds as long as the carinate peduncle, a little longer instead of shorter than the exopod, its first joint about twice as long as the second, instead of subequal to it.

Length of specimen, subadult male, 18 mm. Female unknown.

Locality. Cape Point N. 81 E. 32 miles; No. 17643, sent by Dr. Péringuey.

FAMILY BODOTRIIDÆ.

1901. *Bodotriida*, T. Scott, Rep. Fish. Board Scotl., vol. xix., p. 273.

Telson wanting, telsonic segment little produced between the uropods; exopods only on the first pair of pereopods or also with rudiments on the second and third pairs in both sexes; five pairs of pleopods in the male; inner branch of uropods two-jointed or simple.

To this family are referred *Bodotria*, Goodsir, 1843; *Iphinoë*, Bate, 1856; *Cyclaspis*, Sars, 1865; *Stephanomma*, Sars, 1871; *Heterocuma*, Miers, 1879; *Cumopsis*, Sars, 1879; *Eocuma*, Marcusen, 1894; *Cyclaspoides*, Bonnier, 1896; *Zygosiphon*, Calman, 1907.

From these genera the species *Iphinoë brevipes*, Hansen, and *Iphincë crassipes*, Hansen, have been already considered, and the species *Iphinoë zimmeri*, Stebbing, described, in the Catalogue of S. African Crustacea, 1910; a specimen of *Cyclaspis spectabilis*, Zimmer, mentioned in the same work, has since been obtained by Dr. Péringuey from Cape Point, E. by N. 29 miles; Museum No. 17585, and another, No. 12605, from a depth of 805 m., Cape Natal, N. by E. 24 miles; the Catalogue further notices *Eocuma sarsii* (Kossmann).

GEN. BODOTRIA, Goodsir.

1843. *Bodotria*, Goodsir, Edinburgh New Philosophical Journal, vol. xxxiv., pp. 120, 128.

Carapace without lateral cornua; first pedigerous segment inconspicuous, the second large. Only the first pair of pereopods carrying exopods in either sex; second pereopods with the third joint indistinct; inner branch of uropods either two-jointed or simple.

The two species here added to the genus are distinguished from *B. arenosus*, Goodsir, 1843; *B. pulex*, Zimmer, 1903; and *B. similis*, *B. siamensis*, *B. parous*, all three established by Calman in 1907, because those five species have the inner branch of the uropods simple, whereas the new species have it two-jointed, in agreement with *B. scorpioides* (Montagu), 1804; *B. gibbus* (Sars), 1879; *B. pulchellus* (Sars), 1879; and *B. sublevis*, Calman, 1907. But while each of the four last-mentioned species is provided with an eye, that organ is apparently wanting in the two new species.

BODOTRIA MONTAGUI, n. sp.

Plate LI.A.

This species is closely related to *Bodotria scorpioides* (Montagu), but exhibits the following points of difference in the female sex, to which the single specimen belongs. The integument is not hard and strong. The eyelobe shows no trace of an eye. The carapace exhibits a pair of oblique grooves, diverging near the middle backwards from the central carina. In the first antennæ the third joint is not longer than the second. The second maxillipeds are without the six strong spines on the distal part of the second joint's outer margin, that part being furnished with four very slight setules. The third maxillipeds have the second joint narrowed in the middle. In the first pereopods the fifth joint, though decidedly longer than the sixth, is considerably shorter than the sixth and seventh combined. In the second pereopods there is a faint indication of the third joint, but with incomplete articulation. In dorsal outline the fourth pedigerous segment is not separated from the third and fifth by any deep incisions, and the telsonic segment is little produced between the peduncles of the uropods.

The comparison has been instituted between the South African specimen and the excellent figures and description given in 1879 and 1899 by Professor Sars of "*Cuma Edwardsii*, Goodsir," which is now recognised as a synonym of *Bodotria scorpioides* (Montagu). Though the differences above mentioned are rather numerous, the points of resemblance are also so many and so close that it seems unnecessary to repeat descriptions practically available in the writings of Professor Sars. Among the minute details which he gives is a character of the first maxillæ, the elongate palp of which has its unequal apical filaments furnished with little lateral hairs pointing in different directions. It is difficult to see the hairs at all, but in the southern specimen some point upwards and some downwards as described by Sars for the northern species.

Length of specimen 4·5 mm.

Locality. Lat. 32° 53' 30" S., long. 28° 11' 00" E.; depth 75 m.
No. 83, sent by Dr. Gilchrist.

BODOTRIA AUSTRALIS, n. sp.

Plate L.I.B.

This species, like the preceding, showed no visual elements and had a yielding integument which permitted the flattening out of the carapace, thus making visible a pair of lateral ridges on the under side with a scalloped edge. The outer edge of the extended carapace is fringed beneath with a series of little raised processes. The antero-lateral angle is well marked. The last three pedigerous segments and first two of the pleon are separated from one another and their neighbours by deep depressions. The first antennæ have the third joint shorter than the second. The second maxillipeds have the second joint widest distally instead of in the proximal half. The first peræopods have the sixth joint not longer than the seventh, and the two combined not so long as the fifth joint. In the second peræopods the third joint makes no appearance. The rami of the uropods are two-thirds the length of the peduncle, the exopod being inconsiderably longer than the endopod, of which the second joint is a little over a third of the first.

Length of female specimen 3·25 mm. Male unknown.

Locality. Lat. 32° 53' 30" S., long. 28° 11' 00" E.; depth 75 m.;
No. 83, sent by Dr. Gilchrist.

FAMILY CERATOCUMATIDÆ.

1905. *Ceratocumidæ*, Calman, Fisheries, Ireland, 1904, I., p. 37.

The telson is distinct, but small and unfurnished with spines; only the first two pairs of the peræopods are furnished with exopods; the seventh joint in the two following pairs ends in a curved spine; the pleon carries five pairs of pleopods; the inner ramus of the uropods is 1-jointed.

The characters are all taken from the male, the other sex being as yet unknown.

GEN. CERATOCUMA, Calman.

1905. *Ceratocuma*, Calman, Fisheries, Ireland, 1904, I., p. 37.

As the family depends at present on one sex of a single species, it is, perhaps, inexpedient to attempt a selection of generic characters.

CERATOCUMA HORRIDUS, Calman.

1905. *Ceratocuma horrida*, Calman, Fisheries, Ireland, 1904, I., p. 39, pl. 4, fig. 57-75.

This remarkable species has been fully described and figured by Dr. Calman. Briefly may be mentioned the numerous procurved processes on the flattened oblong carapace, the expanded lateral processes of the second and third pedigerous segments, the absence of limbs from the fifth pedigerous segment (while both pairs of antennæ give evidence of maturity), the peculiar processes with their dense tufts of radiating setæ on the short sixth joint of the first peræopod, and the great length of the slender uropods, in which the equal rami are very much longer than the peduncle. The only point in which the South African specimen differs from Dr. Calman's description and figures is in a small bulbous expansion of the base of this peduncle. The capacity of the telson for closing down over the anal opening, when exercised, has the effect of obscuring its existence. The South African specimen measures 4 mm.

Locality. Cape Natal N. by E. about 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY HEMILAMPROPIDÆ, n.

Telson large, with more than two apical spines; first antennæ with both flagella well developed; exopods on the first four pairs of peræopods, but those on the third and fourth pairs only rudimentary in the female; first peræopods with second joint much shorter than the rest of the limb; three pairs of pleopods in the male; uropods with 3-jointed inner ramus.

The system here followed makes it imperative to separate from the Lampropidæ those genera in which the male has three pairs of pleopods. It seems also desirable to institute a family Paralampropidæ for the genus *Paralamprops*, Sars, 1887, containing the species *P. serratocostatus* (Sars), 1885, and *P. asper*, Zimmer, 1907, this family being distinguished from the Hemilampropidæ by the first maxillæ, which here have no palp. That feature the family shares, so far as is known, only with the Platysymphodidæ, but the latter family has in the female exopods only on the first pair of peræopods, whereas in the Paralampropidæ there are in that sex exopods on the first four pairs, although, as often elsewhere, those on the third and fourth peræopods are rudimentary. The genus *Platysymphus* has a

new name in place of the preoccupied *Platyaspis*, Sars, 1870. It contains the species *P. typicus* (Sars), 1870, and *P. brachyurus* (Zimmer), 1907. The species *orbicularis*, which Dr. Calman referred to *Platyaspis* in 1905 and to *Paralamprops* in 1912, may, perhaps, be transferred to a new genus *Platytyphlops* to be subsequently introduced. The suggestion made by Professor Sars in 1900 that *Chalarostylis*, Norman, 1879, might be referred to the Platyspidæ (now Platysymphodidæ) will not suit the character of the first maxillæ in Norman's *Chalarostylis elegans*, since Dr. Calman has observed that those appendages have a normal bisetose palp.

GEN. HEMILAMPROPS, Sars.

1882. *Hemilamprops*, Sars, Forh. Selsk. Christian., 1882, pp. 11, 55.
1899. *H.*, Sars, Crustacea of Norway, vol. iii., p. 21.

As this is at present the only genus assigned to the family, the family characteristics may suffice to define it. The species included are *H. roseus* (Norman), 1863; *H. cristatus* (Sars), 1870; *H. uniplicatus* (Sars), 1872; *H. assimilis*, Sars, 1882; *H. normani*, Bonnier, 1896; *H. pellucidus*, Zimmer, 1908.

HEMILAMPROPS PELLUCIDUS, Zimmer.

Plate LII.

1908. *Hemilamprops pellucida*, Zimmer, Deutsch. Tiefsee-Exp., vol. viii., pt. 3, pp. 171, 172, pl. 39, figs. 53, 54, pl. 40, figs. 55-59.
1910. *H. p.*, Stebbing, S.A. Crustacea, pt. 5, p. 415.

The specimens here described and figured, if not in absolute agreement with the young female and still younger male, examined by Dr. Zimmer, do not admit of any real doubt that they belong to the same species.

The integument is pellucid, delicate, microscopically scabrous. Pseudorostral lobes short, subacute, with serrate edges. Carapace in both sexes rather deep, the small triangular eyelobe without lenses, the medio-dorsal line carrying four or five forward-pointing denticles, immediately followed by a nearly level line of twenty denticles reaching back beyond the middle of the carapace and succeeded by a groove between the inflated branchial regions. Pedigerous segments combined shorter than the carapace. Pleon longer than those segments and carapace together. Telson with three long apical spines, its denticulate margins carrying six to eight pairs of

spines on the nearly parallel-sided hinder half; in the nearly adult male the telson is longer than in the female, with a narrower base.

First antenna with serrate edge to the large first joint, third joint small, and in the male not longer than broad, flagellum in the female of five or six joints, with accessory of three joints, the third microscopic; in the male the flagellum is four-jointed, with accessory of three well-developed joints. Second antenna of the female small, four-jointed, with a seta on the rather large first joint and another on the small second joint; second antenna in the male showing a flat process on the side of the penultimate joint of the peduncle, the last joint long, probably composite, the flagellum long, annulated, the very numerous short rings not having attained their full development.

The first peræopod has the second joint much curved, with its convex border distally serrate. The second peræopod has the second joint shorter than the succeeding joints combined, of which the strongly spined fifth is longer than the short sixth and long narrow seventh together. The third and fourth peræopods have the second joint more dilated in the male than in the female, in correspondence with the exopods well developed in the former sex but reduced to two-jointed rudiments in the latter; the third joint of the third peræopod in the male shows no sign of the peculiar flattened spines found in adult males of northern species belonging to this genus.

The three pairs of pleopods in the male with short apical setæ may be taken to represent a subadult character.

Peduncle of the uropods in the female longer than the telson with its apical spines and longer than either ramus; in the male it is subequal to the telson with its spines and shorter than the rami; of these the exopod is a little the shorter, with the first the longer of its two long joints; the endopod has its first joint much longer than the two following joints combined, these two being subequal in the female, but the second shorter than the third in the male.

Length 8.5 mm.

Locality. Cape Point N. 81° E. 32 miles; No. 17386, sent by Dr. Péringuey.

FAMILY DIASTYLIDÆ.

1856. *Diastylidæ* (part), Bate, Ann. Nat. Hist., Ser. 2, vol. xvii. p. 449.

1900. *D.* (part), G. O. Sars, Crustacea of Norway, vol. iii., p. 41.

All the pedigerous segments distinct; telson large, with only two apical spines; accessory flagellum of first antennæ distinct; mandibles normal, not broad at the base; first maxillæ with bisetose palp; branchial leaflets numerous, often spirally arranged; exopods on the first four pairs of pereopods in the male, on the first two pairs in the female and sometimes rudiments on the third and fourth pairs; two pairs of biramose pleopods in the male; inner branch of uropods three-jointed.

With this definition the family will be restricted to the genera *Diastylis*, Say, 1818; *Leptostylis*, Sars, 1869; *Diastylopsis*, S. I. Smith, 1880; *Paradiastylis*, Calman, 1904; and the new genera *Adiastylis*, *Makrokylindrus*, and *Ekleptostylis*. But this compactness has to be purchased at the cost of establishing several new families closely allied in most of their features. Thus a two-jointed inner ramus of the uropods introduces a new genus, *Ekdiaastylis*, in the Ekdiaastylidæ, with *E. sculptus* (Sars), 1871, and eight companion species transferred from *Diastylis*. *Holostylis* in the Holostylidæ is instituted to receive *Diastylis helleri*, Zimmer, 1907, and with it *Cuma gayi*, Nicolet, 1849, both of which are set forth as having a simple inner ramus to the uropods. In *Diastyloides*, Sars, 1900, the Diastylididæ have a genus in which the mandibles are broad at the base instead of normally tapering, and the second pleopod has only a single ramus. The Pseudodiastylidæ, dependent on *Pseudodiastylis ferox*, Calman, 1905, known only in the female sex, have an elongate telson with more than two apical spines. In the Oxyurostylidæ, *Oxyurostylis smithi*, a new genus and species, established by Dr. Calman in 1912, exhibits a sharply pointed telson with no apical spine or spines. The Colurostylidæ, in the original representative *Colurostylis pseudocuma*, Calman, 1911, have a short telson without apical spines and a two-jointed inner ramus to the uropods, but "*Colurostylis* (?) *occidentalis*," Calman, 1912, has that ramus three-jointed. The Gynodiastylidæ are separated from all the families just mentioned by having no pleopods in the male. The species originally assigned to the genus *Gynodiastylis*, Calman, 1911, agree in having a rather small, unarmed telson not produced beyond the anus, and as in *Paradiastylis* with no exopod to the third maxillipeds

in the female. But the relations of the species among themselves are rather complicated, since the type species, *G. carinatus*, agrees only with *G. lævis* in having no exopods on the third and fourth peræopods of the male, while *G. lævis* is separated from the type and Dr. Calman's other two species, *G. costatus* and *G. bicristatus*, by having the inner ramus of the uropods simple. A family Dicideæ, with the new genus and species *Dic calmani*, was instituted in the General Catalogue of South African Crustacea, published in 1910, and *Dic tubulicauda* (Calman), is accepted by Dr. Thomas Scott.

GEN. DIASTYLIS, Say.

1818. *Diastylis*, Say, J. Ac. Sci. Philad., vol. i., p. 313.

1900. *D.*, G. O. Sars, Crustacea of Norway, vol. iii., p. 42.

Pseudorostral lobes with antero-lateral corners usually little produced; telson long, post-anal portion narrowly produced, elongate, with several pairs of lateral spines; second antennæ of adult male very long; third maxilliped with exopod in both sexes; third peræopods not widely separated from the second in the adult female; both pairs of pleopods in the male well developed, the outer ramus two-jointed.

The genus *Paradiastylis*, Calman, 1904, has no exopod on the third maxilliped of the female, and the adult female of *Diastylopsis* has the second and third peræopods widely separated. Distinguishing points of other genera in the family are noticed under other headings. *Diastylis* itself, after all the deductions here made, still contains thirty-three species. In six of these the third and fourth peræopods of the female have rudimentary exopods. In the remainder these rudiments are regarded as wanting, but it is an open question in regard to *D. tricinctus*, Zimmer, 1903, only known in the male, and *D. armatus*, Norman, for which these peræopods have not been described.

DIASTYLIS ALGOÆ, Zimmer.

1908. *Diastylis algoæ*, Zimmer, Deutsch. Tiefsee-Exp., vol. viii., p. 188, pls. 44, 45, figs. 96-108.

1910. *D. a.*, Stebbing, S.A. Crustacea, pt. 5, Annals S.A. Mus., vol. vi., p. 418.

Three numbers should be added to the stations from which this species was obtained by Dr. Gilchrist, namely, 78, 83, 131, the localities being respectively lat. 33° 54' 15" S., long. 25° 53' 30" E.,

depth 57 m.; lat. 32° 53' 30" S., long. 28° 11' 00" E., depth 75 m.; Sebastian Bluff, W.N.W. 2 miles, depth 44 m.

ADIASTYLIS, n. g.

This genus is separated from *Diastylis* as having the proximal division of the telson long and cylindrical, while it is distinguished from *Makrokyllindrus* by having the short post-anal part furnished with lateral spines. It contains the new species *A. acanthodes*, together with *A. longipes* (Sars), 1871, *A. costatus* (Bonnier), 1896, both transferred from *Diastylis*, and *A. longicaudatus* (Bonnier), 1896, originally referred to *Leptostylis*, from which it differs strikingly by the length of the telson.

It is not improbable that the species agree in having the first peræopods elongate, but those limbs were mutilated in the specimens from which *A. costatus* and *A. acanthodes* were described—a calamity to which the front legs are especially liable when they are of great length.

ADIASTYLIS ACANTHODES, n. sp.

Plate LIII.

The present species is unfortunately known only in the male sex. The carapace of the single specimen was damaged; the first legs were defective from the end of the second joint and the endopod of the uropods from what appears to be the end of the second joint.

The pseudorostral lobes meet for some distance in advance of the apparently sightless eyelobe, being produced acutely as far as the end of the first joint of the first antennæ; their upper surface is diversified, in common with the rest of the carapace, with numerous denticles of various sizes. The carapace seems to be devoid of ridges. The five pedigerous segments are free, much denticulate, each with a pair of conspicuous dorsal teeth, unless the first segment be an exception; that and the following segment have each the front margin serrate; the side-plates were not clearly made out but appear to have some denticles larger than those on the general surface. The pleon is longer than the anterior division of the body, all of it denticulate except the telson, with several conspicuous dorsal denticles and a few such subventral; the fifth segment the longest and the sixth the widest of the first six, the telson much longer than the fifth segment, about two-thirds as long as the peduncle of

the uropods, its last third very narrow, tapering, somewhat curved, with an apical pair of spines, larger than the unsymmetrically placed lateral spines, four on the left, three on the right.

First antennæ with stout peduncle carrying a few denticles, the first joint the longest, the third ending in a subcircular process from which amidst a bush of filaments issue the two very slender flagella, the principal five-jointed, its first joint the longest, the accessory four-jointed, its first joint the shortest. Second antennæ with second joint of peduncle four times as long as the third, twice the fourth, and two-thirds the length of the fifth joint; the flagellum short, not twice the peduncle, of about twenty joints.

The mouth organs show substantial agreement with those in *Diastylis*, the upper lip slightly emarginate, the first maxillæ with bisetose palp, the mandibles with tapering base, not broad as in *Diastylloides*, the molar well developed but not very stout, the first maxillipeds with no great number of branchial leaflets, the third with long plumose setæ on the somewhat dilated end of the long curved second joint.

First peræpods with second joint much like that of the third maxillipeds, but much more denticulate and forming a narrower neck; the distal joints missing. Second pair with a much shorter second joint, stout, not longer than the long fifth and short sixth joints combined, fourth joint not half the length of the slender fifth, nor the sixth half the seventh. The following limbs successively shorter, the third and fourth distinguished by their denticulate second joint, strikingly narrowed distally. The fifth pair being as usual devoid of exopods, such as are borne by the five preceding pairs of appendages, has a smooth uniformly narrow second joint.

The first pleopods are considerably larger than the second, with more numerous setæ on the peduncle; the little two-jointed outer ramus slightly shorter than the one-jointed inner, while in the second pair there is equality or the outer ramus is a little the longer, in each case carrying four plumose setæ while the inner ramus has eight. The peduncle of the uropods about equals in length the fourth, fifth, and sixth pleon segments combined, the exopod equalling the fifth and sixth combined, and barely exceeding the two remaining joints of the endopod, in which the second joint is two-thirds the length of the first.

Length of the specimen about 9 mm., of which the pleon occupies 5 mm.

Locality. Cape Natal N. by E. about 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

MAKROKYLINDRUS, n. g.

Carapace denticulate; no distinct eye; telson elongate, basal portion cylindrical, much longer than the short post-anal portion, which carries only the two apical spines. Peræopods of the female, so far as known, without rudimentary exopods on the third and fourth pairs.

Name compounded of *μακρός*, long, and *κύλινδρος*, a cylinder.

It seems convenient to assign to this genus, besides the new species *M. fragilis*, four species previously placed under *Diastylis* and one doubtfully assigned by Bonnier to *Diastylopsis*, so that *Makrokylindrus* will contain *M. josephinæ*, described by Sars in 1871; *M. erinaceus* (Sars), 1887; *M. dubius* (Bonnier), 1896; *M. cingulatus* (Calman), 1905; *M. serricauda* (Scott), 1912; and *M. fragilis*, n. sp.

MAKROKYLINDRUS FRAGILIS, n. sp.

Plates LIV., LV.

The integument displays conspicuously a network of hexagonal cells, regular or irregular, with a few smooth spots on the sides of the pedigerous segments. The pseudorostral lobes are subacutely produced in front of the prominent rounded but seemingly sightless eyelobe. Along the line of junction there is on each side a dorsal series of spines successively smaller to the rear, more numerous in the male than in the female. The processes overhang the peduncle of the first antennæ to the end of its second joint; a receding convexity joins the lower margin without any projecting corner. Behind the eyelobe a central ridge, elevated at the middle, ascends to a bilobed girdle which crosses the carapace a little behind the middle. Each lobe of the girdle descends forward to a point at which it meets a dentate carina diverging upwards from the base of each pseudorostral process; from the same point a ridge descends almost perpendicularly towards the lower margin, but before reaching it divides, sending a short branch forward to the base of the pseudorostrum and a somewhat longer one backward to the lower margin. Behind the slightly advanced median point of the girdle the dorsal line of the carapace undulates in gentle descent to the hind margin in the female, with smooth curve in the male. First and second pedigerous segments short, the first partially covered, third and fourth dorsally coalesced but laterally distinct, with considerable rounded dilatation of the side-plates of the third segment, fifth comparatively long, the hinder angles rounded. First three segments of pleon in the male each with a pair of small dorsal

teeth, the rest and all in the female smooth; sixth segment not much shorter than the fifth, and near the uropods much wider; the telson rather longer than both combined, evenly cylindrical for about seven-ninths of its length, then narrowing over the anal valves to the truncate apex which is occupied by a pair of rather large spines; the sides of the telson are serrate in the upper half, but smooth near the base and in the lower half.

First antennæ with long peduncle, stout in the male, first joint dentate at the apex, second equally long, third much shorter, slender in the female, stout in the male, flagellum slender, joints seemingly four, with the usual long setæ at apex, accessory with 2 joints and a very long apical seta at least in the male, in which sex there is a fascicle of sensory filaments attached to a broad process at the base of the flagella, possibly representing the first joint of the principal flagellum. Second antennæ four-jointed in the female, carrying seven plumose setæ, terminal joint very small, sometimes in geniculate attachment. In the male the penultimate joint of the peduncle has a proximal tooth on the outer margin; the outer margin of the long last joint is fringed with very small tufts of setules.

Upper lip emarginate. Lower lip with the lobes apparently deeply indented on the inner margin.

Mandibles with strong molar, spine-row with spines as many as twenty, or sometimes rather fewer, one mandible with an accessory plate and the principal plate minutely quadridentate, the other mandible without accessory plate and narrower principal.

First maxillæ with inner plate broad, five spines on its narrow apex; the palp not very long, with two apical setæ. Second maxillæ seemingly with undivided distal plate, carrying numerous spines on the distal margin and one on the lateral surface, the slightly projecting basal lobe fringed with very numerous short setæ.

First maxillipeds like the maxillæ of very delicate texture, the epipod voluminous, in the male carrying numerous branchial leaves, general structure as in *Diastylis*. Second maxillipeds with second joint rather broad, nearly as long as the rest combined, carrying two plumose setæ at the apex of each margin, third joint distinct, very small. In the females with well-packed ovaries no fan of vibratory setæ was discovered, but in place of the fans a pair of long simple processes with some apical setules. Third maxillipeds with second joint much longer than the rest combined, much curved, strongly produced at the outer apex, which is rounded and furnished with five long plumose setæ, the fourth to the seventh joints differing little in length but the last two much the narrower.

First pereopod with second joint stout and long, much curved; the rest of the limb probably long and slender, as in all the specimens it is missing. Second pereopod with second joint shorter than the rest of the limb, in which the third joint is short but distinct, the denticulate fifth joint longer than the fourth or seventh, the sixth as usual very small. The three following pairs are successively shorter, with no trace of exopods in the female, and in correspondence with this the second joint very slender, whereas in the third and fourth pairs of the male which have exopods this joint is stout. The fifth pereopod is small in both sexes, but with the full number of joints.

The pleopods of the male are similar on the first and second segments of the pleon, having a rather long peduncle with two short rami, the inner one-jointed, furnished with five plumose setæ, of which three are apical, the outer two-jointed, with four setæ, its second joint the shorter. The third and fourth pleon segments show some ventral setæ, presumably vestiges of pleopods now absent.

The uropods have a narrow peduncle, not quite so long as the fifth and sixth pleon segments combined, but much longer than the rami, of which the three-jointed endopod is two-thirds the length of the peduncle, and the exopod little more than two-thirds that of the endopod. In the female specimen figured there are ten spinules along the inner margin of the peduncle, and seven, five, and four respectively on that of the first, second, and third joints of the endopod.

Average length of adult specimens, 10 mm.

Locality. Cape Natal N. by E. about 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

GEN. LEPTOSTYLIS, Sars.

1869. *Leptostylis*, G. O. Sars, *Nyt. Mag. Naturv.*, vol. xvi., p. 343 (39).

1900. *L.*, Sars, *Crustacea of Norway*, vol. iii., p. 67.

1911. *L.*, Stappers, *Duc d'Orléans Campagne Arctique, Crust. Malacostracés*, p. 116.

In general agreement with *Diastylis*, but having a shorter telson, with lateral spines few or none; second antennæ in male with flagellum not very long; all the species with rudimentary exopods on third and fourth pereopods of the female; pleopods of the male less fully developed than in *Diastylis*.

This genus appears to suit eleven species, beginning with *L. ampul-*

laceus (Liljeborg), 1856, to which Sars added *L. longimanus*, *L. macrurus*, and *L. villosus* in 1869, the first of these having been described in 1865 under *Diastylis*. In 1873 he described *L. mancus*, re-described by Zimmer in 1902, and by him transferred to *Diastylis* in 1908. *L. productus*, Norman, dates from 1879, and has been followed by *L. antipus*, Zimmer, *L. crassicauda*, Zimmer, both in 1907, with *L. gracilis* and *L. borealis*, Stappers, in 1908, and here a new species. Dr. Stappers suggests the possibility that his two species may prove to be only the two sexes of a single species, but deems it very improbable.

Leptostylis walkeri, Calman, 1907, is transferred to a new genus *Ekleptostylis*, in which the short telson is furnished with many lateral spines, and in the male has a lobe uniquely produced over the narrow distal portion.

LEPTOSTYLIS MACRUROIDES, n. sp.

Plate LVI.

This species combines some of the characters for which *Leptostylis macrurus* and *L. villosus* are notable. The latter is described by Sars as having the lower edges of the pseudorostral lobes "throughout divided into peculiar lamellar serrations." These resemble a machicolated parapet, and this curious feature occurs in the new species, which, however, is easily distinguished from *L. villosus* both by the carapace and the uropods. On the other hand, to *L. macrurus* of Sars it makes a near approach in these and some other respects. The proportions and general appearance are certainly very similar. But the carinæ in *L. macrurus* are serrate in the ordinary way, not machicolated; the telson is "but slightly narrowed distally," instead of much narrowed; the rami of the first pleopods are more strongly developed; and other differences combine with these to separate it from the southern form.

The dorsal line of the carapace is convex between a slightly upturned pseudorostral projection and a slight upturning of the hind margin. From the base of the pseudorostral projection issue two long curved lateral carinæ which reunite before reaching the hind margin; each of them is machicolated in the anterior half, the upper one then becoming serrate, the lower one almost smooth; the eyelobe is small, seemingly eyeless; the whole surface is pitted with minute glassy circles, each with a microscopic hair. Some at least of the pedigerous segments and the first two of the pleon segments have long slender latero-ventral spines, of which no mention is

made in the northern species. The fifth pleon segment is very long and narrow, the telson as long as the sixth segment, the terminal part much narrowed, carrying an apical pair of spines attended by a very small subapical pair.

The first antennæ have a stout peduncle, the third joint short, with circular process bearing the usual brush of filaments, from among which springs the slender flagellum, of five joints, the second the longest, the fifth minute; in the four-jointed accessory the first joint is shorter than the second or third, the last minute. The second antennæ have a long slender peduncle, the second joint much longer than its neighbours, the fifth nearly thrice as long as the second. The flagellum missing.

The mouth organs are of delicate structure. Upper lip emarginate. Mandibles with strong molar and ten spines in the spine-row. First maxillæ with narrowly ended plates and bisetose palp, the third maxilliped with second joint much longer than the next five joints combined.

First peræopods with long and remarkably bent second joint; rest of the limb missing. Second peræopod with second joint bent, stout, not distally narrowed, much shorter than the five following joints combined, sixth joint as long as the fourth, seventh considerably shorter than fifth. Third peræopods with second joint distally narrowed, much longer than following joints together, one margin strongly serrate. Fourth peræopod like the third, but with second joint considerably shorter. Fifth peræopod slender throughout, second joint longer than the other five combined.

Pleopods with the peduncles not tapering as in *L. macrurus* but parallel-sided, the exopod minute, especially in the first pair, and the endopod of that pair much shorter in proportion to the breadth than represented by Sars for his species. Peduncle of uropods about twice and a half as long as the telson, but considerably less than twice the endopod, of which the first joint is longer than the second but shorter than the third, with 4, 3, 3 spines on the inner margin and a much larger apical spine; exopod broken.

Length of specimen, adult male, about 5 mm.

Locality. Cape Natal N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY EKDIASTYLIDÆ, n.

This family is distinguished from the restricted Diastylidæ by having the inner ramus of the uropods two-jointed.

EKDIASTYLIS, n. g.

With the character of the family.

The species allotted to this genus are *E. sculptus*, *E. insignis*, *E. abbreviatus*, all assigned to *Diastylis* by Sars in 1871; *E. fimbriatus* (Sars), 1873; *E. politus* (S. I. Smith), 1882; *E. horridus* (Sars), 1887; *E. mystacinus* (Sars), 1887; *E. hexaceros* (Zimmer) 1908; and *E. argentatus* (Calman), 1912.

EKDIASTYLIS HEXACEROS (Zimmer).

1908. *Diastylis hexaceros*, Zimmer, Deutsch. Tiefsee-Exp., vol. viii. p. 187, pl. 44, figs. 93-95.
 1910. *D. h.*, Stebbing, S.A. Crustacea, pt. 5, Annals S.A. Mus. vol. vi., p. 418.

I have not myself met with this species, which was taken by the German Expedition outside the Agulhas Bank in a depth of 565 m.

FAMILY LEUCONIDÆ.

1879. *Leuconidæ*, G. O. Sars, Arch. Naturv. Kristian., vol. iii., p. 6, vol. iv., p. 74.
 1900. *L.*, Sars, Crustacea of Norway, vol. iii., p. 28.

All the pedigerous segments distinct; telson wanting; eye wanting; first antennæ with accessory flagellum small; mandibles broad at the base, spines few; first maxillæ with unisetose palp; branchial leaflets few; exopods on first four pairs of peræopods in the male and the first three in the female; two pairs of pleopods in the male; inner branch of uropods two-jointed.

To this family are assigned the genera *Leucon*, Krøyer, 1846; *Eudorella*, Norman, 1867; *Eudorellopsis*, Sars, 1882; and *Pseudoleucon*, Zimmer, 1903. From it are detached the three genera *Paraleucon*, *Hemileucon*, and *Heteroleucon*, all instituted by Dr. Calman in 1907. The first of these I take as representative of a

new family Paraleuconidæ, in which the male has only one pair of pleopods. In the second, for which the family Hemileuconidæ is proposed, the male has no pleopods, and this is the case also with the Heteroleuconidæ, represented by *Heteroleucon*, which has the further character to separate it from the other three families that only the first two pairs of pereopods carry exopods in either sex.

GEN. LEUCON, Kröyer.

1846. *Leucon* (part), Kröyer, Naturhist. Tidsskrift, Ser. 2, vol. ii., p. 208.

1900. *L.*, Sars, Crustacea of Norway, vol. iii., p. 29.

Carapace with longitudinal, medio-dorsal, serrate crest in female, but often not in male; pseudorostral projection prominent; peduncle of first antennæ not conspicuously geniculate, accessory flagellum minute; terminal joint of second antennæ in female well defined.

The new species here introduced brings the number of species at present included in this genus up to twenty.

LEUCON KALLUROPUS, n. sp.

Plate LVII.

This species belongs to the small group in which the one-jointed accessory flagellum of the first antenna is not shorter than the first joint of the principal flagellum, and to the still smaller group in which the outer ramus of the uropod is much shorter than the inner. It makes undoubtedly a close approach to *Leucon longirostris*, Sars, taking into account the successive descriptions of that species by Sars in 1871, by Norman in 1879, and by Calman in 1906. Sars had at command a young male ending with the second segment of the pleon, the fragment being scarcely 4 mm. long. He describes the accessory flagellum of the first antenna as rudimentary and like a tubercle. It was taken off the coast of Portugal at a depth of 1,036 m. Norman's specimen, a female, was taken at the entrance of Davis Strait in lat. 59° 10' N., at a depth of 3,109 m. Calman examined specimens male, female, and young from the Mediterranean, taken at depths between 950 and 1,200 m. He did not find among them the rudimentary accessory flagellum of the first antenna, but only such as matched in length the first joint of the principal. He gives the total length of the adult male as 6 mm., from which it may be inferred that the specimen described by Sars was at least as long when perfect, or probably longer. There is a

tendency throughout the genus *Leucon* for the pseudorostrum in the male to be shorter than that in the female, but the difference is nowhere so extreme as in the sexes of *L. longirostris*, where the produced part is more than a third of the length of the carapace in the adult female, but only a fifth of that length in the adult male.

The present species is unfortunately known only from a single adult male specimen, which differs, so far as can be determined, from the adult male of *L. longirostris* chiefly in the less-produced telsonic segment and the proportions and armature of the uropods.

The outline of the pseudorostrum was not made out with precision. Integument squamose. Fifth pedigerous segment with procurved ventral spines. Telsonic segment with produced portion much instead of little shorter than the base.

In the first antennæ the third joint is shorter and much narrower than the second, and carries two slightly feathered setæ; the four-jointed principal flagellum has the first joint nearly as long as the three following combined, and carries on the outer margin approaching the middle a fascicle of setæ; the one-jointed accessory flagellum is narrower than the first joint of the principal, but about equal to it in length. The second antennæ have the large last two joints of the peduncle fringed with tufts of short setæ, which till resolved by high magnification look like fringed single setæ.

The upper lip is only slightly emarginate. The mandibles are powerful. The palp of the first maxillæ ends in a single filament; the second are without setæ on much of the inner margin. The first maxillipeds have a long seta on the second joint, third joint absent, the fifth joint as long as the second and very setose, the sixth with a strong plumose seta overhanging the small seventh joint, which is tipped with a serrate spine. Second maxillipeds full-jointed; the third the same, its second joint broad, rather longer than the narrow following joints combined, with strong spines or setæ on the forepart of the apical border.

First peræopods broken, the second joint much narrowed distally, part of the margin fringed with setæ. Second pair not elongate, its second joint rather longer than the remaining joints combined, the terminal joint not longer than the antepenultimate, fringed with a longitudinal series of five spines, and having its blunt apex armed with three long feathered seta-like spines. In these and the much shorter following peræopods the true third joint does not seem to be distinct from the long second joint. In the last three pairs the last four joints are all short, the last much the narrowest and tipped

with two smooth spines narrowed at about the middle of their length; long serrate spines are distributed on the other joints.

The first pleopods have a peduncle considerably longer than that of the second pair, which has three slender spines on its inner margin; in both pairs the one-jointed inner ramus is a little shorter than the two-jointed outer; both rami are very small, and each carries six plumose setæ. The peduncle of the uropods is a little longer than the first joint of the endopod, the inner margin fringed with numerous unequal slender spines, of which there are a few on the outer margin. The first joint of the endopod is more than three times as long as the second; its inner margin is fringed with over a score of serrate spines besides two or three of seta-like character at the top; beginning above the middle of the outer margin is a series of eight slightly plumose spines; of these there are four on the outer margin of the second joint, which has its inner margin prettily fringed with eight little serrate spines, the apex carrying two stout spines, one short and one long, both microscopically serrate; the exopod is a little shorter than the first joint of the endopod, and has five spines on each margin of its second joint, those on the inner slender and finely serrate; there are four elongate spines on its apex.

Length of the specimen about 5 mm. Female unknown.

Locality. Cape Natal N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY LAMPROPIDÆ.

1882. *Lampropida* (part), G. O. Sars, Vid. Selsk. Forh. Christiania, No. 18, p. 11.

1899. *L.* (part), G. O. Sars, Crustacea of Norway, vol. iii., p. 17.

Pseudorostral lobes not strongly produced; all pedigerous segments distinct; telson well developed, with more than two apical spines; both flagella of first antenna well developed; second antenna of female more conspicuous than usual; palp of first maxilla bisetose or with only one apical seta; first four pairs of peræopods with exopods, those of the female rudimentary on the third and fourth pairs; no pleopods in either sex; inner ramus of uropods three-jointed.

This definition excludes the genera *Hemilamprops* and *Paralamprops*, in which the male has three pairs of pleopods, but it admits a new genus *Platytyphlops* here described, and provisionally

allows the inclusion of another, *Stenotyphlops*, in which, however, only the female is at present known. The last is distinguished from its companions by having only one seta or apical filament on the palp of the first maxilla, and both the new genera are distinguished from *Lamprops*, Sars, 1862, by their blindness.

PLATYTYPHLOPS, n. g.

Carapace broad, depressed, eyelobe devoid of visual elements, pleon slender, telson carrying three apical spines. First antenna with the flagella long and nearly equal. Second antenna of female four-jointed. First maxilla with bisetose palp. In the male the first four pairs of peraeopods have exopods; in the female the first two pairs are similarly furnished, but the third and fourth pairs have only microscopic rudiments of them. Fifth pair of peraeopods rudimentary. Pleon in both sexes without pleopods.

The generic name is derived from *πλατύς*, broad, in allusion to the character of the carapace, resembling that in the *Platysymphodidae*, and *τυφλώψ*, blind-faced, to emphasise the fact that this is a blind genus in the family *Lampropidae*, of which the typical genus was named from the brightness of the eyes.

The comparatively large size of the specimens for which the genus is instituted makes it very improbable that the want of pleopods in the male and the dwarfed, apparently functionless, fifth peraeopods in both sexes, could be juvenile characteristics. Nevertheless, it had to be borne in mind that the specimen, 7.5 mm. long and apparently adult, for which Sars instituted *Leptostylis manca*, was entirely devoid of fifth peraeopods, and yet a specimen, 10.5 mm. long, was subsequently found by Dr. Zimmer to be provided with the limbs in question well developed (see *Hamburger Magahaensische Sammelreise, Cumaceen*, p. 9, 1902). Fortunately, however, in the present case doubt is to a great extent dispelled by the presence in the collection of a fragmentary specimen containing eggs in the marsupium, yet with the diminutive appendages on the fifth pedigerous segment.

PLATYTYPHLOPS PERINGUEYI, n. sp.

Plates LVIII., LIX.

Pseudorostral lobes short, upturned. Carapace rounded oval, a little longer than broad, the margin forming a sharp carina all round, fringed with microscopic pellucid overlapping scales. The sightless ocular lobe small, triangular; the frontal lobe broad; the medio-

dorsal line from the front to a little beyond the middle convex and finely serrate; near the end this carina is flanked by the commencement of a submedian pair of short carinae which rise each into a conspicuous rounded process and then gradually fade away towards the hind margin. The pedigerous segments combined are about half as long as the carapace, the first shorter and narrower than the second, the second and third raised in the middle but flattened and rounded at the sides, apparently overlapping subacute angles; the fifth cylindrical, not wider than the long, narrow pleon, which greatly exceeds in length the preceding portion of the body. The telson, about as long as the fourth segment of the pleon, has the anal opening near the base, thence narrowing to the apex which is occupied by three spines, forming a kind of fan, with a lateral pair a little higher up; between these and the middle of the telson two other lateral pairs are placed, successively smaller.

First antenna with long first joint, more than twice as long as the second, which is rather longer than the third, all three carrying plumose setae, flagella rather shorter than the peduncle, the principal flagellum five-jointed, the accessory four-jointed. In the female specimen the minute fifth joint of the principal flagellum appears to be succeeded by a still smaller sixth joint. In both sexes a couple of setae attached to the fourth and fifth joints have the usual annulated appearance.

The second antenna of the female carries three plumose setae on the rather large first joint, one such seta on the small second joint; the third joint is narrow, nearly as long as the first, with a small tooth near the base and a seta midway between that and the apex; the fourth joint is very slender, but fully twice as long as the third, with some apical setules. In the male specimen the flagellum has the annulated appearance indicative of incomplete maturity.

The upper lip has the free border a little emarginate. The spine-row of the mandibles consists of about thirteen spines. On the palp of the first maxilla the subapical seta is much shorter than the apical. The first maxillipeds have seven unequal loosely disposed branchial sacs on the epipod, and two very small coupling spines on the basal joint. In the second maxillipeds the third joint is distinct. The third maxillipeds have the second joint not apically produced or widened, shorter than the remaining joints combined, the third joint short, distinct, the fifth longer than the sixth, apparently less so in the female than in the male, the seventh fringed with somewhat adpressed spines, and, as it were, prolonged by an apical spine exceeding the length of the joint itself.

The first and second peræopods are slender and elongate, with the full number of joints, the second joint in each shorter than the rest combined; among these in the first pair the sixth joint is the longest, while in the second pair it is shorter than any except the third. In the remaining pairs the second joint is longer than the rest of the joints combined. The third and fourth pairs are alike in the two sexes, except for the minuteness of the difficultly discernible two-jointed exopods in the female; they have the sixth joint set forward on the truncate apex of the fifth, leaving room behind for insertion on that apex of the long spines by which the sixth joint is overlapped. The minute fifth pair are probably vestigial; they are pellucid, and the last three joints are microscopic.

The peduncle of the uropods is a little longer than the endopod, its inner margin carrying numerous spines (9-13), the endopod on inner margin of its three joints having respectively 8-9, 3-4, and 2 spines, besides an apical spine. The exopod, which is a little longer than the telson, reaches just beyond the base of the endopod's third joint.

Length of the specimens about 10 mm.

Localities. No. 17585, Cape Point E. by N. 29 miles; 17643, Cape Point N. 81° E. 32 miles. The specimens were sent by Dr. Péringuey, out of respect for whom the species is named.

When describing this species and defining the genus, I felt convinced that Dr. Calman's *Platyaspis orbicularis* (Fisheries, Ireland, Sci. Invest., 1904, I. [1905], p. 42, pl. 5, figs. 77-81) must be congeneric. That species, however, was founded on a specimen which did not extend beyond the first pedigerous segment. But quite recently (Proc. U.S. Nat. Mus., vol. 41, p. 631, figs. 29-39, 1912), with far more advantageous material, Dr. Calman has given a fresh description with numerous instructive figures, and provisionally transferred his species to the genus *Paralamprops*. He recognises that it is distinguished from that genus by the possession of a normal palp on the first maxillæ, but having only female specimens at his disposal, he could not make use of the further distinguishing character that the male has no pleopods. At least this is the case if the nearly adult South African specimen of the new species may be trusted as establishing that character. The two species of the new genus are well distinguished by differences in the carapace, but in many respects they show very close agreement, and it was not till I had studied Dr. Calman's account of *P. orbicularis* that I was able, by renewed investigation, to make out the rudimentary exopods on the third and fourth peræopods of *P. peringueyi* in the female.

STENOTYPHLOPS, n. g.

Carapace narrow, cyclobe without visual elements, all five pedigerous segments conspicuous, pleon slender, telson carrying three apical spines. First antenna with both flagella elongate. Second antenna of female four-jointed. First maxilla with unisetose palp. First maxillipeds with terminal joint peculiarly widened at the base. In the female first and second pereopods with exopods, third and fourth having only microscopic rudiments of them. Fifth pereopods apparently wanting.

Male unknown.

The generic name, from στενός, narrow, and τυφλώψ, blind-faced, is intended to indicate the many points of resemblance between this genus and *Platytyphlops*, although the typical species in one of the genera has a broad carapace, and in the other a narrow one. The present genus is further distinguished from its ally by having the palp of the first maxillæ furnished with a single apical seta or filament, and by what appears to be the unique conformation of the terminal joint in the first maxillipeds. The absence of the fifth pereopods, as a negative character based on a single specimen, will naturally be accepted with reserve, but the degraded condition of those limbs in *P. perinquelyi* is suggestive of a decline through inactivity to extinction.

STENOTYPHLOPS SPINULOSUS, n. sp.

Plate LX.

The whole surface seems to be more or less densely sprinkled with minute spinules, among which are some that are rather larger, but the close reticulation renders it difficult to make out the arrangement.

The pseudorostral lobes are slightly upturned, meeting in a point well in advance of the little triangular eyeless eyelobe, from which a keel traverses the middle line far backwards, flanked somewhat behind the centre of the carapace by a pair of raised ridges. The general shape of the carapace is narrowly oval, with sides sharply inflexed. The five pedigerous segments, all dorsally conspicuous, diminish gradually in width to the fifth, which is no wider than the slender pleon. The telson is about four-sevenths of the length of the peduncle of the uropods, inflated rather more than a third of its length for the anal opening, then converging to its three-spined apex, the margins serrate, and below the middle having three pairs of spines, successively larger but none equalling the apical

trio; on the left side a small spine above the middle appears to have no counterpart on the right.

The upper lip is emarginate. The lower lip has the lobes tipped with inward projecting points. The mandibles have a powerful molar and quadridentate cutting edge, accompanied on one of the pair by an accessory plate slightly smaller than the principal, and fourteen spines in the spine-row, of which the foremost six are feathered. On the other mandible there is no accessory plate, but one additional spine, the row not showing any feathering of the spines.

The first maxillæ have the usual five spines on the inner plate, apparently eleven on the outer, the palp elongate, conspicuously with a single but very long apical seta.

The first maxillipeds have the broad antepenultimate joint fringed with seven much-divided spines, the next joint broader than long, exceeded in length by the following joint, which is greatly expanded in its basal half but quite narrow in the terminal, the re-entering angle of the hind margin being beset with blunt teeth. The second maxillipeds are slender throughout, the second joint elongate, the third short, scarcely forming a complete ring. The third maxillipeds have the second joint curved, not apically widened or produced, longer than the five remaining joints combined, of which the fifth is the longest, the seventh short and narrow; the exopod is slender. The mutilated first peræopod was probably of considerable length, the second is slender, with second joint not quite so long as the five following joints combined, among which the well-spined fifth is longer than the short sixth together with the needle-like seventh; the exopod is smaller than that of the larger first peræopod. The third and fourth peræopods are much shorter than the second, the second joint longer than the rest combined, and carrying near its origin a microscopic two-jointed exopod; the fourth joint about equals the fifth and sixth together, both of which carry long apical setæ with annulated terminals; the seventh joint is almost spine-like but not very sharply pointed. Of fifth peræopods no trace could be discerned.

The uropods have serrulate margins; the endopod, four-fifths the length of the peduncle, has a first joint about twice as long as the two following joints combined, the second being a little longer than the third, the spines on the inner margin being respectively ten three, and one; the exopod, which reaches nearly to the middle of the third joint of the endopod, has seta-like spines on both margins.

Length of the specimen, 12 mm.

Locality. Cape Point E. by N. 29 miles; No. 17585, sent by Dr. Péringuey.

FAMILY NANNASTACIDÆ.

1866. *Nannastacidae*, Bate, Zoological Record (for 1865), vol. ii., p. 329.

1900. *N.*, G. O. Sars, Crustacea of Norway, vol. iii., p. 79.

1900. *N.*, Stebbing, Willey's Zoological Results, pt. 5, p. 611.

Pseudorostral lobes with the anterolateral corners well defined; all the pedigerous segments distinct; telson wanting; one eye or two eyes usually present; first antenna with accessory flagellum very small; second antenna of female small, indistinctly jointed; mandibles normal; terminal joint of first maxilliped usually dilated; exopods on first four pairs of peræopods in the male, on none but the first two in the female; no pleopods in either sex; inner branch of uropods simple.

The family includes *Nannastacus*, Bate, 1865; *Cumella*, Sars, 1865; *Cumellopsis*, Calman, 1905; *Platycuma*, Calman, 1905; *Schizotrema*, Calman, 1911; *Diops*, Paulson, 1875, being usually regarded as a synonym of *Nannastacus*, although this can hardly be justified except on the view that Paulson's description and figures are misleading. With respect to the three-jointed second antennæ of the female he is very explicit, as also in ascribing a single filament to the palp of the first maxillæ. In 1911 Dr. Calman allotted six new species to *Nannastacus* all agreeing with *N. submii*, Sars, 1887, in having no exopod on the third maxilliped of the female. He was deterred from giving to this group a new generic designation by the further discovery that two of the species, *N. reptans* and *N. tardus*, had no exopods even on the first and second peræopods of the female. The case was complicated by the close resemblance of these species respectively to *N. minor* and *N. agnatus*, in which the first and second peræopods of the female have well-developed exopods, the relationship being so near that Dr. Calman says "it must be admitted as quite possible that *N. reptans* may be merely an individual variation or a phase in the life-history of *N. minor*, and that *N. tardus* may stand in the same relation to *N. agnatus*." Under these circumstances it seems clear that *N. reptans* and *N. tardus* can be safely assigned to a new genus, *Paranannastacus*, in which the leading character is the absence of an exopod from the third maxilliped. This character they share with five other members of the group, from which they would eventually be separated in a family Paranannastacidæ, if or when it might be established that the unique feature of all the peræopods being devoid of exopods in the female was not accidental or temporary.

GEN. SCHIZOTREMA, Calman.

1911. *Schizotrema*, Calman, Trans. Zool. Soc. London, vol. xviii., pt. 4, pp. 341, 360.

The leading character of the genus, to which it owes its name, is the circumstance that the exhalent respiratory orifices are paired and widely separated from each other. As, however, this feature is not confined to the present family, it is convenient to amplify the generic definition by some additional characters. As only females were known when the genus was first established, the absence of pleopods in the male had to be presumed, as well as the presence of exopods on the first four pairs of peraeopods in that sex. The new species, as represented by a male specimen, confirms both of those anticipations. In the female the exopods are confined to the first two pairs of peraeopods, but both sexes have exopods on the third maxillipeds. There is no distinct telson, and the inner ramus of the uropods is one-jointed.

In all the three forms already described the peduncle of the uropods is shorter than the inner ramus, so that the new species will be found to be conspicuously distinguished from them by having the rami of the uropods very much shorter than the peduncle.

SCHIZOTREMA CALMANI, n. sp.

Plate LXI.

In lateral view the pseudorostral lobes are seen to be upturned, in dorsal aspect they are wide apart and slightly divergent. Following what appears to be a small upturned eyeless eyelobe the median line of the carapace is finely denticulate and setulose throughout almost its whole length; the lateral margins are fringed with denticles for some distance, the teeth at first rather conspicuous but presently dwindling to disappearance. Owing to the smallness of the specimen and the texture of the integument, details of the carapace were not satisfactorily made out before dissection, and owing to its brittleness the result of dissection was in this respect equally disappointing. Of the pedigerous segments the last four have laterally flattened edges cut into teeth, all but the last being rather widely expanded. The pleon segments show lines of denticulation which are conspicuous both dorsally and ventrally on all but the telsonic segment, and also lateral ridges; the fifth segment is long and distally narrowed, the telsonic segment short.

In the first antenna the first joint is much the largest, somewhat geniculate, and having a small distal tooth; the second joint is similarly furnished, and is longer than the third; the slender

flagellum is indistinctly four- to five-jointed, and accompanied by three long filaments; the accessory is minute, perhaps two-jointed. The second antennæ have the penultimate joint of the peduncle more than half as long as the following joint; both have ample brushes of setæ; the flagellum, if complete, is not extremely long.

The mandibles have a narrow cutting edge, supplemented in one member by a narrow accessory plate, four to five spines in the spine-row, and a moderately strong molar.

The maxillæ were not clearly deciphered, but appear to be normal.

The first maxillipeds show some seven branchial leaflets on the epipod; they have a broad antepenultimate joint fringed with pectinate spines, and the last joint very slender, not stumpy or elliptical as in certain species of *Cumella* and *Nannastacus*. The second maxillipeds have the third joint distinct, the three following joints broad, not elongate, the seventh very small. In the third maxillipeds the second joint is broad, rather longer than the following joints combined, carrying long plumose setæ on the free outer (not produced) part of its apical border, the third joint is missing, the fourth has long plumose setæ on the distal part of its outer margin, the fifth is wider but a little shorter than the curved apical sixth, the seventh is slender, subequal in length to the fourth; the exopod is of moderate size.

In the first pereopods the second joint is shorter than the following joints combined, distally narrowed, the third joint is longer than broad, the fourth distally widened, half as long as the fifth, which is about three-fourths of the sixth; the slender seventh in length equals the fourth; the exopod is larger than that of the third maxillipeds; the following exopods successively diminish in size. The second pereopods have a second joint rather shorter than the following joints combined, little more than twice as long as its greatest breadth, its edges somewhat denticulate; the third joint is nearly if not quite obsolete, the fourth little longer than broad, the fifth twice and a half as long as the sixth but scarcely longer than the seventh. The third and fourth pereopods have the second joint narrowly pyriform, the narrow end distal, the third joint well developed, the fourth short, the fifth longer than the sixth, the seventh very small, with a long unguis or curved spine. In the third pereopod the second joint is longer but the fifth shorter than in the fourth pair. The fifth pereopods are very slight in structure, the second joint longer than the rest combined, the seventh joint shorter than the third, the fifth a little longer than either the fourth or sixth.

The uropods have about thirty spinules or denticles on each of three edges of the peduncle, which is twice as long as the endopod. The latter has six good-sized spines along its serrate inner margin, some submarginal spinules, and a very long apical spine. The exopod, about four-fifths as long as the endopod, has a fairly long apical spine, but is otherwise slightly armed.

The length of the single specimen, a male, is about 2.5 mm., thus being, although so small, considerably larger than any of the three species of the genus previously described. The specific name is given out of respect to Dr. Calman, who instituted the genus.

Locality. Cape Natal distant N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY PROCAMPYLASPIDÆ, n.

Telson wanting; no distinct eye; first antenna with accessory flagellum very small; mandible with narrow molar; second maxilla normal; first maxilliped with seventh joint small, unexpanded; second maxilliped with strong teeth projecting from inner margin of the terminal joint; exopods on first four pairs of peraeopods of male, only on first two of female; no pleopods in either sex; inner branch of uropods simple.

GEN. PROCAMPYLASPIS, Bonnier.

1896. *Procampylaspis*, Bonnier, Ann. Univ. Lyon, vol. xxvi., p. 541.
1900. *P.*, Stebbing, Willey's Zool. Results, pt. 5, p. 611.

This being at present the only genus, will have the characters of the family. In addition to the new species *P. tridentatus*, it contains *P. armatus*, Bonnier, 1896, with *P. echinatus*, Bonnier, of the same date, by Calman held to be a synonym of the preceding species; *P. bonnieri*, Calman, 1906, and *P. compressus*, Zimmer, 1907, briefly described without illustrative figures.

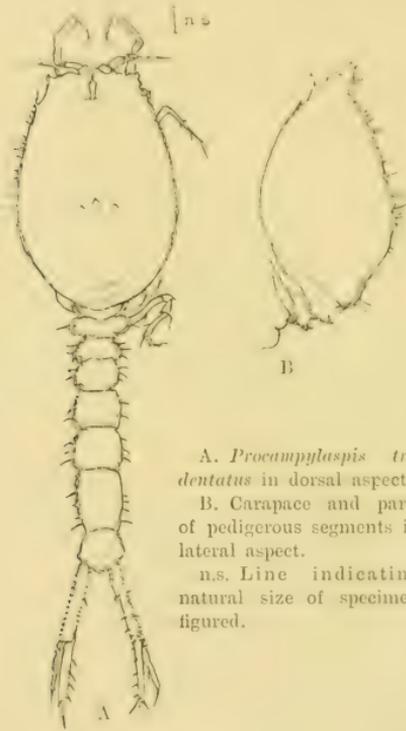
PROCAMPYLASPIS TRIDENTATUS, n. sp.

Plate LXII.

This genus is specially remarkable for the form of the last joint in the second maxillipeds. In the forms described by Bonnier as *P. armatus* and *P. echinatus*, which are considered by Calman to be one and the same species, this joint has in addition to its terminal

unguis four stout teeth. The figures which Bonnier gives of these teeth under the two names are not precisely alike, but in his text he makes no allusion to the difference. The species now added to the genus has, however, only three teeth to this joint instead of four, and to that mark of distinction the specific name calls attention.

The integument is conspicuously squamose. The pseudorostral



A. *Procampylaspis tridentatus* in dorsal aspect.

B. Carapace and parts of pedigerous segments in lateral aspect.

n.s. Line indicating natural size of specimen figured.

lobes a little upturned meet for a short space in front of the narrow bidenticulate eyelobe; their margins in dorsal aspect are obliquely truncate and finely denticulate; they form a sinus, and after a bulge descend to a small antero-lateral tooth, which is followed at some distance by a similar tooth on the lower margin. The carapace is longitudinally well arched, not actually carinate, with scattered hairs and a little denticle behind the centre of the median

line, the denticle perhaps not constantly present. The pedigerous segments narrow successively towards the pleon. The pleon segments are laterally, as so commonly in male *Sympoda*, bicarinate for the protection of the slender flagellum of the second antenna; the fifth segment is distally narrowed, not very elongate, though much longer than any of the other segments, telsonic segment not longer than broad.

First antenna with first joint geniculate, larger than second, second than third, flagellum slight, three-jointed, accessory minute, one-jointed. Second antenna with penultimate joint of peduncle more than half as long as the last joint, furnished with strong brush of setæ; first joint of the long slender flagellum knobbed at the base.

Upper lip not quite symmetrically bilobed. Lower lip with inward pointing apical tooth to each lobe. Mandibles with cutting plate and accessory finely dentate, spine-row of six spines, molar slender, with its narrow apex divided into about six close-set teeth, of which the hindmost is the strongest. First maxilla with only seven spines on apical margin of outer plate, palp with two very unequal apical filaments. Second maxilla with eleven seta-like spines distributed on its divisions.

First maxillipeds having the large laminar antepenultimate joint bordered by six spatulate spines with an ordinary spine at the apex and followed by two short joints, of which the second is much the narrower and tipped with a slender spine. The proximal joints are not easy to distinguish, but between that which carries the two little coupling spines (the true second joint) and the laminar fourth joint there is an indication of an intervening third joint. The branchial elements of the epipod are numerous. The second maxillipeds have the second joint not twice as long as broad, with a plumose seta at the apex of its inner margin, a short third joint, the fourth as long as the fifth, with a plumose seta springing from a little prominence on the side where a square marking gives a deceptive appearance of an articulation, the sixth joint is subequal to the fifth, the much-curved seventh has three strong teeth, the middle tooth the longest. The third maxillipeds have a powerful second joint, bent, much longer than the remaining joints combined, with three long plumose setæ on the slightly produced outer apex, the third joint very small, the fourth much widened distally, the fifth much shorter than either the fourth or sixth, but longer than the narrow seventh.

The first pereopods are remarkable because the third joint, which so often in appendages of the *Sympoda* gives trouble by its elusive smallness, here has a length equal to that of the inner margin of the

fourth or the outer margin of the fifth joint; the slender sixth is about twice as long as the still more slender seventh. The exopods of the first four pereopods, like those of the third maxillipeds, have the peduncular joint narrow compared with the stout second joint of the limb, while the first joint of the flagellum is unusually long, and at least in that of the first pereopods with a denticulate margin. In the second pereopods the third joint is short but outdrawn to a conspicuous apical spine; the fourth joint is much stouter but not longer than the fifth, which together with the small sixth cannot make up the length of the slender straight seventh joint. The third pereopods have the stout second joint much narrowed distally, longer than the slender rest of the limb, in which the fifth joint is considerably the longest, the seventh almost spine-like. The fourth pereopods are very like the third, but with the second joint a little shorter and less narrowed distally, while the fifth joint is a little longer than in the preceding pair. The fifth pereopods are very like the two preceding pairs, except for the absence of an exopod and the strikingly different second joint, which is very slender and not much longer than the fifth joint.

The endopod of the uropods is rather less than two-thirds of the length of the serrately margined peduncle, and carries nine spines on its inner edge, the apex having a large spine flanked by two smaller ones; the much narrower and shorter exopod has a slender apical spine with a small one adjoining and a small spine or two on its inner edge.

Length of the specimen 4.5 mm.

Locality. Cape Natal distant N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

FAMILY CAMPYLASPIDÆ.

1879. *Campylaspida*, G. O. Sars, Arch. Naturv. Kristian., vol. iv., pp. 6, 126.

1900. *C.*, Sars, Crustacea of Norway, vol. iii., p. 82.

Telson wanting; first antenna with accessory flagellum very small; second antennæ of female imperfectly developed; mandible with molar slender, acute; second maxilla an undivided plate; first maxilliped of four joints, the last minute; second maxilliped without strong teeth on inner margin of the terminal joint; exopods on first four pairs of pereopods of male, only on first two of female; no pleopods in either sex; inner branch of uropods simple.

GEN. CAMPYLASPIS, Sars.

1865. *Campylaspis*, G. O. Sars, Forh. Selsk. Christian. for 1864, p. 200 (75).

1900. *C.*, Sars, Crustacea of Norway, vol. iii., p. 83.

This being at present the only genus, the characters of the family suffice for its definition. It contains twenty-three species, including the two here described as new.

CAMPYLASPIS OVALIS, n. sp.

Plate LXIII.

This species, which agrees with *C. vitreus*, Calman, in the transparency of the integument and shares with that and *C. macrophthalmus*, Sars, the possession of two long lateral keels on the carapace, is at once distinguished from the former by not having a transverse keel to divide the carapace dorsally into two compartments, and from the latter by having the eyelobe obsolete instead of peculiarly elongate. At first sight the species was suggestive of the genus *Platycuma*, Calman, but it proved to be generically distinct.

The pseudorostral lobes are very briefly and obtusely produced in advance of a minute eyeless eyelobe. In dorsal view the carapace presents a flattened oval appearance, wider in front than behind. The oval is formed by the somewhat raised edges of a surrounding keel, the central part broadly convex, with a depression on either side and towards the rear. Another keel runs nearly parallel to the sinuous lower margin and not very distant from it. The sides of the carapace below the upper keel are strongly inflexed, so as to leave only a long narrow opening occupied by the maxillipeds. The stomach appeared to be dilated with food, including foraminifera and what looked like the dentate fingers of some crustacean, the horny nature of which had defied digestion. The second to the fifth pedigerous segments successively narrowed and depressed have the lateral angles more or less rounded. The pleon segments show faint serration of the front angles, the fifth segment the longest, the telsonic pentagonal, the two combined not quite as long as the peduncle of the uropods.

First antenna very small, flagellum three-jointed, its terminal joint and the one-jointed accessory flagellum minute. Second antennæ those of a male not fully adult.

Upper lip with obtuse-angled margin. Mandibles with the generic character.

First maxilla with bisetose palp; on the inner plate one of the

spines showed a tridentate apex. First maxilliped having very numerous branchial leaflets on the epipod, exopod very elongate; terminal joint extremely small, attached at inner front angle of the preceding laminar joint. Second maxilliped with short but very broad second joint, rather longer than the remaining joints, distally narrowed, carrying a long feathered seta; from the very short third joint projects nearly at right angles a spine with a distally widened spear-like end, microscopically ciliated, similar to that described by Sars for *C. macrophthalmus*; sixth joint not specially dilated, tipped with two spines and carrying a short curved seventh joint, which but for the attached muscles might pass for a spine. The third maxillipeds have the much-curved second joint about as long as the remaining serrate joints combined, the seventh joint very small.

The first peraeopods are very like the third maxillipeds, but with all the joints rather longer, and the fifth rather longer than the sixth instead of the reverse. Second peraeopods with second joint stout, not so long as the rest combined, the seventh rather longer than the fifth and thrice the sixth. Third peraeopods with second joint much narrowed distally, much longer than the rest combined, while in the fourth pair this joint about equals the others together. Fifth pair narrow throughout.

Peduncle of uropods serrate on both margins, more strongly on the inner, about twice and two-thirds as long as the endopod, which has five spines on the inner margin and a terminal spine; the slightly shorter exopod is almost unarmed.

The carapace, of immature male, measured 3.3 mm. long, by 2.5 mm. broad.

Locality. Cape Natal distant N. by E. 24 miles; depth 805m. No. 12605, sent by Dr. Péringuey.

CAMPYLASPIS PÆNEGLABER, n. sp.

Plate LXIV.

The specific name is applicable not only to the character of the carapace but also to the close affinity between this species and the *Campylaspis glaber*, described by Professor Sars, from Norway and the Mediterranean. The size, the shape, the mouth organs, and even so particular a feature as the arrangement of pellucid spots on the carapace seem to be in close agreement. On the other hand, against identification of the two species may be set the following differences. The South African species is rather larger, its carapace is not quite smooth, its eyelobe is differently shaped and without

any sign of lenses, its first antennæ have a geniculate bulb at the base, in the second peræopods the seventh joint is longer than the fifth and sixth joints combined, and the fifth peræopod, so far as can be judged from figures of the other species, is more slenderly built, with the second and fifth joints more elongate.

The female of the present species is at present unknown. The carapace of the male is somewhat compressed, narrowly oval, in dorsal view having what may be called a high-shouldered appearance. The pseudorostral lobes are somewhat upturned, meeting for a short distance in advance of the narrowly oval, slightly prominent eyeless eyelobe, and in lateral view showing a very shallow sinus. On the front part of the carapace are various pimples, one pair of marked importance, but all difficult to observe except by turning the opaque white carapace at different angles to the light. When the carapace is divested of its contents the pattern on it of pellucid spots comes clearly into view. The first pedigerous segment is almost concealed by the carapace, but the other four are distinct, with lateral ridges which are continued along the pleon. This is much shorter than the preceding part of the body, its last three segments together not much longer than the peduncle of the uropods.

Both mandibles have the principal cutting-plate divided into six teeth. The first maxilla shows ten spines on the outer plate and four on the inner, the palp is long, ending in a single seta. The second maxilla has four slender spines on its single plate. The first maxillipeds have the little terminal joint almost obsolete; the branchial epipod with a great number of leaflets. The terminal joint of the second maxillipeds appears to be bifid, as in the Norwegian *C. glaber*, not trifid as in the Mediterranean form. The figures will show the likeness of the third maxilliped and the first peræopod to those of *C. glaber*. The second peræopod has the seventh joint longer than the fifth and sixth joints combined and has four short setæ on each margin; the third and the shorter fourth peræopods have the second joint narrowed at the apex.

The peduncle of the uropod is about once and three-quarters the length of the endopod and twice as long as the exopod, with eight setæ on its inner margin; the endopod has nine spines on the inner margin and a long apical spine; the exopod has a still longer apical spine, but for most of its length is unarmed.

Length of specimen about 4.3 mm.

Locality. Cape Natal N. by E. 24 miles; depth 805 m.; No. 12605, sent by Dr. Péringuey.

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* Names printed in italics are such as are not accepted in the classification of the present treatise. A note of interrogation signifies that the name originally was, or still is, of doubtful validity.

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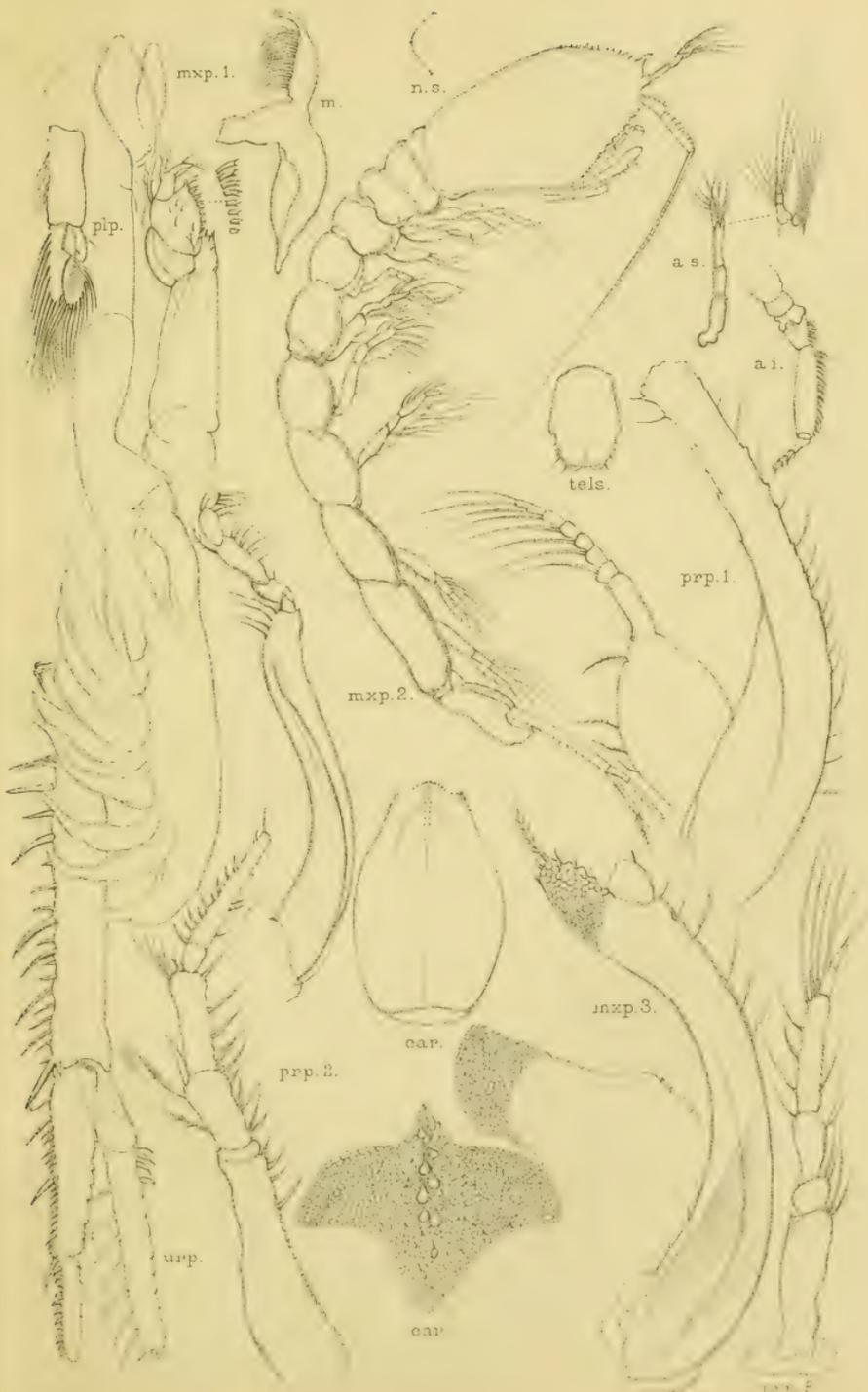
The systematic position of *Pachystylis rotundatus*, Hansen, 1895, and of some other important species remains for the present indeterminate. For *Colurostylis* (?) *occidentalis*, Calman, the new generic name *Anchicolurus* is proposed, and Kröyer's *Cuma resima* is transferred from *Diastylopsis* to a new genus *Brachydiastylis* in the family Diastylidæ.

EXPLANATION OF PLATES.

PLATE XLIX.

Bathycuma natalensis, n. sp.

- n.s. Line indicating natural size of specimen figured below in lateral view.
- car., car., tels. Dorsal view of carapace and telsonic segment, the lower figure car. being a more highly magnified view of part of the carapace slightly flattened, showing distal portion of right pseudorostral lobe, the little triangular eyeclobe, and part of the frontal lobe.
- a.s., a.i., plp. First antenna, proximal part of second, and one of the pleopods, more highly magnified than the preceding figures, but less than the following figures which are to a uniform scale, except that the flagella of the first antenna, and some spines of the first maxilliped are more highly magnified than any of the other figures.
- m. Mandible.
- mxp. 1, 2, 3. First, second, and third maxillipeds, the third without its exopod and ending with the third joint.
- prp. 1, 2, 5. First pereopod, ending with the second joint; second pereopod, without its exopod; fifth pereopod.
- urp. Uropods, with second joint of endopod supplied from a separate specimen.



Del. T.R.R. Stebbing.

West, Newman lith.

BATHYCUMA NATALENSIS, n. sp.

PLATE I.

Sympodomma africanus, n. g. et sp.

- n.s. Line indicating natural size of male specimen figured below.
car. Carapace and pedigerous segments in dorsal aspect.
oc. Ocular lobe and eye more highly magnified.
a.s. First antenna, with higher magnification of the small flagella.
m., mx. 1, mx. 2, mxp. 1, 2, 3. Mandible, first and second maxillæ, first, second, and third maxillipeds, with higher magnification of spine-teeth on the first.
prp. 1, 2. First and second peræopods, exopod of second only partially figured.
plp. 1. First pleopod.
urp. Left uropod in connexion with telsonic segment dorsally viewed.
All the appendages are drawn to a uniform scale.



Del. T.R.R. Stebbing.

West, Newman imp.

SYMPODOMMA AFRICANUS, *n.g. et sp.*

PLATE LI.A.

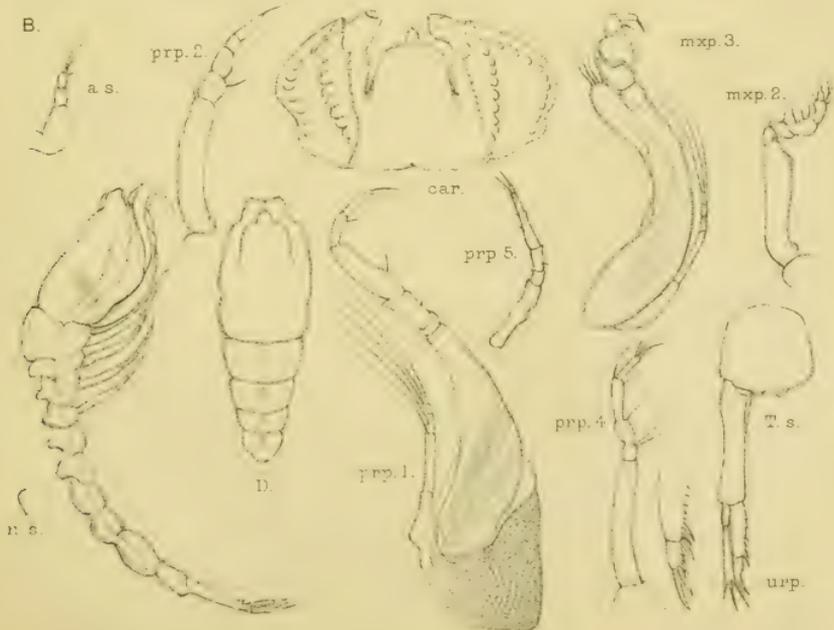
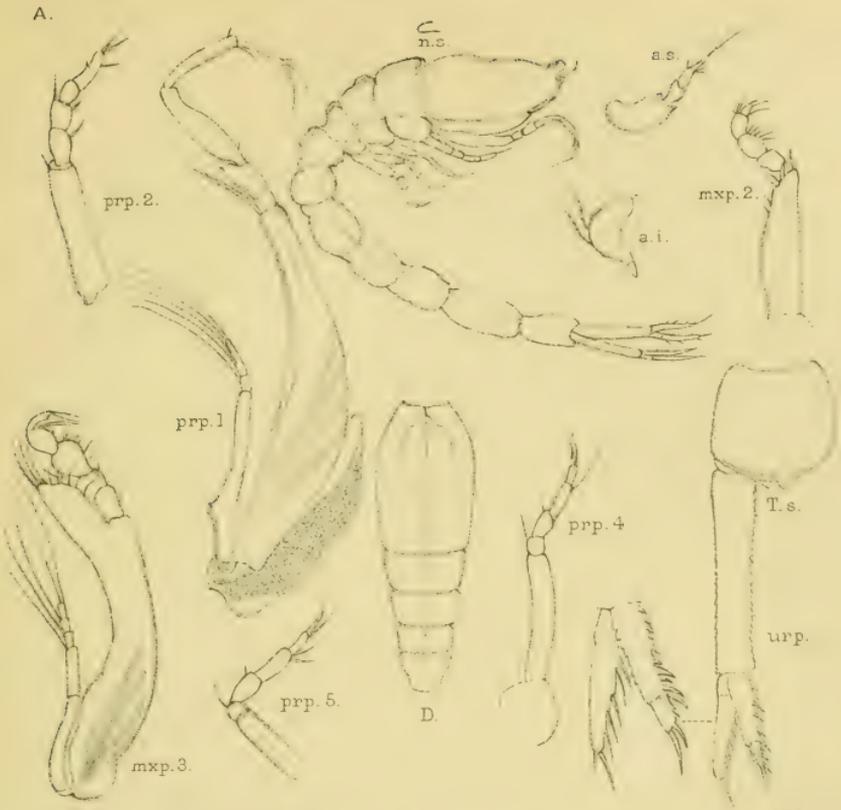
Bodotria montagui, n. sp.

- n.s. Line indicating natural size of female specimen figured below in lateral view.
D. Dorsal view of carapace and pedigerous segments.
T.s., urp. Telsonic segment, with left uropod, in dorsal view, on a higher scale than the preceding figures, but uniform with the rest, except for still higher magnification of the uropod's rami.
a.s., a.i. First and second antennæ.
mxp. 2, mxp. 3. Second and third maxillipeds.
prp. 1, 2, 4, 5. First, second, fourth, and fifth pereopods.

PLATE LI.B.

Bodotria australis, n. sp.

- n.s. Line indicating natural size of female specimen in the adjoining figure.
D. Dorsal view of carapace and pedigerous segments.
car. Carapace flattened out.
T.s., urp. Telsonic segment, with left uropod, in dorsal view, on a higher scale than the preceding figures, but uniform with the rest, except for still higher magnification of the uropod's inner ramus. All the figures of this species agree as to scale with those of the preceding species.
a.s. First antenna.
mxp. 2, mxp. 3. Second and third maxillipeds.
prp. 1, 2, 4, 5. First, second, fourth, and fifth pereopods.



Del. T.R.R. Stebbing.

West, Newman lith.

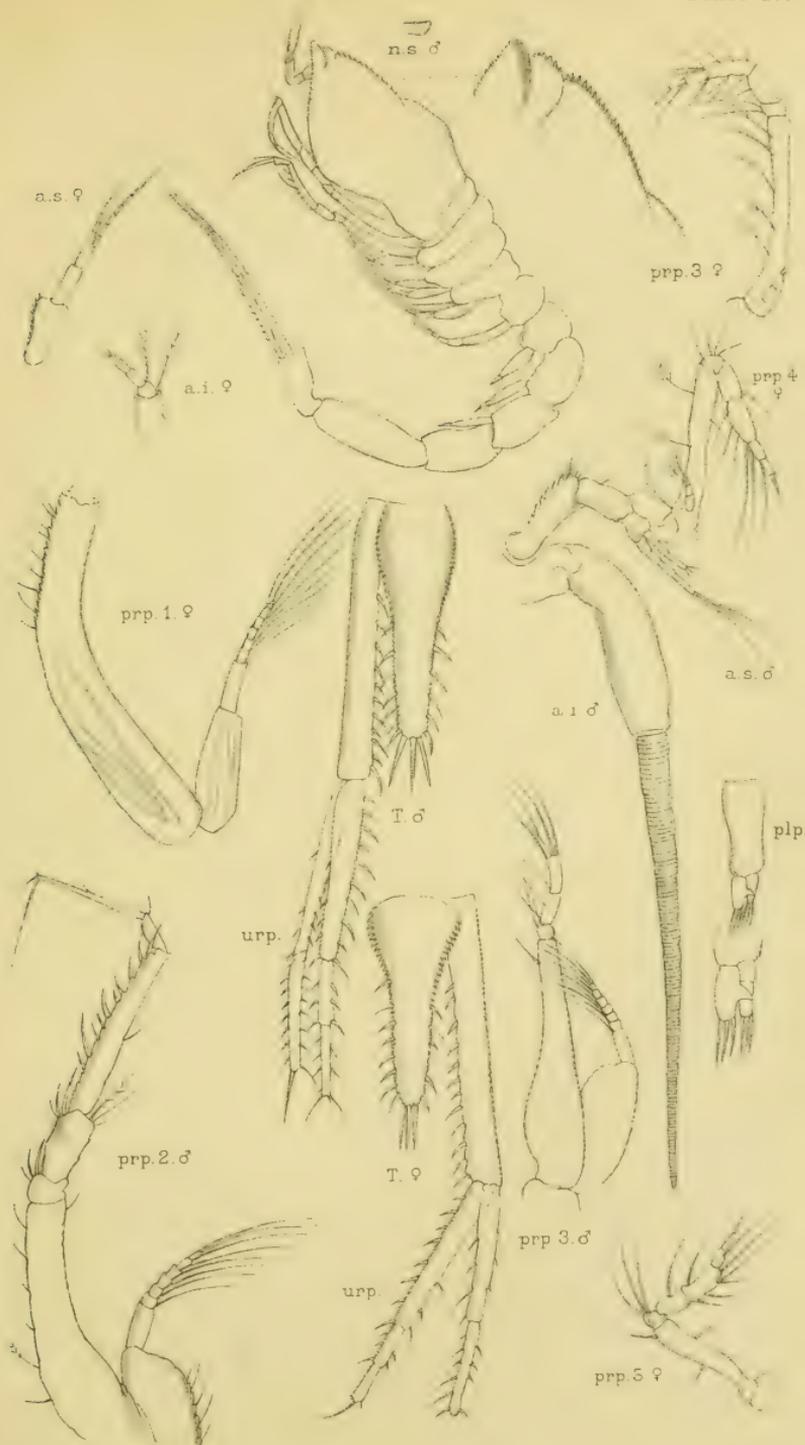
A. *BODOTRIA MONTAGUI*, n. sp.

B. *BODOTRIA AUSTRALIS*, n. sp.

PLATE LII.

Hemilamprops pellucidus, Zimmer.

- n.s. ♂. Line indicating natural size of male specimen figured below, with more highly magnified part of dorsal crest.
- T. ♂, urp., T. ♀, urp. Telson and left uropod of the male, and telson and right uropod of the female.
- a.s. ♂, a.i. ♂; a.s. ♀, a.i. ♀. First and second antennæ of the male, and of the female.
- prp. 2, ♂, prp. 3, ♂. Second and third peræopods of the male.
- prp. 1, 3, 4, 5, ♀. The first, third, fourth, and fifth peræopods of the female, the first shown only to end of second joint.
- plp. Pleopod of male, with higher magnification of the rami.



Del. T.R.R. Stebbing.

West, Newman imp.

HEMILAMPROPS, PELLUCIDUS, *Zimmer.*

PLATE LIII.

Adiastylis acanthodes, n. sp.

- n.s. Line indicating natural size of male specimen figured below.
- car. Part of the carapace in flattened dorsal aspect, showing armature of the pseudo-rostral projection and indicating shape of the eyelobe and frontal lobe. The carapace was too much damaged to afford a satisfactory view of all its spines and spinules.
- ped. s. 1. Part of front margin of first pedigerous segment.
- T. urp. Dorsal view of pleon segments 4-6 and the telson with one of the uropods in position.
- a.s., a.i. First and second antennæ.
- l.s., m., m. Upper lip and mandibles, the distal half of one, the other complete, with higher magnification of the apical portions.
- mxp. 1-3. The three maxillipeds, omitting the branchial epipod of the first.
- prp. 1-5. The five peræopods, the first defective after the second joint.
- plp. 1, 2. The first and second pleopods, each with higher magnification.

All the parts are drawn to the same scale, with added figures on a higher scale for the mandibles and pleopods.



W. H. R. Stebbing

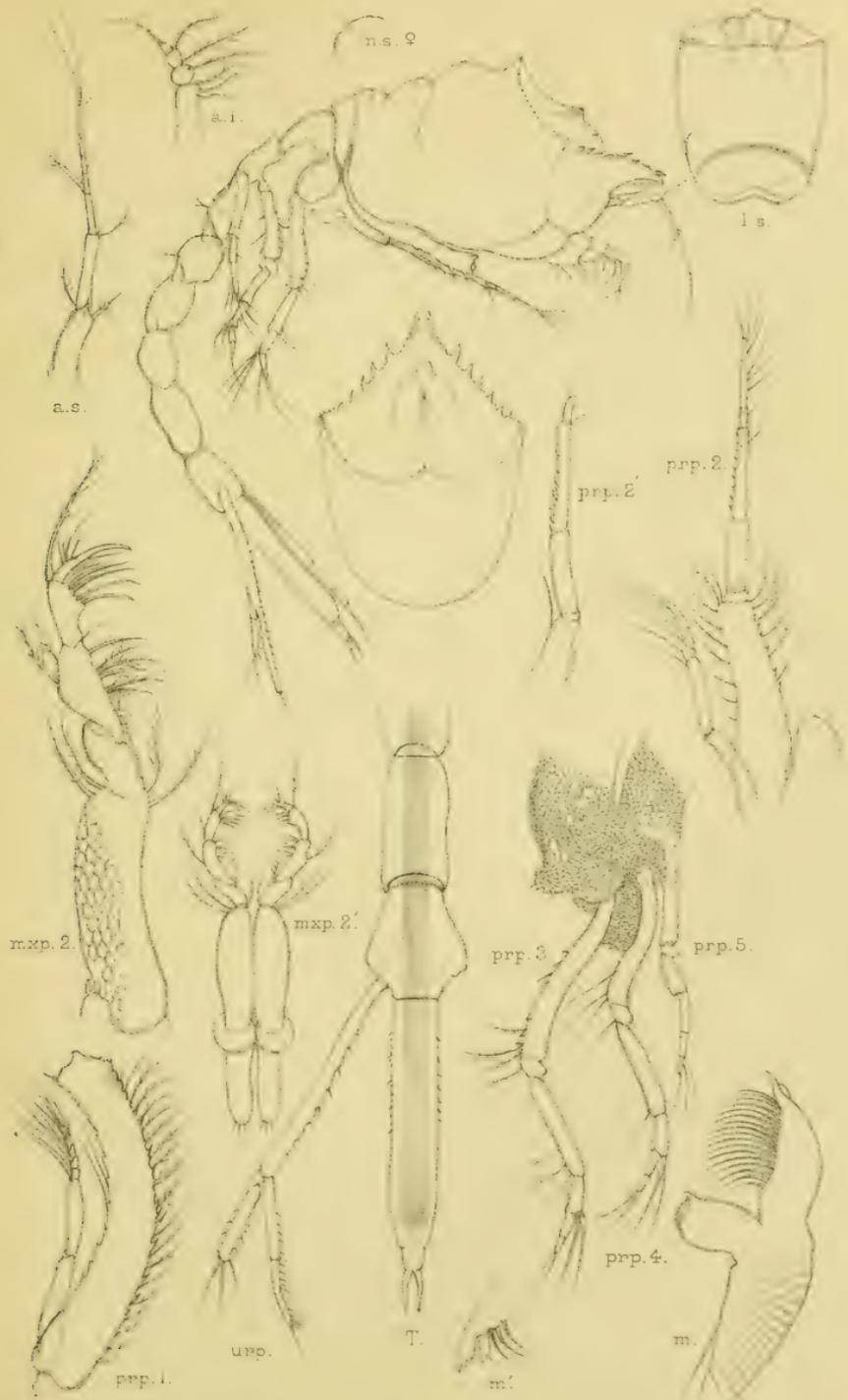
West, Newman imp.

ADIASTYLIS ACANTHODES, n. sp.

PLATE LIV.

Makrokyllindrus fragilis, n. g. et sp. ? .

- n.s. ♀. Line indicating natural size of female specimen figured below.
car. Carapace of the same specimen in dorsal view.
T. urp. Telson in connexion with two preceding segments and one of the uropods more highly magnified, on the same scale as the antennæ and pereopods.
a.s., a.i. First and second antennæ.
l.s., m., mxp. 2. Upper lip, mandible, and second maxilliped, more highly magnified than the other appendages.
m'. Apex of mandible with accessory plate from another specimen.
mxp. 2'. Pair of second maxillipeds on the same scale as the pereopods.
prp. 1-5. The five pereopods, the first defective from end of second joint.
prp. 2'. Part of second pereopod from another specimen.



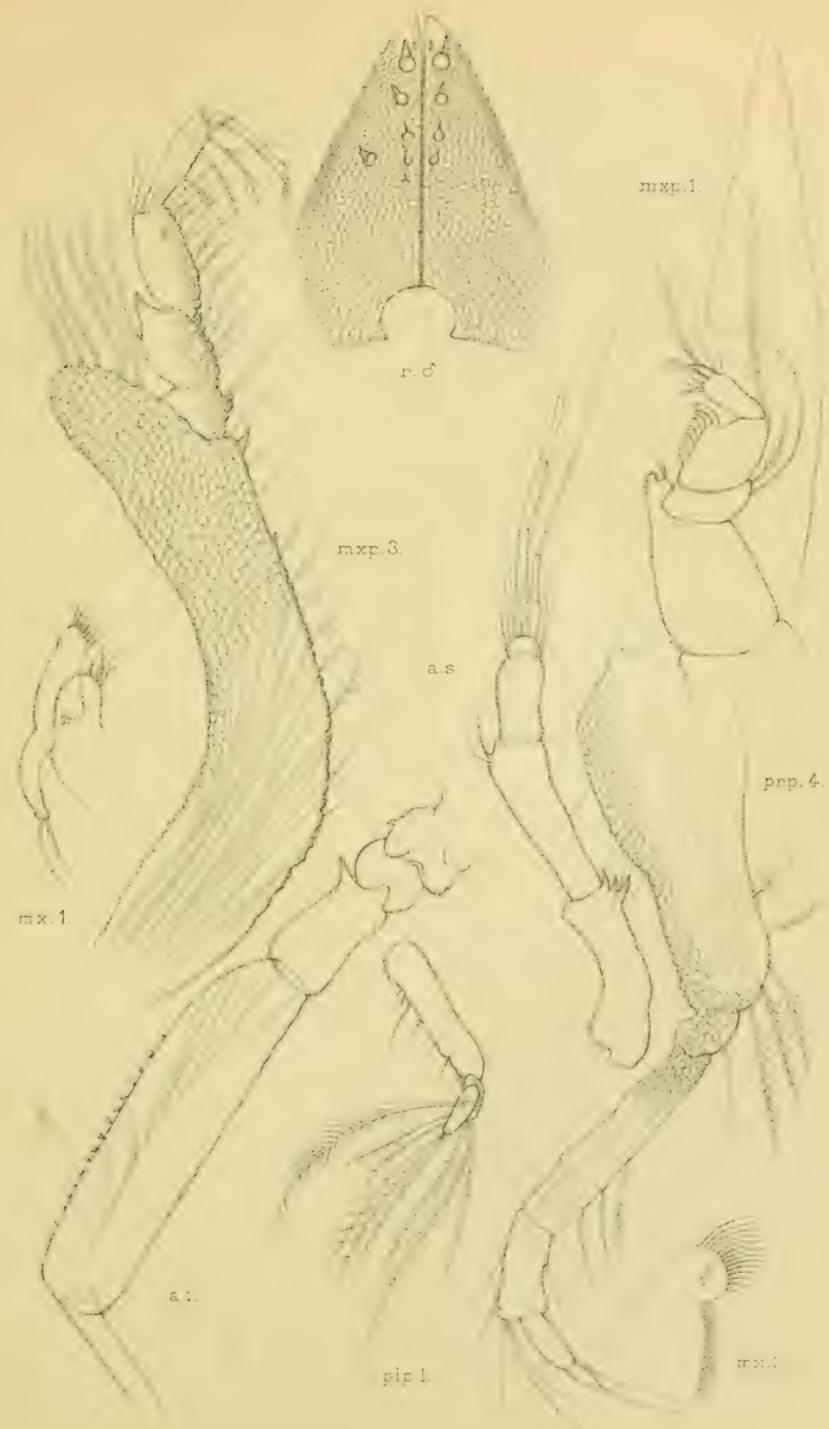
Del. T.R.R. Stebbing.

West, Newman imp.

PLATE IV.

Makrokyllindrus fragilis, n. g. et sp. ♂.

- r. ♂. Terminal lobes of male pseudorostrum; all the figures on this plate magnified to a uniform scale with the mouth organs on the preceding plate.
- a.s., a.i. First antenna and peduncle of second, with beginning of flagellum.
- mx. 1, mx. 2, mxp. 1, mxp. 3. First and second maxillæ, first maxilliped without the large branchial epipod; third maxilliped without its exopod.
- prp. 4. Fourth pereopod without its exopod.
- plp. 1. First pleopod.



Ed. N. S. Steadman

West. Newman imp.

MAKROKYLINDRUS FRAGILIS, n.g. et sp.

PLATE LVI.

Leptostylis macruroides, n. sp.

n.s. Line indicating length of the male specimen figured below.

car. Part of carapace more highly magnified.

T. Telson in dorsal view, in connexion with the sixth segment of the pleon.

a.s., a.i. The first antenna, and peduncle of the second.

l s., l.i., m. Upper and lower lips and mandible, this last with apical plates more enlarged.

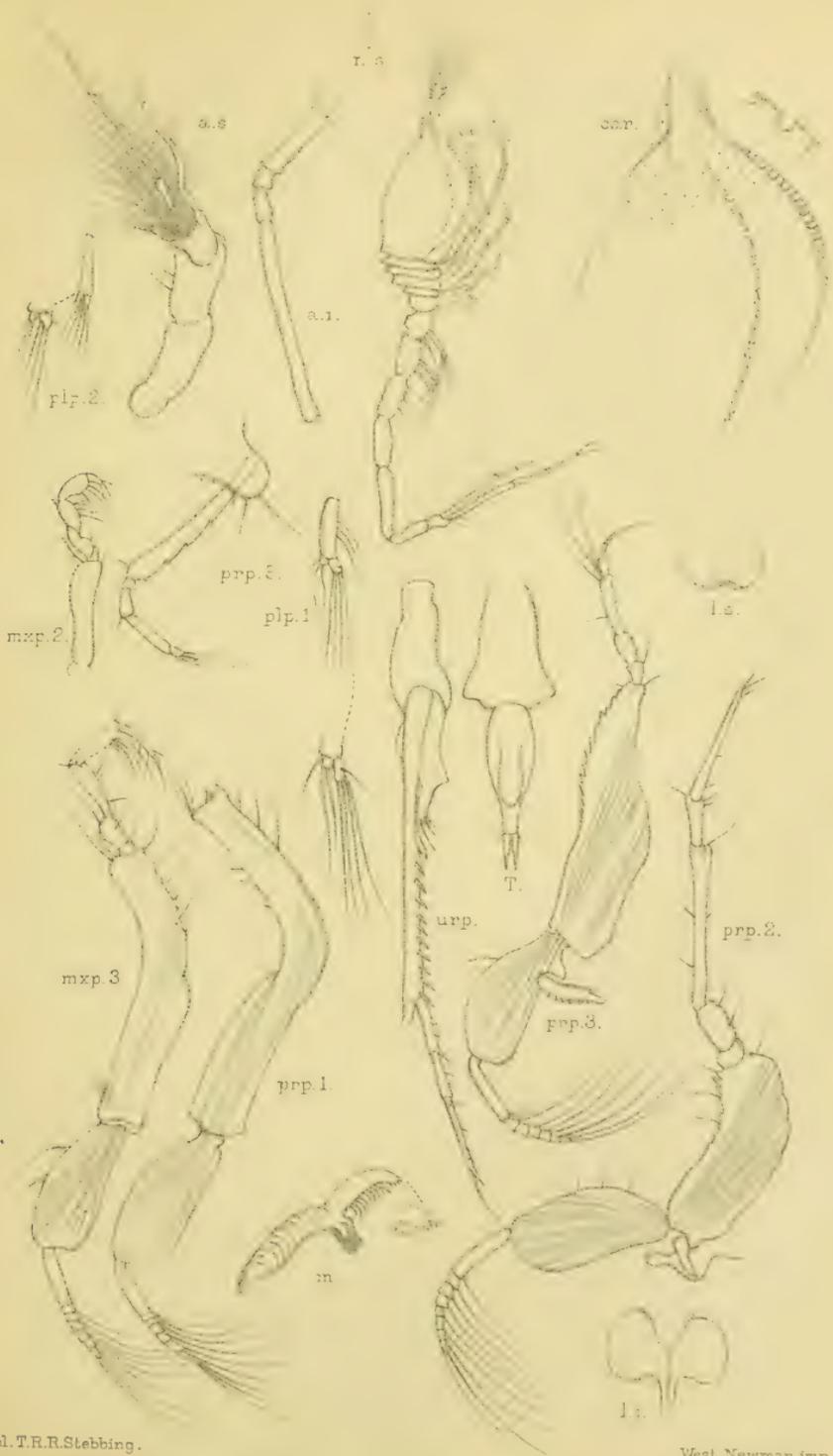
mxp. 2, mxp. 3. Second and third maxillipeds.

prp. 1, 2, 3, 5. First three and fifth peræopods, first only to end of second joint.

plp. 1, plp. 2. First and second pleopods, each with the rami in further magnification.

urp. The uropod (exopod broken) in attachment to the sixth pleon segment shown along with the telson in lateral view.

All the parts are drawn to the same scale, except the above-mentioned portions of the mandible and pleopods.



Del. T.R.R. Stebbing.

West, Newman imp.

LEPTOSTYLIS MACRUROIDES, n. sp.

PLATE LVII.

Leucon kalliropus, n. sp.

n. s. Line indicating length of male specimen figured below.

a. s., a. i. First and second antennæ more highly magnified.

l. s., m. Upper lip; mandible.

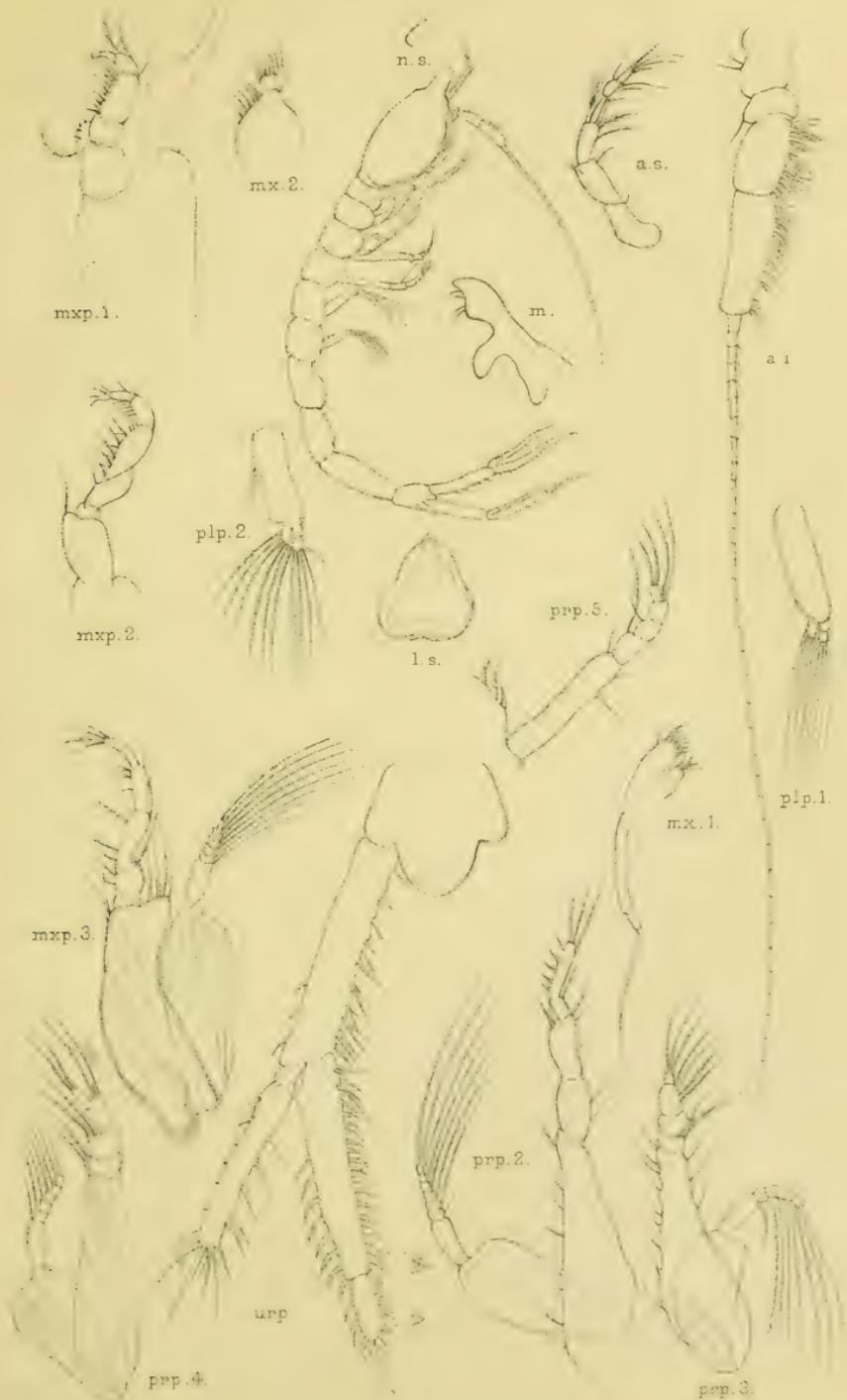
mx. 1, mx. 2, mxp. 1, 2, 3. First and second maxillæ; first, second, and third maxillipeds, the first with only fragments of its epipod and exopod.

prp. 2, 3, 4, 5. Second, third, fourth, and fifth peræopods.

plp. 1, 2. First and second pleopods.

urp. Left uropod in attachment to the telsonic segment, with further enlargement of spines on the endopod.

With exception of the last-mentioned spines, all the parts are magnified to a uniform scale.



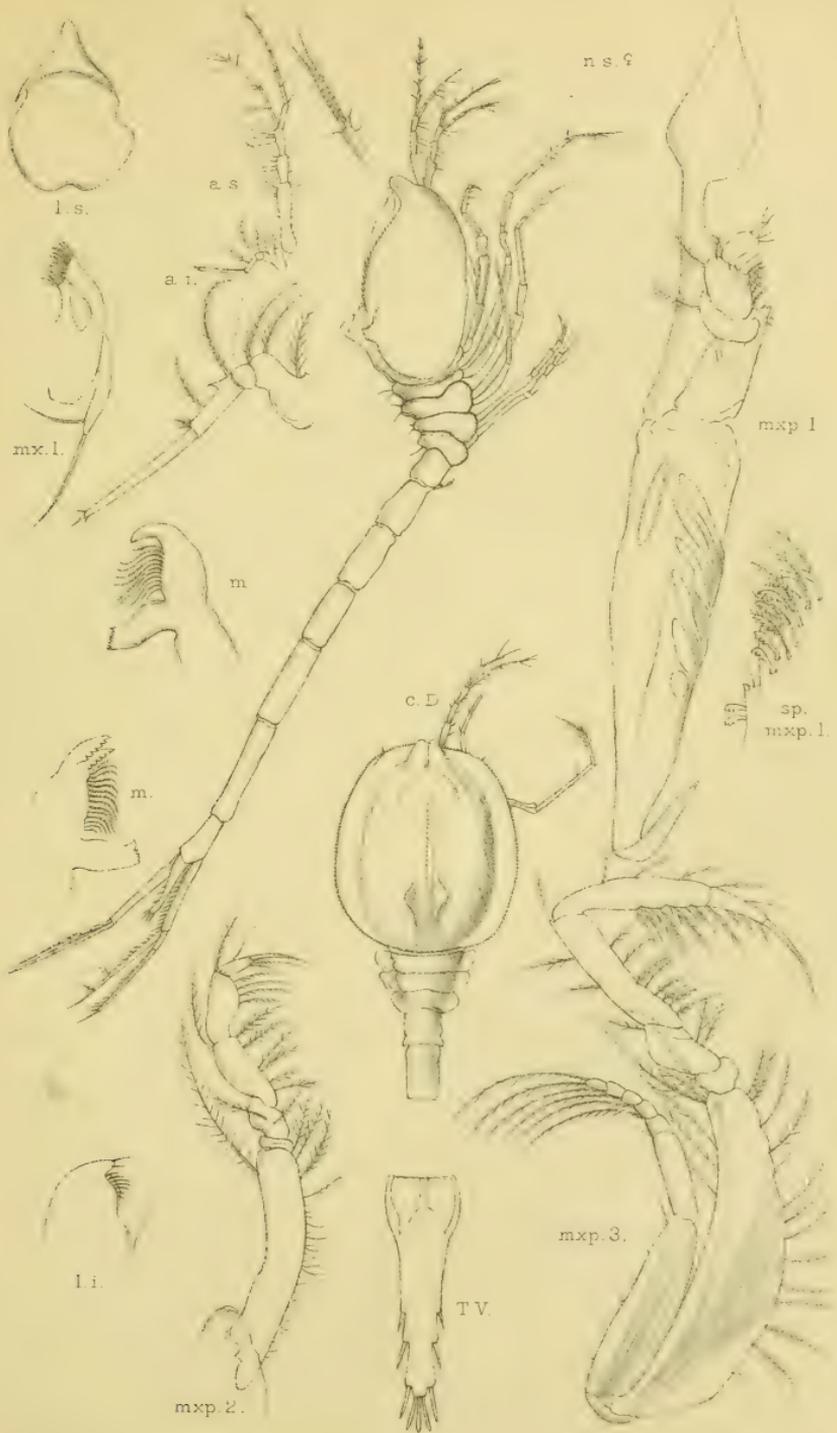
Del. T.R.R. Stebbing.

West, Newman lith.

PLATE LVIII.

Platytyphlops peringueyi, n. g. et sp.

- n.s. ♀. Line indicating actual length of female specimen figured in about three-quarter view, showing both of the first antennæ and of the uropods, but only one member of each pair for the third maxillipeds and the five pereopods.
- C.D. Dorsal view of the carapace followed by pedigerous segments and first pleon segment.
- T.V. Ventral view of telson, more highly magnified.
- a.s., a.i. First and second antennæ, with tip of first and whole of second much more highly magnified.
- l.s., l.i., m., m., mx. 1. Upper lip, half of lower lip, parts of the two mandibles, and first maxilla.
- mxp. 1, 2, 3. First, second, and third maxillipeds. All the mouth organs magnified to the same scale.
- sp. mxp. 1. Spines of first maxilliped more highly magnified.



Del. T.R.R. Stebbing.

West, Newman imp.

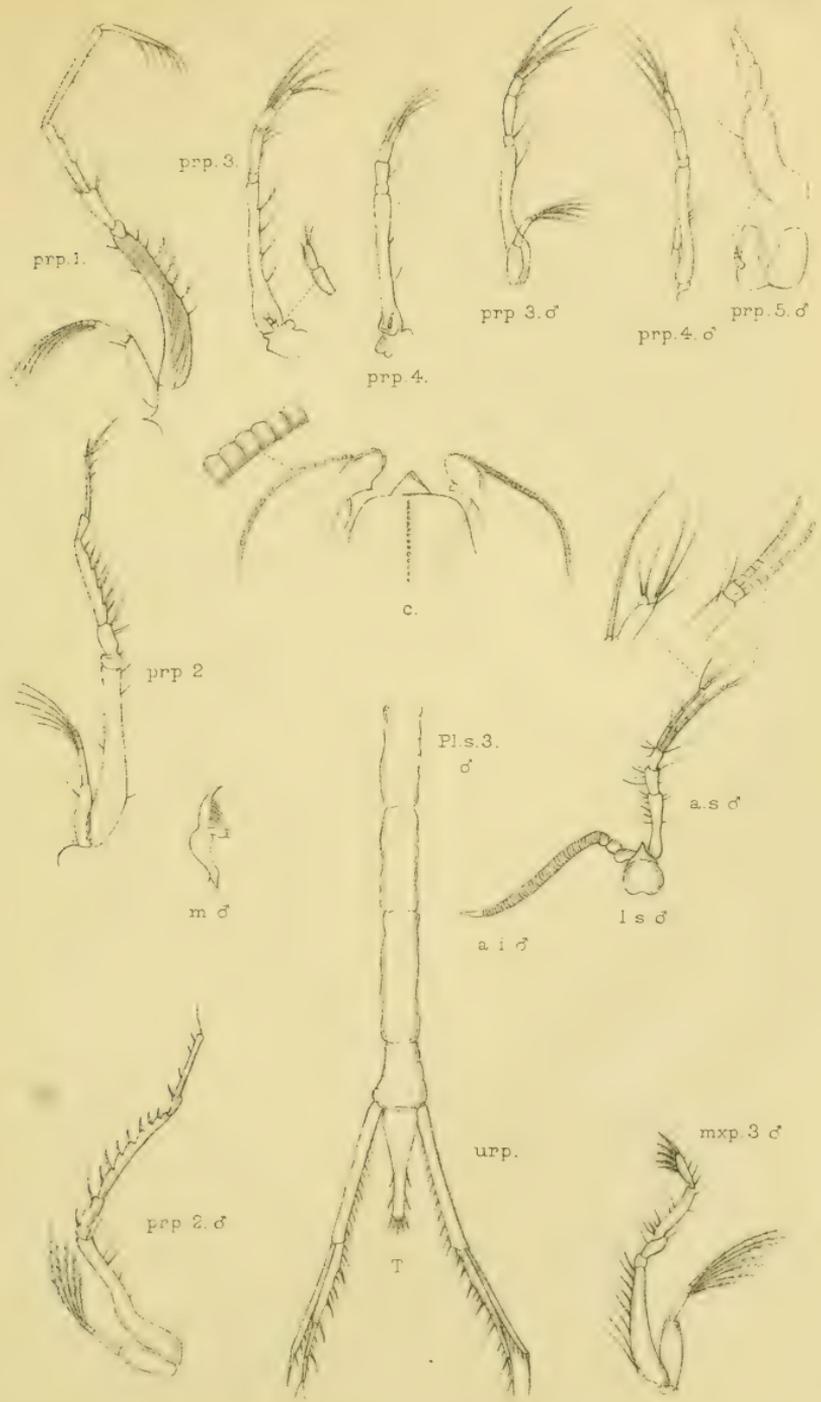
PLATYTYPHLOPS PERINGUEYI, n.g. et sp.

PLATE LIX.

Platytyphlops peringueyi, n.g. et sp.

- C. Front of carapace flattened, with high magnification of part of the margin.
prp. 1, 2, 3, 4. First four pereopods of the female, with rudimentary exopod of the third pereopod more highly magnified.
Pl. s. 3, ♂, T., urp. Dorsal view of male pleon from third segment to the end including telson and uropods.
a.s., a.i., l.s., ♂. First and second antennæ and upper lip of male, with much higher magnification of the tips of the flagella of the first antenna.
m., mxp. 3, prp. 2, 3, 4, 5 ♂. Mandible, third maxilliped and last four pereopods of male, the fifth pereopod attached to its segment, and separately more highly magnified.

The appendages of male and female on this plate are all drawn to the same scale.



Del. F. R. Stebbing.

West, Newman imp.

PLATYTYPHLOPS PERINGUEYI, n.g. et sp.

PLATE LX.

Stenotyphlops spinulosus, n. g. et sp.

n.s. Line indicating natural size of female specimen figured below in dorsal view, with lateral view of carapace on the right.

a.s., a.i. First and second antennæ.

l.s., l.i. Upper and lower lips.

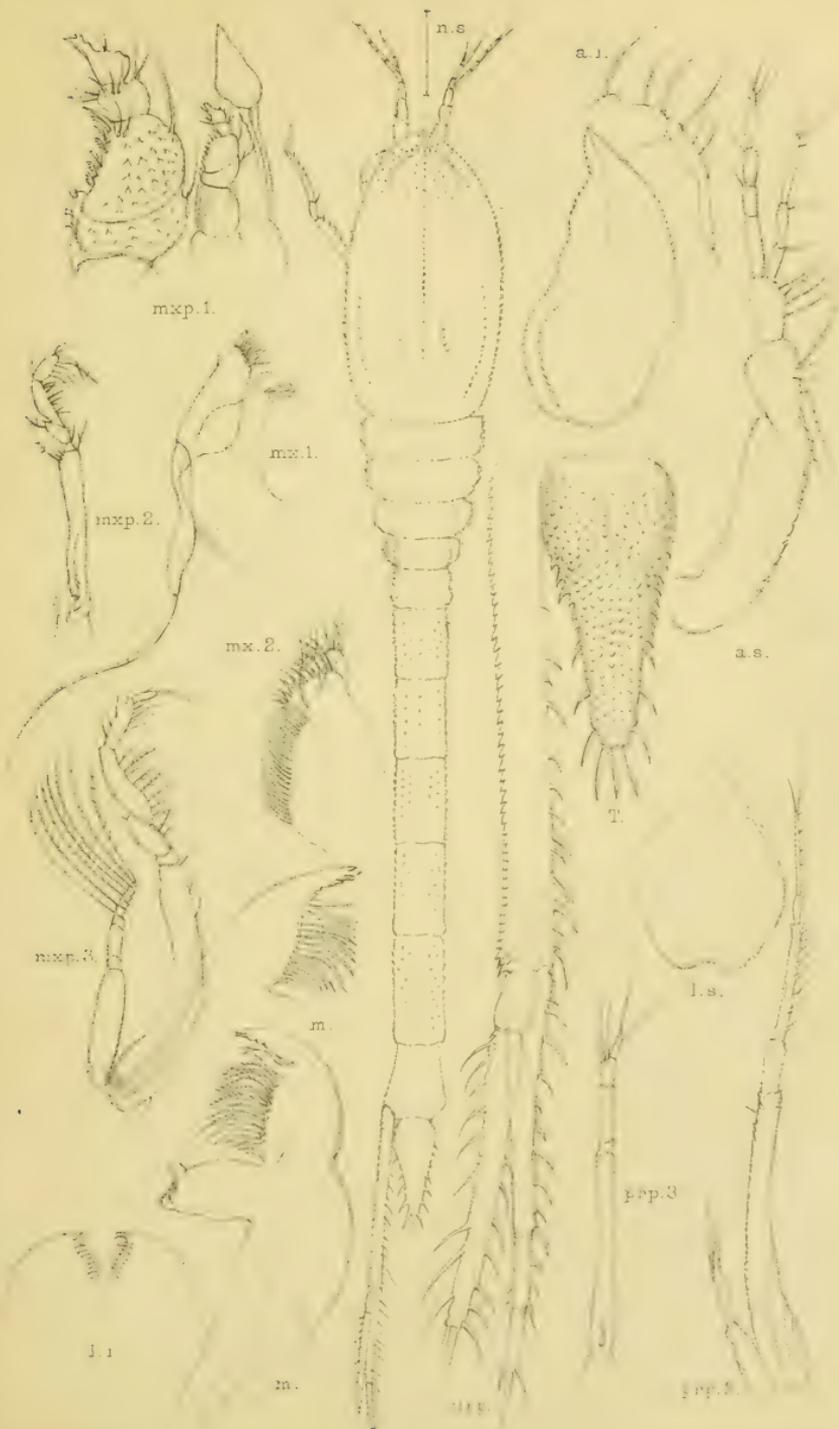
m., m. One of the mandibles complete and distal portion of the other.

mx. 1, mx. 2, mxp. 1, 2, 3. First and second maxillæ, and the three maxillipeds.

pp. 2, 3. The second and third peræopods.

T., urp. The telson and left uropod in dorsal view.

In this plate the lips, mandibles, the two maxillæ, and part of the first maxilliped are magnified on a uniform scale, more highly than the other figures. Again the first and second antennæ, the uropod and telson, are magnified to the same scale, more highly than the figures of the maxillipeds and peræopods.



Del. T.R.R. Stebbing.

West, Newman lith.

STENOTYPHLOPS SPINULOSUS, n.g. et sp.

PLATE LXI.

Schizotrema calmani, n. sp.

n.s. ♂. Line indicating natural size of male specimen figured below in lateral view, with dorsal view (imperfectly made out) of the carapace and pedigerous segments.

car. More highly magnified view of a pseudorostral lobe.

a.s. First antenna.

l.s., m., mxp. 1, 2, 3. Upper lip, mandible, first, second, and third maxillipeds.

ppp. 1, 2, 3, 4, 5. First, second, third, fourth, and fifth pereopods.

urp. Left uropod.

All figures are magnified to the same scale except the lateral view of the whole specimen with the dorsal view of its carapace and pedigerous segments.



Del. T.R.R. Stebbing.

West, Newman lith.

SCHIZOTREMA CALMANI, n. sp.

PLATE LXII.

Procampylaspis tridentatus, n. sp.

- n.s. Line indicating length of male specimen figured below.
car. Portion of carapace in dorsal view, more highly magnified, outline of eyelobe doubtful.
a.s., a.i. First and second antennæ, flagellum of second incomplete.
l.s. Upper lip.
m. Mandible, with distal part more highly magnified.
mx. 2. Second maxilla, with armature more highly magnified.
mxp. 1, 2, 3. First, second, and third maxillipeds, with higher magnification of the extremities of the first and second.
prp. 1, 2, 3, 4, 5. First to fifth pereopods.
urp. Right uropod, in connexion with telsonic segment in dorsal view.

All the separate parts are drawn to a uniform scale, with higher magnification of certain details as above mentioned.

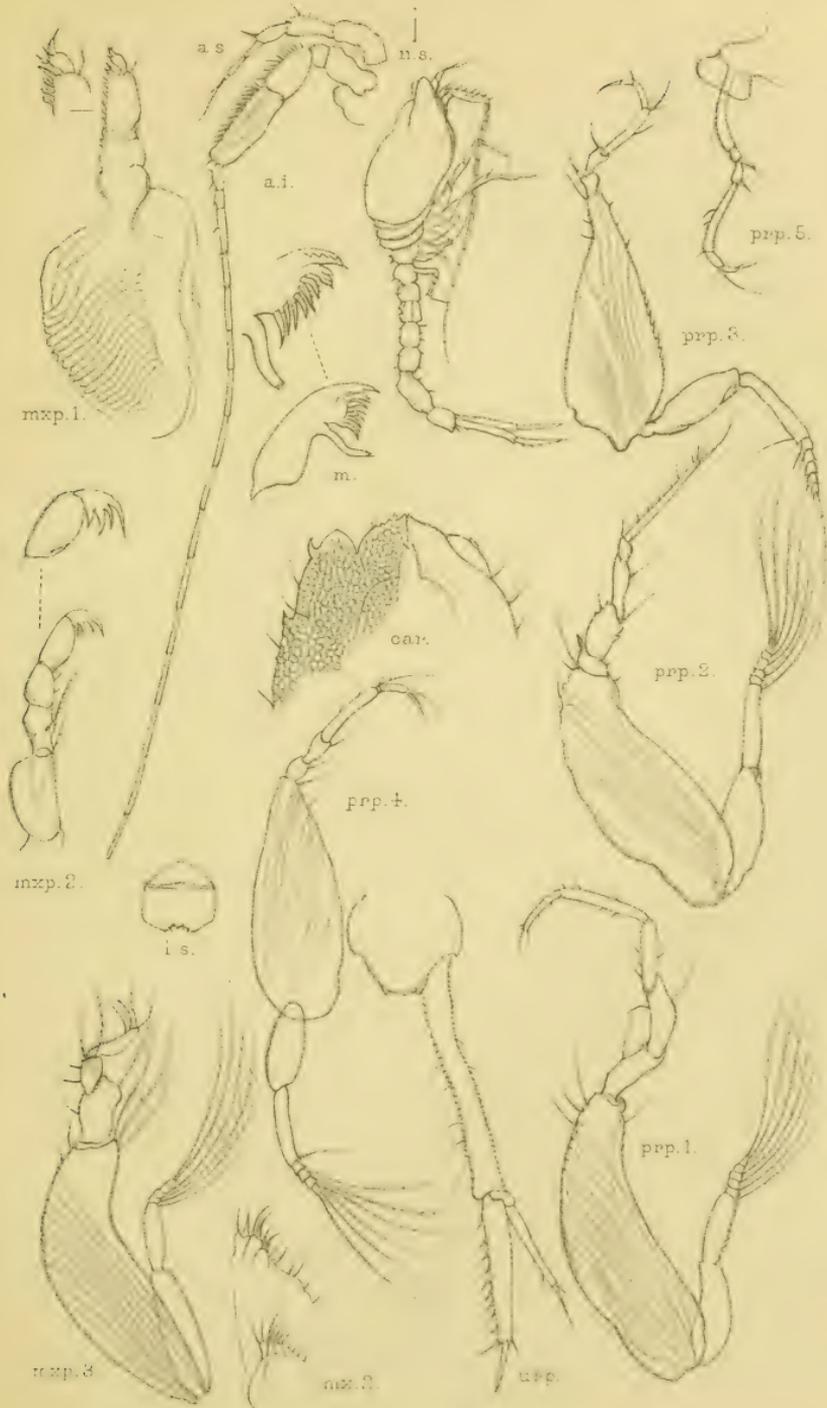
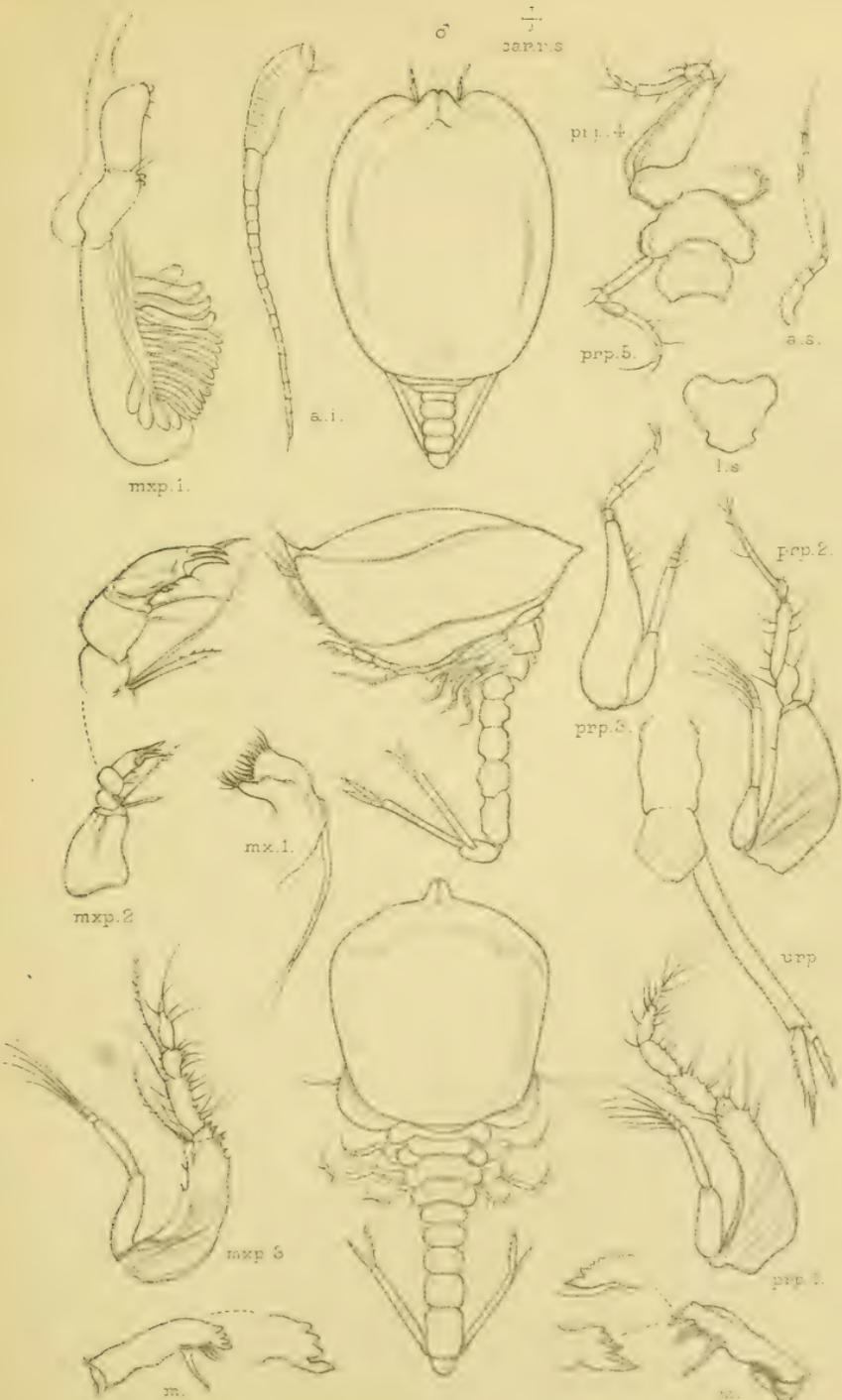


PLATE LXIII.

Campylaspis oralis, n. sp.

- ♂. Male specimen figured below in three positions dorsally with surface of carapace horizontal, carapace from left side tilted to the right, and thirdly with surface of pedigerous segments and first six of pleon horizontal, but carapace foreshortened by its downward inclination.
- car. n.s. Lines indicating natural size of the carapace.
- a.s., a.i. First and second antennae, with further enlargement of flagella of first antenna.
- l.s., m., m., mx. 1, mxp. 1-3. Upper lip, mandibles, first maxilla, first, second, and third maxillipeds, with further enlargement of the apices of the mandibles and of the distal joints of the second maxilliped.
- prp. 1-5. The five pereopods, the fourth and fifth in attachment to their respective segments.
- urp. Right uropod in attachment to the telsonic segment with the preceding fifth pleon segment.



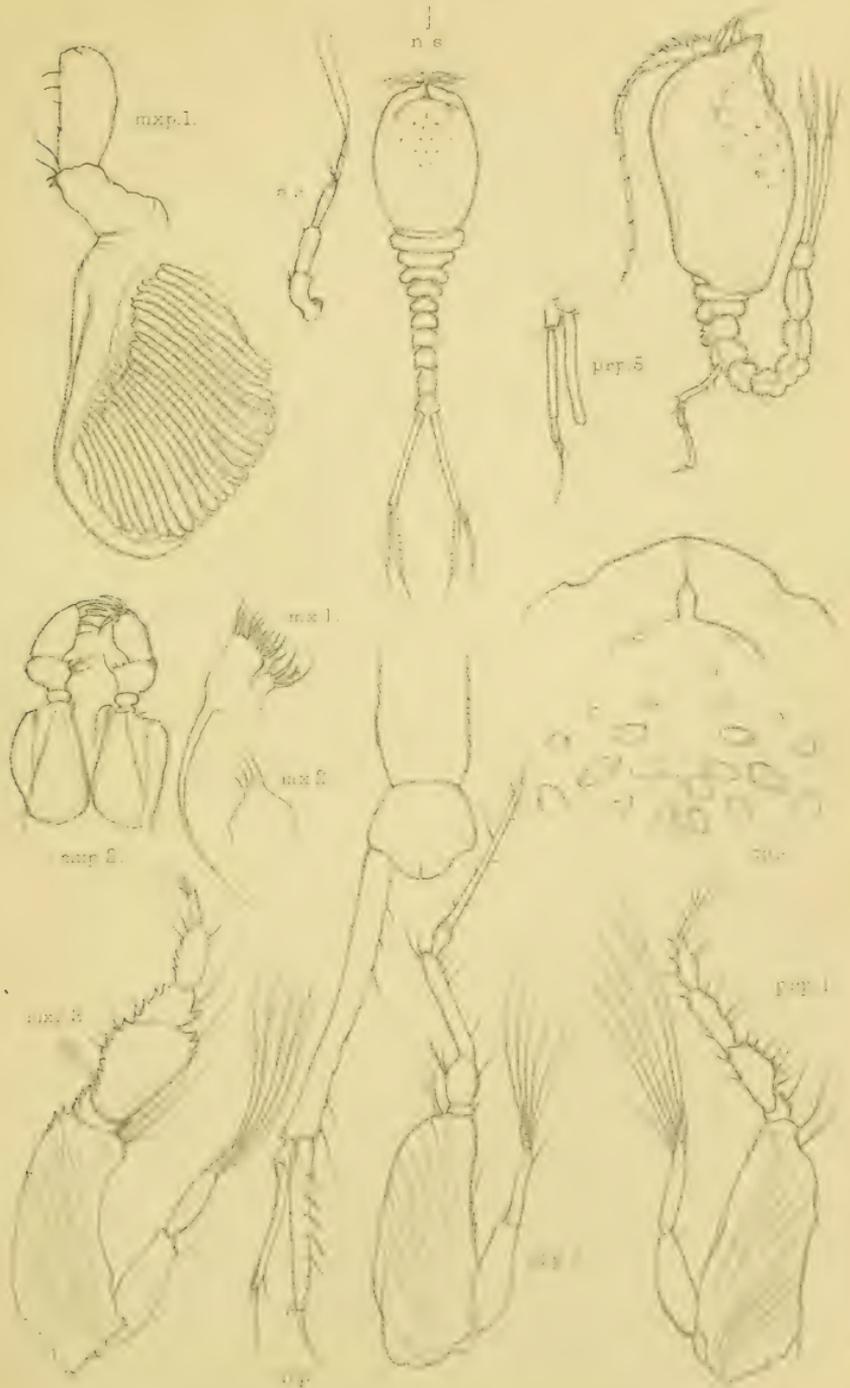
Del. T.H.R. Stebbing.

West, Newman lith.

PLATE LXIV.

Campylaspis peneglaber, n. sp.

- n.s. Line indicating length of male specimen figured below in dorsal aspect. On the right is the figure of a similar specimen from the left side more enlarged, from which are taken the parts marked car., prp. 2, prp. 5, the others being from the first-mentioned specimen.
- car. Upper portion of carapace slightly flattened, showing pseudorostral sinus, shape of eyelobe, and pellucid markings.
- a.s. First antenna. Second antenna incomplete in both specimens.
- mx. 1, mx. 2, mxp. 1, 2, 3. First and second maxillæ, first maxilliped without exopod, pair of second maxillipeds, third maxilliped.
- prp. 1, 2, 5. First, second, and fifth pereopods.
- urp. Left uropod, in attachment to the telsonic segment in dorsal view.
- The separate parts are magnified to a uniform scale.



West, Newman lith.

CAMPYLASPIS PENEGLABER, *n. sp.*



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(Plates I.—XII. of Vol. XV. Plates LXXV.—LXXXVI. of Crustacea.)

At various opportunities Dr. Gilchrist and Dr. Péringuey have sent me specimens of *Macrura* from South African waters. I was in hopes of being able to deal with the accumulated material in a single essay. But it now seems expedient to offer the present contribution as a first instalment of the report. There is some excuse for going slowly. The literature of the subject has become voluminous, and not infrequently the student is confronted with two opposite difficulties, in having to guess what species was intended by an old meagre description, and in having to weigh critically all the minute distinctions of a modern elaborate one. When there are many specimens at his disposal all superficially alike, he has to guard against overlooking important characters that may differentiate some of them. When the specimen is unique, there is the torturing alternative of spoiling it for exhibition in a museum by dissection, or spoiling it for any real use to science by leaving it intact. With the extension of research the task of assigning specific names becomes increasingly hard, as connecting links are discovered between species and species, and the range of variability within an acknowledged species is demonstrated. Of the South African macruran fauna it is probably true that its members have very near relatives in almost every part of the ocean.

Six new species are here proposed, and two new genera, *Hali-poroides* and *Macropetasma*. Further, the name *Pomatochelidae* is substituted for the family previously called *Pylochelidae*, and for the preoccupied names *Sicyonia* and *Ogyris* the new generic names

Eusicyonia and *Ogyrides* are offered respectively in exchange. Incidentally a parasitic isopod is named *Hemiarthrus nematocarcini* and the amphipod *Platyschnopus mirabilis* is added to the South African fauna.

MACRURA.

MACRURA ANOMALA.

TRIBE PAGURIDEA.

1888. *Paguridea*, Henderson, Rep. Voy. Challenger, vol. 27, p. 40.

FAMILY POMATOCHELIDÆ.

1888. *Pylochelidae*, Bate, Rep. Voy. Challenger, vol. 24, pp. 10, 11.
 1892. *Parapaguridae*, Ortmann, Zool. Jahrb., vol. 6, pp. 243, 274.
 1893. „ Stebbing, Hist. Crust., Internat. Sci. Ser., vol. 74, pp. 166, 169.
 1901. *Pylochelidae*, Alcock, Catal. Indian Deep-sea Crust. Anomala, p. 209 (*Pomatochelidae*?, p. 210).
 1905. „ Alcock, Catal. Indian Deep-sea Anomura, fasc. 1, pp. 12, 13.
 1913. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 9, p. 34.

The genera included in this family, according to Alcock, are *Pomatocheles*, Miers, 1879, *Pylocheles*, A. Milne-Edwards, 1880, *Mixtopagurus*, A. Milne-Edwards, 1880, *Cheiroplatea*, Bate, 1888, and *Parapylocheles*, Alcock, 1901. The proximity of *Pomatocheles* to *Pylocheles* was noticed by A. Milne-Edwards and Bouvier in 1893, and in 1913 the species *Pomatocheles jeffreysii*, Miers, is transferred by Balss to *Mixtopagurus*. But clearly the generic name given by Miers has the precedence, and the union of the two genera requires that the *Mixtopagurus paradoxus* of A. Milne-Edwards and Henderson's *Pylocheles spinosus* should be renamed as species of *Pomatocheles*. There is a difficulty in regard to *Mixtopagurus gilli*, Benedict, 1901, that it has a very unsymmetrical telson, which would seem to exclude it from this family altogether. That the family should be named *Pomatochelidae* after its premier genus, as Alcock suggested in 1901, is to my mind obvious, but *quot homines, tot sententiae*.

GEN. POMATOCHELES, Miers.

1879. *Pomatocheles*, Miers, Pr. Zool. Soc. London, p. 49.
 1880. *Mixtopagurus*, A. Milne-Edwards, Bull. Mus. Comp. Zoöl.,
 vol. 8, pt. 8, p. 39.
 1893. „ A. M.-Edwards and Bouvier, Mem. Mus. Comp.
 Zoöl., vol. 14, No. 3, p. 23.
 1905. *Pomatocheles* and *Mixtopagurus*, Alcock, Catal. Indian Deep-
 sea Anomura, fasc. 1, p. 14.
 1913. *Mixtopagurus*, Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl.
 vol. 2, pt. 9, p. 34.

In his synopsis of the genera, Alcock distinguishes *Pomatocheles* as having "hands of chelipeds forming an operculum" from *Mixtopagurus* with "chelipeds not operculiform." Both are distinguished from *Pylocheles* and *Cheiroplatea* by having the third maxillipeds normal instead of cheliform. The new species here described is distinguished from *P. gilli* by its symmetrical telson, from *P. paradoxus* by having the palp of the first maxillae simple instead of two-jointed, from *P. spinosus* by its unequal chelipeds, and from *P. jeffreysii* by longer eyestalks, the rostrum acute instead of rounded, unequal and strongly tuberculose chelipeds, and the much more sharply separated lobes of the telson.

POMATOCHELES BALSSI, n. sp.

Plate LXV.

The anterior half of the carapace is calcified, the rest more or less membranaceous, as is the case with the pleon except in the short first segment and the sixth, the latter appearing to be immovably bent, as though the telson and uropods were permanently folded forwards and underneath. It is rather remarkable that this symmetrical hermit should have been found occupying a simple cylindrical coral which is itself curved and tapers to a narrow completely closed foot. But similarly *P. jeffreysii* occupied the curved shell of a *Dentalium*. The general surface is pilose, the rostral point acute, a smaller acute point being formed by the front margin outside each ocular peduncle. These peduncles are long, a little dilated for the small dark cornea; the small scales at the base are not contiguous and are produced on the inner side into a single acute point. The telson is much longer than broad, bilobed with a deep apical incision, the sides of which, like the free border all round, are fringed with plumose setae; the

outer lateral margins are convex, with no such concavity as is shown in the figures of *P. jeffreysii* and *P. spinosus*. In *P. paradoxus* the sides of the telson are sinuous in the figure, but in the description the telson is said to be "broadly emarginate behind and excavate on the sides."

The first antennae have a first joint rather longer than the second, with an apical tooth on one side and one below the apex on the other; the third joint is rather shorter than the second; the principal flagellum is subequal in length to the peduncle, its first half broad, with very long plumose setae, the whole nearly twice as long as the slender companion flagellum. The peduncles are perhaps scarcely as long as the eyes. Benedict, in comparing *P. gilli* with *P. paradoxus*, remarks that in the latter species these peduncles do not reach the corneae, while in the former they pass them. But it may be asked whether he is not comparing the peduncles of his own species fully extended with those of Milne-Edwards' figured in their natural geniculate position, which shows the second joint end on, thus giving no idea of its actual length.

The long third joint of the mandibular palp is partially fringed with setules. The middle plate of the first maxillae is fringed with numerous strong spines, the narrow one-jointed "palp" has six slender spines at the apex. The long sinuous apical joint of the second maxillae, broad at its base, is drawn out to a fine point at the lightly armed apex. In the third maxillipeds the third joint is armed with a long row of teeth, the fourth joint has two teeth at the outer apex, the sixth joint is elongate, carrying the short spinose seventh at its end, with no suggestion of the chelate character which makes these appendages notable in *Pylocheles*.

The first peraeopods are not symmetrical, that on the left side being considerably the larger. In both, the fourth, fifth, and sixth joints are furnished with numerous teeth, the fingers of the left chela being stout, shorter than the palm, while those on the right are subequal to it in length. The small but sturdy fifth peraeopods have the sixth joint fringed with close-set spines, the short finger closing tightly on the truncate or slightly concave apex.

The first pleopods of the male are set rather near together, membranaceous, fringed with setae, in shape like a flat spoon, the handle curved, of uniform width, the bowl pointed. The second pair wide apart, with stiff peduncle, the single ramus ending in a membranaceous trowel-shaped expansion. The three remaining pairs all membranaceous, each with a long and a short ramus. Peduncle of the uropods with a small tooth at each apex, both rami fringed

with long plumose setae and pads of short stout spines along the outer margin.

Total length, allowing for an extended telson, about 18 mm., the carapace accounting for 6 mm. The eyes are 3 mm. long. The coral is 33 mm. long, width of interior at the top nearly 7 mm. externally 10 mm., narrowest part 6 mm.

Locality. Near East London, Cove Rock NW. $\frac{3}{4}$ W. 13 miles (Cape Colony); depth 80–130 fathoms. A 1571.*

The specific name is given in compliment to Dr. Heinrich Balss, a valued carcinologist.

TRIBE GALATHEIDEA.

1888. *Galatheidea*, Henderson, Rep. Voy. Challenger, vol. 27, p. 103.

FAMILY GALATHEIDAE.

1853. *Galatheidæ*, Dana, U.S. Expl. Exp., vol. 13, p. 1431.

GEN. GALATHEA, Fabricius.

1793. *Galathea*, Fabricius, Entomologia Sytematica, vol. 2, p. 472.

GALATHEA DISPERSUS, Bate.

1858. *Galathea dispersa*, Bate, Journ. Pr. Linn. Soc. London, vol. 3, No. 9, p. 3.

1863. *G. nexa*, Heller (not Embleton), Crust. südl. Europa, p. 191, pl. 6, fig. 4 (by misprint 3 in expl. pl.).

1888. *G. dispersa*, Henderson, Rep. Voy. Challenger, vol. 27, pt. 69, p. 119, pl. 12, figs. 6, 6a.

1888. „ Bonnier, Bull. Sci. France Belgique, Ser. 3, vol. 1, Nos. 4–8, p. 68, pl. 13, figs. 1–3.

1900. „ A. Milne-Edwards et Bouvier, Crust. Decap., Travailleur et Talisman, p. 278, pl. 29, figs. 2, 3.

1910. „ Stebbing, Ann. S. Afr. Mus., vol. 6, pt. 4, p. 364.

The fuller description of Stimpson's *Galathea labidoleptus*, published in 1907, long after Stimpson's death, appears to show

* The number given with a locality only concerns the South African Museum.

many points of difference from *G. dispersus*. Thus he describes the rostrum as long, with the four lateral teeth as small and very slender, the gastric region of the carapace carrying 2 little spines anteriorly, the chelipeds as rather stout, hand with a thick palm, but very slender fingers, which together are much narrower than the palm, straight and not toothed.

In the specimens here referred to *G. dispersus* the rostrum cannot properly be called long, and three of the lateral teeth are not small nor always slender, the teeth behind the rostrum on the gastric region are 6 in number. Within and slightly below the antero-lateral tooth there is a small denticle, and a row of denticles runs behind the antero-lateral to a pterygostomian tooth; a line of seven teeth runs down each side. The first joint of the first antennae has three long apical processes. The fingers of the chelipeds are together not strikingly narrower than the palm, and they are not devoid of teeth on their confronting margins, though the teeth are inconspicuous except one near each curved apex. Perhaps the most distinctive feature of this species is one to which Stimpson's account makes no allusion, namely, the four conspicuous teeth on the oblique distal margin of the fourth joint in the third maxillipeds. The difficulty of deciding anything as to the independence of Stimpson's species is in large measure due to the varying characters of *G. dispersus*. Thus Hender-son states that "the first striated ridge on the gastric area, situated at the base of the rostrum, bears from two to six spinules, but in some cases they are obsolete." A. Milne-Edwards and Bouvier have discussed the great differences in size that occur between adult specimens. In our three South African specimens, of graduated sizes, the medium one was 23 mm. long, of which the carapace accounted for 12.5 mm., the rostral part of it being 4.5 mm., and the greatest breadth 8 mm. Only in the smallest of the three did the rostral lateral teeth give the impression of slenderness.

Locality. Great Fish Point Lighthouse, W. by N. 5 miles (Cape Colony); depth 22 fathoms. A 919.

GEN. MUNIDOPSIS, Whiteaves.

1874. *Munidopsis*, Whiteaves, Amer. J. Sci., Ser. 3, vol. 7, p. 212.

1882. " S. I. Smith, Bull. Mus. Comp. Zoöl., vol. 10,
No. 1, p. 21.

1888. *Munidopsis*, Henderson, Rep. Voy. Challenger, vol. 27, pt. 69, p. 148.
 1895. „ Faxon, Mem. Mus. Comp. Zoöl., vol. 18, p. 81.
 1900. „ A. Milne-Edwards et Bouvier, Exp. Travailleur et Talisman, Crust. Decap., pt. 1, p. 312.
 1901. „ Alcock, Catal. Indian Deep-sea Crustacea, p. 247.
 1902. „ Benedict, Pr. U.S. Mus., vol. 26, pp. 244, 315.
 1904. „ Calman, Ann. Nat. Hist., Ser. 7, vol. 14, p. 214.

Alcock's synonymy of this genus includes *Galathodes*, *Orophorhynchus*, *Elasmonotus*, instituted by A. Milne-Edwards in 1880, *Anoplonotus*, Smith, 1883, *Galathopsis*, Henderson, 1885, and *Bathyankyristes*, Alcock and Anderson, 1894, the intergrading of all but the last having been already discussed by Faxon in 1895. But, while making the name *Munidopsis* generically paramount, Alcock divides the genus into five groups under the names *Munidopsis*, *Galathodes*, *Orophorhynchus*, *Elasmonotus*, *Bathyankyristes*, so that the last four generic names seem to be practically readmitted as it were by the back door, after being turned out by the front one. Group 1 is defined as:—

“*Munidopsis* proper, with the antero-lateral angles of the carapace spiniform, even if the lateral borders are not anteriorly spinose or dentate; with the rostrum styliform or acutely triangular, without any lateral spines; with the chelipeds decidedly longer than the legs and usually, in the male, as long as, or longer than, the fully extended body; and with the eyes terminal on the eye-stalks, which are almost always freely movable.”

MUNIDOPSIS SIMPLEX, A. Milne-Edwards.

1880. *Galathodes simplex*, A. Milne-Edwards, Bull. Mus. Comp. Zoöl., vol. 8, p. 56.
 1894. *Munidopsis simplex*, A. M.-Edwards et Bouvier, Ann. Sci. Nat., Ser. 7, vol. 18, p. 275.
 1897: „ „ A. M.-Edwards et Bouvier, Mem. Mus. Comp. Zoöl., vol. 19, No. 2, p. 89, pl. 5, figs. 2-7.
 1900. „ „ A. M.-Edwards et Bouvier, Exp. Travailleur et Talisman, Crust. Decap., p. 314.

1902. *Munidopsis simplex*, Benedict, Pr. U.S. Mus., vol. 26, pp. 277, 326.
 1908. „ „ Hansen, Danish Ingolf Exp., vol. 3, Crust. Malac., p. 37.

In Benedict's useful key to fifty-one species of the genus, *M. simplex* is distinguished as one of those in which eye spines are not present, the rostrum is simple and curved upward, the armature of the pleon confined to the median line, the median line on the gastric area armed with spines or tubercles, orbicular (? orbital) sinus lacking, and finally with carapace of nearly uniform width, widest in middle, not cut up into lobes. *M. longirostris*, A. M.-Edwards and Bouvier, agrees with it, according to the key, except in having "carapace not uniform in width, cut into lobes by cervical sutures" and "broadest near anterior end." Our specimens have the carapace narrowest near anterior end, with antero-lateral spines less pronounced than those figured for *M. longirostris*. On the other hand, the third maxillipeds have only two teeth on the inner margin of the fourth joint, which the French authors mention as a character of their species, compared with the three teeth in *M. simplex*. Here also the carapace has a transverse pair of teeth followed by a single tooth near them and another quite distinct at a distance, in accord with *M. longirostris*. Thus, as the French authors themselves suggest, the two forms are probably not specifically distinct. The carapace including rostrum of the larger specimen measures 22 mm. in length, the pleon being rather shorter; it contained eggs in no great quantity. The carapace of a much smaller specimen measured 18 mm., of which the rostrum accounted for 7.5 mm.

Locality. Cape Point, N. 77° E. (Cape Colony); depth 660 fathoms. A 912.

MACRURA GENUINA.

TRIBE THALASSINIDEA.

1893. *Thalassinidea* (part), Stebbing, History of Crustacea, Internat. Sci. Ser., vol. 74, p. 180.
 1901. „ Alcock, Catal. Indian Deep-sea Macrura, p. 151.
 1903. „ Borradaile, Ann. Nat. Hist., Ser. 7, vol. 12, p. 534.

FAMILY AXIIDAE.

1888. *Axiidae*, Bate, Rep. Voy. Challenger, vol. 24, p. 36.
 1901. ,, Alcock, Catal. Indian Deep-sea Macrura, p. 186.
 1901. ,, Rathbun, Bull. U.S. Fish. Comm. 1900, vol. 2, p. 95.
 1906. ,, Rathbun, Bull. U.S. Fish. Comm. 1903, pt. 3, p. 893.
 1907. ,, Borradaile, Ann. Nat. Hist., Ser. 7, vol. 19, pp. 468,
 475, 476.
 1914. ,, Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2,
 pt. 10, p. 85.

GEN. CALOCARIS, Bell.

1853. *Calocaris*, Bell, Brit. Stalk-eyed Crust., p. 231 (dated 1847 by
 White in List of British Crustacea in Brit. Mus.,
 p. 33, 1850).
 1891. ,, Ortmann, Zool. Jahrb., vol. 6, p. 50, pl. 1, fig. 5,
 (mouth organs).
 1901. ,, Alcock, Catal. Indian Deep-sea Macrura, p. 187
 (with synonymy, p. 189).
 1908. ,, Lagerberg, Göteborgs K. Vet. Handl., Ser. 4, vol.
 '11, p. 51.
 1908. ,, Hansen, Danish Ingolf Exp., vol. 3, Crust. Malac.
 p. 41 (distribution).

CALOCARIS BARNARDI, n. sp.

Plate LXVI.

From Bell's *C. macandracae* the present species is well distinguished by the very different proportions of the large chelae in the first pereopods, the fingers in the former being about three times as long as the palm, while here the fixed finger is not longer than the palm and the movable finger about once and a half as long as that shorter part of the palm to which it is attached. In *C. alcocki*, McArdle, the palm is as long as the fingers, but the whole structure is more slender than in the new species. There also the rostrum is upturned, whereas here it is perfectly straight and horizontal; the carinae diverging backwards from the rostrum are each surmounted by three denticles. The telson has a minute median spine in its very shallow apical emargination.

The eyes are large, flattened, and as preserved opaque white.

In the first antennae the proximal portion of the first joint is much wider than the distal; of the two slender flagella one is rather more than thrice, the other more than four times as long as the peduncle. In the second antennae the penultimate joint of the peduncle is twice as long as the last joint, but only a little longer than the ante-penultimate joint; the flagellum is about twice as long as the longer one in the first pair.

In the palp of the mandibles the third joint is the longest. The long two-jointed palp of the first maxillae has the first joint straight, the second sinuous. The third maxillipeds have an apical tooth on the first joint and also on the second, the remaining joints are beset with numbers of very long spine-like setae; the third joint has a slightly oblique surface row of 8 or 9 teeth, and the following joint has a small sub-terminal tooth as in *C. alcocki*; the seventh joint has a close brush of serrate spines in addition to its long setae.

The fixed finger of the first peraeopods has its inner margin crenulate, met before the centre by a prominence of the movable finger. The confronting margins of both fingers in the second peraeopods are finely denticulate.

The first pleopods resemble the petasmata of the Penaeids, but are described and figured by Alcock as common to both sexes. The remarkable second pleopod of the female found in *C. alcocki* is not represented in our specimens. They attain a length of 38 mm.

Locality. Cape Castle, E. $\frac{1}{2}$ N. 9 miles (near Saldanha Bay, Cape Colony); depth 89 fathoms. A 1549.

The specific name is given to mark my sense of the excellent service which Mr. K. H. Barnard is rendering to carcinology at the South African Museum under the auspices of Dr. Péringuey.

TRIBE ERYONIDEA.

1901. *Eryonidea*, Alcock, Catal. Indian Deep-sea Macrura, p. 151.
1910. „ Stebbing, Ann. S. African Mus., vol. 6, p. 377.

FAMILY ERYONIDAE.

1852. *Eryonidae*, Dana, U.S. Expl. Exp., vol. 13, p. 515.
1901. „ Alcock, Catal. Indian Deep-sea Macrura, p. 164
(with synonymy).

GEN. PENTACHELES, Bate.

1878. *Pentacheles*, Bate, Ann. Nat. Hist., Ser. 5, vol. 2, p. 276.
 1888. „ Bate, Rep. Voy. Challenger, vol. 24, p. 143.
 1901. „ Alcock, Catal. Indian Deep-sea Macrura,
 pp. 165, 171.

PENTACHELES GRANULATUS (Faxon).

1893. *Polycheles granulatus*, Faxon, Bull. Mus. Comp. Zoöl., vol. 24,
 p. 197.
 1894. *Pentacheles beaumontii*, Alcock, Ann. Nat. Hist., Ser. 6, vol. 13,
 p. 236, and Illustrations Zool. Investigator, Crust., pt. 2,
 pl. 8, fig. 3.
 1895. *Polycheles granulatus*, Faxon, Mem. Mus. Comp. Zoöl., vol. 18,
 p. 123, pl. 32, fig. 1, pl. 33, figs. 2, 2a.
 1901. *Pentacheles beaumontii*, Alcock, Catal. Indian Deep-sea
 Macrura, p. 175.
 1906. *Polycheles granulatus*, Rathbun, Bull. U.S. Fish. Comm., 1893,
 p. 899, fig. 54.

Both specimens in the collection are small, only reaching a length of 38 or 39 mm. Unfortunately in both the first peraeopods are damaged, but the other details are well within the limits of variation shown by the descriptions which Faxon and Alcock have respectively given. The specimen more particularly examined has the small fifth peraeopod not chelate, the sixth joint being only shortly produced over the seventh, which is stated to be a male characteristic.

Locality. Cape Point E. by N. $\frac{3}{4}$ N. 34 miles (Cape Colony); depth 480 to 600 fathoms. A 1025.

TRIBE PENAEIDEA

1888. *Penaeidea*, Bate, Rep. Voy. Challenger, vol. 24, p. 219.

FAMILY PENAEIDAE.

1881. *Penaeidae*, Bate, Ann. Nat. Hist., Ser. 5, vol. 8, pp. 171,
 173.

GEN. GENNADAS, Bate.

1881. *Gennadas*, Bate, Ann. Nat. Hist., Ser. 5, vol. 8, pp. 171, 191.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2,
 pt. 10, p. 4.
 1914. „ Stebbing, Trans. R. Soc. Edinb., vol. 50, pt. 2,
 No. 9, p. 282 (with synonymy).

GENNADAS KEMPI, Stebbing.

1914. *Gennadas kempi*, Stebbing, Trans. R. Soc. Edin., vol. 50,
 pt. 2, No. 9, p. 283, pl. 27.

In one of the specimens with petasmata, those organs are in precise agreement with the same parts as figured for an example obtained by Dr. Bruce's "Scotia" Expedition. The present specimens have more slender eye-stalks with the lateral process more produced, and the little tooth at the end of the scale of the second antennae is rather longer, but the details in general present no differences. The length of a female specimen was 31 mm., and the male with petasmata well developed was approximately the same. It is no doubt nearly allied to *G. calmani*, Kemp, which appears to be a considerably larger species, and distinguished by a prominent ventral spine on the first pleon segment in both sexes, not found in either sex of the present species.

Locality. Cape Point, NE. $\frac{1}{2}$ N. 47 miles (Cape Colony); depth 700-1,000 fathoms. A 1256.

GEN. PENAEUS, J. C. Fabricius.

1798. *Penaeus*, J. C. Fabricius, Suppl. Ent. Syst., p. 408.

PENAEUS JAPONICUS, Bate.

1888. *Penacus canaliculatus*, Olivier, var. *japonicus*, Bate, Rep. Voy.
 Challenger, p. 245, pls. 31, 32,
 fig. 4, pl. 37, fig. 2.
 1906. „ „ Alcock, Catal. Indian Mus. Macrura,
 fasc. 1, p. 14, pl. 2, figs. 6, 6a-c.
 1906. „ *japonicus*, Nobili, Ann. Sci. Nat., Ser. 9, vol. 4,
 pp. 6, 10.
 1911. „ „ de Man, Siboga Exp. 39a, p. 107.
 1914. „ „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl.
 vol. 2, pt. 10, pp. 7, 13.

The rostrum of the specimen is broken, but the sculpture of the carapace and the thelycum agree with Alcock's figure, and the telson has three small lateral spines on one margin and two on the other. The length of the specimen, with allowance for the broken rostrum, may be estimated as 140 mm.

Locality. Van Staden River, N. by E. $\frac{1}{2}$ E. 3 miles (St. Francis Bay, Cape Colony); depth 32 fathoms. A 1038.

PENAEUS CANALICULATUS, Olivier.

1811. *Penaeus canaliculatus*, Olivier, Encycl. Méthodique, p. 660.
 1888. " " Bate, Rep. Voy. Challenger, vol. 24,
 p. 243, pl. 32, figs. 1, 2.
 1911. " " de Man, Siboga Exp., vol. 39a, p. 147.
 1913. " " de Man, Siboga Exp., vol. 39a, pl. 9,
 figs. 34a, 34b.

Bate's account of this species gives "rostrum slightly arched, furnished on the upper surface with nine teeth, the posterior of which stands on the gastric region a little unequally distant from the preceding, and one tooth on the lower margin immediately below the most anterior of those on the upper." With this our specimen agrees, except in having ten teeth instead of nine, as also with Bate's account of the telson, "acuminate and fringed with hairs at the sides; dorsal median line longitudinally channelled to the apex." It agrees also with de Man's observation that the telson is characterized by bearing no spinules on its lateral margins. So far as could be discovered without dissection the thelycum corresponds with that which de Man figures for the young female. The only point in which the specimen appears to differ from earlier descriptions regards the extension of the rostrum, which reaches beyond the dark bean-shaped eyes, but not nearly to the apex of the peduncle of the first antennae. This peduncle reaches the level of the lateral tooth of the scale of the second antennae. The scale extends some distance beyond this tooth. The flagella of the first antennae are of no great length; the upper stouter one is the shorter. The flagellum of the second antennae measured 70 mm., therefore being longer than the body, which is only 50 mm. The first pereopods are short, nor are any of the limbs conspicuously elongate. The inner branch of the uropods is longer than the telson and shorter than the outer branch,

in which the marginal tooth is inconspicuous, being close to the apex of the branch.

Locality. Bluff Lighthouse, SW. 5 miles; depth 15 fathoms (Durban). A 1190.

PENAEUS PULCHRICAUDATUS, n. sp.

Plate LXVII.

The small slender specimen for which this new species is instituted after long preservation in spirit was still beautifully variegated with lines of little blue spots. The nearest ally appears to be *Penaeus japonicus*, Bate, with which the carapace closely agrees. There are 9 dorsal spines, the hindmost remote from the rest, of which 2 are behind the orbit and the foremost rather remote from the apex and slightly in advance of the single ventral tooth. Between the fourth pereopods there is a long adpressed spine-like ventral process, and a similar but shorter one between the fifth pereopods. The sixth pleon segment is longer than the telson, sharply carinate, ending posteriorly in a medio-dorsal tooth, and having a smaller tooth at each postero-lateral angle. The telson is narrowly lanceolate, behind the centre having eight pairs of marginal spines, four pairs successively larger at successively smaller intervals, followed by a series of four microscopical pairs, all outflanked by the last of the large pairs and placed on the converging sides of the apical tongue, which then becomes nearly parallel-sided, with a slight bulge before running out to a point.

The eyes are large, dark, and bean-shaped, with a narrow peduncle. The two pairs of antennae are like those of *P. japonicus*, with which the mouth organs show much agreement, but in place of the very long terminal joint which Bate attributes to the palp of the first maxillae there are here two short joints, together shorter than Bate's long single joint. In the second maxillae the lowest lobe is notable for the paucity of setae; on the apical lobe there are 3 very short spines, and below them on the inner margin a group of denticles. In the second maxillipeds the terminal joint is shorter instead of longer than the preceding joint, and in both second and third maxillipeds the exopod is much less strongly developed than it appears in the figures of *P. japonicus*. This, however, may be referable to the age of the specimen.

In the first, second, and third pereopods the fingers of the chela are longer than the palm, and the confronting denticulation is more or less limited in its extent. In the first pair groups of little serrate

spines are present subapically on the fifth and proximally on the sixth joint. In the first pair the second and third joints carry each a strong apical spine. In the second pair only the second joint is thus provided. All the peraeopods have exopods, those on the fifth pair being very small. The fifth pair is slightly longer than the fourth, both being considerably shorter than the third. The uropods extend beyond the telson, the outer branch beyond the inner, its small terminal tooth being on a level with the apical margin. Length of specimen 45 mm., the carapace with its rostrum constituting about one-third of this measurement.

Locality. Great Fish Point Lighthouse, N. $\frac{1}{2}$ W., 2 miles (Cape Colony); depth 30 fathoms. A 1046.

GEN. PENAEOPSIS, A. Milne-Edwards.

1881. *Penaeopsis*, A. M.-Edwards in Bate, Ann. Nat. Hist., Ser. 5, vol. 8, pp. 171, 182.
 1888. „ Bate, Rep. Voy. Challenger, vol. 24, p. 273.
 1891. *Metapenaeus*, Wood-Mason, Ann. Nat. Hist., Ser. 6, vol. 8, p. 271.
 1906. *Metapeneus*, Alcock, Catal. Indian Decap. Crust., pt. 3, fasc. 1, pp. 5, 7, 16.
 1909. *Penaeopsis*, Bouvier, Mem. Mus. Comp. Zoöl., vol. 27, No. 3, pp. 205, 220.
 1911. „ de Man, Siboga Exp., vol. 39a, pp. 8, 53.

This genus, according to Dr. de Man, comprises nearly fifty species. Some of them appear to be very closely connected together.

PENAEOPSIS QUINQUEDENTATUS (de Man).

1902. *Penaeus*, sp., de Man, Abhandl. Senckenb. Naturforsch. Gesell., vol. 25, p. 906, pl. 27, figs. 65, 65a-c.
 1907. *Metapeneus quinquedentatus*, de Man, Notes Leyden Mus., vol. 29, p. 133.
 1911. *Penaeopsis q.*, de Man, Siboga Exp., vol. 39a, pp. 8, 71.
 1913. „ de Man, Siboga Exp., vol. 39a, pl. 7, fig. 23a-d.

Among points to be observed in this species, it may be noted that the carapace is without stridulating ridges, the body is finely tomentose, the rostrum setulose below, with five or six teeth on the convex upper margin, its apex reaching little beyond the large red bean-shaped cornea of the eye. There is a small epigastric tooth at some distance behind the

rostrum. The carina of the pleon is most marked on the sixth segment. The pointed apex of the telson has a subapical process on each side, these processes being completely flanked by a pair of movable spines planted higher up, these in turn being partially flanked by a nearly equal pair further up, succeeded further up by a much smaller pair. The first antennae have a large first joint hollowed out to receive the eye, a shorter but still rather long second joint, twice the length of the third joint, which nearly reaches the apex of the scale of the second antenna; the two flagella are little longer than the two preceding joints of the peduncle combined, the more slender flagellum a little longer than its companion.

The second joint of the palp of the mandible is much larger than the first, widening distally and having a shallow emargination in the setose distal border between the two rounded corners. The second pereopod is longer than the first, the third than the second, the wrist contributing notably to the successive elongation. The confronting ends of the fingers are microscopically denticulate. The fifth pereopod is considerably longer than the fourth. The petasmata, as observed in a specimen in which they had not come into contact, and are presumably not fully developed, are in near agreement with those figured by de Man. In a specimen 38 mm. long from apex of rostrum to apex of telson, the carapace measured 12 mm., or 8 mm. without the rostrum, which in this instance had six teeth on the dorsal margin. The sixth pleon segment was nearly 7 mm. long, and the telson slightly over 5 mm., a little shorter than the inner branch of the uropod, which in turn was shorter than the outer branch. In a specimen 38 mm. long, with 5 rostral teeth, the slender flagellum of the second antenna measured 28 mm. in length.

Locality. Cape Natal, W. by N. $6\frac{1}{2}$ miles (Natal); depth 54 fathoms. A 1207.

PENAEOPSIS AFFINIS (Milne-Edwards).

1837. *Penaeus affinis*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 410.
 1906. *Metapeneus a.*, Alcock, Catal. Indian Decap. Crust., pt. 3, fasc. 1, pp. 17, 20, pl. 3, figs. 8, 8a-b (with synonymy).
 1911. *Penaeopsis a.*, de Man, Siboga Exp., vol. 39a, p. 57.

1913. *Penaeopsis a.*, de Man, Siboga Exp., vol. 39a, pl. 6, figs. 15a, 15b.
1914. ,, Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 7.

The separate tooth on the carina of the carapace is followed by eight teeth on the rostrum, which has no ventral teeth and reaches about to the end of the peduncle of the first antennae, this being level with the tooth of the scale of the second antennae. In the first antennae the second joint is stout and long; the flagellum of the second pair is much longer than the body. The telson is dorsally sulcate, sharp-pointed, with lateral setae but not spines. The length of the single dry and brittle specimen is about 52 mm. The place of origin is uncertain, and perhaps the same epithet should be applied to the identification, as thorough examination was not feasible. A 1198.

PENAEOPSIS SPINULICAUDA, n. sp.

Plate LXVIII.

The characters which induce me to name this species as new are to be found in the lanceolate telson which has no large or projecting lateral spines or processes, but numerous little spines within the margins and some that are dorsal among a large number of spicules; further, in the second maxillae, of which the endopod has at the apex two notable spines on one surface and one on the other, and seven or eight little teeth along the inner margin; and further in the symmetrical petasmata, which are fringed along the adjoining margins with innumerable microscopic hooks, and at the two extremities appear to differ somewhat from these organs so far as known in other species.

The rostrum has no ventral teeth but eight dorsal, the last of which is behind the orbit and is followed at a distance by a small tooth on the long carina of the carapace. The eyes are very dark, bean-shaped. In the first antennae the second joint is more than half as long as the first and more than twice as long as the third; the flagella are a little shorter than the first two joints of the peduncle combined, one flagellum for two-thirds of its length much stouter than the other. The scale of the second antennae reaches the end of the peduncle of the first; the flagellum is 96 mm. long.

The mandibles have the molar broad, the second joint of the palp very large and setose, distally narrowed. Lower lip with a small group of setules at the inner corner of the broad lobes. The first

maxillae have a small apical joint, longer than broad, tipped with a seta; the preceding joint has very sinuous margins, with a pellucid transverse band near the apex, behind which the surface has several spines, and the inner margin develops a strong tooth. Second maxillipeds with terminal joint longer than the penultimate, exopod very elongate. Third maxillipeds more slender than the first peraeopods, the long exopod reaching the end of the fifth joint, the epipod strongly furcate. The first peraeopods have the second joint produced into a strong tooth, the short exopod strongly setose, the fifth joint not longer than the chela, in which the palm is much shorter than the fingers; in these the tips are rounded, the confronting margins as usual microscopically denticulate; the brushes of small serrate setae are present distally on the fifth and proximally on the sixth joint. In the much longer second peraeopods, similar to the first as to the tooth and exopod, these brushes are not present, and the fifth joint is much longer than the chela. In the third peraeopods, which are much longer than the second, the fifth joint is twice the length of the chela and the palm is subequal in length to the fingers. The fifth peraeopod is rather shorter than the third, rather more slender than the fourth but considerably longer, and apparently unlike it in having no exopod.

The characters of the first and second pleopods are shown in the figures. The other three pairs have two very unequal branches. The uropods extend considerably beyond the telson, the inner branch without the peduncle being subequal to it in length; the outer branch is broader and rather longer, with a simple unemarginate outer edge, ending in a very small tooth, beyond which the curved strongly setose apical border is scarcely produced. Total length of specimen 65.5 mm., of which the carapace with rostrum occupied 25 mm., the sixth pleon segment 7 mm., and the telson 9.5 mm.

The specimen was obtained by Mr. K. H. Barnard in Durban Bay. In the same gathering were included small specimens which I assign to *Penaeus caeruleus*, and one with seven irregularly spaced dorsal and five ventral teeth on the carapace and elongate rostrum, which I leave for the present undetermined. A 2231.

GEN. PARAPENAEUS, S. I. Smith.

1885. *Parapenaeus*, Smith, Pr. U.S. Mus., vol. 8, p. 170.

1899. „ Alcock and Anderson, Ann. Nat. Hist., Ser. 7,
vol. 3, p. 279.

1901. *Parapeneus*, Alcock, Indian Deep-sea Macrura, p. 14.

1905. *Neopenaeopsis*, Bouvier, Comptes Rendus, vol. 141, p. 747.
 1906. *Parapeneus*, Alcock, Catal. Indian Deep-sea Macrura, pp. 7, 30, 52.
 1909. *Parapeneus*, Bouvier, Mem. Mus. Comp. Zoöl., vol. 27, p. 228.
 1911. „ de Man, Siboga Exp., vol. 39a, p. 77.
 1913. *Parapeneus*, Balss, Schultze's Forschungsreise in Südafrika, vol. 5, pt. 2, p. 105.
 1914. *Parapeneus*, Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 10.

Rostrum without ventral teeth; carapace with longitudinal and vertical sutures usually present; flagella of first antennae not very elongate; "palp" of first maxilla unsegmented; all the pereopods without exopods; no pleurobranch on the last thoracic segment.

Alcock in 1906 retains *P. rectacutus* (Bate) in the genus, though pointing out that its carapace is without the sutures which he includes among the characters of the genus. Dr. de Man notices the difficulty.

PARAPENAEUS FISSURUS (Bate).

Plate LXIX.

1881. *Penaeus fissurus*, Bate, Ann. Nat. Hist., Ser. v., vol. 8, p. 180.
 1888. „ „ Bate, Rep. Voy. Challenger, vol. 24, p. 263, pl. 36, figs. 1, 1'', 1p, 1z.
 1899. „ „ Borradaile, Willey's Zool. Results, pt. 4, p. 404.
 1905. *Parapeneus f.*, Alcock, Ann. Nat. Hist., Ser. 7, vol. 16, p. 520.
 1906. „ Alcock, Catal. Indian Decap. Macrura, p. 31, pl. 5, figs. 16, 16a, 16b.
 1911. *Parapeneus f.*, de Man, Siboga Exp., vol. 39a, p. 79.
 1913. „ de Man, Siboga Exp., vol. 39a, pl. 8, figs. 25a, 25b.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 10, text-fig. 4.

In the specimens examined the rostrum makes a double curve, with six teeth on its dorsal carina, the last small, at some distance from the upturned apex; the sides are also carinate. Of the seven teeth on the carapace the pair between

the first and second antennae are the largest. The sutures are not easily seen until the carapace is detached. The eyes as preserved are orange-red. In the first antennae the third joint is about half as long as the second, and one flagellum two-thirds the length of the other. The flagellum of the second antenna is considerably longer than the body.

In the palp of the mandible the second joint exhibits remarkable width. The chela of the first peraeopods is not longer than the wrist, the fingers are considerably longer than the palm, their confronting margins microscopically denticulate, the whole limb more setose than those which follow, with minute brushes, distal on the wrist, proximal on the hand, such as are more effectively developed elsewhere in the Caridea. The last four joints of the fifth peraeopods are very decidedly longer than the corresponding four respectively of the fourth pair. The first two-fifths of the telson are broad, the sides then becoming fringed with plumose setae and converging to a sharp apex, but midway or a little beyond sending out a pair of unjointed teeth.

Locality. Tugela River, N. by W. $\frac{3}{4}$ W. $15\frac{1}{2}$ miles (Natal); depth 40 fathoms. A 1195.

HALIPOROIDES, n. g.

Near to *Haliporus*, but distinguished by having the palp of the mandibles three-jointed. Rostrum with one or two teeth on the lower edge. Telson trifurcate. Both flagella of first antenna very elongate. First peraeopods with clasping arrangement of spines between the distal margin of the fifth joint and proximal of sixth.

In 1901 Alcock speaks of Bate's *Haliporus* as having the rostrum "toothed dorsally only, as in all the subgenera of *Peneus* excepting *Peneus* itself." Since then, however, Bouvier and de Man have shown that teeth may occur on the ventral margin in various species of *Haliporus*. Thus Bouvier, commenting on the variability of the rostrum in *H. debilis* (S. I. Smith), says that it has the ventral edge sometimes unarmed, more often armed, with from one to three denticles. The trifurcate telson is noted for some species of the genus, but has not been adopted as a generic character. Similarly the clasping spines of the first peraeopods are not present in some of the species, unless they have been overlooked. I have earlier suggested that the corresponding spines in *Sergestes* may be used as brushes and combs for the long flagella of the antennae.

The many striking points of resemblance between the species for which the new genus is proposed and *Haliporus sibogae*, de Man, 1911, greatly perplexed me in view of the undoubted fact that the new species differed not only from de Man's species, but, so far as I could find, from the whole known range of the Penaeidae in having the palp of the mandible three-jointed. Recently, however, Calman has pointed out that Boas in 1880 assigned a three-jointed palp to the mandible in *Sicyonia*, which he himself has verified for *Sicyonia carinatus* (Olivier), adding the same character for *Bemthesicymus investigatoris*, Anderson, thus for the former species controverting Bate's express statement, and for the latter the generic definition alike of Bate and of Alcock.

HALIPOROIDES TRIARTHURUS, n. sp.

Plates LXX., LXXI.

The carapace has a medio-dorsal carina beginning some way in front of the hind margin, with a slight depression where the arms of the cervical groove nearly meet it; thence it ascends to a denticle, followed by a second, remote and reaching to a point level with the base of the orbit; at a rather less distance a series of eight denticles begins, running along the arch of the rostrum, leaving a space intervening to the upturned apical tooth, behind which on the ventral margin there is a denticle about on a level with the foremost denticle on the upper edge; to the rear the margin is concave, closely fringed with setules. Some specimens have a second ventral denticle. The front of the carapace has on each side a small antero-lateral tooth, a larger antennal tooth leading to a short carina at the back of which is another carinate tooth, while further back and lower down is a denticle at the end of the cervical sulcus. The telson is shorter than the uropods, apically acute, with fringes of setae and two divergent processes, about half as long as the portion of the telson from their bases to its apex.

Both flagella of the first antenna are elongate, one much longer than the other. The flagellum of the second antenna attains a great length, in one specimen, not the largest, being 200 mm. long.

The first joint of the mandibular palp is perfectly distinct, rather broader than long, the very large second joint is almost twice as long as the third, and in its expanded proximal half more than twice as broad. The lower lip is perfectly smooth. The palp or terminal joint of the endopod in both the first and second maxillae is completely fringed on both margins with setae or spines, except for a

small smooth interval near the apex in the second maxillae, to make up for which there is a closely packed group of spines on the surface close to the apex. The second and third maxillipeds agree with all the five pairs of pereopods in having each a minute exopod, the smallness being in striking contrast with the great length of the endopod in the third maxillipeds and most of the following appendages.

For the three chelate pairs of limbs the relations of length between the several joints may be sufficiently estimated by help of the illustrations, as they do not appear to show anything exceptional. It may, however, be noticed that in each pair the teeth of the opposing margins are not continued even half-way along the fingers from their blunt apices. A transparent membrane shielding these marginal teeth is perhaps usual in this family.

The total length of the specimen dissected was 87 mm., the carapace with rostrum being 31 mm. long, the sixth pleon segment 11 mm., and the telson 12.5 mm.

Locality. East London NW. $\frac{1}{2}$ N. 18 miles (Cape Colony); depth 250-300 fathoms. Obtained by Dr. Gilchrist. No. 208. The specific name alludes to the distinctly three-jointed character of the mandibular palp.

GEN. MACROPETASMA, n.

A Penaeid with long stiletto-like terminals to the petasma. Rostrum without ventral teeth. Peduncle of first antennae elongate, both flagella rather long. Flagellum of second antennae longer than the body. Second joint of mandibular palp large but distally narrowed. Upper lip and lobes of lower lip broad. An epipod on each of the first three pereopods, an exopod only on the first. Fourth and fifth pereopods very slender.

MACROPETASMA AFRICANUS (Balss).

Plate LXXII.

1913. *Parapeneus africanus*, Balss, Schultze's Forschungsreise in Süd-afrika, vol. 5, pt. 2, p. 105, text-figs. 1-6.

The rostrum, which reaches just beyond the dark globular eyes, has a variable number of dorsal teeth, 12 according to Balss, 11 in a female, 8 in a male of our specimens; at some distance behind the rostrum there is a small tooth. The sixth pleon segment is more than twice as long as the fifth and much longer than the telson, which is very narrow, the sharply

pointed apex having at the base a pair of articulated spines, above which are three pairs of minute marginal spines, inconspicuous among the plumose marginal setae.

The first joint of the first antennae has a leaf-like appendage at the base, the second and third joints successively shorter, but both rather long, the flagella longer than the peduncle, the shorter one (in the male) being at the base the wider and at a little distance from the base expanding and then abruptly narrowing so as to become less wide than its longer companion. In the second antennae the apical tooth of the scale does not quite reach the top of the setose distal margin.

The characters of the maxillae and maxillipeds are well shown by Dr. Balss; those of the lower lip and one mandible are seen in the present plate; the other mandible appears to have the molar process rather less strongly developed.

The first three peraeopods are, as usual in this family, similar in structure, but their difference in size is here very striking, the first pair being very short and the third very long; the first pair differs from the others in having the apparatus of little brushes of spines, serrate on both edges, situate near the base of the hand and distal end of the wrist. The figures sufficiently show the characters of the exopod and epipod attached to this pair. The fourth pair is considerably shorter than the fifth, and is sometimes difficult to observe from its tendency to fold inwards. The thelycum of the female has been figured and described by Dr. Balss.

The petasma of the male appears to be exceptional by the long terminal stiletts, to which the generic name alludes. These appendages are very similar to the male organs of some Isopoda, formed by adaptation of the inner branch of the second pleopods. In the present species the second pleopods have the inner ramus represented by two little folded plates with a diminutive terminal flagellum of seven joints. A female specimen, 67 mm. in length, had a carapace just over 19 mm. long, of which the rostrum took barely 7 mm.; the fifth pleon segment was 5.5 mm. long, the sixth 12 mm., the telson 8 mm., the uropods 11 mm., the third peraeopods 25 mm., the fifth 20 mm. In the somewhat smaller male specimen from which the figures were drawn, the third peraeopods measured 18 mm. and the fifth 15 mm.

Locality. Flesh Point N. $\frac{1}{2}$ W. 2 miles (Mossel Bay, Cape Colony); depth 15 fathoms. A 1206.

GEN. ARISTAEOMORPHA, Wood-Mason & Alcock.

1891. *Aristacomorpha*, Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 8, p. 286.
1895. *Plesiopencus*, Faxon, Mem. Mus. Comp. Zoöl., vol. 18, pp. 197, 199.
1901. *Aristacomorpha* (subgen.), Alcock, Catal. Indian Deep-sea Macrura, pp. 13, 38.
1908. *Aristecomorpha*, Bouvier, Camp. Sci. Monaco, fasc. 33, pp. 52, 53 (with synonymy).
1911. *Aristecomorpha*, de Man, Siboga Exp., vol. 39a, p. 6.

Professor Bouvier in his account of the "Série des *Aristeac*" says, "Premier article des palpes mandibulaires plus étroit et notablement plus court que le second qui est triangulaire et souvent échanuré." The peculiar shape of the second joint with its dilated base is no doubt an interesting characteristic of this group, but the preceding joint is shown to be considerably longer, instead of notably shorter, alike in Bate's figure of this palp in his *Aristeus armatus* and in Bouvier's own figures of it in *Hepomadus tener*, Smith, and *Plesiopencus edwardsianus* (Johnson).

ARISTAEOMORPHA ROSTRIDENTATUS (Bate).

1881. *Aristeus rostridentatus*, Bate, Ann. Nat. Hist., Ser. 5, vol. 8, p. 189.
1888. " " Bate, Rep. Voy. Challenger, vol. 24, pp. 221, 317, pl. 51.
1891. *Aristacomorpha rostridentata*, Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 8, p. 286.
1892. " " Wood - Mason, Illustrations Zool. Investigator, Crust., pl. 2, fig. 1.
1895. *Plesiopencus rostridentatus*, Faxon, Mem. Mus. Comp. Zoöl., vol. 18, pp. 196, 199.
1901. *Aristaeus (Aristacomorpha) rostridentatus*, Alcock, Catal. Indian Deep-sea Macrura, p. 39.
1908. *Aristecomorpha rostridentata*, Bouvier, Camp. Sci. Monaco, fasc. 33, p. 56.
1911. " " de Man, Siboga Exp., vol. 39a, p. 6.

1912. *Aristeomorpha rostridentata*, Kemp and Sewell, Rec. Indian Mus., vol. 7, pt. 1, p. 17.

The figure, natural size, in the Investigator Illustrations would do service excellently for the South African specimen, except that the latter is not quite so large, and that the last three teeth on its rostrum are more widely spaced. Alcock's description speaks of 10 or 11 carinal teeth. The figure shows only 10, and of these the penultimate is obscure; our specimen has only 8. Bate in 1881 estimated the "flagellum of second pair of antennae about six times the length of the animal"; in 1888 he reduces it to "about four times." In our specimen, much as in that of the Investigator, it does not exhibit so disproportionate a length, but it is imperfect. As in Bate's figure, the second joint of the mandibular palp is not so long as the first. The fourth and fifth peraeopods are remarkably slender. Length of the animal from apex of rostrum to that of telson about 5 inches or 125 mm.

Bate was evidently inclined to remove this species from *Aristeus*, since he observes that in that genus three teeth are the almost constant armature of the rostrum, while here alone a number of small teeth arm it to the apex, and that a small tooth at the anterior extremity of the hepatic region, constant in *Penaeus*, is absent in *Aristeus* in all species except *A. rostridentatus*.

Locality. Buffalo River N. 15 miles (East London, Cape Colony); depth 310 fathoms. A 1294.

GEN. EUSICYONIA, nom. nov.

1830. *Sicyonia* (preocc.), Milne-Edwards, Ann. Sci. Nat., vol. 19, p. 339.
 1837. ,, Milne-Edwards, Hist. Nat. Crust., vol. 2, pp. 405, 408.
 1849. ,, de Haan, Crust. Japonica, decas 6, pp. 187, 189.
 1888. ,, Bate, Rep. Voy. Challenger, vol. 24, pp. 219, 292.
 1895. ,, Faxon, Mem. Mus. Comp. Zoöl., vol. 18, p. 179.
 1901. ,, Rathbun, Bull. U.S. Fish. Comm., 1900, vol. 2, pp. 100, 103.
 1906. ,, Rathbun, Bull. U.S. Fish. Comm., 1903, p. 908.
 1911. ,, de Man, Siboga Exp., vol. 39a, pp. 10, 111.

Milne-Edwards separated the genus from *Penaeus* because the pleopods have only one branch instead of two. He did not take account of the male petasma. Miss Rathbun in 1901

uses the median dentate crest of the carapace to distinguish this genus from *Penaeus*, *Parapenaeus*, and *Xiphopeneus*. In 1911 de Man enumerates twenty named species, a named variety, and two unnamed species as belonging to the genus. Between some of them the distinguishing characters seem to be of slight importance.

EUSICYONIA LONGICAUDA (Rathbun).

Plate LXXIII.

1906. *Sicyonia longicauda*, Rathbun, Bull. U.S. Fish. Comm., 1903, p. 908, pl. 20, fig. 6.
 1911. " " de Man, Siboga Exp., vol. 39a, pp. 11, 113.

The South African specimens are in clear agreement with the figure and the characters supplied by Miss Rathbun, except in an unimportant detail. The rostrum is apically bidentate, the upper tooth projecting a little beyond the lower one. The earlier description gives to the rostrum "tip oblique truncate, with three projections, a tooth between two spines." In describing the telson as having "a pair of lateral spines not far from the tip," it is not unlikely that Miss Rathbun refers to the pair of unjointed processes which occupy the position in question in our specimens. There are three pairs of microscopic spines spaced higher up, and much of the telson is fringed with plumose setae. In the first antennae the lower spine-tooth of the first joint does not nearly reach the base of the apical tooth. In the first maxilla the outer plate or palp has two setae at the inner corner of its apex, and within the outer margin has a row of seven spines on the surface. The second maxilla has three very small stumpy spines about the apex. The first pleopod shows a little wart-like piece apparently distinct from the peduncle by the side of the single ramus.

The largest of the South African specimens was about 56 mm. long, the carapace with rostrum measuring 19.5 mm., the fifth pleon segment 5 mm., the sixth 8 mm., the telson 8.5 mm. The uropods were slightly shorter than the telson, both branches with rounded apices.

Locality. Buffalo River N. 15 miles (East London, Cape Colony); depth 310 fathoms. A 1219.

FAMILY LEUCIFERIDAE.

1852. *Sergestidae*, Dana, U.S. Expl. Exp., vol. 13, pp. 601, 608 (in Penaeidea).
1852. *Luciferidae*, Dana, U.S. Expl. Exp., vol. 13, figs. 636, 639, 668 (in Mysidea).
1888. *Sergestidae*, Bate, Rep. Voy. Challenger, vol. 24, pp. 219, 345 (sub-family *Sergestinae*, p. 345, *Luciferinae*, p. 443).
1896. ,, Hansen, Pr. Zool. Soc. London, p. 937.
1905. ,, Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 208.
1914. ,, Illig, Deutsche Südpolar-Exp., vol. 15 (Zool. 7) p. 349.
1914. *Leuciferidae*, Stebbing, Trans. Roy. Soc. Edinb., vol. 5, pt. 2, p. 284.

If the right of primogeniture is admitted, the genus *Lucifer* is entitled to give its name to the family, having been born a year sooner than the rival claimant *Sergestes*. The genus itself, having been properly instituted, does not lose its privilege, although the name originally given to it was preoccupied, and therefore yields to another.

GEN. LEUCIFER, Milne-Edwards.

1829. *Lucifer*, Vaughan Thompson, Zoological Researches, vol. 1, pt. 1, mem. 3, p. 68 (not *Lucifer*), Linn., Amoen. Acad., vol. 6, p. 70, 1760, Sherborn, nor *Lucifer*, Lesson, Aves, ? 1829.
1831. ,, Latreille, Cours d'Entomologie, p. 386.
1837. *Lucifer*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 467 (in Tribu des Leuciferiens).
1852. *Lucifer*, Dana, U.S. Expl. Exp., vol. 13, pp. 639, 668.
1880. *Lucifer*, Boas, Vidensk. Selsk. Skr., Ser. 6, vol. 1, pp. 37, 165.
1888. *Lucifer*, Bate, Rep. Voy. Challenger, vol. 24, pp. 443-469.
1896. *Lucifer*, Hansen, Pr. Zool. Soc. London, p. 937.
1903. *Lucifer*, Ortman, Ergebn. Plankton Exp., vol. 2, G. b., pp. 71, 108.
1904. *Lucifer*, Calman, Ann. Nat. Hist., Ser. 7, vol. 13, p. 151.
1905. *Lucifer*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 208.

Vaughan Thompson enlarges on the characters of the genus

and species, but, while supplying illustrative figures of the latter, he gives it no name. Milne-Edwards, after describing the genus under an altered name, assigns to it first a new species, *L. reynaudii*, and then secondly distinguishes Thompson's species, for which he supplies the name *typus*, in a footnote misquoting Thompson as authority for the generic name *Lucifer*. Milne-Edwards speaks of his *L. reynaudii* as being about 4 inches long. His enlarged figure of it, however, only measures 3 inches, and a line indicating the natural size is 14 mm. long, not very greatly in excess of Dana's measurement for the same species. Dana adds three species to the genus—*L. aestra*, *pacificus*, and *acicularis*. The first of these is regarded by Faxon as probably identical with *L. reynaudii*, and the second is made a synonym of *L. typus* by Bate, who says (*loc. cit.* p. 448): "So far as I can determine, there are only two species of *Lucifer*." Later Hansen states that there are four species preserved in the Copenhagen Museum.

LEUCIFER TYPUS, Milne-Edwards.

1829. *Lucifer*, sp., Vaughan Thompson, Zool. Researches, vol. 1, pt. 1, Mem. 3, pp. 58, 67, pl. 7, fig. 2, the animal enlarged and natural size, parts, 1c, 2c, f1, f3, a1, a2, s, e, t.
 1837. *Lucifer typus*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 469.
 1888. *Lucifer t.*, Bate, Rep. Voy. Challenger, vol. 24, p. 464, pl. 83.

Adult males, a little over 8 mm. long, clearly belonging to this species, were taken at the surface.

Locality. Seven miles SE. from Flesh Point (Mossel Bay, Cape Colony); surface. A 1563.

TRIBE CARIDEA.

1852. *Caridea* (part), Dana, U.S. Expl. Exp., vol. 13, p. 528.

FAMILY CRANGONIDAE.

1853. *Crangonidae*, Bell, British Stalk-eyed Crustacea, p. 255.
 1910. .. Kemp, Fisheries, Ireland, Sci. Invest., 1908, i. [1910], p. 134.

GEN. SCLEROCRANGON, G. O. Sars.

1885. *Sclerocrangon*, Sars, Norske Nordhavs Exp., vol. 14, Crustacea, vol. 1, p. 14.
 1886. ,, S. I. Smith, Rep. U.S. Fish. Comm. for 1885, p. 652 (48).
 1895. ,, Faxon, Mem. Mus. Comp. Zoöl., vol. 18, p. 132.
 1910. ,, Kemp, Fisheries, Ireland, Sci. Invest., 1908, i. [1910], pp. 135, 139.
 1914. *Crangon* (*Sclerocrangon*), Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, pp. 62, 65.

SCLEROCRANGON BELLMARLEYI, n. sp.

Plate LXXIV.

The new species is closely allied to two earlier members of the genus. The first of these was named *Pontophilus jacqueti* by A. Milne-Edwards in 1881, *Ceraphilus agassizii* by Smith in 1885, *Sclerocrangon agassizii* by Smith in 1886, *S. jacqueti* by Faxon in 1895, and more decidedly by Kemp in 1910. The name *Ceraphilus* was no doubt an oversight for *Cheraphilus*. The second allied species is *Sclerocrangon procax*, Faxon, 1895. In the sculpture of the carapace the new species shows general agreement with its allies, but with some differences of detail. Thus the supra-ocular teeth are not produced nearly as far as the short rostrum, the large ascendant process over the rostrum is common to both sexes, the smaller median process behind it is set more forward than in either of the other species, and so is the little marginal tooth to the rear of the large antero-lateral processes. In our specimens the pleon is without medio-dorsal carina except a faintly expressed blunt one on the sixth segment, which has its lateral carinae well marked. In these respects, however, they agree with the variety of *S. jacqueti* which Kemp has figured. From that species they differ in having, like *S. procax*, a longer second joint to the first antennae. The scale of the second antennae is narrow in *S. procax*, apically bifid into two processes, both figured as acute. In the other two species the scale is broad, in *S. jacqueti* having a normal tooth with no bifid appearance, such as is produced in the new species by a tooth with a broad base and a serrate inner margin the tip of which is on a level with the setose rounded part of the apical margin.

The eyes are not very small, with no perceptible tubercle, dark red as preserved.

The mouth organs agree fairly well with those figured by Sars for the typical species, but the mandible has the cleavage of its bifid apex more distinct or less overlapping than as shown for that species, and the vibratory fan of the second maxilla has its lower portion much broader. The middle plate of the first maxilla has six spines instead of four, and the outer border of the palp has only two setae instead of a fringe. The endopod of the first maxilliped is shorter in relation to its exopod than that figured by Sars.

The large subchelate first pereopods, the slender second with their small chela, the slender third pair with needle-like sixth and seventh joints, and the stouter fourth and fifth pairs, do not offer any striking differences from those of the allied species. Differences in the relative lengths of joints are only such as may be referred to individual variation.

The first pleopods have the small inner branch distally narrowed as if to serve the purpose of a coupling apparatus, but no hooked spine could be perceived, nor is such apparatus present on any of the following pairs. Faxon says of *S. procax* that "the terminal segment of the inner branch of the second abdominal appendage in the male bears on its inner margin a short blunt stylamblys, which is absent in *S. agassizii*." I cannot see any indication of this in his figure of the second pleopod in question. In our species the inner branch is distally bilobed, the inner lobe the longer, both distally setose. The following pleopods have each a small simple inner branch, these branches in each pair set so far apart that they could not easily be coupled together. The medio-ventral spines between them appear to be characteristic of the male sex.

The female specimen is 40 mm. long, and much more bulky than the male, which measured only 22 mm. in length.

Locality. Cape Natal N. by E. 24 miles (Natal); depth 440 fathoms. A 1564.

The specific name is given out of respect to Mr. W. H. Bell-Marley, of Durban, to whose kindness I am indebted for various interesting specimens. The present species must, I think, be regarded as a connecting link between *S. jacqueti* and *S. procax*.

FAMILY PALAEMONIDAE.

1910. *Palaemonidae*, Stebbing, Ann. S. African Mus., vol. 6, p. 383 (with synonymy).

GEN. LEANDER, Desmarest.

1849. *Leander*, Desmarest, Ann. Soc. Entom. France, Sér. 2, vol. 7, pp. 87, 91.
 1914. „ Stebbing, Tr. R. Soc. Edinb., vol. 50, pt. 2, No. 9, p. 286 (with synonymy).

LEANDER SERRIFER, Stimpson.

1860. *Leander serrifer*, Stimpson, Pr. Ac. Sci. Philad., vol. 12, p. 41 (110).
 1890. „ „ Ortmann, Zool. Jahrbüch., vol. 5, pp. 521, 525, pl. 37, fig. 17.
 1902. *Palaemon s.*, Rathbun, Pr. U.S. Mus., vol. 26, p. 52.
 1902. *Leander s.*, Doflein, Abhandl. K. Bayer. Ak. Wiss., vol. 21, pt. 3, p. 640.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 57.

A single specimen, 60 mm. in length, has on the carapace ten dorsal teeth, two of which are behind the orbit. There are four ventral teeth to the rostrum, which is as long as the scale of the second antennae. The short flagellum of the first antennae has at the base the marking of eight coalesced joints with several more than twenty joints free. In the first peraeopods the chela is much shorter than the wrist, with its fingers longer than the palm. In the second peraeopods the wrist, rather shorter than the fourth joint, is 8 mm. long, while the chela is 10 mm., of which the palm occupies 6·5 mm.

Locality. Baakens River, Swartkop R., Port Elizabeth (Cape Colony). A 1277.

FAMILY ALPHEIDAE.

1899. *Alpheidae*, Coutière, Thèse à la Faculté des Sciences de Paris (with synonymy).

GEN. OGYRIDES, nom. nov.

1860. *Ogyris* (preocc.), Stimpson, Pr. Ac. Sci. Philad., vol. 12, p. 36 (105).
 1880. „ Kingsley, Pr. Ac. Sci. Philad., 1879, p. 420.
 1893. „ Ortmann, Ergebn. Plankton Exp., vol. 2, G. b. p. 45.

1911. *Ogyris*, de Man, Siboga Exp., vol. 39a, p. 135.

1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2,
pt. 10, p. 37.

Ortmann distinguishes three species, the original *O. orientalis*, Stimpson, *O. alphaevrostris*, Kingsley, in both of which the wrist of the second peraeopod is three-jointed, and his own *O. occidentalis*, which has a four-jointed wrist. Dr. de Man adds *O. sibogae*, which also has a quadriarticulate carpus, but only four teeth on the dorsal carina.

OGYRIDES OCCIDENTALIS (Ortmann).

1893. *Ogyris occidentalis*, Ortmann, Ergebn. Plankton Exp., vol. 2,
G. b. p. 46, pl. 3, figs. 4, 4a, d, f-i, k-s, z.

Ortmann mentions that the denticles on the medio-dorsal carina of the carapace number from seven to nine. In our specimens examined it varied from six to eight. The palp of the first maxilla has a bilobed apex, with a seta on each lobe. In the second maxilliped the third joint is much broader than the fourth, and the broad seventh joint, which is not at all finger-like, is remarkable for its size. As in the other species the long stalks of the small eyes are a notable feature. Length from apex of carapace to that of telson 15 mm.

Locality. Saldanha Bay (Cape Colony); depth 10 fathoms. A 1298.

With this species there occurred a specimen of the curious amphipod, *Platyischnopus mirabilis*, Stebbing.

FAMILY PASIPHAEIDAE.

1852. *Pasiphaeidae*, Dana, U.S. Expl. Exp., vol. 13, pp. 532, 536.

1908. „ Lagerberg, Göteborgs K. Vet. Handl., Ser. 4,
vol. 11, p. 5.

1914. „ Stebbing, Tr. R. Soc. Edinb., vol. 50, pt. 2,
p. 293 (with synonymy).

GEN. PARAPASIPHAË, S. I. Smith.

1884. *Parapasiphaë*, Smith, Rep. U.S. Fish Comm., 1883, p. 383
(39).

1901. *Parapasiphaea*, Alcock, Catal. Indian Deep-sea Macrura,
pp. 58, 64.

1910. *Parapasiphaë*, Kemp, Fisheries, Ireland, 1908, pp. 37, 47.
 1914. „ „ Stebbing, Tr. R. Soc. Edinb., vol. 50, pt. 2,
 p. 294.

The mandibles have a slender two-jointed palp.

PARAPASIPHAË SULCATIFRONS, S. I. Smith.

1884. *Parapasiphaë sulcatifrons*, Smith, Rep. U.S. Fish Comm.,
 1883, p. 384 (40), pl. 5, fig. 4,
 pl. 6, figs. 1-7.
 1886. „ „ Smith, Rep. U.S. Fish Comm.,
 1885, pp. 5, 8, 12, 13, 15, 79.
 1908. „ „ Hansen, Danish Ingolf Exp.,
 vol. 3, pt. 2, p. 79.
 1910. „ „ Kemp, Fisheries, Ireland, 1908,
 p. 47, pl. 5, figs. 1-21.
 1913. *Parapasiphae* „ Stephensen, Meddel. om Grön-
 land, vol. 22, p. 48.

The South African specimen agrees completely with the excellent figures and description supplied by Professor S. I. Smith, and corroborated by Mr. Stanley Kemp, who in addition gives interesting information as to the development. In this species the rostrum is much shorter than in the Indian species of the genus described by Colonel Alcock. The mouth organs in this genus have several noteworthy peculiarities, such as the abrupt narrowing of the palp in the first maxillæ. Our specimen measured 79 mm. in length, of which the carapace occupied 28 mm. and the telson 12.5 mm.

Locality. Cape Point ENE. 36½ miles (Cape Colony); depth 660 fathoms. A 1255.

GEN. PHYE, Wood-Mason.

1893. *Phye*, Wood-Mason, Ann. Nat. Hist., Ser. 6, vol. 11, p. 164.
 1914. „ „ Stebbing, Tr. R. Soc. Edinb., vol. 50, pt. 2, p. 294.

PHYE PACIFICUS (Rathbun).

1902. *Pasiphaea pacifica*, Rathbun, Pr. U.S. Mus., vol. 24, p. 905.
 1904. „ „ Rathbun, Decap. Crust. NW. coast N.
 America, p. 20, text-figs. 2, 3.

The South African specimen shows no difference of any importance from Miss Rathbun's figures and description. The front is rounded at the centre; behind this a small

forward pointing tooth rises, the upper edge of which is continued in a carina almost to the end of the carapace; the pleon is carinate from the second to the end of the sixth segment without any tooth-like extension. The sixth segment is rather longer than the furcate telson, the fork of which is fringed with 22 graduated spines. The palpless mandible has a cutting edge of 12 teeth, one of them minute, the largest double. The middle plate of the first maxilla is fringed with 13 spines, the inner plate has only armature on one corner, the palp, not abruptly narrowed, carries 8 setae. The first peraeopod has 3 spines on the inner margin of the fourth joint, the second 19 on the corresponding margin, with 7 on the margin of its second joint, of which Miss Rathbun only says that it "is armed with a small spine at the distal end of its inferior margin." Total length of specimen in median line 103 mm., the carapace accounting for 33 mm., the sixth pleon segment 13·5 mm., and the telson 11·5 mm.

Locality. Cape Natal N. by E. 24 miles (Natal); depth 440 fathoms. A 1254.

FAMILY HIPPOLYTIDAE.

1910. *Hippolytidae*, Stebbing, Ann. S. African Mus., vol. 6, pt. 4, p. 390 (with synonymy).

GEN. SARON, Thallwitz.

1891. *Saron*, Thallwitz, Zool. Anzeiger, vol. 14, p. 99.
 1906. ,, Calman, Ann. Nat. Hist., Ser. 7, vol. 17, p. 30.

Calman, in his provisional synopsis of the family Hippolytidae, distinguishes this genus as having arthrobranchiae at the bases of the first four pairs of peraeopods, mandibles with incisor process and palp, more than seven jointlets in the wrist of the second peraeopods, and a movable spine at the base of the second peraeopods.

SARON MARMORATUS (Olivier).

1811. *Palaeomon marmoratus*, Olivier, Encycl. Méth., vol. 8, p. 665.
 1852. *Hippolyte gibbosus*, Dana, U.S. Expl. Exp., vol. 13, p. 565, pl. 36, fig. 4a-c.
 1891. *Saron gibberosus*, Thallwitz, Zool. Anzeiger, vol. 14, p. 99.

1898. *Saron marmoratus*, Borradaile, Pr. Zool. Soc. London, p. 1009.
 1906. *Spirontocaris marmorata*, Rathbun, U.S. Comm. Fish for 1903,
 pt. 3, p. 913.
 1914. „ *gibberosa*, Balss, Abhandl. K. Bayer. Ak. Wiss.,
 Suppl. vol. 2, pt. 10, p. 46.

For this species Borradaile supplies an ample synonymy, with explanatory discussion. Miss Rathbun supplements Borradaile's reference to Olivier by giving the page, and the reference to the Atlas of the Encycl. Méth., vol. 24, pl. 319, fig. 3, 1818; but appears to be unaware of the contributions to the literature of the subject by Thallwitz and Borradaile. In 1904 Miss Rathbun enumerated no fewer than 51 species of *Spirontocaris* as found in the Pacific, and exhibiting great diversity in form. Since then two more species have been added to that genus by Rathbun and two by Brashnikow, if the generic name *Euales*, which he used for one of them, is to be considered a synonym of *Spirontocaris*. According to Calman's synopsis in *Spirontocaris* (with several synonyms) there are no arthrobranchiae on the peraeopods, only seven jointlets in the wrist of the second peraeopods, and the mandibular palp is two-jointed. In *Saron marmoratus* I find the mandibular palp three-jointed, so that at least that species is properly withdrawn from *Spirontocaris*. But, as even the numbers above mentioned do not show the complete series of species at present assigned to that genus, it may eventually prove desirable to make a much more extensive redistribution of its members.

The single South African, or rather South-east African, specimen exactly resembles Dana's figure in the dentation of the carapace, but in addition has many tufts of feathered setae. The mandibles have a long molar and four small distinct teeth to the cutting edge. In the first maxillae the apex of the palp is emarginate, with a strong spine on the inner corner. The vibratory plate of the second maxillae is short, the apical plate of the endopod narrow, tipped with one long and two short setae, the intermediate lobes large, but the lower small, with the upper division insignificant. In the first and second maxillipeds the exopod extends much beyond the endopod and in the second is attached to a joint compounded of the second and third joints, with the fourth and fifth joints small, the sixth and transversely attached seventh large. The long third pair do not reach the end of the scale of the second

antennae, carry long feathered setae, and have an exopod which does not reach the end of the antepenultimate joint. First pereopods much stouter than second. Wrist of second pereopods with not fewer than ten jointlets. The carapace with rostrum measures 16 mm., the remainder of the body 20 mm.

Locality. Mozambique, where the specimen was obtained by Mr. K. H. Barnard. A 2215.

FAMILY PANDALIDAE.

1888. *Pandalidae*, Bate, Rep. Voy. Challenger, vol. 24, pp. 480, 625.
 1901. „ Alcock, Catal. Indian Deep-sea Macrura, pp. 55, 56, 91 (with synonymy).
 1902. „ Doflein, Abhandl. K. Bayer. Ak. Wiss., vol. 21, pt. 3, p. 615.
 1904. „ Rathbun, Harriman Alaska Exp., p. 43.
 1910. „ Calman, Ann. Nat. Hist., Ser. 8, vol. 5, p. 524.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 27.

GEN. PANDALUS, Leach.

1814. *Pandalus*, Leach, Edinb. Encycl., vol. 7, p. 432.

PANDALUS MODESTUS, Bate.

1888. *Pandalus modestus*, Bate, Rep. Voy. Challenger, vol. 24, p. 670, pl. 114, figs. 4, 4b, k, l, l', m.

Bate's 3 specimens were obtained by the "Challenger" at the Agulhas Bank, from a depth of 150 fathoms. The 3 specimens from the South African Museum are without notification of special locality. Though all imperfect, they show so many points of agreement with Bate's account that I am disposed to attribute discrepancies either to his imperfect observation or to variation within the species. Thus the only perfect carapace has 8 dorsal teeth, of which 5 with appearance of articulation are behind the orbit, the remaining 3 on the rostrum are not articulated; there are only two little ventral teeth, both in advance of the dorsal series. According to Bate "the frontal margin beyond the orbit has no well-defined teeth." In our specimen it has a well-marked antennal tooth, and a small antero-lateral.

Of the first antennae the more robust flagellum is also the longer. The stiliform extremity of the first peraeopods appears to have an apical slit. Bate speaks of the second peraeopods as unequally long and slender. Each of our specimens has only one member of the pair, the wrist in two instances being four-jointed, in the third instance much longer and obscurely multiarticulate, thus among them agreeing with Bate's figures for this pair. The last three pairs of peraeopods are in agreement with Bate's account, except that the curved fingers, instead of only 2 teeth on the concave border, have on its proximal part a series of 4 or 5 slender spines, successively larger towards the apex. Bate says that the first pair of pleopods is single-branched. In our specimen it has a short but conspicuous inner blade. The uropods are longer than the telson, their rami nearly equal in length, the broader outer one prolonged beyond the lateral tooth in a broadly rounded apex. The narrow telson has 7 pairs of lateral spines and 2 pairs that are much longer on the irregularly truncate apex. Total length of the specimen specially examined, not quite the largest, was 23.5 mm., of which the carapace with rostrum occupied a little more than 7 mm.

Locality uncertain. A 1280.

GEN. PLESIONIKA, Bate.

1888. *Plesionika*, Bate, Rep. Voy. Challenger, vol. 24, pp. 626, 640.
 1899. *Parapandalus* (part), Borradaile, Willey's Zool. Results, pt. 4, pp. 396, 411.
 1901. *Plesionika*, Alcock, Catal. Indian Deep-sea Macrura, pp. 91-94.
 1910. „ Stebbing, Ann. S. African Mus., vol. 6, p. 392.
 1914. „ Balss, K. Ak. Wiss., Wien, Ak. Anzeiger, No. 9, p. 1.

Alcock distinguishes *Plesionika*, in which there are epipodites on the first four pairs of paraeopods, from *Parapandalus* which has no epipodites on those limbs, with the result, as Balss points out, that *Parapandalus longirostris*, Borradaile, must be transferred to *Plesionika*.

PLESIONIKA LONGIROSTRIS (Borradaile).

1899. *Pandalus* (*Parapandalus*) *longirostris*, Borradaile, Willey's Zool. Results, pt. 4, pp. 396, 413, pl. 37, figs. 10, 10a-h.
 1914. *Plesionika l.*, Balss, K. Ak. Wiss., Wien, Ak. Anzeiger, No. 9, p. 1.

Although a length of not more than 2 inches might be expected to distinguish our specimens from those which Dr. Willey collected in New Britain, exceeding a length of 5 inches, yet in most other respects the South African examples show very exact agreement with Borradaile's description and figures of his species. The upturned rostrum is a striking feature, being about twice the length of the trunk of the carapace in the medio-dorsal line, armed above and below with teeth, those at the base above being for the most part longer and further apart than those towards the free end. But Borradaile both in his sub-generic definition and in his description of this species speaks of movable spines, which cannot be reconciled either with his figure or with our specimens. It may be noticed indeed that Alcock omits the character from the definition of *Parapandalus* as restricted, and in describing *Pandalus (Parapandalus) spinipes* (Bate) expressly states that the serrations of the rostrum in that species are comb-like and fixed, while to *Plesionika* he assigns a "rostrum armed dorsally with fixed teeth and sometimes with movable teeth also." The figures of the mouth organs in Borradaile's plate are all characteristic of those in the South African specimens, except that in the cutting plate of the mandible each external tooth of the five is larger than any of the three intermediate teeth. The other member of the pair of mandibles differs a little from its fellow in having six teeth. The second maxilliped has the very short broad seventh joint more distinct than might be expected from the figure. The first peraeopods have on the distal part of the fifth joint and the proximal part of the sixth several transverse rows of short spines or stiff setules, which may perhaps be of use for cleansing the long flagella of the two pairs of antennae. The second pair of peraeopods with their small setose chela and many-jointed wrist are equal. The narrow end of the telson carries a short spine flanked by two long ones.

Locality. Cape Natal, W. by N. $\frac{3}{4}$ N. 11 miles (Natal); depth 185 fathoms. A 1272.

GEN. HETEROCARPUS, A. Milne-Edwards.

1881. *Heterocarpus*, A. Milne-Edwards, Ann. Sci. Nat., Ser. 6, vol. 11, art. 4, p. 8.

1888. *Herterocarpus*, Bate, Rep. Voy. Challenger, vol. 24, pp. 480, 626, 627.
1893. ,, Stebbing, History of Crustacea, p. 238.
1895. ,, Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 148.
1901. ,, Alcock, Catal. Indian Deep-sea Macrura, pp. 92, 102.
1912. ,, Kemp and Sewell, Records Indian Mus., vol. 7, pt. 1, p. 20.

Bate, in describing the genus, says that the two long and slender flagella of the first antennae "both only reach a little beyond the distal extremity of the rostrum," but his figure of *H. gibbosus* contradicts this, and in his description of the species he states that of these flagella "the longest is nearly as long again as the rostrum." Of the nearly allied *H. tricarinatus* Alcock and Anderson say that "the subequal antennular flagella are more than three-fourths the length of the body, rostrum included."

HETEROCARPUS TRICARINATUS, Alcock and Anderson.

1894. *Heterocarpus tricarinatus*, Alcock and Anderson, J. Asiat. Soc. Bengal, vol. 83, pt. 2, p. 14 (154).
1901. ,, ,, Alcock, Catal. Indian Deep-sea Macrura, pp. 103, 107; Zool. Investigator, Crustacea, pl. 51, fig. 1.

The authors distinguish this species from *H. gibbosus*, Bate, 1888, "by its smaller size, and by the indistinctness of the lower lateral carina, which fades completely before reaching the posterior half of the carapace." Alcock in 1901 says: "In an egg-laden female the length of the rostrum is 21 millim., of the carapace 24 millim., of the abdomen 49 millim." The rough measurements taken of our single South African specimen agree almost to a nicety with the foregoing, thus giving in each case a total length of $3\frac{3}{4}$ inches. Bate gives the entire length of his species as 43 mm., but to that must evidently be added 20 mm. for the rostrum and 5 mm. for the telson, bringing the total to 68 mm.; even so, however, the small size is no doubt due to immaturity, since Alcock records an egg-laden Indian specimen measuring 156 mm. in length, thus leaving *H. tricarinatus* much inferior in that respect,

though it has the more numerous dorsal spines on the rostrum and the more extensively developed flagella on the first and second antennae.

In our specimen the eyes have an unusual appearance, the dark red cornea being mapped out into quadrangular areas of different sizes, an effect due to the vicissitudes of captivity and travel. The carapace has 8 teeth on the medio-dorsal carina, the hindmost 3 very small; it has 6 on the rostrum dorsally and 8 very distinct ventrally with one or more among the setules close to the orbit. The flagella of the first antenna are elongate, distally of extreme tenuity; the flagellum of the second antenna is considerably over 100 mm. long. The two second peraeopods are very unequal, and the fourth pair much longer than the fifth.

Locality. Buffalo River, N. 15 miles (East London, Cape Colony); depth 310 fathoms. A 1292.

HETEROCARPUS ALPHONSI, Bate.

1888. *Heterocarpus alphonsi*, Bate, Rep. Voy. Challenger, vol. 24, pp. 629, 632, pl. 112, fig. 1, 1l, 1".
 1891. " " Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 7, p. 196.
 1892. " " Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 9, p. 367.
 1901. " " Alcock, Catal. Indian Deep-sea Macrura, pp. 103, 106.

From other species of the genus Alcock distinguishes this as having the third, fourth, and fifth pleon segments sharply carinate, and each prolonged into a backward pointing tooth, the other pleon segments not carinate, the sixth not twice as long as the fifth and shorter than the telson. Length of the South African specimen from tip of the long slender rostrum to end of telson about 5 inches. The rostrum has 11 teeth on the lower edge, above 9 teeth are spaced along the rostrum on to the body of the carapace.

Locality. Cape Natal N. by E. 24 miles (Natal); depth 440 fathoms. A 1291.

HETEROCARPUS LAEVIGATUS, Bate.

1888. *Heterocarpus laevigatus*, Bate, Rep. Voy. Challenger, vol. 24, p. 636, pl. 112, fig. 3.

1899. *Heterocarpus laevigatus*, Alcock and Anderson, Ann. Nat. Hist., Ser. 7, vol. 3, p. 285; Illustrations, Investigator, pl. 41, figs. 1, 1a.
1901. „ „ Alcock, Indian Deep-sea Macrura, pp. 103, 105.

Alcock's figure of this species differs from that given by Bate in having more numerous ventral teeth to the long upward pointing rostrum. The two agree in having the foremost of the five teeth on the medio-dorsal carina in advance of the eye. In the South African specimen that tooth is over the eye not in advance of it; and the ventral teeth of the rostrum are ten in number. According to Alcock and Anderson "the under margin of the rostrum is armed with eleven to thirteen teeth."

Locality. East London NW. $\frac{1}{2}$ N. 20 miles (Cape Colony); depth 408 fathoms. A 1295.

GEN. CHLOROTOCUS, A. Milne-Edwards.

1882. *Chlorotocus*, A. Milne-Edwards, Rapport Comm. pour la faune sous marine, p. 18.
1883. „ A. Milne-Edwards, Recueil figs. Crust. Nouv., pl. 16.
1888. ? „ Bate, Rep. Voy. Challenger, vol. 24, pp. 627, 673.
1901. „ Alcock, Indian Deep-sea Macrura, pp. 92, 100.
1902. „ de Man, Abhandl. Senckenb. Nat. Gesellschaft, vol. 25, pt. 3, p. 856.
1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 33.

From the other Pandalidae this genus is distinguished by having the wrist of the second peraeopods only bipartite. The first peraeopods are simple.

For the single South African specimen which Bate assigned to this genus as *C. incertus*, he figured and described the palp of the mandible as two-jointed, and in place of a dentate cutting edge represented a sort of stiletto. On each side of the rostrum he gave an orbital tooth, but no antero-lateral tooth below. Also, according to Alcock, the branchial formula which he gives does not conform with that of the type-species, *C. gracilipes*, at least as represented by the variety *anda-*

manensis. Bate also mentions the presence of an ocellus, of which Alcock says the eye is devoid.

CHLOROTOCUS CRASSICORNIS (A. Costa).

Plate LXXV.

1871. *Pandalus crassicornis*, A. Costa, Annuario Mus. Zool. R. Univ. Napoli, Ann. 6, p. 89, pl. 2, fig. 2.
1882. *Chlorotocus gracilipes*, A. Milne-Edwards, Archiv. Missions scient. littér. (3), vol. 9 (Senna), p. 18 (Bate).
1883. " " A. Milne-Edwards, Recueil figs. Crustacés, pl. 16.
1885. " " Carus, Prodromus faunae Mediterraneae, vol. 1, p. 474, and *Pandalus crassicornis*, p. 477.
1888. " " Bate, Rep. Voy. Challenger, vol. 24 pp. 674, 681.
1904. " *crassicornis*, Senna, Annuario Mus. Zool. R. Univ. Napoli, n. ser., vol. 1, No. 18, pp. 1-3, fig. 1 (with synonymy).
1914. " *gracilipes*, Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 33.

The carapace has 11 or 12 dorsal teeth, 4 behind the orbit, the rest on the rostrum, which beyond the eye has 5 ventral teeth; on each side of the rostrum there is an orbital tooth and an antero-lateral tooth below. The telson has five pairs of dorso-lateral spines, the last pair adjoining the abruptly narrowed apex, which is flanked by a pair of much longer spines and bordered with long setae. The fifth pleon segment has no postero-lateral tooth; the sixth is dorsally spinulose between two sharp points.

The eye shows no ocellus. The mandibular palp is distinctly three-jointed; one cutting-plate has six, the other five teeth. The widely divergent lobes of the lower lip have little sharp tips. The emarginate palp of the first maxillae is tipped with several setae. The second and third joints of the second maxillipeds are coalesced, with only a small notch in the margin. Other mouth organs agree fairly with those figured by Bate for *C. incertus*. The first peraeopods are very setose, and on the surface of the simple seventh joint have many rows of microscopic spinules. In the second peraeopods the "chelae are, for a *Pandaloid*, large," as Alcock observes,

while for *C. incertus* this point is not noticed. The third peraeopod is longer than the fifth. The larger specimen, a female with eggs, measured 58 mm., the smaller, from which the figures were drawn, was about 40 mm. in length.

Localities. Cape Point NE. by E. 6 miles (Cape Colony); depth 80 fathoms. A 1269; and Cape Natal W. by N. $\frac{3}{4}$ N. 11 miles (Natal); depth 185 fathoms. A 1271.

Two opposite questions suggest themselves, one, whether *C. incertus* may not be a synonym of *C. crassicornis*, the other, whether, if correctly described, they should not be assigned to different genera.

FAMILY NEMATOCARCINIDAE.

1888. *Nematocarcinidae*, Bate, Rep. Voy. Challenger, vol. 24, pp. xiii, 809, 927.
 1914. „ Stebbing, Tr. Roy. Soc. Edinb., vol. 50, pt. 2, p. 296 (with synonymy).

GEN. NEMATOCARCINUS, A. Milne-Edwards.

1881. *Nematocarcinus*, A. Milne-Edwards, Ann. Sci. Nat., Zool., Ser. 6, vol. 11, art. 4, p. 14.
 1914. „ Stebbing, Tr. Roy. Soc. Edinb., vol. 50, pt. 2, p. 297 (with synonymy).
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., Suppl. vol. 2, pt. 10, p. 22.

This genus is well fitted to excite wonder at the length and tenuity of the flagella in both pairs of antennae and of the three median joints in the last three pairs of peraeopods. Admiration, however, may well be tinged with disappointment when the student finds that, owing to these very characters, all his specimens are mutilated. In the present collection not a single example could be found with the third peraeopod complete, the fourth and fifth pairs offering respectively no more than two and three perfect limbs. Similarly, the more or less elongate rostrum, scarcely ever absolutely uninjured, is often seriously damaged or broken short off at the base. Spence Bate, who uses the length of the rostrum and its denticulation to justify a variety of specific distinctions, in his discussion of *N. productus* practically admits that the criterion is untrustworthy. For two species, *N. undulatipes* and *N. tenuirostris*, Bate gives the character that the finger in the

third and fourth peraeopods (or one of them) is undulated. This would separate the former from *N. cursor*, A. Milne-Edwards, with which Alcock in 1901 suggests its identity. Alcock in the same year refers to the close affinity between Bate's *N. tenuipes* and the same author's *N. tenuirostris*. But in redescribing the latter he makes no mention of undulated fingers, while of *N. tenuipes* Bate expressly says that the fingers are straight. Between his *N. lanceopes* and his *N. longirostris* Bate draws the distinction that in the former the eggs are large and oval, but in the latter small and round. Whether the eggs observed were at the same stage of development he does not state. In this genus the large size of the second joint in the second maxillipeds may be worthy of notice, though much the same character occurs in neighbouring families.

Specimens, differing much in bulk, all from considerable depths, and all from the same area of the South African waters, have been sent from the following stations:—

1. Cape Point N. 81° E. 32 miles; depth 460 fathoms. A 1312. No. 180.

2. Cape Point E. by N. $\frac{3}{4}$ N. 34 miles; depth 480–600 fathoms. A 1242.

3. Cape Point NE. $\frac{3}{4}$ E. 6 miles; depth 600 fathoms. A 1287.

4. Cape Point Lighthouse N. $2\frac{3}{4}$ E. 36 miles; depth 600 fathoms. No. 179.

5. Cape Point Lighthouse NE. $\frac{3}{4}$ E. 36 miles; depth 600 fathoms. No. 200.

6. Cape Point N. 89° E. 36 miles; depth 700 fathoms. A 1243.

7. Cape Point NE. by E. $\frac{1}{2}$ E. 43 miles; depth 900 fathoms. A 1229.

8. Cape Point N. 58° E. 49 miles; depth 900 fathoms. A 1290.

A specimen which has come to light from a ninth station must be reserved for discussion at a future opportunity.

NEMATOCARCINUS LANCEOPES, Bate.

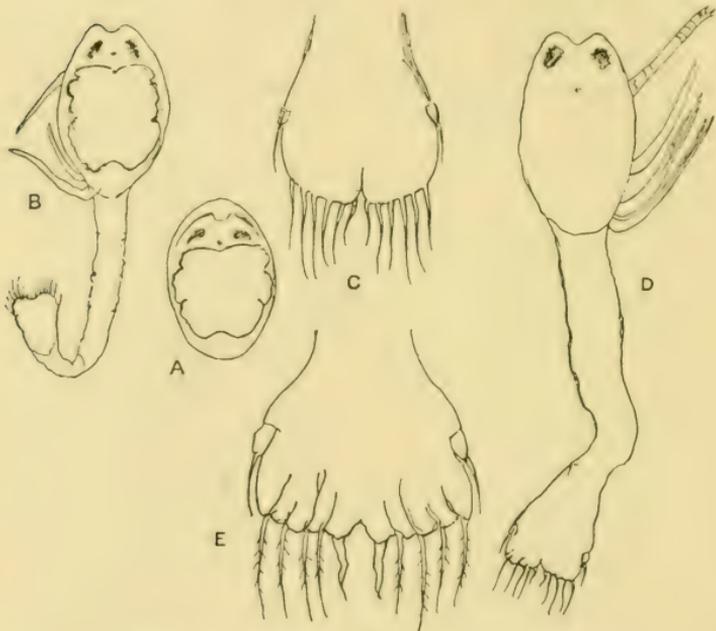
1888. *Nematocarcinus lanceopes*, Bate, Rep. Voy. Challenger, vol. 24, p. 804, pl. 131.

1914. „ „ Stebbing, Tr. Roy. Soc. Edinb., vol. 50, pt. 2, p. 298, pl. 32b.

In using the above specific name for the present collection I must confess that it is only adopted after long deliberation as a counsel of despair. Some of the specimens have a length of 7 inches, retaining as preserved and while shielded from light a deep red colour. A specimen from No. 7 in the list of stations given above has the following dimensions: total length 175 mm., of which the carapace with rostrum accounts for 75 mm. and the telson for 21.9 mm. The rostrum from the base of the orbit is nearly 41 mm. long; the dorsal teeth are 30 in number, 7 of them behind the base of the orbit, the foremost 3 widely spaced, ventral teeth 3, widely spaced, the ventral margin as usual setulose. The sixth pleon segment is of the same length as the telson, the fifth pereopod 109 mm. long. The finger of this limb is much shorter than that of the fourth pair, but broader at the base, triangular with a setule at the tip, surrounded as in the preceding pair by long setae finely fringed, some of them more conspicuously armed near the base. Neither in this nor in any other specimen is the third pleon segment dorsally extended into an acute point.

Only two specimens in the collection are carrying ova, each being an example of very large size, with very long rostrum, the length of it conjectural in one case but easily inferred from companion specimens. In each instance the eggs are abundant, not round but decidedly oval, yet curiously differing in size and other respects. Those of the larger pattern are from the smaller depth of 460 fathoms, the smaller from the depth of 600 fathoms (No. 4 in the list). It is interesting to compare these forms with that which Mr. Stanley Kemp has figured and described in 1910 (Fisheries, Ireland, p. 79, pl. 9, figs. 9, 10), extracted from an egg of "*Nematocarcinus ensifer*, var. *exilis*, Spence Bate." Mr. Kemp says: "The chief features of this larva are the long, sharp, downwardly curved rostrum and an obtuse angle in the posterior third of the third abdominal somite. The telson (Fig. 10) is apically emarginate and bears seven pairs of plumose setae. The mandibles, maxillae, and maxillipedes are present, but no pleopods or pereopods are developed." Presumably my figures show an earlier stage of development, as there is a nauplian eye, no rostrum, but on the other hand there appears a small plate tipped with a seta and indicative of the coming uropods (the Figs. A, B, C are from station No. 179, D, E from No. 180. The telson, Fig. C, is more highly magnified than the telson, Fig. E).

Specimens from the third, fifth, and eighth stations are all of comparatively small size and have reddish brown eyes, while in specimens from the other stations, whether large or small, the eyes are black. A specimen from the third station, with the rostrum perfect, shows that arrangement of its denticulation which Bate describes and figures for his Japanese species *N. longirostris*, the dorsal teeth very numerous, to the rear closely packed, but widely separated forward, where they are accompanied by five ventral teeth. This specimen was



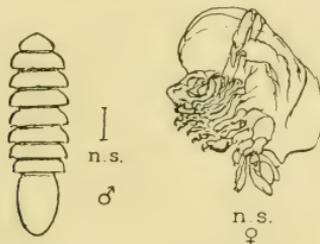
Ovum, and larvae from ova of *Nematocarcinus*, sp.

83 mm. in total length, the carapace 34 mm., inclusive of the rostrum, which measured 18 mm. Another specimen with carapace 30 mm. long has a rostrum 14 mm. in length. This specimen also has five ventral teeth, the dorsal numbering 36. A specimen from the eighth station has a carapace 32 mm. long, of which only 12 mm. belong to the rostrum. The dorsal teeth are 19, the tooth most to the rear being clearly separate from the 8 immediately in advance of it. There are 4 ventral teeth nearly corresponding in position to the

4 anterior dorsal teeth behind the foremost dorsal tooth. The antennal tooth and the antero-lateral tooth of the carapace are acute and conspicuous, but this seems to be a character common to the South African specimens. The telson agrees in length with the rostrum. Another specimen from the same station, measuring 81 mm., has a carapace 28 mm. long, with rostrum 10 mm., dorsal teeth 28, and no ventral teeth.

In the mouth organs of different specimens there do not appear to be variations on which any reliance can be placed for specific discrimination.

The Epicaridean parasite here figured, with a specific name alluding to the genus of its host, was lodged among the anterior pleopods of a large specimen taken at Station A 1229. The parasite itself has the characters of a genus very clearly described by Professor Sars in his *Crustacea*



Hemiarthrus nematocarci, n. sp.

of Norway (vol. 2) under the preoccupied name *Phryxus*. For this Giard and Bonnier substituted the name *Hemiarthrus*, rather unfortunately as the closely similar name *Hemiarthrum* had already been used. The male of the new species is distinguished from that of *H. abdominalis* (Krøyer) by the very different shape of its oval pleon. On its first extraction from an apparently symmetrical situation the female may well excite surprise by its extremely lopsided structure, but Sars has explained that "the parasite is always found to be firmly attached by the aid of the one series of legs to the basal part of one of the anterior pleopods of its host, sometimes the right, sometimes the left, and the distortion of the body to the one or the other side depends on this mode of attachment" (*Crustacea of Norway*, vol. 2, p. 217). Nevertheless, the distortion, which is so adequately explained

when a Bopyrid is lodged in the cheek-piece of a prawn, seems far less natural when its residence is between the pleopods, unless inherited from an ancestry differently located. *Cryptione elongatus*, Hansen, was described in 1897 from the branchial cavity of *Nematocarcinus agassizii*, Faxon, and quite recently Mr. K. H. Barnard has described *Zonophryxus quinquedens*, n. sp., found in company with an unnamed South African species of *Nematocarcinus*.

FAMILY ATYIDAE.

1879. *Atyidae*, Kingsley, Pr. Ac. Sci. Philad., p. 414.

GEN. CARIDINA, Milne-Edwards.

1837. *Caridina*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 362.
 1910. „ Stebbing, Ann. S. African Mus., vol. 6, pt. 4, p. 393
 (with synonymy).
 1912. „ Lenz, Arkiv för Zoologi, vol. 7, No. 29, p. 4.
 1913. „ Bouvier, Tr. Linn. Soc. London, Ser. 2 Zool., vol. 15,
 pt. 4, p. 447.

CARIDINA NILOTICUS (ROUX).

1833. *Pelias niloticus*, Roux, Ann. Sci. Nat., vol. 28, p. 73, pl. 7.
 1908. *Caridina nilotica*, de Man, Records Indian Mus., vol. 2,
 pp. 255, 262, 263.
 1910. „ „ Stebbing, Ann. S. African Mus., vol. 6,
 pt. 4, p. 394.

To judge by the elaborate researches of Dr. de Man and Professor Bouvier the species of *Caridina* are capable of yielding an endless number of variations. Professor Bouvier has patiently dealt with hundreds, nay, thousands, of specimens. With seven specimens at my disposal from a single locality, it may be interesting to give details as to the rostrum in each. The first examined excited attention by a feature which did not recur in any of the others, namely, by having three dorsal teeth lying closely in succession behind the apex; they were separated by a long smooth interval from the series of 17 dorsal teeth, of which 2 are behind the orbit; 10 ventral teeth form a series beginning some way in front of the eyes and ending in advance of the dorsal row but at some distance from

the apex. The second specimen showed 21 dorsal teeth in series, 1 after a long interval, and still another after a shorter interval lying close to the apex, the first and second dorsal teeth were behind the orbit, the twenty-first just behind the foremost of the 10 ventral teeth. A third specimen bore 17 teeth in dorsal series, 3 of them behind the orbit, a single tooth after a long interval, and after a short interval 1 tooth near the apex; the ventral teeth were 14, the foremost almost under the single dorsal tooth following the long interval. The fourth specimen, a female with eggs, had 16 dorsal teeth, 2 of them behind the orbit, then a very long interval followed by 2 teeth close to the apex, the 14 ventral teeth reaching much beyond the dorsal series, but not nearly to the apex. The fifth specimen, also a female with eggs, had 17 dorsal teeth followed at a long interval by 2 at the apex, which was approached at a shorter interval by the 13 ventral teeth. The sixth specimen, a small one, had 18 dorsal teeth, of which the foremost was slightly more distant from its neighbour than the others and followed at a long interval by 2 at the apex, with 12 ventral teeth also distant from the apex. The seventh specimen differs much from the others, having a series of 6 teeth, 3 of them behind the orbit, followed at a short distance by a series of 3 ending a little in advance of the eyes, all the rest of the rostrum being devoid of teeth, except a minute group below the apex. This is perhaps a monstrosity rather than a variation. The first specimen measured 24.5 mm. in length; the apex of the telson carried 7 long spines, 3 on one side and 4 on the other of the minute central point, flanked by a short pair of lateral spines, a similar pair a little higher up being unsymmetrically placed. That one of the named varieties may claim these specimens for its own is not unlikely.

Locality. Vaal River at Parys (Orange Free State). Collected by Mr. H. A. Fry. 1471.

FAMILY STYLODACTYLIDAE.

1880. *Stylodactylidae*, Bate, Rep. Voy. Challenger, vol. 24, pp. 481, 850.
 1902. „ de Man, Abhandl. Senckenb. Naturforsch. Gesells., vol. 25, p. 897,

1906. *Stylodactylidae*, Rathbun, Bull. U.S. Fish Comm. for 1903, pt. 3, p. 927.
 1907. „ Borradaile, Ann. Nat. Hist., Ser. 7, vol. 19, p. 466; *Stylodactyloidea*, pp. 467, 471.
 1914. „ Balss, Abhandl. K. Bayer, Ak. Wiss., Suppl. vol. 2, pt. 10, p. 26.

In this family remarkable characters are furnished by the second maxillipeds and the first two pairs of peraeopods. According to Bate the second maxilliped "terminates in two branches, subequal in size and importance," though his figure qualifies the subequality by showing one branch nearly twice as long as the other. From his specific descriptions it is evident that he regarded both branches as representing the seventh joint. Borradaile takes a different view, assigning to this family "second maxillipeds with the sixth and seventh joints articulating separately on fifth." Against this explanation it may be urged that the short curved joint which follows the long third joint has the appearance of being actually representative of the fifth joint. Bate speaks of it as "analogous to the carpos." But if the third joint be in reality composite, ischium and merus in one, the following joint will be the true fifth. Whatever their numerical position, the two terminal branches are very anomalous. Dr. Calman has suggested to me that the smaller branch may be a process of the sixth joint which has become movable, like the thumb of the first peraeopod in the genus *Psalidopus*, Wood-Mason. In the first and second peraeopod the palm has dwindled to the shortest span, and the long slender setose fingers lie so closely one upon the other that the ordinary function of chelae as grasping organs seems almost out of the question.

GEN. *STYLODACTYLUS*, A. Milne-Edwards.

1881. *Stylodactylus*, A. M.-Edwards, Ann. Sci. Nat., Ser. 6, vol. 11, art. 4, p. 11.
 1888. „ Bate, Rep. Voy. Challenger, vol. 24, pp. 481, 850.

Milne-Edwards established the genus for a single species, *S. serratus*, though giving precedence in 1883 to another species, *S. rectirostris*, on Plate 35 of his "Recueil de Figures de Crustacés Nouveaux ou peu connus," *S. serratus* being

figured on the following, Plate 35a. Bate in 1888 added *S. discissipes*, *S. orientalis*, and *S. bimaxillaris*, in the first and third directing attention by the specific names to the most notable characters of the family. The grounds assigned for separating *S. orientalis* from *S. discissipes* can scarcely be accepted as adequate. In 1902 de Man describes a very young specimen, related to *S. bimaxillaris*, under the provisional name of *S. amarynthis*. There are thus six nominal species in the genus, if we include *S. rectirostris*, which has been overlooked since its institution. The figures very clearly differentiate it from *S. serratus*. The rostrum shows 37 teeth above and 7 below in addition to a tooth close to the base; the first peraeopod has the wrist or fifth joint longer than that of the second peraeopod, and the telson is only about twice as long as broad, with a blunt apex. In *S. serratus* the rostrum shows 36 teeth above, 27 below, without tooth close to the base; the second peraeopods decidedly longer than the first, the wrist and fingers contributing to this superiority in a marked degree; the telson more than thrice as long as broad, with apex acute.

STYLODACTYLUS SERRATUS, A. Milne-Edwards.

Plate LXXVI.

1881. *Stylodactylus serratus*, A. Milne-Edwards, Ann. Sci. Nat.,
Ser. 6, vol. 11, art. 4, p. 11.
1883. " " A. Milne-Edwards, Recueil figs. Crust.
 Nouv., pl. 35a.
1888. " " Bate, Rep. Voy. Challenger, vol. 24,
 p. 853.

The South African specimens appear essentially to agree with the descriptions and figures given by A. Milne-Edwards, except that the wrist of the second peraeopods does not differ in length from that of the first pair, although the fingers are much longer. These fingers are quite straight, strongly setose, the apex not acute. In the preserved condition they are resilient, upon separation springing back into position, one overlapping the other so as to look like a single joint. On these limbs and some other parts the long setae, instead of being finely and continuously plumose, have spicules discontinuously projecting at various angles on different lines.

A specimen with rostrum and telson practically complete measured 52 mm., rostrum 13 mm., carapace with rostrum 23 mm., pleon 29 mm., of which the telson accounted for 7 mm. Here the upper carina carried 34 teeth and the lower margin of the rostrum 17. The length of the telson is more than thrice its greatest breadth; dorsally there is a small group of setae near the base; 6 pairs of spines are spaced to the place whence the sides abruptly converge to form a pointed apex flanked by a short pair of spines, with a longer pair outside them, one of the pair in our specimen abnormally shorter than the other.

The eyes are of moderate size, as preserved reddish brown, with the pigment broken up into irregular compartments. In Milne-Edwards' account the eyes are small, but he adds that they are in contact on the median line, which would imply some tumidity. To the first antennae he attributes a little pointed scale, but his figure shows that this stylocerite, as Bate calls it, is at least as long as the joint of which it forms a part; the flagella are very unequal. The scale of the second antennae has the smooth margin somewhat concave, with the distal tooth reaching beyond the narrowed apical margin.

As the figures show, the denticulation of the mandibles is not absolutely identical in the two members of the pair or in different specimens of the same species. According to Bate the palp or outer branch of the first maxillae is bifid at the extremity; in our species the extremity is only faintly emarginate, with a strong seta at the inner corner, three slighter setae at the outer, and a curved surface spine below the apex. The vibratory apparatus of the second maxillae carries very long setae on the lower end which is narrower than the upper. The second maxillipeds have the terminal joints as represented by Milne-Edwards, the longer but narrower plate attached near the inner margin of the preceding joint, but partly overlapping the attachment of the shorter and broader plate; both are beset with masses of curved plumose setae alike from their own margins and surfaces and from the preceding joint, which contains muscles directed to each of the plates. Third peraeopods stouter than fourth or fifth, fingers small, with dentate inner margin.

The outer branch of the uropods has a sinuous diaeresis

leading to a tooth on the outer margin, this tooth partially overlapping a stout spine.

The specimen figured is an ovigerous female, measuring by allowance for the imperfect rostrum about 3 inches or 75 mm.

Locality. Buffalo River NW. $\frac{1}{2}$ W. 19 miles (East London, Cape Colony); depth 300 fathoms. A 1284.

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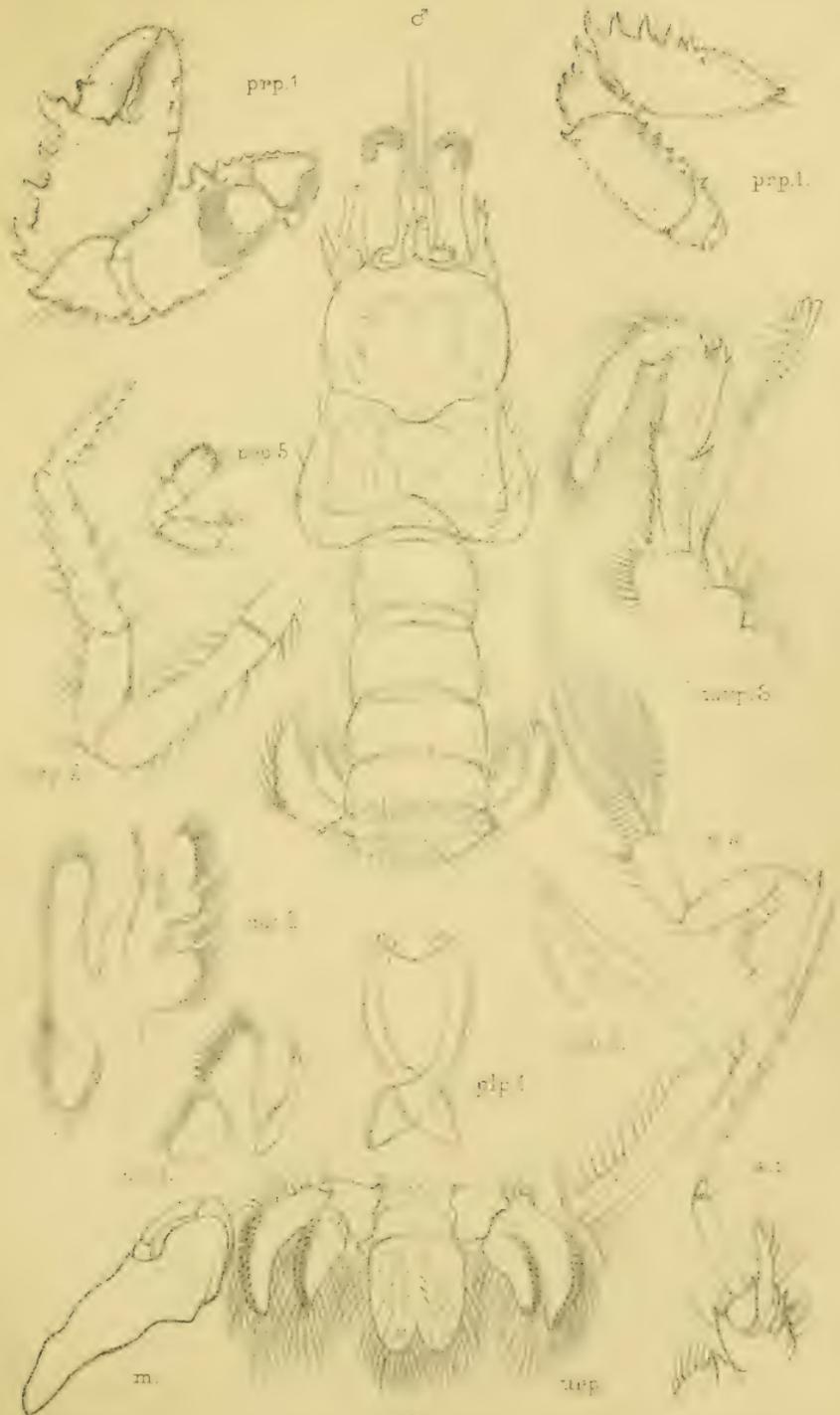
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PLATE I. (Crustacea, Plate LXV.)

Pomatocheles balssi, n. sp.

- ♂. Dorsal view of male specimen magnified, the telson folded out of sight.
- T., urp. Dorsal view of telson and uropods. This figure and the peraeopods on the same scale as the full figure, the rest more highly magnified.
- a.s., a.i. The first and second antennae, flagellum of the second incomplete.
- m., mx. 1, mx. 2, mxp. 3. Mandible, first and second maxillae, and third maxilliped.
- prp. 1, 1, 2, 5. Both members of the first pair in their relative positions, but the inner side of the large left cheliped is shown and the outer of the smaller right-hand one. The peraeopod marked prp. 2 is open to a little doubt, as, besides being detached, it was the only one present of the three intermediate peraeopods, and may therefore be the third; the fifth peraeopod was in position when received.
- plp. 1, 2. The first pair of pleopods and one member of the second pair.



Del. T.R.R. Stebbing

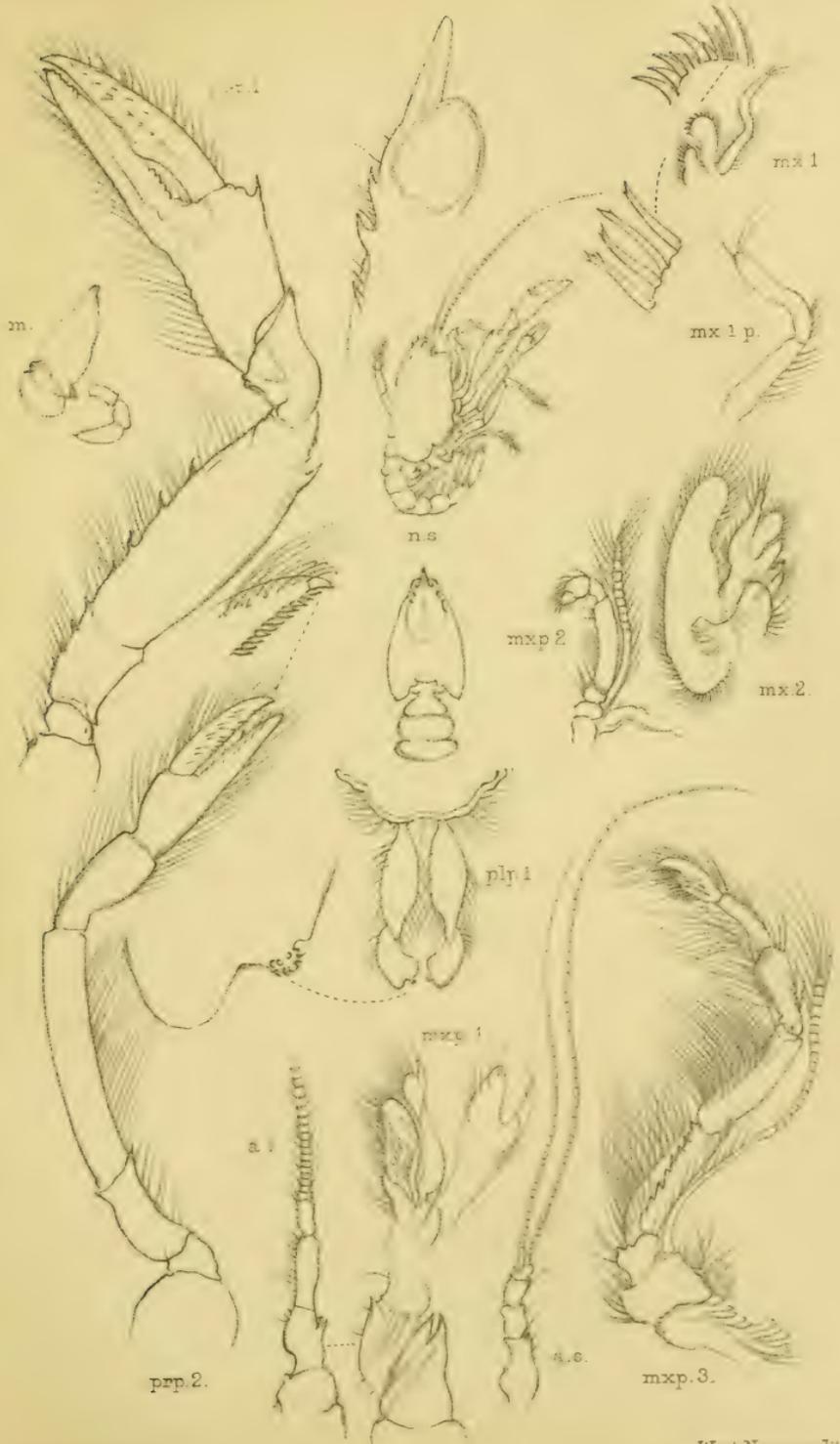
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West, Newman lith.

PLATE II. (Crustacea, Plate LXVI.)

Calocaris barnardi, n. sp.

- n.s. A specimen in lateral view, natural size, and the same without appendages in dorsal view below; the rostrum and eye in lateral view above, magnified.
- a.s., a.i. The first and second antennae; only a small portion of the flagellum of the latter shown, the antepenultimate joint of its peduncle more highly magnified.
- m., mx. 1, mx. 1 p., mx. 2. Mandible, with palp detached, first maxilla, with higher magnification of spines, palp of the other mx. 1 more highly magnified; second maxilla on a higher scale of magnification.
- mxp. 1, 2, 3. First, second, and third maxillipeds.
- prp. 1, 2. First and second pereopods, with higher magnification of the apex of the movable finger of the second.
- plp. 1. The first pair of pleopods, with apex more highly magnified.



T.R.R. Stebbing del.

West, Newman lith.

CALOCARIS BARNARDI, n.sp.

PLATE III. (Crustacea, Plate LXVII.)

Penacus pulchricaudatus, n. sp.

car. Carapace in lateral view.

T. Telson in dorsal view, with much higher enlargement of the distal portion.

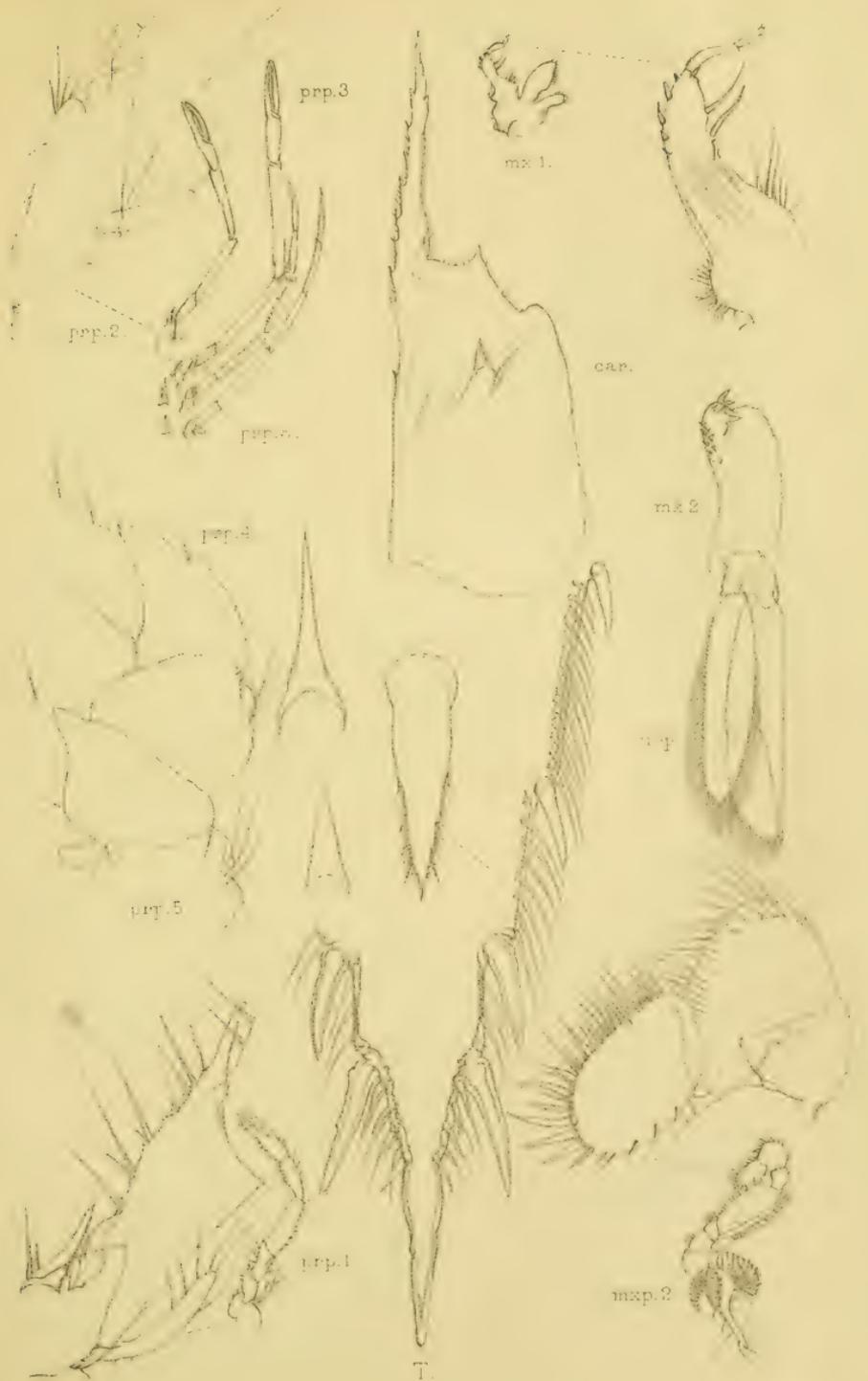
mx. 1. First maxilla with terminal joints much more enlarged.

mx. 2. Only the apical plate of the second maxilla, on the higher scale.

mxp. 2. The second maxilliped, with higher enlargement of the three distal joints.

prps. 1-5. The five pereopods, the first with higher enlargement of the second and third joints and the exopod; the second with further enlargement of second joint and exopod; basal joints of fourth and fifth on the higher scale, with the adjoining ventral processes.

urp. One of the uropods.



Del. T.R.R. Stebbing.

West, Newman lith.

PENAEUS PULCHRICAUDATUS n.sp.

PLATE IV. (Crustacea, Plate LXVIII.)

Penaeopsis spinulicauda, n. sp.

- car. Part of carapace in lateral view.
- T. Telson in dorsal view.
- a.s. First antenna.
- p.m. Palp of mandible.
- mx. 1. First maxilla, with much higher magnification of terminal joints (the palp).
- mx. 2. Second maxilla, with much higher magnification of the lobes and terminal joint.
- mxp. 1. First maxilliped, with much higher magnification of intermediate joints of the endopod.
- mxp. 2. Second maxilliped.
- plp. 1. First pleopod with the petasma, with much higher magnification of the proximal and distal ends of one of its members.
- plp. 2. Second pleopod.

The various parts are drawn to a uniform scale, with the higher magnifications also uniform.



Del. T. E. Stebbing.

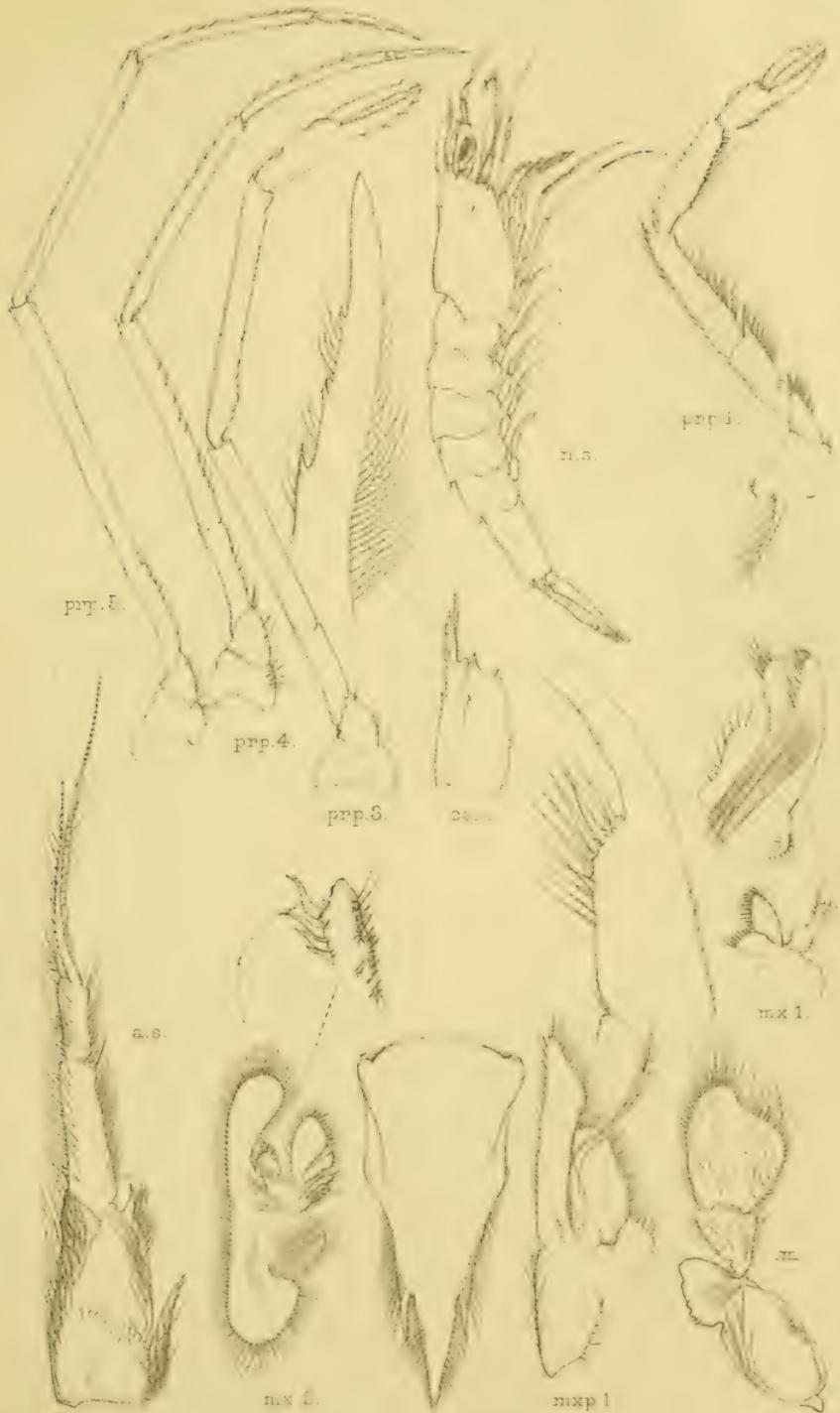
West, Newman lith.

PENÆOPSIS SPINULICAUDA n.sp.

PLATE V. (Crustacea, Plate LXIX.)

Parapenaeus fissurus (Bate).

- n.s. Specimen in lateral view, natural size, flagellum of second antennae imperfect.
- car. Carapace of a smaller specimen detached, to show more clearly the teeth and the fissures, with higher magnification of distal portion of the rostrum.
- T. The telson much enlarged.
- a.s. First antenna.
- m., mx. 1, mx. 2, mxp. Mandibles, first and second maxillae, first maxilliped, with higher magnification of the palp or apical joint of the first maxilla, and still higher of the apex in the second maxilla and the base of the flagellar portion of the first maxilliped.



• Del. T. R. Stebbing.

West, Newman lith.

PLATE VI. (Crustacea, Plate LXX.)

Haliporoides triarthrus, n. g. et sp.

- n.s. Lateral view of specimen figured above, natural size.
- car. Much enlarged view of the carapace.
- T. Apical part of the telson.
- m. Mandible.
- pp. 1. Wrist and chela of first peraeopod.



Del. T.R.R. Stebbing.

West, Newman lith.

HALIPOROIDES TRIARTHROS *n.g. et sp.*

PLATE VII. (Crustacea, Plate LXXI)

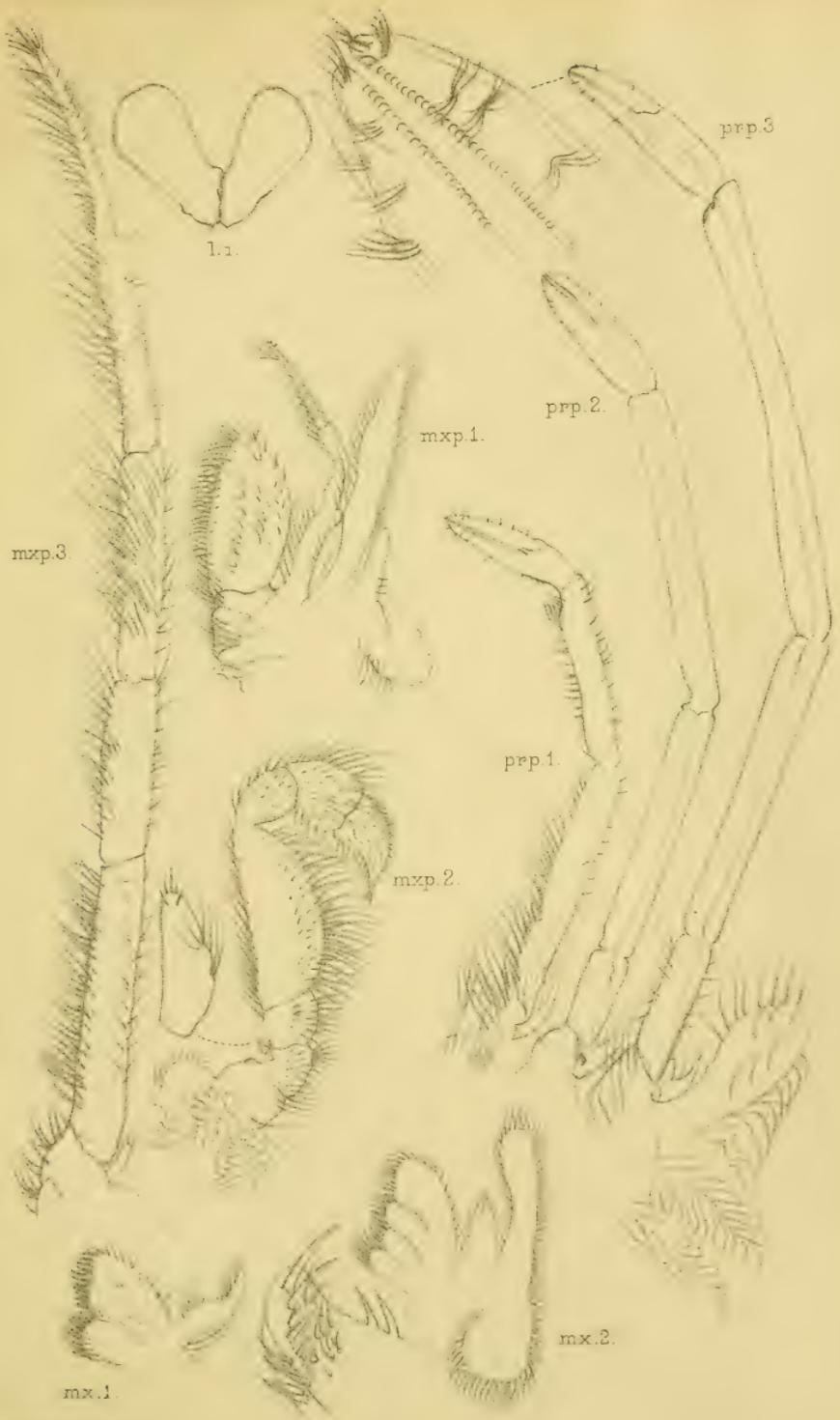
Haliporoides triarthrus, n. g. et sp.

l.i. Lower lip.

mx. 1, mx. 2. First and second maxillae, with higher magnification of the apex of the endopod of the second.

mxp. 1, 2, 3. First, second, and third maxillipeds, with exopod of the second more highly magnified.

ppp. 1, 2, 3. First, second, and third pereopods, with apices of the fingers of the third pair more highly magnified.



Del T.R.R. Stebbing

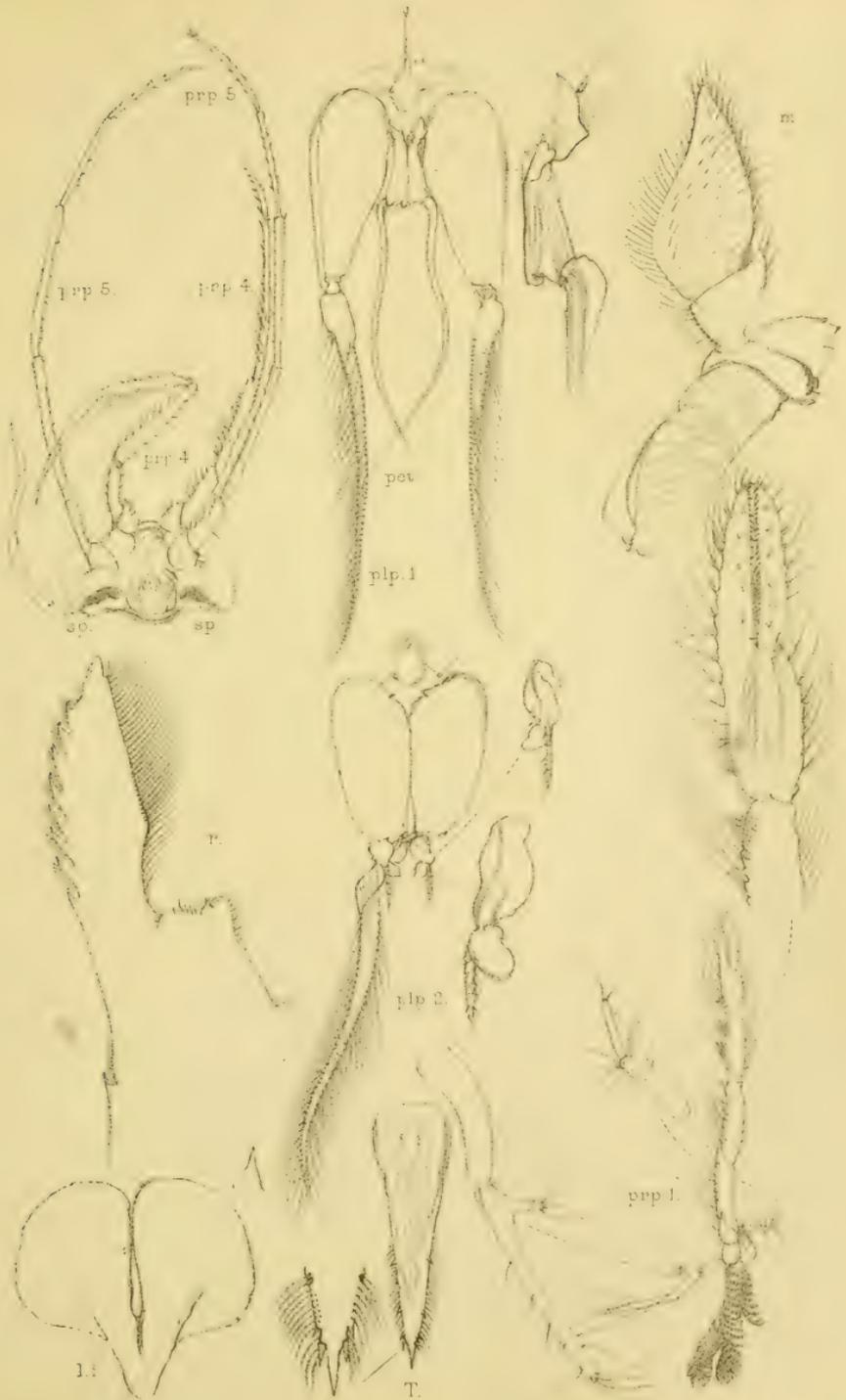
West, Newman lith.

HALIPOROIDES TRIARTHURUS *n.g. et sp.*

PLATE VIII. (Crustacea, Plate LXXXII.)

Macropetasma africanus (Balss).

- r. Rostrum and part of carapace.
- T. Telson, with apex more highly magnified.
- m., l.c. Mandible and lower lip.
- prp. 1. First peraeopod, with higher magnification of the epipod, the exopod, chela and part of fifth joint.
- prp. 4, prp. 5, sp., sp. Fourth peraeopods, one of the pair in its partially folded position, and fifth peraeopods with spermatophores.
- plp. 1, plp. 2, pet. First pair of pleopods with the petasma, part of which is more highly magnified, and second pleopods, omitting the outer ramus of one member, the vestigial ramus more and more highly magnified.



Del. T. R. Stebbing.

MACROPETASMA AFRICANUS (Balss)

PLATE IX. (Crustacea, Plate LXXIII.)

Eusicyonia longicauda (Rathbun).

car. Carapace in lateral view, incomplete.

T. Telson in dorsal view.

a. s., a. i. First antenna and scale of second.

m., m. p., m. Mandible with the palp detached, the other mandible with its palp oblique.

l. i. Lower lip.

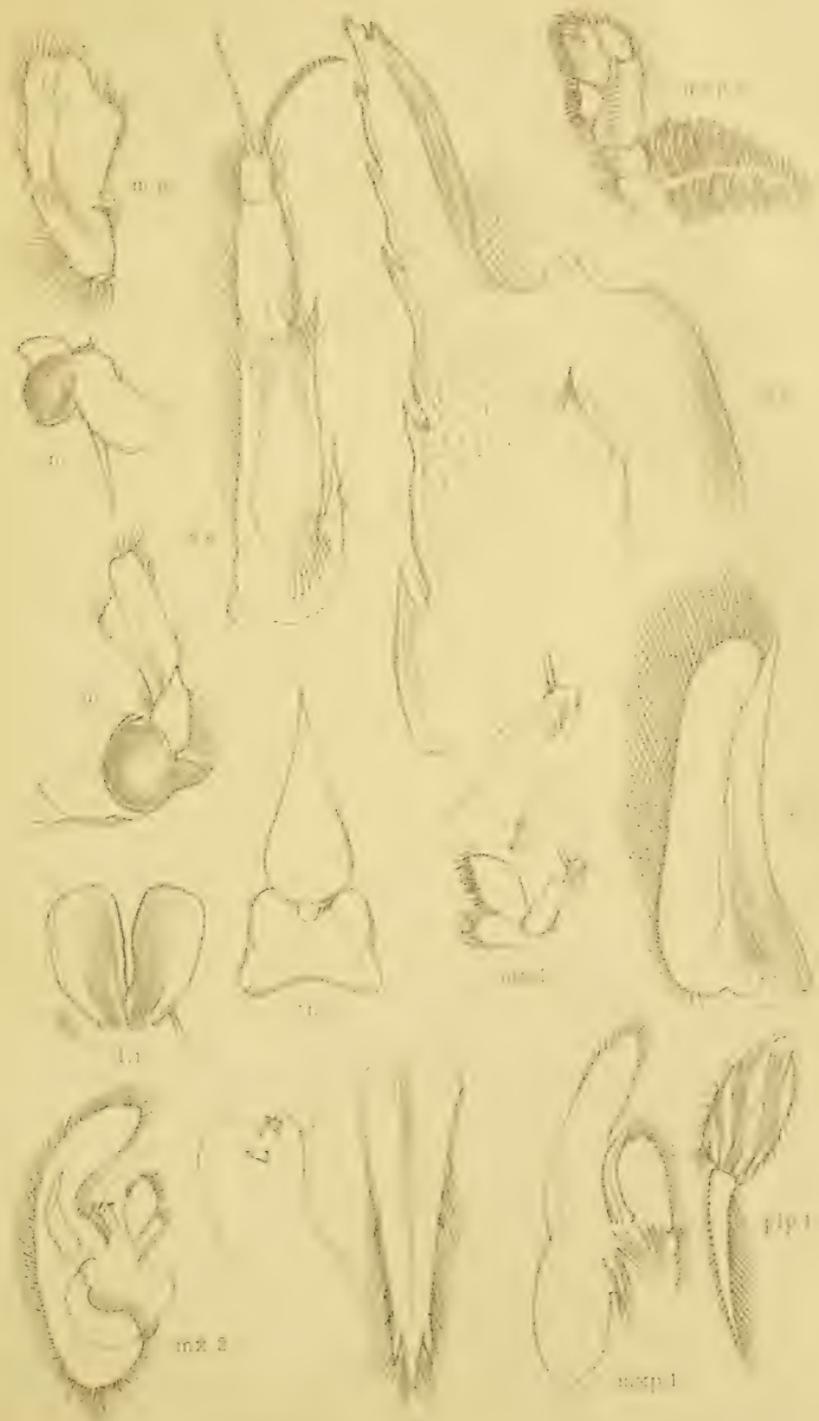
mx. 1, mx. 2. First and second maxillae, the first incomplete, each with the apical plate more highly magnified.

mxp. 1, mxp. 2. First and second maxillipeds.

th. Thelycum.

plp. 1. First pleopod.

and J. Ann. Mus. V. LXXV.



Del. J. L. S. Gould.

West, Newman lith.

PLATE X. (Crustacea, Plate LXXXIV.)

Sclerocrangon bellmarleyi, n. sp.

- n.s. ♀. Lateral view of a female specimen, natural size.
- car. ♂, urp., T. Carapace of male specimen, flattened out; one of the uropods, and the telson in dorsal view; these figures to the same scale, less highly magnified than the following, but all alike taken from the male specimen.
- a.s., a.i. The first and second antennae, the flagellum of the second missing.
- m., mx. 1, mx. 2, mxp. 1, mxp. 2. Mandible, first and second maxillae, and first and second maxillipeds.
- mxp. 3. Third maxilliped, ending with base of the penultimate joint.
- plp. 2. Second pleopod, with still higher magnification of the inner branch.

PLATE XI. (Crustacea, Plate LXXV.)

Chlorotocus crassicornis, A. Costa.

car. Part of carapace in lateral view.

T. Telson in dorsal view.

oc. One of the eyes.

m., m. One mandible complete, with higher magnification of its molar's apical border, the same magnification being used for the cutting edge and molar apex of the other mandible.

l.i., mx. 1, mxp. 2. Lower lip, first maxilla and second maxilliped on the same scale as the whole mandible.

ppp. 1, ppp. 2. First and second pereopods, on the same scale as the telson, parts more highly magnified, on the same scale as the whole mandible.



PLATE XII. (Crustacea, Plate LXXVI.)

Stylodactylus serratus, A. Milne-Edwards.

- n.s. ♀. Lateral view of female specimen, natural size, rostrum imperfect.
- car. Carapace of a smaller specimen, magnified; tip of the rostrum still more enlarged.
- T. Dorsal view of telson from the smaller specimen, with distal portion more enlarged; the fellow to the long spine on the left is imperfectly developed.
- m., m., m. Mandibles, the uppermost figure from the female specimen, the other two from the smaller specimen.
- prp. 1, prp. 2. The first peraeopod and distal part of the second, from the female specimen.



Del. T. R. Stebbing.

West, Newman lith.



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ANNALS

OF THE

SOUTH AFRICAN MUSEUM

VOLUME XV.

PART II. containing:—

2.—*South African Crustacea* (Part VIII. of S.A. Crustacea, for the Marine Investigations in South Africa).—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Memb. New Zealand Inst., Hon. Fellow Worcester College, Oxford.

(Plates XIII.—XXV. of Vol. XV. Plates LXXVII.—LXXXIX. of Crustacea.)



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(Plates XIII.—XXV. of Vol. XV. Plates LXXVII.—LXXXIX. of Crustacea.)

IN the General Catalogue of South African Crustacea (Ann. S.A. Mus., 1910) forty-nine species were enumerated under the heading of *Maerura Genuina*. To this list twenty-eight species were subsequently added (Ann. S.A. Mus., 1914). Of the twenty-two species considered in the present essay eleven are proposed as new, one of them representing a new genus. As nineteen are additional to the two earlier lists, the total of the group in question stands for the moment at ninety-six species. In other divisions of the crustacean class a large number of new species have been added to the South African fauna by various authors, especially Dr. G. S. Brady and Mr. K. H. Barnard, since the publication of the General Catalogue. In any future revision of it attention would have also to be directed to several older species, the habitat of which in these waters as recorded by Lenz and others I overlooked. To undertake such a revision just now would perhaps be premature, and at any rate on the present occasion is not convenient. But I venture to take this opportunity of cordially thanking Mr. W. H. Bell-Marley, of Durban, for the large number of specimens with which he has favoured me during a course of years from the coast of Natal, effectively corroborating the work of Krauss, who made that coast his principal hunting ground.

In addition to specimens already acknowledged in this series, Mr. Bell-Marley has sent the following:—

Dehaanius dentatus (Milne-Edwards), with varieties.

Blastus fascicularis (Krauss).

Huenia proteus, de Haan, new to S. African fauna.

Pilumnus xanthoides, Krauss.

- Eriphia smithii*, McLeay.
Callinectes gladiator (Fabricius), new to S. African fauna.
Charybdis cruciatus (Herbst), small specimens.
Lupa sanguinolentus (Herbst).
Thalamita prymna (Herbst).
Cyclograpsus punctatus, Milne Edwards.
Ocyropode cordimanus, Desmarest.
Hymenosoma orbicularis, Desmarest, carrying a comparatively large *Balanus*.
Matuta lunaris (Forskål).
 ? *Leucisca squalinus*, McLeay.
Clibanarius virescens (Krauss).
Diogenes catricatus, Stebbing.
Porcellana dehaanii, Krauss.
Macropetasma africanus (Balss).
Leander affinis (Milne Edwards).
Alpheus edwardii (Audouin).
Gonodactylus chiragra (Fabricius).
Talorchestia africanus, Bate.
Anthosoma crassus (Abildgaard), on old shark. New to S. African fauna.
Balanus capensis, Darwin, on *Hymenosoma orbicularis*.

TRIBE THALASSINIDEA.

(See these Annals, vol. 15, pt. 1, p. 8, 1914.)

FAMILY AXIIDAE.

1888. *Axiidae*, Bate, Rep. Voy. Challenger, vol. 24, p. 36.
 1891. „ Ortmann, Zool. Jahrb., vol. 6, p. 46.
 1914. „ Stebbing, Ann. S. African Mus., vol. 15, pt. 1, p. 9.

GEN. CALOCARIS, Bell.

- (1847) 1853. *Calocaris*, Bell, Brit. Stalk-eyed Crust., p. 231.
 1888. „ Bate, Rep. Voy. Challenger, vol. 24, pp. 7, 54
 (*Calocaris*, pp. 11, 46).
 1895. „ Faxon, Mem. Mus. Comp. Zool., vol. 18,
 p. 105.
 1900. „ McArdle, Ann. Nat. Hist., Ser. 7, vol. 6,
 p. 476.

1914. *Calocaris*, Stebbing, Ann. S. African Mus., vol. 15, pt. 1, p. 9.

Other references for the family and genus are given in the last-mentioned paper.

CALOCARIS ALCOCKI, McArdle.

1900. *Calocaris alcocki*, McArdle, Ann. Nat. Hist., Ser. 7, vol. 6, p. 476.
 1901. „ „ Alcock, Catal. Indian Deep-sea Macrura, pp. 189, 190; Zool. Investigator, Crust., pt. 9, pl. 50, figs. 4, 4a.

McArdle's specimen, measuring 54 mm. in length, was taken in the Bay of Bengal, off Ceylon, from a depth of 542 fathoms. The description given of it essentially fits the South African example. Thus, to quote from Alcock, "the rostrum, which reaches to the end of the antennular peduncle, is up-curved and dorsally grooved; on either lateral border, near the middle, are 1 or 2 spines, and on each of the epigastric continuations of the lateral borders is a single spine." In our specimen the upturned apex of the rostrum reaches somewhat beyond the peduncle of the first antennae, but so it appears to do in the figure on Plate 50 of the Investigator's Crustacea. It may be only an accidental coincidence, but it may be noticed that the African rostrum has 2 spines on the left margin and only 1 spine on the right. The considerable length of the penultimate joint in the peduncle of the second antennae as compared with the terminal joint should be noticed, as it is a mark distinguishing this species from the recently established *C. barnardi*. Only one of the flagella was preserved in the first antennae, and the same seems to have been the case with the Indian specimen, which, however, retained the flagellum of the second pair, missing in ours. No special notes are given on the mouth-organs of the Indian specimen, except that the fourth joint of the third maxillipeds "has a subterminal spine on the inner border." This applies equally to ours, if we accept the term spine as signifying a small unjointed tooth. In *C. barnardi* this tooth is also present, though much obscured by the crowded setae, but that species shows a great difference in the denticulate border of the third joint, having some nine strong teeth in place of the 28 mixed large and small which form the row in the present species, in addition to an irregu-

larly placed dozen of minute ones at the base. A comparison of the figures for the two species will show rather considerable differences of detail in the maxillae and other maxillipeds. But without more specimens for control it may be imprudent to lay too much stress on such details.

A detached first pereopod, beginning with the third joint, and measuring 23 mm. in length, agrees well with Alcock's account of the large chelipeds in the female, having the hand as long as the fourth and fifth joints combined (carpus and merus being evidently intended, in agreement with the figure, not "carpus and ischium" as printed), the fifth joint is two-thirds the length of the palm, and the palm is as long as the fingers; there is a terminal tooth on the lower border of the third joint and on the upper border of the fourth joint and the palm. In the second pereopods the last three joints measure together 6.5 mm., equally divided between the wrist, palm, and fingers, while the fourth joint, 7.5 mm. long, exceeds the whole combination. The three following pereopods appear to have a total length respectively of 25, 24, 21 mm., the apical part of the sixth joint in all, but especially in the fifth pair, and the fingers being copiously furnished with setae.

The pleopods are perplexing. A comparison of the figures will show that the first pair in this species differs from that of *C. barnardi*. The second pair of the present species would, I imagine, apart from contradictory evidence, be regarded as male organs. But Alcock is evidently describing these organs when he writes: "In the female the protopodite and endopodite of the second pair of abdominal appendages are long and rigid, and articulated to the tip of the endopodite is a large boot-shaped plate, its toe pointing backwards and its heel armed with a spine." The sole, it will be seen, is fringed with spinules. In describing the family Axiidae Alcock says: "In the Indian species from the deep sea it is common to find orifices, corresponding with the genital orifices of the male, in adult females." In defining the genus *Calocaris* he says: "The first pair of abdominal appendages are slender and uniramous in both sexes, the 2nd-5th pairs are slender and biramous, and have a slender styliform internal appendix." This appendix I have sought in vain in the present species. The characters of the telson and uropods are sufficiently shown in the figures, the diaeresis in the exopod of the latter incomplete.

The total length of the specimen was about 33 mm., the carapace 13 mm. including the rostrum, the telson 4.5 mm. The plate illustrating this species is reserved for future publication.

Locality. Cape Natal, N. by E., 24 miles; depth 440 fathoms. A 1550.

TRIBE SCYLLARIDEA.

This tribe, established as the "Tribu des Scyllariens" by Milne-Edwards in 1837, has been already noticed in his *Annals*, vol. 6, part 1, p. 28, 1908, and vol. 6, part 4, p. 372, 1910.

FAMILY SCYLLARIDAE.

With the above-mentioned notices of the tribe will be found many references to the literature of the family. As might have been expected, the singular bodily shape and the spade-like second antennae of the "Mother-lobsters" have excited attention in very early times. Linnaeus, however, in 1758 was content to group all the forms then known as a single species, *Cancer arctus*. To determine which of them, according to modern rules, has a right to the specific name *arctus* requires some consideration.

In the *Fauna Suecica*, ed. 2, p. 496, No. 2040, 1761, Linnaeus again named *Cancer arctus*, but this time with a single reference, "Rumph. mus. t. 2. f. C. D." These figures illustrate what were supposed to be the two sexes of *Ursa-Cancer*, Rumphius, as described in his *D'Amboinsche Rariteitkamer*, Book 1, p. 3, 1705. Fig. C is now referred to *Parribacus*, Dana, and Fig. D to *Thenus*, Leach. By strict rule perhaps, therefore, *arctus* should be a species of one or the other of those two genera, but as the habitat is restricted to *Oceano septentrionali*, it is possible that Linnaeus was referring to yet a third species, an indefiniteness and confusion which may justify us in leaving the "Fauna Suecica" out of account. We next come to *Cancer arctus* in the *Systema Naturae*, ed. 12, vol. 1, part 2, p. 1053, 1767. Here we have the old distribution over the four quarters of the globe and contradictory references to the two figures in Rumphius and the single figure in Browne's *Jamaica* and the very different one in Seba's *Thesaurus*, but the reference to the "Fauna Suecica" is also given, and contrary to custom a comparatively full description is appended, as if drawn up from an

actual specimen. With regard to the application of this description I asked the advice of my friend, Dr. W. T. Calman, D.Sc., who, after consulting with his colleague, Mr. C. Tate Regan, writes: "He agrees with me that it applies very well indeed to a specimen of '*Scyllarus arctus*,' but cannot, by any stretch of imagination, be made to fit specimens of '*Parribacis antarcticus*' or of '*Thenus orientalis*.' . . . Only *S. arctus* can be described as 'aculeis inter oculos circiter 10' or as having the carapace 'quinquefariam antrorsum aculeatus.' The description of the 'cauda' puzzled me a good deal till Mr. Regan pointed out that the grooves on each abdominal somite except the first and last do really define three areas, the first smooth, the second rough, and the third rough and triply emarginate behind. Regan also makes the suggestion which I think probably right, that 'digito brevissimo' refers to a very minute tooth on the concave margin of the dactylus of the first pereopods."

In 1775, as Gill, Miss Rathbun, and Sherborn have stated, Fabricius instituted the genus *Scyllarus* for *Cancer arctus*, Linn. To this genus he added the species *S. australis* in 1781, and again recorded these two species in 1793 (Ent. Syst., vol. 2, p. 477), without reference to his own earlier records or any indication that the genus was not a new one. Under *S. arctus* he gives the old cosmopolitan distribution and mixture of references, as though quite unaware that they belong to a variety of species, here also as in 1781 quoting Rumph. Mus. tab. 2, fig. 6, D, by mistake for C, D. My own mistake in 1908 must be acknowledged. It consisted in accepting 1793 as the date for the genus *Scyllarus* and the species *S. australis*, in place of 1775 for the one and 1781 for the other. The year 1793, however, is rather deeply involved in the interests of the present family. For while Fabricius was leaving his genus in its primitive disorder, two of his contemporaries were independently making a systematic revision of it. Herbst (Krabben und Krebse, vol. 2, part 3, pp. 80, 82, 83, pl. 30, figs. 1, 2, 3), mentioning but not adopting *Scyllarus*, assigns to *Cancer (Astacus)* three species which he named respectively *arctus*, *ursus major*, *ursus minor*. Here it should be noted that the invaluable "Index Animalium" makes a slight slip by assigning these three names to 1792, which would have been correct had the descriptions occurred in part 2, ending with p. 78, but Sherborn now accepts Miss Rathbun's date 1793 for parts 3 and 4 of Herbst's second volume. This robs Herbst of any unquestionable precedence over N. T. Lund, who in the same year 1793 (Acta Hafn. or Skriver af Naturhistorie-Selskabet, vol. 2,

part 2, p. 17, Slaagten Scyllarus) distinguished as species of *Scyllarus*: 1. *arctus* (Linn.); 2. *aequinoctialis*; 3. *antarcticus*; 4. *orientalis*. In this brief but admirable treatise Lund compares and distributes the illustrative figures from various authors, which had been so absurdly referred to a single species. At the same date Herbst gives a confused synonymy to his *Cancer (Astacus) arctus* (including *Scyllarus arctus*, Fabricius), but his description and figure make it quite clear that the species is *not* the *Cancer arctus* of Linnaeus discussed above, and further that it *is* the *Scyllarus orientalis* of Lund. Consequently, as the name *arctus* is preoccupied, Herbst's species so-called becomes a synonym of Lund's *orientalis*, subsequently referred to the genus *Thenus*, Leach.

Herbst's second species, *Cancer (Astacus) ursus major*, competes with Lund's third, *Scyllarus antarcticus*; since both writers agree in identifying the species with Rumph's tab. 2, fig. C, and Seba's tab. 20, fig. 1. Lund's specific name is misprinted *antarcticius* in the Suppl. Ent. Syst. of Fabricius, 1798, and misquoted as *antarcticus* by Milne Edwards in 1837. The latter author gives *C. ursus*, Seba, as the name applying to Seba's pl. 20, f. 3 [error for f. 1]. But Guérin, in the description of that plate (as reproduced in 1827) writes: "No. 1. *Ursa-cancer, seu Squilla lata, amboinensis*, Seb.—*Scyllarus antarcticus*, Fabricius." De Haan (Crust. Japon., decas 5, p. 133, 1841), has already called attention to the difference of Rumph's fig. C from others supposed to be identical. But Herbst's figure of *ursus major* and that which Milne-Edwards gives of *Ibacus antarcticus* in the illustrated edition of the "Règne Animal," pl. 45, fig. 3, are in good agreement, and Herbst's specific name having been accompanied by an excellent coloured figure from the first, should have a preference over Lund's name of the same date, but with a bare description. The species, after its transfer by Milne Edwards to *Ibacus*, Leach, was again transferred by Dana in 1852 to a new genus, *Parribacus*. Immediately after this transfer Dana proceeds to describe it as *Ibacus antarcticus* (Rumph), in U.S. Expl. Exp., vol. 13, p. 517, 1852, although Rumph has nothing to do with either the generic or the specific name, and was probably concerned with a different species of the genus. Herbst's figure is without the row of tubercles down the centre of the carapace, which are conspicuous in Seba's and Dana's figures and faintly marked in that given by Milne Edwards; but this detail does not appear to be important. The acceptance of the name *Parribacus ursus* (Herbst) in place of *Parribacus antarcticus* (Lund) has the advantage of displacing a name so puzzling and inappropriate as *antarcticus* for

a species recorded from the East Indies, Japan, and the Samoa Islands. There is a *Cancer ursus*, Fabricius, but that does not pre-occupy the use of the specific name in the clearly different genus *Cancer* (*Astacus*). Herbst's third species, *ursus minor*, instead of being a variety of *ursus major*, is accepted as a synonym of *Scyllarus arctus*. Lund's remaining species, *aequinoctialis*, is the type of *Scyllarides*, Gill. Hence each of the four species which Lund acutely distinguished stands now under a separate generic name, *Scyllarus*, *Scyllarides*, *Parribacus*, *Thenus*. Balss in his important treatise on East-Asiatic Decapoda (Abhandl. K. Bayer. Ak. Wiss., vol. 10, Suppl. 2, p. 81, 1914) states that "*Paribaccus papyraceus* Rathbun 1906," is a synonym of "*Paribaccus antarcticus* (Rumph.)," in his spelling of the generic name being no doubt misled by Bate's change of *Ibacus* into *Ibaccus*, which he also adopts, without noticing that the authors whom he cites usually follow Leach and Dana, though *Parribacus* is sometimes changed to *Paribacus*.

GEN. THENUS, Leach.

1815. *Thenus*, Leach, Trans. Linn. Soc. London, vol. 11, p. 338.
 1816. ,, Leach, Encycl. Britannica, ed. 5, Supplement, pp. 417, 419, Art. Annulosa.
 1825. *Scyllarus* (part), Desmarest, Consid. gén. Crustacés, p. 181.
 1837. *Thenus*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 285.
 1841. ,, de Haan, Crust. Japonica, decas 5, p. 151.
 1852. ,, Dana, U.S. Expl. Exp., vol. 13, p. 516.
 1888. ,, Bate, Rep. Voy. Challenger, vol. 24, pp. 56, 65.
 1891. ,, Ortmann, Zool. Jahrb., vol. 6, p. 38.
 1893. ,, Stebbing, Hist. Crust., Internat. Sci. Ser., vol. 74, p. 193.

In his Zoological Miscellany, vol. 2, p. 152, 1815, Leach remarks that "*Ibacus* is one of four distinct genera that have been confounded under the general appellation *Scyllarus*." He presently instituted the genus *Thenus*, to which Dana added *Parribacus* in 1852. The characters given by Leach for distinguishing *Thenus* from *Scyllarus* were, "*Hinder* legs with simple tarsi. *Thorax* subdepressed, broader anteriorly. *Eyes* inserted at the anterior angles of the thorax." The last character is emphasized by Herbst in his description of the type species by the remark that "in no single known insect do the eyes stand so far apart." Ortmann uses this character and the non-chelate fifth peraeopods of the female to distinguish

Thenus from *Scyllarus*, *Ibacus*, and *Parribacus*. The mouth-parts of the different genera are described by de Haan, whose work also shows that, while there are 21 pairs of branchiae in *Scyllarides*, *Parribacus*, *Ibacus*, and *Thenus*, there are only 19 pairs in *Scyllarus*. As, according to Miss Rathbun, *Scyllarus americanus*, S. I. Smith, is usually not more than half an inch long, great size is not an invariable characteristic of the "Mother-Lobsters."

THENUS ORIENTALIS (Lund).

1705. *Ursa Cancer*, Rumphius, D'Amboinsche Rariteitkamer, vol. 1, p. 3, pl. 2, fig. D.
1758. *Cancer arctus* (part), Linn., Systema Naturae, ed. 10, p. 633.
1775. *Scyllarus arctus* (part), Fabricius, Syst. Entom., p. 413.
1793. " " " Fabricius, Ent. Syst., vol. 2, p. 477.
1793. *Cancer (Astacus) arctus*, Herbst (not *arctus*, Linn., *sensu strictiore*), Krabben and Krebse, vol. 2, part 3, p. 80, pl. 30, fig. 1.
1793. *Scyllarus orientalis*, Lund, Skrivter Nat.-Hist.-Selsk., vol. 2 part 2, p. 22.
1798. " " Fabricius, Suppl. Ent. Syst., p. 399.
1803. " " Latreille, Hist. Nat. Crust. Ins., vol. 6, p. 181.
1815. *Thenus indicus*, Leach, Trans. Linn. Soc. London, vol. 11, p. 338.
1816. " " Leach, Encycl. Brit., ed. 5, Suppl., p. 419.
1825. *Scyllarus orientalis*, Desmarest, Consid. gén. Crust., p. 182, pl. 31, fig. 1.
1837. *Thenus orientalis*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 286, and Règne Animal, illustr. ed. undated, pl. 45, figs. 2a-c.
1888. " " Bate, Rep. Voy. Challenger, vol. 24, p. 66.
1888. " " de Man, J. Linn. Soc. London, vol. 22, p. 261.
1891. " " Ortmann, Zool. Jahrb., vol. 6, p. 46.
1914. " " Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10, Suppl. 2, p. 80.

Ortmann assigns the species to Rumph, though without using Rumph's name for it. Jonston, Hist. Nat. de Exangvibus aqvaticis, p. 21, pl. 4, figs. 3, 4, 8, 12, 1767, adopts the name *Ursa major* for three figures, 3, 4, 12, which on his

plate are called *Squilla lata*, while fig. 8 is named *Squilla Ursa minor*. The last appears to be *Scyllarus arctus*, and the position of the eyes suggests that fig. 3 is intended to represent *Thenus orientalis*. But as Jonston's work has been ruled out of court among treatises not consistently binomial, a discussion of his rude figures may be dispensed with.

The South African specimen is in unmistakable agreement with the illustrations by various authors cited in the synonymy. Milne Edwards speaks of the ocular peduncles in this genus as very long, no doubt meaning comparatively rather than absolutely. They enable the small cornea to project only very slightly beyond the lateral borders of the carapace. The stomach in our specimen is protruded, as happens sometimes with animals brought suddenly to the surface from a considerable depth. The first and second segments of the pleon have each a small medio-ventral process, the second much the smaller. Length of the specimen along the middle line, from the base of the cavity of the frontal process to the end of the telson 139 mm., breadth across front just behind the eyes 81 mm. Herbst says that the flesh of the animal is good eating, better than that of the lobster, as Rumph had observed many years earlier, though for actual comparison of flavours one would not expect *Astacus gammarus* to have been common in Amboyna, and *Thenus orientalis*, which is rare even in the East, can seldom have come to table in Germany.

Locality. Amatikulu River NW. by W. $\frac{1}{2}$ W. 12 miles (Natal); depth 26 fathoms. A 969.

TRIBE PENAEIDEA.

FAMILY PENAEIDAE.

(See these Annals, vol. 15, pt. 1, p. 11, 1914.)

GEN. SOLENOCERA, Lucas.

1850. *Solenocera*, Lucas, Ann. Soc. Entomol. de France, Ser. 2, vol. 8, p. 219.
 1884. ,, Koelbel, SB. Ak. Wiss., Wien, vol. 90 (1885), pt. 1 (1884), p. 314.

1885. *Solenocera*, S. I. Smith, Pr. U.S. Mus., vol. 8, p. 185.
 1895. „ Faxon, Mem. Mus. Comp. Zool., vol. 18, p. 183.
 1901. „ Alcock, Catal. Indian Deep-sea Macrura, p. 19.
 1908. „ Bouvier, Camp. Sci. Monaco, fasc. 33, p. 86
 (with synonymy, p. 87).
 1910. „ Kemp, Fisheries Ireland, 1908, i., pp. 13, 20.
 1911. „ de Man, Siboga Exp., Mon., 39a, pp. 7, 45.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10,
 Suppl. 2, p. 5.

SOLENOCERA COMATUS, n. sp.

Plates LXXVII., LXXVIII.

The carapace is scabrous, the rostrum directed straight forward, only twice as long as deep, the medio-dorsal carina having a tooth just in front of the cervical groove, followed by a series of four teeth of which the hindmost is just behind the base of the orbit and the foremost separated by a distinct interval from the apical point; below this point the margin descends with a gentle curve adorned by a conspicuous series of plumose setae, to which the specific name alludes. Behind this series the lower margin of the rostrum is horizontal. The sides of the carapace have an antennal tooth and an antero-lateral, and on the surface a tooth a little above and behind the antennal with an apex not quite reaching the margin, and a tooth at the lower end of the cervical groove. The fourth, fifth, and sixth pleon segments are carinate, the sixth ending in a distinct tooth. The telson is shorter than the uropods, ending acutely, for nearly two-thirds of its length to the rear fringed with plumose setae, the last third narrow, with a pair of slightly divergent processes at its base which are not quite half its length.

The eyes are brownish red, short, with large oval cornea, protected by the first joint of the first antennae, this joint being as long as the second and third joints combined and having two small lateral teeth. The flagella are not quite twice the length of the peduncle, one flagellum about two-thirds the breadth of the other. In the second antenna the apical tooth of the scale reaches just beyond the setose margin; the flagellum (imperfect) considerably exceeds the length of the body.

The mandibular palp is very large and setose, with a twist at the base of the first joint, which is decidedly wider and not shorter than the long second, that being wide at the base, distally quite narrow. The plates of the lower lip are in close contact, longer than broad.

The "palp" of the first maxilla has a series of 5 long setae on the inner margin near the apex. The apical plate of the second maxillae has at the tip of its inner margin a notable tooth carrying spines on both edges and 3 on the surface. The long sinuous endopod of the first maxillipeds has a spaced row of very long setae on its sixth joint. The third maxillipeds are elongate, as is usual in the genus. The first peraeopods are short, the second and third joints each produced into a tooth, the fourth rather longer than the fifth, the fifth longer than the sixth, the fingers rather less than twice the palm, their confronting margins armed with teeth distally for less than half the length. The cleansing apparatus of denticulate spines occurs near the apex of the wrist, and proximally on the palm. What remains of the fifth peraeopod is long and slender.

The first pleon segment is ventrally produced into a short triangular process beset with slender spines, between the stout peduncles of the first pleopods. Of these the outer ramus is long and doubly serrate with the usual furniture of plumose setae; the inner ramus, attached much higher up, is short, pellucid, much of the feebly serrate outer margin fringed with setae, of which there are several also on the surface, while the smooth inner margin has but a single seta pointing inward near the base; the apex of this ramus is pointed, but the outer margin some way from the end forms a little oval lobe carrying a setule, before contributing to the apex proper.

The inner branch of the uropods is subequal in length to the telson, and has the end ovate, fringed round with plumose setae; the wider and considerably longer outer ramus has the outer margin straight, unarmed, its little apical tooth about on a level with the distal margin which at starting is only feebly convex.

The specimen measured 46 mm., the carapace with rostrum being 15 mm., the pleon 31 mm., of which the sixth segment and the telson each accounted for 6 mm. The flagella of the first antennae were about 16 mm. long, with 53 jointlets in the broader and 46 in the narrower flagellum, or thereabouts, for the counting is not easy. The imperfect flagellum of the second antenna was 60 mm. long, the third maxilliped 18 mm.

Locality. 33° 6' S., 27° 55' E.; depth 43 fathoms. A 1218.

Since the above description was written a male specimen from a neighbouring station has been observed, from which it will be convenient to supply some further details. The total length was practically the same, being 47 mm. Here the medio-dorsal carina has only 4 teeth, the 2 anterior teeth being rather far from the next to

the rear. The hands and fingers of the second and third peraeopods are very slender, the movable finger in each case extending somewhat beyond the fixed one. The fifth peraeopod is more slender and much less setose, but longer than the fourth, the difference in length of the fourth, fifth, and sixth joints being very marked, while the fingers are subequal, but the sixth joint in the fifth pair more than twice as long as the finger, in the fourth pair not more than once and a third of the finger's length.

The petasma, when unfolded and flattened, is seen to consist of two symmetrical conjoint halves, each ending in a rather broad, roughly oval lobe fringed on the outer end with 15 little teeth or spicules and on the inner end with 8 that are blunter but still microscopic. Before these transverse overlapping lobes are reached, each division has on its outer (inward folding) side a longitudinal lobe ending obtusely, although a thickening of the otherwise pellucid membrane gives the appearance of an inward curled hook. The second pleopods at the base of the endopod carry a trilobed process, one lobe unarmed extended outwards, the other two downwards on the inner side, one with a furniture of setae, the other with a small fringe of setules.

Locality. Nicea River, N. by W. 6 miles (near East London); depth 50 fathoms. A 1217.

GEN. PENAEUS, J. C. Fabricius.

(See these Annals, vol. 15, pt. 1, p. 12, 1914.)

PENAEUS SEMISULCATUS, de Haan.

1849. *Penaeus semisulcatus*, de Haan, Crust. Japonica, decas 6,
p. 191, pl. 46, fig. 1.
1911. ,, ,, de Man, Siboga Exp., vol. 39a, p. 97.

A specimen 148 mm. in length, with flagellum of the second antennae 245 mm. long, appears to belong to this species. It has a very small exopod on the fifth peraeopods, and the telson strongly sulcate. The petasma agrees well with that figured by Kishinouye for his *P. ashiaka*, which Dr. de Man identifies with *P. semisulcatus*, though not noticing the striking difference in length between the flagella of the first antennae as figured by Kishinouye for both sexes of *P. ashiaka* and those figured by de Haan for *P. semisulcatus*. The length represented by de Haan is exceeded by that in our specimen.

A female 160 mm. long (with telson slightly imperfect) has a thelyceum corresponding with that figured by Alcock for *P. monodon*, which de Man supposed later to be *P. semi-sulcatus*. In this specimen the rostrum has 5 small ventral teeth instead of the usual three.

Locality. Delagoa Bay. A 2128-9. The specimen was obtained by Mr. K. H. Barnard in October 1912.

GEN. PENAEOPSIS, A. Milne-Edwards.

(For synonymy see these Annals, vol. 15, part 1, p. 15, 1914.)

PENAEOPSIS MONOCEROS (Fabricius).

1798. *Penaeus monoceros*, Fabricius, Supplementum Ent. Syst., p. 409.
 1906. *Metapeneus monoceros*, Alcock, Catal. Indian Macrura, p. 18, pl. 3, figs. 7, 7a-c. (with synonymy).
 1911. *Penaeopsis monoceros*, de Man, Siboga Exp., vol. 39a, pp. 8, 55.
 1913. " " de Man, Siboga Exp., vol. 39a, Suppl., pl. 6, figs. 14a-c.
 1914. " " Balss, Abhandl. K. Bayer, Ak. Wiss., vol. 10, Suppl. 2, p. 7.

Dr. de Man distinguishes two sections in this genus. The first, to which this species belongs, he defines as follows: "No marginal subterminal articulating spines on the telson; last pair of thoracic legs without exopod; their merus in the adult male, with a notch and spine or tooth at its proximal end." The presence of this tooth in the adult male helps to distinguish this species from *P. spinulicauda*, Stebbing, 1914.

The specimen examined has 9 dorsal teeth on the carapace, the hindmost remote from the others, the end of the rostrum slightly upturned. The carapace has a length of 37.5 mm., the rostrum from the base of the eyes accounting for 15.5 mm.; the pleon is 68.5 mm. long, bringing the total to 106 mm. The flagellum of the second antenna measured 180 mm., this being probably its full extent, as it had to be extracted from what appeared to be secure shelter within the carapace and other parts of the animal. The slender fifth peracopods were also protected by the carapace. Another specimen, 116 mm. long, has the flagellum of second antennae 225 mm. long, the flagella of the first pair only about 10 mm. in length.

Locality. Delagoa Bay. A 2128-9. The specimen was obtained by Mr. K. H. Barnard in October 1912. Another specimen, female, length 163 mm., flagellum of second antennae 430 mm., was earlier obtained by Dr. Gilchrist, together with a male of nearly the same size, off South Head of Tugela River, in depth between 12 and 14 fathoms, No. 149.

TRIBE CARIDEA.

(See these Annals, vol. 15, part 1, p. 28, 1914.)

FAMILY CRANGONIDAE.

1853. *Crangonidae*, Bell, British Stalk-eyed Crustacea, p. 255.
 1910. „ Stebbing, Ann. S. Afr. Mus., vol. 6, p. 382 (with synonymy).
 1914. „ Balss, Abhandl. K. Bayer, Ak. Wiss., vol. 10. Suppl., 2, p. 61.
 1914. „ Stebbing, Ann. S. Afr. Mus., vol. 15, part 1, p. 28.

GEN. PHILOCHERAS, Stebbing.

1862. *Cheraphilus* (part), Kinahan, Proc. Royal Irish Ac., vol. 8, pt. 1, p. 7.
 1900. *Philocheras*, Stebbing, Marine Invest. S. Africa, Crustacea, pt. 1, pp. 48, 49.
 1910. „ Kemp, Fisheries Ireland, 1908, pp. 135, 143.

The characters of this genus are very clearly explained by Mr. Kemp, and the species now to be described shows no disagreement with his exposition.

PHILOCHERAS MEGALOCHEIR, n. sp.

Plate LXXIX.

Of British and Irish species the present makes the nearest approach to *P. neglectus* (Sars), considered by Kemp to be only a variety of *P. bispinosus* (Hailstone and Westwood). It has only a single spine behind the rostrum, but it differs from the approximate species in having a much more broadly rounded rostrum, and still more in the great size of the hand and finger of the first peraeopods, to which

the specific name alludes. The finger is widely arched, and from its hinge the margin of the hand extends very obliquely to the widely projecting thumb, numerous setules lining the margin and resting on a membranaceous finely ribbed extension of the border. The small wrist has some little serrate spines at its inner corner, and a few of similar character are on the margin of the hand behind the thumb; otherwise these limbs are singularly devoid of any plumage, such as abundantly adorns the third maxillipeds and the much slighter second pereopods. In the latter the hand is very insignificant, the feeble fingers much longer than the palm, which is not longer than its breadth. The telson is about three and a half times as long as its greatest breadth, tapering evenly almost to a point, but with a truncate apex just broad enough for a stout terminal spine, with a pair of much longer and more slender spines inserted in the margins just above it. The rami of the uropods are subequal in length to one another and to the telson, though from the manner of insertion the inner branch extends a little beyond the outer, and a little further still beyond the telson; the outer ramus is squarely truncate, its outer margin ending in a very small tooth on a level with the apical border.

The total length was 20 mm., of which the telson occupied 3 mm., a greater length than that of the sixth pleon segment.

Localities. Cove Rock NE. 2 miles; depth 25 fathoms (near East London). A 1317. And 33° 13' S., 27° 39' E.; depth 37 fathoms. A 1316.

FAMILY PALAEMONIDAE.

This family has been already considered in these Annals, vol. 6, part 1, p. 39, vol. 6, part 4, p. 383, and vol. 15, part 1, p. 30. In the first notice the new generic name *Macroterocheir* is proposed in place of Ortmann's subgenus *Macrobrachium*; in the second (a General Catalogue of South African Crustacea) five genera of the family are noted, these being, besides that just named, *Palaemon*, *Eupalaemon*, *Parapalaemon*, and *Leander*, but the species there named *Leander squilla* (Linn.) should, I think, rather be called *L. affinis* (Milne Edwards), and the result of raising Ortmann's subgenus *Eupalaemon* to generic rank is to make that name a synonym of *Palaemon*, Fabricius, *sensu strictiore*. *Palaemon quoianus*, Milne-Edwards, can no longer stand under *Palaemon* thus limited, and perhaps belongs to *Leander*. The characters of *Palaemon* as restricted by Ortmann have been very fully set out by de Man in 1892 and Coutière in 1905.

GEN. PALAEMON, Fabricius, s.s.

1798. *Palaemon* (part), Fabricius, Suppl. Ent. Syst., pp. 378, 402.
 1891. *Eupalaemon* (subgenus), Ortmann, Zool. Jahrb., vol. 5,
 pp. 696, 697.
 1892. " " de Man, in Max. Weber's Zool.
 Ergeb. Niederl. Ost-Indien,
 vol. 2, p. 410.
 1902. " " de Man, Abhandl. Senck. Nat.
 Gesellsch., vol. 25, pt. 3, p. 763.
 1904. " " de Man, Trans. Linn. Soc. London,
 vol. 9, pt. 8, p. 291.
 1905. " " Coutière, Ann. Sci. Nat., Ser. 8,
 vol. 12, pp. 263, 273.
 1911. " " de Man, Notes from Leyden Mus.,
 vol. 33, p. 281.
 1912. " " de Man, Rev. Zool. Africaine,
 vol. 1, pt. 3, p. 413.
 1912. " " de Man, Ann. Soc. Zool. Belgique,
 vol. 46 (1911), p. 197.

PALAEMON SUNDAICUS, Heller.

(See these Annals, vol. 6, pt. 4, p. 384, 1910.)

The distinction of species in this family has been made largely to depend on the size, shape, and denticulation of the rostrum, the roughness or smoothness of the carapace and limbs, the relative proportions of various joints, details in the shape and armature of the chelae, and even on the position of small spines pertaining to the telson. Unfortunately for the systematist several of these characters are found to vary with the age or sex of individuals, and in some of these they may be obscured by wear and tear or by natural abnormality. While, therefore, it may be easy to say that such and such a species has been found in this or that locality, it may be a tedious business to confirm the statement.

The specimen here assigned to Heller's species is 100 mm. long, the carapace with the rostrum measuring 45 mm., and the telson 13 mm., equalling the length of the fifth and sixth pleon segments combined. The slightly imperfect rostral carina carries 10 or 11 dorsal teeth, much the longest interval being between the foremost 2 or 3 teeth and that next behind them; two of the teeth are behind the orbits; among the setules of the ventral margin 3 small teeth

could be felt. The carapace is very stout, with the hinder peraeopods contiguously paired beneath. The first peraeopods are very slender, with the wrist 14 mm. long, twice as long as the chela, the fingers of which are longer than the palm. The second peraeopods are both detached, one imperfect, but the remainder like its companion, these limbs being dark in colour, with none of the joints dilated, but the palm rather stouter than the wrist, that with the end unbroken measuring 126 mm. for the last 5 joints, composed as follows, beginning with the 3rd joint, 15, 24, 33, 54, 27 mm., the last of them, the finger, not adding to the length, as it closes accurately over the thumb which equals the palm in length and forms a very obtuse angle with it. The third, fourth, and fifth peraeopods are subequal, but the fifth rather the longest, all extending beyond the scale of the second antennae. The flagellum of these antennae attains a length of 153 mm., the longest flagellum of the first antennae (perhaps a little imperfect) measuring 118 mm. The uropods extend a little beyond the telson, and their exopod a little beyond the endopod.

Locality. Umhlaas River, Natal; obtained by Dr. Gilchrist from salt water. A 1252.

PALAEEMON DELAGOAE, n. sp.

Plate LXXX.

The present species may be regarded as a link between *P. macrobrachion*, Herklots, and *P. sollaudii*, de Man, 1912, on both of which the latter author has bestowed so much accurate attention. In the form here assumed to be new the rostral carina has 5 ventral teeth, 9 dorsal, of which 2 are behind the orbit, and the foremost 3 are rather widely spaced; the oblique apex is perhaps imperfect. The carapace with rostrum measures 34.5 mm., the telson 10 mm., the intermediate part about 35.5 mm., thus giving a total of 80 mm. The slender first peraeopod is 34 mm. long. The right-hand second peraeopod has a total length of 108 mm., the 3rd joint 14 mm., 4th 19 mm., 5th 35.5 mm., the 6th 39 mm. In the 6th the palm counts for 25 mm., the thumb for 14 mm., the finger being only 13 mm. does not quite reach the thumb's apex; both are furred on their opposed margins. The second peraeopod on the left is decidedly shorter than its companion, the thumb (perhaps slightly imperfect) not reaching beyond the finger. Both of these limbs can with difficulty be seen to carry lines of microscopic prickles. The peduncle of the first antennae does not reach the end of the scale of the second,

and that scale falls a little short of the rostral apex. The mandible has a slender three-jointed palp, a tridentate incisor plate and a prominent molar ending in a group of three strong teeth. The palp of the first maxillae is apically deeply bifid. The telson has a pair of dorsal spines at the middle, two pairs on the sides of the triangular apex, the outer pair very small, a group of feathered setae extending beyond the inner pair; microscopic prickles fringe the lateral margins, and perhaps extend over much of the surface. Of the intermediate pair of dorsal spines the left-hand spine could not be discerned.

Locality. Mouths of rivers flowing into Delagoa Bay yielded a single specimen, named after the bay. A 2196.

GEN. LEANDER, Desmarest.

(See the General Catalogue of South African Crustacea, 1910, in these Annals, vol. 6, p. 386, where for *Leander squilla* should, I now think, be read *Leander affinis* (Milne Edwards). See also Trans. R. Soc. Edinb., vol. 50, p. 286, 1914, and these Annals, vol. 15, p. 81.)

LEANDER PERINGUEYI, n. sp.

Plate LXXXI.

This species belongs to the section of the genus in which the palp of the mandible is three-jointed, in company with *L. serratus* (Pennant), *L. affinis* (Milne Edwards), *L. adspersus* (Rathke). But from all the congeneric forms with which I am acquainted it is distinguished by its peculiar rostrum. A small tooth on the carapace is followed at a well-marked interval by a series of 4 teeth, successively larger, the hindmost of them slightly behind the base of the eyestalk; to these again at an interval succeeds a series of 3 small teeth successively smaller, leading to a slightly upturned apex, broad in lateral aspect, its ventral margin receding to a broad cavity formed by a curved acute process at some distance to the rear, with no other ventral teeth except a microscopic spinule between the apex and the cavity. The telson is sharply carinate for half its length, twice as broad at its base as distally at the base of its little acute apical triangle, this base being furnished with a pair of long spines, between which are two rather longer setae, while they are flanked by a pair of much smaller spines. From the 2 pairs of dorsal spines normally to be expected, one spine of the upper pair is wanting in this specimen.

In the first antennae the second and third joints are subequal in

length, the first longer than both combined; the flagella, not absolutely perfect, show a length of about 40 mm. for the stouter, and about 30 mm. for the slighter, the small third flagellum which separates from the former, has a free course of about 22 joints, together equal in length to the first joint of the peduncle.

The incisor process of one mandible shows 4 teeth, that of the other only 3; the palp is very slender, the third joint longer than the first and second combined. The inner lobe of the apical plate or palp of the first maxillae is armed at the inner corner with a little spine which is twisted outwards, but this and various other details of the mouth-organs occur similarly in *L. affinis*. At the apex of the third maxilliped that species has a single strong spine, where the present specimen has two such spines, but the variation may be a casual one.

In the first pereopods the fifth joint is nearly twice as long as the chela; in the second pair the fingers are about five-sixths the length of the palm.

The specimen, a female laden with eggs, had a total length of 66 mm., the carapace with rostrum accounting for 23 mm., and the telson for a little over 8 mm.

Locality. 33° 49' S. lat., 25° 56' E. long. A 1276.

The specific name is given as a mark of respect to Dr. Péringuey, Director of the South African Museum and Editor of these Annals.

LEANDER GILCHRISTI, n. sp.

Plate LXXXII.

This species differs, so far as I can find, from all other forms in the genus by having a good-sized distal tooth both on the dorsal and ventral margins of the rostrum, advanced nearly as far as the slightly upturned acute apex; there are in all 7 dorsal teeth, the hindmost situated on the carapace a little remote from the next, which is slightly behind the base of the orbit; the three anterior are a slightly larger group than the three behind, and correspond pretty precisely with the three ventral teeth. The telson is in very close agreement with that of *L. peringueyi*, but the apex is more abruptly narrowed, and the accompanying plumose setae are shorter instead of longer than the two long spines between which they extend. All four dorsal spines are present, but, as the figure shows, not symmetrically arranged, those on the left being wider apart than those on the right.

In the first antennae the teeth of the first joint are wider apart than in the other species, and the short flagellum separates from its companion sooner, the common portion showing only six instead of nine components; the companion (seemingly almost complete) is about four times as long.

The mouth-organs show no differences of any apparent importance, unless it be that the present specimen shows less expansion at the base of the exopod in the first maxillipeds and less flexure of the antepenultimate joint of the third pair.

In the first peraeopods the fourth and fifth joints are here rather shorter in relation to the third joint and the chela, and in the second peraeopods the fifth joint is here not longer than the palm of the chela.

The total length of the specimen, a female with eggs, was 57 mm.

Locality. East London wood, where, as long ago as April 4, 1900, it was taken by Dr. J. D. F. Gilchrist, after whom I have the pleasure of naming it.

GEN. PALAEMONETES, Heller.

1869. *Palaemonetes*, Heller, Zeitsch. wiss. Zool., vol. 19, p. 157.
 1890. „ Ortmann, Zool. Jahrb., vol. 5, p. 513.
 1904. „ Rathbun, Decap. Crust. N.W. coast of N. Amer.,
 p. 30.
 1906. „ Norman and Scott, Crust. Devon and Cornwall,
 p. 20 (with synonymy).
 1910. „ Kemp, Fisheries Ireland, 1908, pp. 127, 132.
 1912. „ Rathbun, Bull. Mus. Comp. Zoöl, vol. 54,
 p. 451.

In 1899 Borradaile instituted a genus *Palaemonopsis* for a specimen from New Britain, agreeing with *Palaemonetes* in the absence of a mandibular palp, but differing from it in having on each side of the carapace one antennal spine only. In these two respects the specimen about to be described agrees with *Palaemonopsis*, but differs so considerably from it in the first antennae and the second peraeopods that it cannot safely be assigned to that genus. On the other hand, with the first and third peraeopods missing, I am unwilling to found upon it another genus while the much-needed revision of the family Palaemonidae, to which Mr. Kemp has called attention, is still in abeyance.

PALAEMONETES NATALENSIS, n. sp.

Plate LXXXIII.

The dorsal teeth of the carapace are eleven in all, three behind the base of the orbit, followed by seven in close succession on the rostrum, but the two foremost more widely spaced than the rest, and finally a longer interval leading to a denticle just in advance of the apex; the three ventral teeth nearly correspond in position with the dorsal three behind the denticle. The sixth pleon segment is much longer than the fifth. The telson is nearly three and a half times as long as its greatest breadth, narrowing evenly to a shallowly triangular apex, the median point flanked by two small spines, outside of which is a much larger pair, with a very small pair at the corners similar to two lateral pairs, one about at the middle of the telson's length, the other intermediate between that and the apex.

In the first antennae the third joint is less than twice as long as broad, shorter than the second, both combined much shorter than the first, which has an apical tooth, the basal spine reaching little beyond the middle of the joint and scarcely beyond the globular cornea of the eye; the stouter flagellum with its longer branch is considerably longer than the peduncle; the shorter branch, which is also rather the stouter, is subequal in length to the part from which both branches spring, and combined with that part gives a length equal to the peduncle; the more slender independent flagellum equals in length the stouter in combination with its longer branch. The proportions of these flagella in *Palaemonetes varians* (Leach) and *Palaemonopsis willeyi*, Borradaile, differ markedly from those just described. The scale of the second antennae differs little from that of *P. varians*, the flagellum, which is incomplete, could scarcely have been the full length of the body.

The incisor process of the mandible has three unequal teeth. The palp of the first maxilla is apically bilobed, with a little upturned tooth or spinule on the inner lobe. In the second maxillae the *lacinia interna* is not produced into lobes, the median lobes are very slender, and the apical plate is unarmed. In the second maxillipeds the second and third joints are completely fused, the large sixth joint a little outflanks the large transversely attached and strongly fringed seventh. The antepenultimate joint of the third maxillipeds is long and curved, the exopod reaching nearly to its apex.

First peraeopods unknown; the second have the fourth joint about as long as the first three combined, considerably longer than the

fifth joint or carpus, which in turn is a little longer than the slender chela; proportions, quite unlike those in the two species above compared; the fingers close tightly together and are subequal in length to the palm; there are several groups of setae on the fixed finger, and a group near the apex of the carpus. The fourth and fifth peraeopods are nearly alike, the long fourth and sixth joints subequal in length, but decidedly less than twice as long as the fifth joint without reckoning the little lobe by which that overlaps the sixth; the finger is very small and curved, about a tenth as long as the sixth joint. A little tooth precedes its upturned point, but this may be in preparation for the moult.

The first pleopod has a very short inner branch. The branches of the uropods are broad, the outer one a little the longer, much extended beyond the little apical tooth of the outer margin.

Total length 32 mm., carapace with rostrum 12.5 mm.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1275.

The specimen had a very uninviting appearance, as if covered in all directions by a sort of scurf. This, however, was easily removed, and eventually proved to consist chiefly of the ova of some Epi-caridian, together with the larvae in great numbers, minute objects considerably less in total length than half a millimeter, otherwise in close agreement with the figures given by Sars (Crustacea of Norway, vol. 2, pl. 94) for the male larvae of *Dajus mysidis* (Krøyer).

FAMILY ALPHEIDAE.

1888. *Alpheidae*, Bate, Rep. Voy. Challenger, vol. 24, p. 528.
 1899. „ Coutière, Thèse à la Faculté des Sciences Paris
 (with bibliography), Ann. Sci. Nat. Zool., Ser. 8,
 vol. 9.
 1899. „ Borradaile, Willey's Zool. Results, pt. 4, p. 415.
 1901. „ Alcock, Indian Deep-sea Macrura, p. 139.
 1905. „ Coutière, Fauna Maldive-Laccadive Archip., vol. 2,
 pt. 4, p. 852.
 1911. „ de Man, Siboga Exp., vol. 39a', p. 135 (Suppl.
 Plates, 1913).
 1913. „ Zimmer, Zool. Jahrb., Suppl. 11, pt. 3, p. 381.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10,
 Suppl. 2, p. 37.

Through the above-cited authorities numerous other refer-ences may be traced.

GEN. ALPHEUS, Fabricius.

1798. *Alpheus*, Fabricius, Suppl. Ent. Syst., pp. 380, 404.

Notice has been already taken of this genus in the General Catalogue, South African Crustacea, part 5, 1910. The literature discussing it is very extensive.

ALPHEUS NOTABILIS, n. sp.

Plates LXXXIV., LXXXV.

The interesting specimen here described, besides being solitary, was without flagellum to the second antennae, had only one member of the first pair of peraeopods, neither of the second pair, and only one representative for each of the three following pairs. All the limbs were detached, but as there was no other specimen in the bottle there can be no reasonable doubt that the limbs belonged to the body which they accompanied.

The rostrum protrudes from between the raised and distally rounded eye-lobes and its carina is continued along two-thirds of the carapace. The covered eyes are dark and sub-rotund. In the first antennae the second joint is nearly as long as the first and two and a half times as long as the third; the shorter flagellum has its thickened part about half as long as its slender companion, with a slender 12-jointed continuation equal to nearly a third of the preceding length; this is composed of 26 joints, only the last of them having a freely projecting tip, which carries two long sensory filaments, 19 pairs of filaments being distributed over 9 joints. The well-marked apical tooth of the bent and strongly plumose scale of the second antennae just reaches the apex of the plumose portion.

The incisor process of the mandible has one rather large tooth between three or four much smaller teeth above and five very minute ones below; the powerful molar is fringed with combs or brushes of hair-like teeth; the palp with seta-fringed second joint is bent as usual on to the inner surface of the mandible. The palp of the first maxillae has a bilobed apex, with a single spine on the tip of the inner lobe. The corresponding joint of the second maxillae is small with a spinule at the narrow apex and a few setae low down on the outer margin. In the slender terminal part of the endopod of the first maxilliped the jointing is obscure. In the second maxillipeds there is a very large branchial plate attached to the first joint, the second and third joints are completely coalesced, the part representing the third joint being distally expanded, the sixth is

strongly dilated above the fifth, and the transversely apposed seventh is strongly spined. The third maxillipeds have the antepenultimate joint long and twisted, the penultimate distally expanded beyond the insertion of the last joint; this inward expansion carries a group of straight setae extending beyond the last joint, which is more than twice the length of the penultimate and itself very copiously furnished with long setae.

The first peraeopod, which from its structure is no doubt the smaller cheliped of the present species, is remarkable alike for its setose furniture and the great length of the hand. The character naturally suggested a comparison with *Alpheus longimanus*, Bate (Rep. Voy. Challenger, p. 551, pl. 98, fig. 4), a species which I cannot find mentioned in Dr. de Man's admirable monograph of the family, nor indeed by any other authority since its publication. Bate declares that the second peraeopods have the "carpos six-articulate," which would be a very important feature, were not the importance discounted by the circumstance that his figure clearly shows the wrist normally five-jointed. In the first antennae he represents the shorter flagellum as much less than half the length of the other, and in the second antennae the long joint of the peduncle overtops the scale, whereas in our specimen it does not reach the top of it. In the smaller first peraeopod Bate describes the fingers as "nearly, and in some instances quite, as long as the propodos," meaning of course the palm. In our species the fingers are very considerably shorter than the palm, and the fringes of very long setae with which fingers and palm are alike begirt are exceedingly notable. The fourth joint on the outer edge is as long as the palm, and on the inner edge near the base shows four slender spines and is lightly fringed with setae. The third and rather shorter fourth peraeopods have each the sixth joint fringed with long setae; the more slender fifth has the distal half of the sixth joint's inner margin fringed with more than twenty little groups of setae, increasing in size as they approach the straight pointed finger.

The first pleopods have the inner ramus very short, both rami fringed with long setae. In the second pair the inner ramus is longer than the outer, with a long slender retinaculum. In both pairs the peduncle is elongate, with stout setae above and below on the inner margin for holding the ova. The uropods are very broad and strongly plumose, the outer ramus rather the longer, a diaeresis ending in a small tooth low down. The telson is peculiar in shape, narrowing a little above the middle, at five-sixths of the length each

lateral margin ending in a little tooth, the remaining sixth forming a half oval fringed with 14 pairs of long plumose setae.

The total length of the body was 30 mm., the carapace being 10 mm. long and the telson 5 mm.

Locality. Delagoa Bay, the specimen obtained by Mr. K. H. Barnard. A 2130.

ALPHEUS LOTTINI, Guérin.

- 1826-30. *Alpheus lottini*, Guérin, Voy. de La Coquille, Atlas, Crust., pl. 3, fig. 3.
 1837. „ *ventrosus*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 352.
 1837. *Alpheus lothini*, Milne Edwards, Hist. Nat. Crust., vol. 2, p. 353 footnote.
 1838. *Alpheus lottini*, Guérin Méneville, Voy. de La Coquille, Zool., vol. 2, pt. 2, p. 38.
 1839. *Alpheus laevis*, Randall, J. Ac. Sci. Philad., vol. 8, p. 141.
 1852. „ „ Dana, U.S. Expl. Exp., vol. 13, p. 556, pl. 35, fig. 8a-h.
 1899. „ „ Coutière, Ann. Sci. Nat. Zool., Ser. 8, vol. 9, pp. 250, 262, figs. 307, 324, 325.
 1905. *Alpheus ventrosus*, Coutière, Maldive-Laccadive Archip., vol. 2, pt. 4, p. 882.
 1911. „ „ de Man, Siboga Exp., vol. 39a', pp. 311, 339.

Milne-Edwards says that "L'Alphée de Lottin dont il a été publié une bonne figure, mais dont la description n'a pas encore paru, paraît être très-voisine de l'espèce précédente," namely, his own *Alpheus ventrosus*. But the description of *A. ventrosus* does not seem to justify any claim for the priority of that name over Guérin's *A. lottini*. Bate's figure of *A. laevis* in the *Challenger* report cannot easily be reconciled with the species here in question.

Our specimen, a female with eggs in a forward state of development, was unfortunately bereft of both members of the first pair of peraeopods. The second pair were attached to the body, and by their comparative stoutness and the relative lengths of the five compartments of the wrist are in unmistakable agreement with the figures by Dana and Coutière. A similar agreement is shown by the broad blunt-ended fingers of the hinder peraeopods, a character so unlike that which is found in most members of the genus. In the uropods a strong dark spine is extended from within and beyond the

distal tooth of the outer margin of the outer ramus. The apical breadth of the telson is a fourth of its length, as measured between the distal points of the lateral margins, beyond which it extends in a shallow three-sided convexity, bordered with plumose setae two central spines and a small and large pair at the corners. Between the mouth-organs of this and the preceding species there are several small differences of detail.

Total length of specimen 22 mm., the carapace 7 mm., the telson 3 mm.

Locality. Delagoa Bay, where the specimen was obtained by Mr. K. H. Barnard. A 2123.

ALPHEUS DISSODONTONOTUS, n. sp.

Plate LXXXVI.

This striking species is closely allied to *Alpheus praedator*, de Man, 1908, and to *A. bidens* (Olivier), as recently described and figured by de Man, who finds a synonym of it in *A. tridentatus*, Zehntner (Revue Suisse Zool., vol. 2, p. 204, pl. 8, fig. 24, 1894). The remarkable feature of these rare forms is the presence of two strong teeth on the back of the carapace, not beside the rostral tooth, but well to the rear of it. To this feature the new specific name refers, in agreement with Olivier's *bidens*, while the addition of the rostral tooth would justify the epithet *tridentatus*. In the two earlier species the medio-dorsal carina is interrupted behind the dorsal teeth and resumed with an obtuse tubercle. In the new species this tubercle is not found, and the dorsal teeth are separated from the carina by a very narrow groove. The most obvious further distinction is in the second peraeopods, in which the first carpal joint is decidedly longer than the second, instead of shorter as in the other two species. The telson is just twice as long as its greatest breadth at the base; the apical curve is closely fringed with 24 strongly plumose setae and numerous short spines, with a very small pair at the outer corners and a rather larger pair just within this small pair. The upper dorsal pair of spines is a little above, and the lower pair a little below the middle of the telson.

The globular eyes are clearly visible beneath the inflated hoods; as to the latter de Man says that in *A. praedator* "the eye-hoods end anteriorly in an obtuse tubercle"; in the present species it is the eyes themselves that show a small tubercle which seems to project clear of the hoods. The first antennae have a broad stylocerite, the

sharp apex of which reaches the end of the first joint, the second is shorter than the first but considerably longer than the third joint; the stouter flagellum consists of 17 thick joints followed by 10 that are thinner; the other flagellum is more than thrice as long. In the second antennae the tooth of the scale reaches only a little beyond the setose portion of the blade, which slightly overtops the peduncle.

The incisor process of the mandible is broad, convex, its middle tooth the largest, the rest successively smaller in each direction. The first maxilla has the palp bifid, with a single spine at the apex of its inner lobe. The second maxilla has the palp weak, with a spine on its narrow apex, and the adjoining plate (*lacinia media*) appears to be completely undivided. The short, transversely articulated, finger of the second maxilliped is of notable breadth. The antepenultimate joint of the third maxilliped is strongly curved, thus differing from the straight form of that joint as figured by de Man for *A. praedator*, but the difference may be referable to the much smaller size of the specimen by which that species is represented; in both species the terminal joint carries very long setae; in the present the little epipods of these maxillipeds have hook-shaped apices as shown in the figure, and the same character may be noticed in the second peraeopods.

The relative dimensions of the large left and the much smaller right cheliped of the first pair may be judged from the figures, the left hand being about 19 mm. and the right about 12 mm. long. Notwithstanding the great difference in the bulk of the hands, the fourth joint is about the same for each limb, and has in each a sharp ridge ending in a conspicuous tooth. In the second peraeopods the first jointlet of the wrist is equal to the last three combined and decidedly longer than the chela, the fifth is longer than the third or fourth but not equal to both combined; the second jointlet is equal to the chela, in which the fingers are somewhat longer than the palm. In the third and fourth peraeopods the fourth joint has the inner margin produced into a prominent subapical tooth; in the third pair there are seven spines along the inner margin of the sixth joint; in the fourth pair only six spines in this position. The fifth pair is more slender, its fourth joint without the sub-apical tooth, its fifth joint rather longer than in the other two pairs. In all the fingers are simple.

The uropods are of great breadth, strongly fringed with plumose setae, the diaeresis of the outer ramus not strongly sinuous.

The total length of the specimen, a female with globular ova,

measured round the back was 44 mm., the carapace being 13·5 mm., the telson 6 mm. long.

Locality. 33° 50' S., 25° 46' E.; depth 20 fathoms. A 1561.

GEN. SYNALPHEUS, Bate.

1888. *Synalpheus*, Bate, Rep. Voy. Challenger, vol. 24, pp. 480, 572.
 1899. „ Couitière, Ann. Sci. Nat. Zool., Ser. 8, vol. 9,
 pp. 154, 334, etc.
 1905. „ Couitière, Fauna Maldive-Laccadive Archip.,
 vol. 2, pt. 4, pp. 853, 869.
 1909. „ Couitière, Pr. U.S. Mus., vol. 36, pp. 1-93.
 1911. „ de Man, Siboga Exp., vol. 39a, p. 185.
 1913. „ Zimmer, Zool. Jahrb., Suppl. 11, pt. 3, p. 381.

In Bate's original definition of the genus a salient point is the statement that the mandibles have a curved, sharply pointed, and almost rudimentary incisor process, with a small two-jointed palp. But Professor Couitière in 1899 explains that, while this is true for the single species on which Bate founded his genus, there are gradations which lead through closely allied species from this form of mandible to that which may be regarded as normal in this genus and *Alpheus*. Authors may well be excused for not foreseeing discoveries of this kind, since in the process of evolution every peculiarity, however striking, is liable to be neutralized in the same way for purposes of classification. A new and full description of the generic character is given by Couitière in 1899. As often happens, some of the features are shared with neighbouring genera, and some of the distinguishing points, besides the incisor of the mandibles, are alternative. Since 1888 there has been an amazing development of the genus, for in place of the single species then assigned to it by Bate, de Man in 1911 enumerated 62 species and 15 varieties from the Indo-Pacific region alone. In the discrimination of these species minute measurement plays an almost alarming part, because as the eyes are completely covered by the carapace the vision of these creatures must be dim, and without compasses the members of different species will never know one another apart. Perhaps indeed the numerous varieties may be the result of inconsiderate intermarriages.

In 1909 Couitière distributed the species then known among six groups, with keys which must be invaluable to those who

have varied material available for study. The *Comatularum* group is distinguished from the rest by having "supraorbital spines insignificant compared to the rostrum," while the others have these spines "at least equal to the rostrum in importance." Our South African species does not conform to either condition, but neither does Coutière's own, *S. parancomeris*, 1905, since there the variable rostrum is described as always more or less, though not very considerably, longer than the supraorbital spines.

SYNALPHEUS ANISOCEIR, n. sp.

Plate LXXXVII.

Rostrum twice as long as breadth at the base, supraorbital spine not reaching the level of the rostral apex. Telson at base twice as broad as the interval between its postero-lateral teeth; between these the margin is produced to rather less than a semicircle, fringed with (about 30) plumose setae, a notch at each corner containing a small and a larger spine, the dorsal spines wide apart, the anterior pair not quite symmetrically placed, but in line with the lateral teeth the left-hand spine is slightly above, the right-hand slightly below the middle.

Peduncle of first antenna with spine of first joint longer, but the trunk rather shorter than second and third joints combined; the shorter flagellum with the stouter portion 10-jointed, as long as the peduncle, the last five joints carrying sensory filaments, the terminal point free, the slender continuation showing 6 joints, but imperfect; the slender flagellum is more than twice the length of the stout portion of its companion. In the second antennae the long joint or carpus of the peduncle reaches a little beyond the end of the long spine of the scale, this tooth reaching well beyond the blade of the scale and remaining free from it to below the middle; the blade itself is apically rounded and fringed with setae round the apex and inner margin, the remaining portion of the flagellum is 18-jointed, as long as the peduncle, and by its stoutness rather suggesting a length exceeding that of the first antennae. Coutière assigns to the *Comatularum* group "antennules shorter than the antennae," but to the other groups "antennules at least equal to the antennae." I am forced to join the conspiracy of silence which in the description of species seems invariably to leave this part of the organism indeterminate.

The incisor process of the mandible has seven well-pronounced but unequal teeth. The palp of the first maxilla is bilobed, with a single spine on the apex of the shorter inner lobe. The last joint of the third maxillipeds has some strong spines on the obliquely truncate apex, one surface thickly set with rows of spines, the preceding joint very short.

The asymmetry of the first pair of pereopods is characteristic of the genus, but in this species, besides the usual diversity of form, the inequality of size in the hands, alluded to by the specific name, seems to be carried to an extreme. While the smaller chela is 3.5 mm. long by 1.3 mm. broad, the larger is 8.5 mm. long by 3.5 mm. broad, with a corresponding difference in thickness. Notwithstanding this great difference in the bulk of the hands the three preceding joints differ but little in size in the pair. In the second pereopods the first jointlet of the carpus is rather shorter than the four following combined, the second, third, and fourth each little longer than broad, combined rather longer than the fifth, which equals the palm of the chela and is slightly shorter than the fingers; the fixed finger has several tufts of stiff setae. The fingers of the fourth and fifth pereopods are strongly curved at the pointed apex, within which is a short tooth. The sixth joint of the fourth pair has 6 spines along the inner margin, which in the fifth pair carries numerous tufts of spinules. The rami of the pleopods are broad, and much more so those of the uropods, the outer of which is prolonged considerably beyond the tooth of its outer margin; between this and a longer inner tooth are planted two conspicuous spines; from the inner tooth starts the very sinuous diaeresis. Besides the extensive marginal fringes of plumose setae, the inner ramus down the centre of its ventral surface has numerous rows of spines. The ova are large, 2 mm. long, showing the eyes, but have become hardened. The total length of the mother was 18 mm., the carapace 7 mm. long, and the telson 2.5 mm.

Locality. Gordon's Bay, False Bay, whence it was obtained by Dr. Gilchrist more than ten years ago. A 1555.

GEN. ATHANAS, Leach.

1814. *Athanas*, Leach, Edinb. Encycl., vol. 7, p. 432.
 1817. „ Leach, Malac. Podophth. Britanniae, text to pl. 44,
 No. 14.
 1863. „ Heller, Crust. südlichen Europa, p. 280.
 1898. „ Borradaile, Pr. Zool. Soc. London, p. 1011.

1899. *Athanas*, Coutière, Ann. Sci. Nat., Thèse "Alpheidae," passim.
 1905. " Coutière, Fauna Maldive-Laccadive Archip., vol. 2,
 pt. 4, p. 856.
 1908. " Coutière, Bull. Soc. Philomathique, n. Ser., vol. 11,
 No. 5, p. 2.
 1911. " de Man, Siboga Exp., vol. 39a', p. 144.

ATHANAS, sp.

The specimen, an ovigerous female, was in a fragmentary condition, having none of its pereopods except one member of the second pair, and the flagella of both pairs of antennae imperfect. Hence its systematic position cannot well be determined. The carapace agrees with *A. nitescens*, but the first joint of the first antennae is little longer than the second, the eleven remaining joints of its flagellum show no sign of a division, and the stylocerite springs nearly from the base of the peduncle and overlaps the base of its third joint. The scale of the second antennae is very broad, the tooth of the straight margin not reaching beyond the broadly convex distal margin. In each mandible the excisor process has 12 teeth, 6 large and 6 small, more or less regularly graduated from each corner in a broad curve; the second joint of the palp is fringed round the distal half or rather more with long setae. In the second maxillipeds the second and third joints are coalesced, the fifth joint is short, having the tongue-like process of the sixth bent against and beyond it, carrying as it were in transverse attachment the spinose finger, a broad short strip.

The second pereopod has the third and fourth joints subequal in length, the first division of the wrist nearly as long as the other four combined, the second and third scarcely shorter than the fourth, and these three combined scarcely longer than the fifth; the chela is as long as the three preceding divisions of the wrist combined, the finger as long as the palm.

The branches of the uropods are not quite so broad as the telson, the inner subequal to it in length, the outer a little longer, with the part following the diaeresis broader than long. The broad convex distal margin of the telson has markings indicative of 14 pairs of setae within the pair of teeth and attendant spines at the corners; there are two pairs of dorsal spines not far from the smooth slightly converging lateral margins, the upper pair a little above, the lower a little below, the middle of the telson.

Total length 15 mm., the telson 2.5 mm.

Locality. False Bay, St. James (taken by Dr. Gilchrist).
 A 1296.

FAMILY HIPPOLYTIDAE.

1910. *Hippolytidae*, Stebbing, Ann. S. African Mus., vol. 6, pt. 4
p. 390 (with synonymy).
1912. „ M. J. Rathbun, Bull. Mus. Comp. Zoöl., vol. 54,
p. 454.
1914. „ Kemp, Records Indian Mus., vol. 10, pt. 2,
p. 81.
1914. „ Stebbing, Ann. S. African Mus., vol. 15, pt. 1,
p. 34.

Miss Rathbun adds a new genus *Barbouria*. Mr. Kemp adds two new genera, *Gelastocaris* and *Merguia*, and supplies a valuable key to 15 Indo-Pacific genera of the family.

GEN. HIPPOLYTE, Leach.

1814. *Hippolyte*, Leach, Edinb. Encycl., vol. 7, p. 431.

HIPPOLYTE KRAUSSIANUS (Stimpson).

1860. *Virbius kraussianus*, Stimpson, Pr. Ac. Sci. Philad., p. 105 (36).
1910. *Hippolyte kraussiana*, Stebbing, Ann. S. African Mus., vol. 6,
pt. 4, p. 391.

Three specimens in good agreement with Stimpson's description have been obtained by the *Pieter Faure*. One of them 29 mm. long considerably exceeds the size mentioned by Stimpson, and the rostrum much exceeds the length of the peduncle of the first antennae, though not reaching the apex of the scale of the second, and otherwise conforming to Stimpson's account, "above at the base bidentate, at the apex tridentate, on the lower margin quadridentate." A second specimen, a female, ovigerous, 18 mm. long, practically agreeing in this respect with Stimpson's, has, like his, the rostrum little longer than the peduncle of the first antennae, with the dentation numerically the same, except for the addition of a minute ventral tooth. This, however, does not exclude a different arrangement of the teeth in our two specimens, the ventral teeth in the larger being much more remote from the apex than in the smaller, and its median apical tooth being advanced beyond its smaller neighbours above and below, whereas in the smaller specimen the lowest tooth of the three is the largest and the most advanced. In the third specimen,

only 13 mm. long, and very insignificant in bulk compared with the first, the rostrum again is little longer than peduncle of the first antennae, but it has only one ventral tooth in addition to that of the apical trio, both the other members of which reach beyond it, the median tooth greatly exceeding both its partners. In the smaller specimens the flagella of the first antennae might justify Stimpson's characterization of them as subequal, but in the largest specimen the more slender flagellum is considerably the longer. The flagellum of the second antennae appears to be as long as the body; the scale is broad, the apical tooth of the outer margin not nearly reaching the end of the broadly rounded setose distal border.

The mandibles have a strong molar, the incisor process weak, ending in five little teeth. First maxillae with a short twisted palp. Second maxillae with lowest lobe receding, fringed with a few long setae, apical plate bent, tipped with one spine. First maxillipeds with the slender distal part of the endopod rising from a broad membranaceous base. Finger of second maxillipeds short, broad, with fan-like fringe of slender spines.

First peraeopods short, stout, fingers shorter, wrist rather longer than palm and subequal to the fourth joint. Second peraeopods, with wrist subequal to fourth joint, its proximal division as long as the other two combined, the third longer than the second. Fifth peraeopods having the finger fringed with 8 graduated spines, the largest adjoining the unguis, which is backed by a spine slightly longer and more slender.

Postero-lateral angles of the sixth pleon segment acute. Outer ramus of the uropods broad, its outer margin smooth, ending in a small tooth, within which is a large spine, the distal border of the ramus extending some way further, fringed with setae. The elongate telson has two pairs of dorso-lateral spines, as stated by Stimpson, but also three pairs of different sizes on the apex.

Localities. Knysna $\frac{1}{2}$ mile above jetty. A 1282. A specimen, ovigerous female, from East London, sent to the Museum by Mr. Wood, agrees with the largest of the three specimens described above exactly in the rostral character, and has a total length of 32 mm. A 1281.

GEN. SPIRONTOCARIS, Bate.

1888. *Spirontocaris*, Bate, Rep. Voy. Challenger, vol 24, pp. x, 576, 595.
 1898. „ Walker, Tr. Liverpool Biol. Soc., vol. 12, p. 276.
 1904. „ Rathbun, Decap. Crust. NW. Coast N. America, pp. 5, 56-107.
 1906. „ Norman and Scott, Crustacea of Devon and Cornwall, p. 18.
 1906. „ Calman, Ann. Nat. Hist., Ser. 7, vol. 17, pp. 31, 32.
 1910. „ Kemp, Fisheries Ireland, 1908, i., pp. 99, 102.
 1914. „ Balss, Abhandl. K. Bayer. Ak. Wiss., vol. 10, Suppl. 2, p. 42.

Through the above references there may be traced a large literature relating to this rather perplexing genus. The species now offered as an additional member of its numerous horde does not conform with the original definition, as it is devoid of the two supraorbital teeth therein mentioned, its rostrum is not deep, and the incisor process of the mandible cannot be called rudimentary. One or other or both of the first two deficiencies, however, it shares with several other species, and with regard to the third precise information is in most cases wanting. The mouth-organs are suggestive of agreement with Bate's *Hetairus*, but if that genus were resumed from the synonymy of *Spirontocaris*, Bate's statement that the third maxillipeds are without an exopod must be noted as erroneous.

SPIRONTOCARIS PAX, n. sp.

Plate LXXXVIII.

The species to which the present appears to make the nearest approach is *Spirontocaris cranchii* (Leach), 1817, which in turn closely resembles the rare form from Japan named *Hippolyte gracilirostris* by Stimpson in 1860, and transferred to *Spirontocaris* by Balss in 1814. Here the slender rostrum carries dorsally 4 teeth instead of 6 as in Stimpson's species, a smooth space being left anteriorly which his occupies with the 2 foremost teeth; ventrally there are 2 small teeth just behind the apical point in Balss's figure of the other species. In *S. cranchii* the 3 or 4 rostral teeth approach the bifid or trifid apex more nearly than here. In all

three species there is no other tooth, except the antennal. The third segment of the pleon is medio-dorsally produced over the fourth, but not acutely. The sixth segment is much longer than any of the preceding segments. The apical margin of the telson carries a pair of long spines, between which are 3 rather more than half as long and several setae; above them are a small pair of spines and outside them a rather short pair, above which on the left are a series of 6 spaced sub-lateral spines, while on the right, no doubt abnormally, there are only 3 spines, unsymmetrical in position. Stimpson gives the telson of his species 4 pairs of dorsal spines, and the same number is assigned to *S. cranchii* by Milne Edwards and Bell. Eyes dark, cornea globular. First antennae agreeing with Bate's account of those appendages in "*Hetairus gaimardii* (Milne-Edwards)." Second antennae nearly as long as the body, the tooth of the scale almost level with the rounded apical margin.

Mandibles with much denticulate molar, which is much stouter than the incisor process, the latter ending in an obliquely truncate apex, the anterior point of which is finely bifid, and the receding border cut into 6 or 7 little teeth; the two-jointed palp is rather feeble, the second joint carrying a few setae. The first maxilla has several strong spines about the curved apex of the lower plate, a close fringe of spines round much of the margin of the large median plate, and the palp proximally stout, with two unequal spines on the faintly emarginate much narrower apex. The second maxilla has the lower plate apparently undivided, carrying a curved series of some 10 long not very closely-set setae, the middle plate divided about to the middle, both lobes fringed with close-set setae or spines, the palp or apical plate not very broad, but the apical part rather abruptly narrowed, tipped with 2 very unequal spines, neither very large. The first maxilliped differs from that described and figured by Bate for *Hetairus gaimardii* (Milne Edwards), chiefly in the apical part of the endopod, which Bate speaks of as "a two-jointed continuation," the figure showing the two joints about equal in length. In our species the widest part at the base is short, followed by a narrower but much longer portion, to which succeeds a still narrower but quite short apical piece. I cannot definitely make out any articulation between these three divisions, though I cannot positively deny its existence between the last two compartments; the broad proximal part of the exopod has a distal fringe of long setae, not short ones as in Bate's figure. The second maxillipeds are in near agreement with the figure given by Bate. The

third maxillipeds have a small exopod, not nearly so long as the antepenultimate joint of the endopod; but this is not a point of distinction from "*Hetairus gaimardii*," since that also, as I stated in 1893, has the exopod in question, the species properly belonging to *Spirontocaris*.

The first peraeopods are moderately robust, the chela nearly as long as the fourth joint, not twice as long as the fifth joint, in this respect differing from *S. herdmani*, A. O. Walker, 1898; the fingers are rather less than two-thirds the length of the palm. The second peraeopods are slender, the divisions of the wrists not exactly corresponding in the pair of limbs, but the proximal first and second jointlets in both are coalesced, so that the wrist is 6-jointed. Here, however, the result is due to the coalescence mentioned, whereas in *S. cranchii*, according to Mr. Kemp's fig. 8, pl. 18, there is a jointlet missing. Stimpson speaks of the third, fourth, and fifth peraeopods in his species as all slender, which is an epithet not applicable to the third pair in the new species, and not specially appropriate to the fourth or fifth. Walker mentions that the third peraeopods in *S. herdmani* have 3 spines on the distal third of the fourth joint. In the new species no such spines were observable. In all three pairs the fifth joint is distally produced over the base of the long sixth, and the short stout finger is fringed with spines on the inner margin, and ends in a short stout unguis with a spine behind it.

The first pleopods are comparatively short, the second and third much longer, the long second joint being expanded, at first gradually, into a membranaceous wing which aids in securing the very numerous eggs; far down on the inner ramus there is a long coupling process with about a dozen minute hooks on the transverse apex. The uropods, which are rather longer than the telson, have the peduncle produced into a sharp point on its outer margin; the inner ramus, a very elongate oval, is a little shorter and narrower than the outer, which, besides the ordinary long plumose setae of its inner and rounded apical border, has the straight outer margin fringed all along with short setae to the distal tooth, this tooth not nearly reaching the apex.

Total length of the specimen, a female laden with eggs, was 14.5 mm., the carapace with rostrum being 4 mm. long, and the pleon to end of telson 10.5 mm.

Localities. 34° 11' S., 18° 31' E.; depth 20 fathoms. A 1297. And off Buffels Bay (False Bay); 30 fathoms. No. 116. The

specimen from this locality has on the rostrum 5 dorsal teeth and 3 very small ventral teeth.

With all Europe in the throes of war (August 17, 1914), this little species is a fitting representative of Peace, in honour and hope of which I name it.

GEN. EXHIPPOLYSMATA, nov.

1914. *Hippolysmata* (part), Kemp, Records of the Indian Museum, vol. 10, pt. 2, p. 112.

Closely allied to *Lysmata*, Risso, and *Hippolysmata*, Stimpson. Rostrum longer, usually much longer than carapace, with an elevated dentate basal crest; telson lanceolate, the acute apex unarmed. Upper flagellum of first antennae elongate, its basal portion apparently composed of two coalesced branches, the shorter free only at the apex. Mandibles without palp, the molar comprising a broad spinuliferous band and by its side a projecting dentate plate. In the first maxillipeds the endopod has a small conical joint at the apex tipped with a spinule, the preceding joint a little wider and about two and a half times as long.

Mr. Stanley Kemp has recently (April, 1914) given a key to the Indian species of *Hippolysmata*, separating a new species, *H. ensirostris*, with a variety *punctata*, from the rest by characters of which I have made use for instituting the present genus. The Indian species is said to be very variable in some of its features, so that it may be a question of taste whether nearly related forms shall be treated as named varieties or as distinct species.

EXHIPPOLYSMATA TUGELAE, n. sp.

Plate LXXXIX.

The dorsal crest is composed of 13 graduated teeth increasing in size towards the front, with a small tooth at a little distance on the carapace to the rear and another at a small distance on the rostrum in front; just behind the latter tooth begins a row of 7 ventral teeth, at first at small then at large intervals, while above all but the first the dorsal margin is perfectly smooth. The rostrum measured from the base of the eye-stalk is once and a half as long as the rest of the carapace; the antennal tooth and the antero-lateral are acute and pronounced. The telson is very like that of *E. ensi-*

rostris, but has the margins feathered with setae for nearly two-thirds of the length from the apex; the latter is acute and appears to have a very small pair of spines at its base, the main body of the telson has two pairs of dorsal spines, not quite symmetrically placed in the specimen figured.

The eyes are cylindrical, with a rather small corneal area.

The first joint of the first antennae has a tooth at about the middle of one margin; the much shorter second joint is decidedly longer than the third; the flagella are about as long as the body and sub-equal in length, the upper one at the base being considerably the broader, a thicker part indicative of 28 jointlets being accompanied by a thinner part, about half its width, which carries some 56 groups of filaments, only the rounded apex of this portion being free. The division into jointlets along this apparently composite part of one flagellum and along the corresponding portion of the other depends rather on marginal constrictions than on any definite articulation. The second antennae have a flagellum considerably longer than the body, the rounded apex of the scale reaching well beyond the strong tooth of the outer margin.

The character of the mandibles has been in part explained above. The part which may perhaps function as an incisor process extends in one mandible all across the end of the molar in three large teeth, the largest fringed with setules; in the other the extent is smaller and the edge divided into five teeth of various sizes, the setaliferous band of the molar being here accompanied by an irregular strip of three blunt teeth.

The lower lip shows two broad lobes with rather irregular outlines. The first maxilla has a bilobed apex, the inner lobe the larger with one long spine among others that are seta-like. The second maxilla has its vibratory plate more flat-topped than usual. The third maxilliped ends in a strong apical spine, the exopod extends along two-thirds of the antepenultimate joint, and a small epipodal plate is setiferous on its anterior margin.

The first pereopods are short, the fifth joint rather shorter than the fourth or sixth, the movable finger as in *E. ensirostris* scarcely two-thirds the length of the palm. The more slender but longer second pereopods have the wrist in each limb divided into 12 jointlets, of which the first is the longest, the last being next in size sub-equal to the palm but longer than the fingers; the fourth joint is very faintly sub-divided into 4 compartments and equals in length the first 8 of the wrist; it is rather longer than the somewhat stouter third joint, which is distinguished by a peculiar armament of 6 or 7 hooked

spines on its inner margin; it has other simple spines, but these are less strongly developed than those on the corresponding joint of the next two pairs. The third, fourth, and fifth peraeopods are stouter than the second, subequal to one another in length and similar in general appearance, but with certain differences, the fourth joint being successively shorter but the fifth successively longer; the fifth also near the end of its inner margin has four groups of serrate spines which are not represented on the two preceding pairs; in all three the finger has a group of spinules at the base of its acute unguis, and on the proximal part of the inner margin 3 spines successively larger; on the third and fourth pairs these are preceded by a very small spine, which in the fifth is perhaps hidden by the last serrate group.

In the uropods the broadly rounded apex of the exopod extends a little beyond the narrowly rounded apex of the endopod and much beyond the bifid, spine-including apex of the outer margin, from which the diaeresis starts its devious course.

The total length of the specimen was 67 mm., the carapace with rostrum 30 mm., the telson 9 mm., the flagellum of the second antennae about 85 mm.

Locality. Off South Head, Tugela River, from a depth of 12 fathoms. A 1274.

Another specimen was obtained at Cape Henderson, NW. 2½ miles, from a depth of 26 fathoms. A 1203.

FAMILY OPLOPHORIDAE.

(See Annals of S. African Museum, vol. 6, part 4, p. 394, 1910.)

GEN. ACANTHEPHYRA, A. Milne-Edwards.

(See Annals of S. African Museum, vol. 6, part 4, p. 394, 1910.)

ACANTHEPHYRA PURPUREUS, A. Milne-Edwards.

1906. *Acanthephyra purpurea*, Kemp, Fisheries Ireland, 1905, i., p. 4, pl. 1, pl. 2, figs. 1-3.

Mr. Stanley Kemp has discussed this species so fully, with the long list of synonyms which he assigns to it, that there seems to be nothing left to say on the subject. Our small South African specimen agrees with Bate's *A. sicca* in the long straight rostrum with 10 dorsal teeth of which the foremost is

rudimentary and the three to the rear are behind the 5 ventral teeth which cover the same space as 6 of the dorsal. Each of the pleon segments from the third to the sixth is extended about equally in the medio-dorsal line over the segment behind it; the sixth is as long as the telson. The latter on its narrow distal half has 4 pairs of spines, and on the narrow apex 3 small and 2 moderately large spines. Bate's much larger specimen of *A. sica* has 9 or 10 pairs of dorso-lateral spines on the telson, and the scale of the second antennae, according to Kemp as well as Bate, is regularly narrowed to a sharp point armed with an apical spine. In the present specimen the apical spine is distinct enough, but it overtops an apical border which is almost straightly truncate and broad enough to carry 9 little slightly overlapping lobes. Unfortunately all the setae are missing from this appendage. The mandibular palp is described and figured by Bate as two-jointed, but it appears to be undoubtedly three-jointed, as figured by S. I. Smith in 1882; the first joint and the setose third being each shorter than the second. The specimen had only two of its peraeopods remaining, a first and a fifth, the latter almost devoid of setae, but this bareness might be accidental. Length 46 mm., carapace 15 mm., of which the rostrum accounted for 7 mm. The telson was 6.5 mm. in length, the scale of the second antennae 6 mm. The outer branch of the uropods is considerably longer than the inner, the tooth of its outer margin at some distance from the rounded apex.

Locality. Cape Point NE. by E. $\frac{1}{4}$ E. 40 miles; 800 to 900 fathoms. A 1273.

ACANTHEPHYRA BRACHYTELSONIS, Bate.

1888. *Acanthephyra brachytelsonis*, Bate, Rep. Voy. Challenger, vol. 24, p. 753, pl. 126, figs. 7, 7a.
1891. " " Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 7, p. 195.
1892. " " (? = *A. angusta*, Bate, and *A. eximia*, Smith), Wood-Mason and Alcock, Ann. Nat. Hist., Ser. 6, vol. 9, p. 362, fig. 4.

1901. *Acanthephyra eximia*, var. *brachytelsonis*, Alcock, Catal
Indian Deep-sea Macrura, p. 78,
(as *A. brachytelsonis*) Illustr. In-
vestigator, Crust., pl. 3, fig. 2.
1906. " " var. *brachytelsonis*, Kemp, Fisheries
Ireland, 1905, pp. 21, 23.
1914. " " var. *brachytelsonis*, Balss, Abhandl.
K. Bayer Ak. Wiss., vol. 10,
Suppl. 2, p. 21 (distribution).

A South African specimen, with damaged antennae and the body broken in two between the fourth and fifth segments of the pleon, has the rostrum "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," in these respects exactly corresponding with Bate's description and also with his illustration, which differs very considerably from that supplied for *A. eximius* by the trustworthy pencil of Professor S. I. Smith (Rep. Comm. Fish. for 1885, pl. 14, fig. 1, 1886). No doubt, however, there are many connecting links between the two forms. According to Bate his *A. angustus*, which Kemp identifies with *A. eximius*, has the pleon carinate from the second to the sixth segment, and Alcock ascribes the same character to *A. eximius*. In the form here considered the first segment is also carinate. The various descriptions agree in giving the length of the telson as less than that of the exopod of the uropods, but it is not on that account especially short as might be expected from the name *brachytelsonis*. Its narrow apex is armed with a central tooth flanked by a pair of spines that are longer and stouter, with a slender pair intervening from below; there are four dorso-lateral spines on the right and three on the left of the distal half of the telson.

The scale of the second antennae, though narrowing from the base, is not very narrow at the apex, which is just overtopped by the marginal tooth. The mandibles have a broad incisor process divided into 8 or 9 teeth of different sizes, the most prominent one more or less central. This process is attached to the molar, which in the left mandible, as seen from the upper or inner surface, appears partially to fold over it. The palp of the first maxillae has two small spines projecting from the inner surface near the apex, and on the

outer margin of the base there is a row of 7 or 8 spinulate setae. In the second maxillae the proximal lobe is far less prominent than the following deeply bifid lobe except in respect of the very long setae with which it is fringed; the top of the vibratory plate is flattened. In the first maxillipeds the apical joint is much shorter than the preceding, and is overtopped by the long and broad exopodal plate. In the second maxillipeds the second and third joints are coalesced though their limits are defined, the exopod reaches much beyond the down-bent sixth joint to which the triangular finger is obliquely attached. In the third maxillipeds the antepenultimate joint is notable for the strong flexure of the proximal half and the great widening of the distal.

The total length of the specimen was about 84 mm., the carapace measuring 30 mm., of which the rostrum occupied 14 mm. The first and second segments of the pleon were together 12.5 mm. long, equal to the third segment, including its extended postero-dorsal tooth; the three following segments together measured 23 mm., and the telson 12 mm. In adding the lengths of the different parts, allowance must be made for the overlapping, the process of the third pleon segment extending over nearly half of the short fourth segment. Each of the three following segments has a dorsal tooth, the last the longest, but none of them very important. Plates illustrating this and the next species are reserved for future publication.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1210.

FAMILY NEMATOCARCINIDAE.

(See these Annals, vol. 15, part 1, p. 43, 1914.)

GEN. NEMATOCARCINUS, A. Milne-Edwards.

(See these Annals, vol. 15, part 1, p. 43, 1914.)

NEMATOCARCINUS PARVIDENTATUS, Bate.

1888. *Nematocarcinus parvidentatus*, Bate, Rep. Voy. Challenger, vol. 24, pp. lxxviii, lxxxvii, 214, 322, pl. 132.

The specimen here accepted as representing Bate's Japanese species above named makes as near an approach to his partial

figure and brief description as any that I have had an opportunity of examining. Bate could not describe the peracopods, and on our specimen there were none to describe. The dorsal teeth on the carapace and rostrum number 27, and there is a little ventral tooth near the apex, just below the foremost of the dorsal teeth. Bate says "the frontal margin has a well-developed antennal tooth, but the fronto-lateral tooth appears to be entirely absent." If by "fronto-lateral" he means the tooth at the lower front corner, which I call the antero-lateral, it is well marked in his figure and is found in the South African specimen. The telson is narrow, and has only 4 pairs of dorso-lateral spines, two of the pairs in unsymmetrical arrangement; the spines of the apex are for the most part missing. The eyes are moderately large, dark red. The stylocerite of the first antennae is broad, ending acutely, not nearly reaching the apex of the first joint. In the second antennae the setose distal border is broad, slightly convex, on a level with the little apical tooth, the flagellum about 75 mm. long. The mandible has a broad incisor process edged with six unequal teeth, the molar stout, the third joint of the palp much the longest and broadest, with a fringe of long setae. The palp of the first maxilla is slightly emarginate at the apex, with a long seta at one corner, 4 short setae at the other, and 3 subapical spines on the surface. In the second maxilla the terminal plate is distally narrowed and tipped with 5 setae. Attention may be called to the strong spine, bent at the end, on the apex of the third maxillipeds. Calman in 1906 points out that Bate separated his *Stochasmus exilis* from *Nematocarcinus* through mistaking this spine for a separate joint or "dactylos." Kemp in 1910 reduces *N. exilis* to the rank of a variety of *N. ensifer* (S. I. Smith). The figures which Kemp gives point to a near alliance, but not, I think, identity, between the forms *exilis* and *parvidentatus*. In the second maxillipeds a further point arises for consideration. In his figure Bate represents the second and third joints in complete coalescence, probably by inadvertence, as usually in this genus they are quite distinct, as shown in Smith's figure of *N. ensifer*. Yet in the specimen here described the separation is very incomplete, as shown in the figure. The first pleopod of the male, in place of an inner branch, has a wide membranaceous plate, with little hooks low down on the inner margin, as though it were a retinaculum in coalescence with a

simple branch. The second pleopod has two branches lying so closely one on the other that they are with difficulty drawn apart; in independent attachment to the peduncle is a process, on the inner side of the inner branch, which carries a slender piece about one-third the length of the ramus, having its lanceolate end densely fringed with setae. To this piece on the inner side near its base is attached a rather long retinaculum, distally armed with numerous hooks, its blunt end level with the base of the lanceolate apex just mentioned. There are obvious differences between this arrangement and the corresponding parts figured by Kemp for *N. exilis*.

The peduncle of the uropods on the outer side is apically acute. The inner ramus is lanceolate, much shorter than the broad outer ramus, the setose outer margin of which meets the sinuous faintly marked diaeresis with a very small tooth, within which is a larger spine, and beyond which the margin is continued to form a broadly rounded apex, fringed like the other available edges of both branches with long plumose setae. Total length of specimen about 70 mm., rostrum 5 mm., carapace with rostrum 19 mm., telson 10 mm.

Locality. Cape Natal N. by E. 24 miles; depth 440 fathoms. A 1261.

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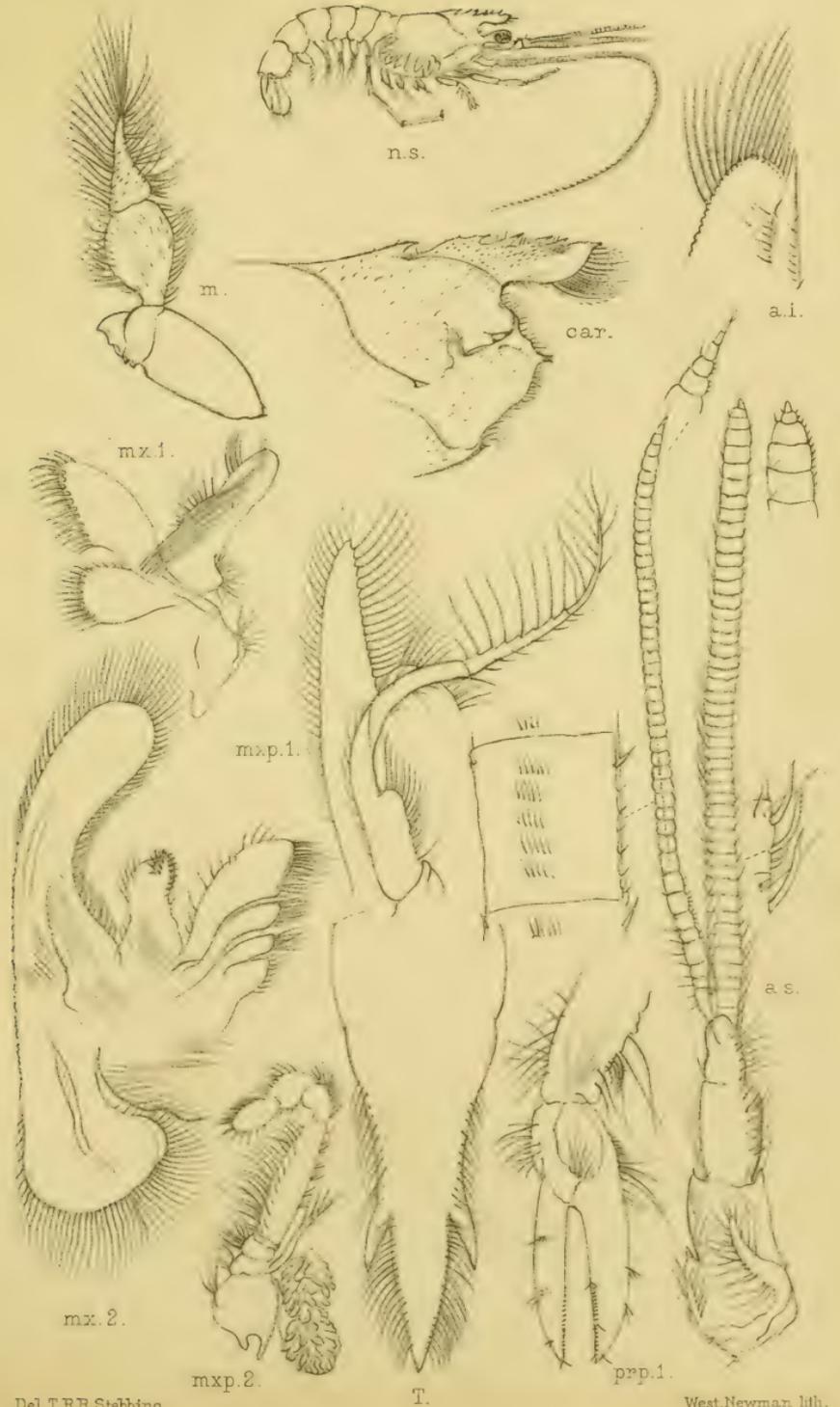
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PLATE XIII. (Crustacea, Plate LXXVII.)

Solenocera comatus, n. sp.

- n.s. Specimen in lateral view, natural size; peraeopods 2, 3, 4, almost entirely missing, and distal part of fifth peraeopod imperfect.
- car. Part of carapace much magnified.
- a.s. First antenna, with further enlargement of the tips of the two flagella, and still higher magnification of median parts.
- a.i. Apex of scale of second antenna.
- m., mxp. 2. Mandible and second maxilliped, less highly magnified than the other parts to economize space.
- mx. 1, mx. 2, mxp. 1. First and second maxillae and part of first maxilliped on a uniform scale.
- prp. 1. The chela of first peraeopod with part of the wrist.
- T. Dorsal view of the telson.



SOLENOCERA COMATUS, n.sp.

PLATE XIV. (Crustacea, Plate LXXVIII.)

Solenocera comatus, n. sp.

l.i. Lower lip.

mxp. 3. Third maxilliped.

plp. 1. First pleopod, with higher magnification of the inner ramus.

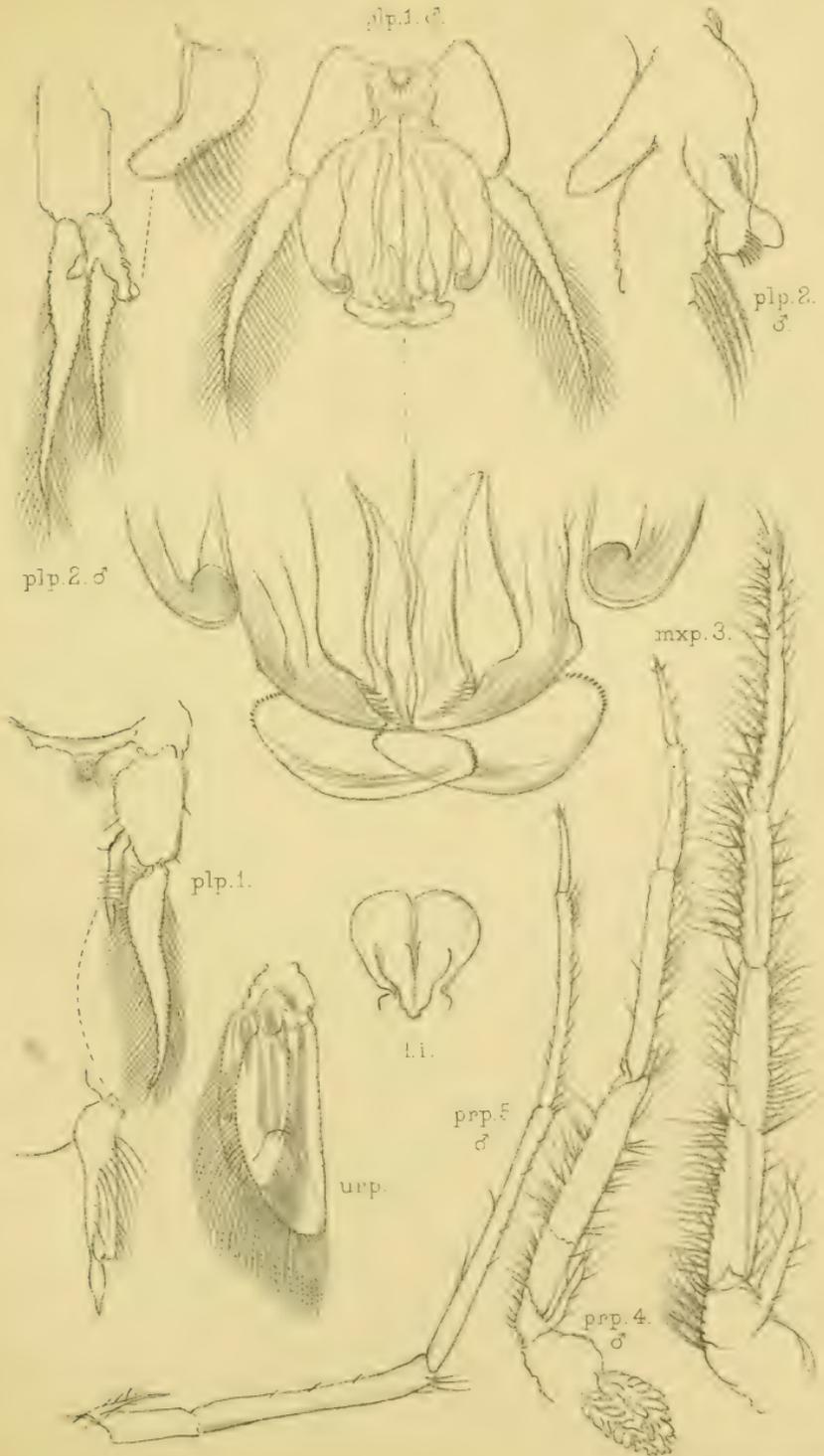
urp. One of the uropods.

The remaining figures are from a male specimen.

prp. 4, ♂, prp. 5, ♂. Fourth and fifth peraeopods.

plp. 1, ♂. First pleopods, with the petasma flattened, and higher magnification of the free end.

plp. 2, ♂. Second pleopod, with higher magnification of the three proximal lobes of the inner ramus (on the right of the plate), the innermost lobe shown in full on the left.



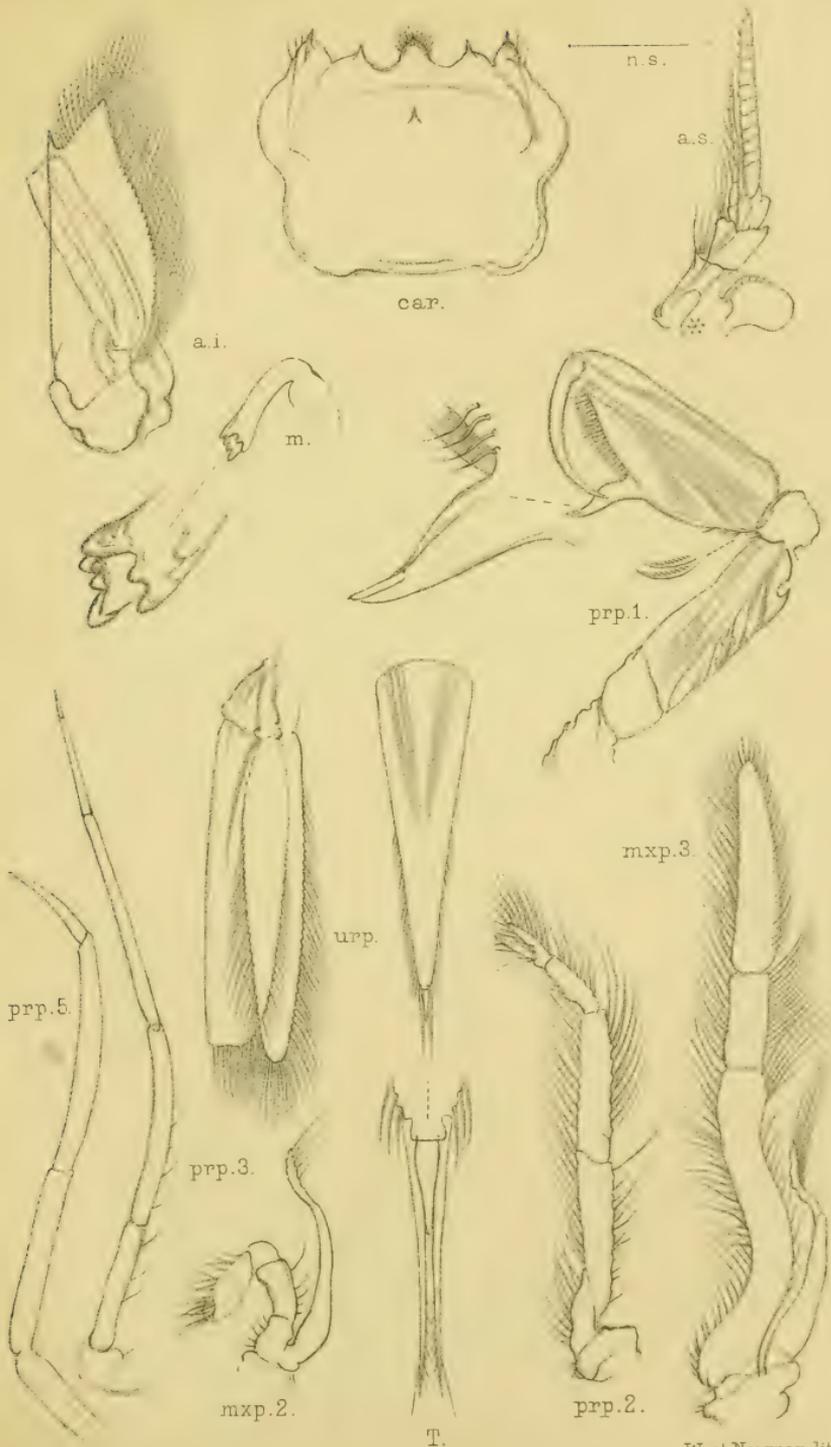
Dr. T. R. Stebbing.

West, Newman lith.

PLATE XV. (Crustacea, Plate LXXIX.)

Philocheras megalochair, n. sp.

- n.s. Line indicating natural size of the specimen from which the figures were drawn.
car. Carapace in dorsal view, somewhat flattened.
T. Telson on a higher scale of enlargement than the carapace, but uniform with the figures in general; its apex still more enlarged.
a.s., a.i. First antenna, and second to end of long joint of peduncle.
m. Mandible, with further enlargement of incisor process, uniform with the extra magnification of first pereopod and telson.
mxp. 2., mxp. 3. Second and third maxillipeds.
prps. 1, 2, 3, 5. First pereopod, with further enlargement of the sixth joint's tooth and serrate marginal spinules; second and third pereopods; distal joints of the fifth.
urp. One of the uropods.



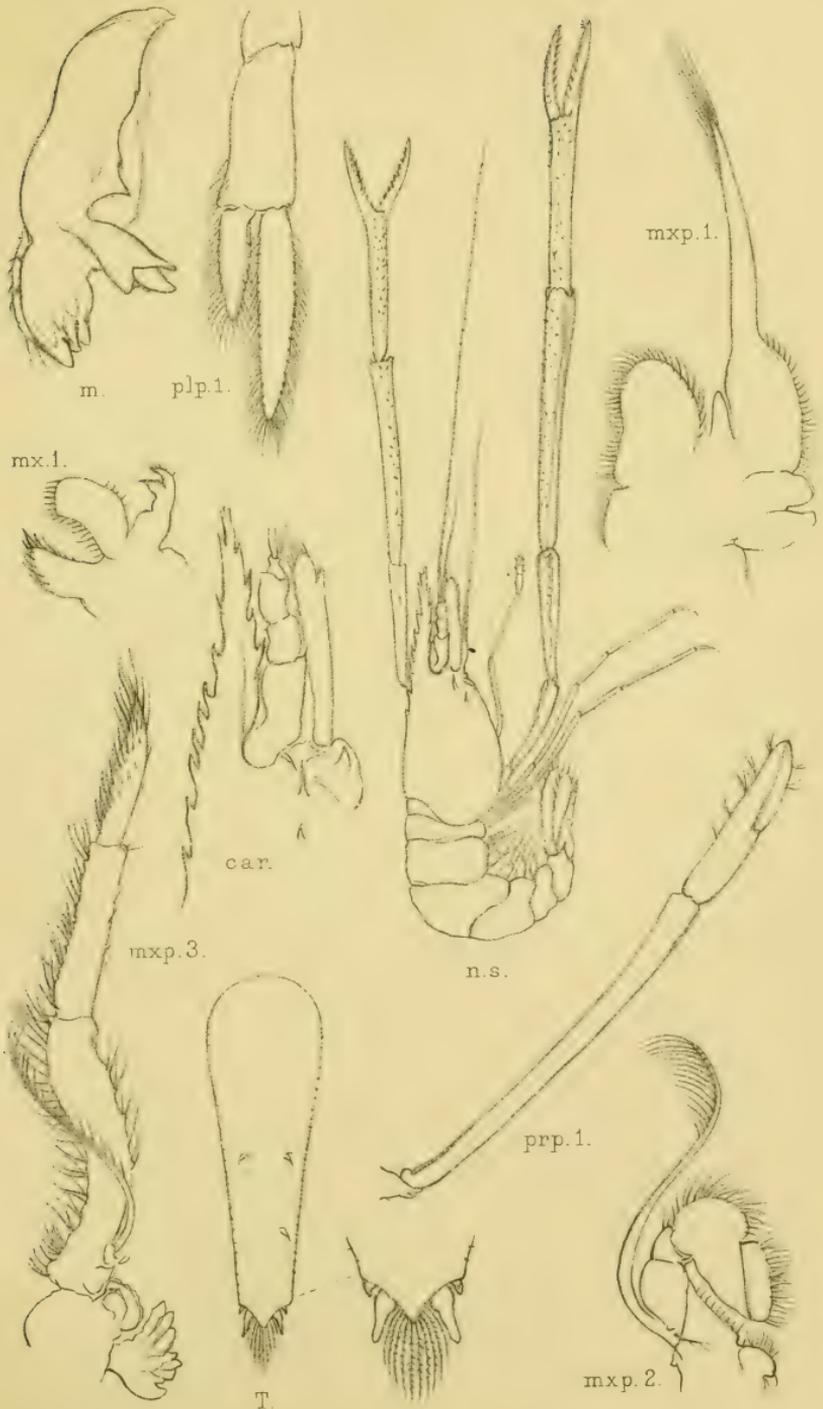
Del. T.R.R. Stebbing.

West, Newman lith.

PLATE XVI. (Crustacea, Plate LXXX.)

Palaemon delagoae, n. sp.

- n.s. Specimen above in lateral view, of the natural size, the antennae imperfect, and eye omitted.
- car. Rostral end of carapace with parts of first and second antennae, enlarged in conformity with other separate parts.
- T. Telson in dorsal view, with apex still further enlarged.
- m., mx. 1, mxp. 1, 2, 3. Mandible, first maxilla, first, second, and third maxillipeds.
- prp. 1. Last three joints of one of the first pereopods.
- plp. 1. First pleopod.



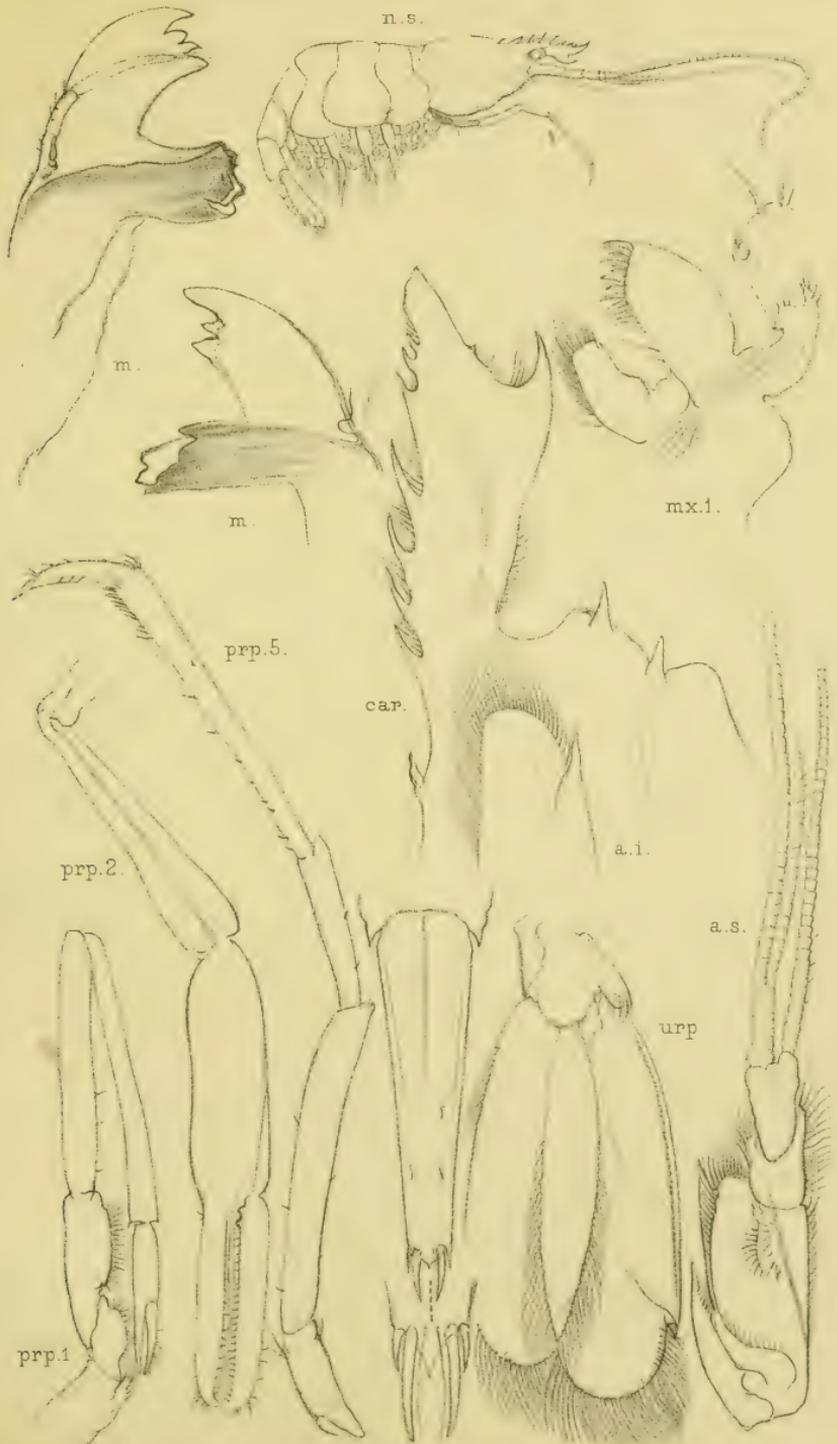
Del. T.R.R. Stebbing.

West, Newman lith.

PLATE XVII. (Crustacea, Plate LXXXI.)

Leander peringueyi, n. sp.

- n.s. Specimen in lateral view, of the natural size, many appendages omitted.
car. Rostrum and frontal margin in lateral view much enlarged.
T. Telson in dorsal view, with further enlargement of the apex.
a.s. First antenna, the two elongate flagella only in part.
a.i. Apex of the scale of the second antenna.
m., m. The mandibles from the inner or upper side, that on the right showing only the basal joint of the palp.
mx. 1. First maxilla, with further enlargement of the inner apical lobe.
prp. 1, 2, 5. First, second, and fifth peracopods, incomplete, but all to the same scale.
urp. One of the uropods.



Del. T.R.R. Stebbing.

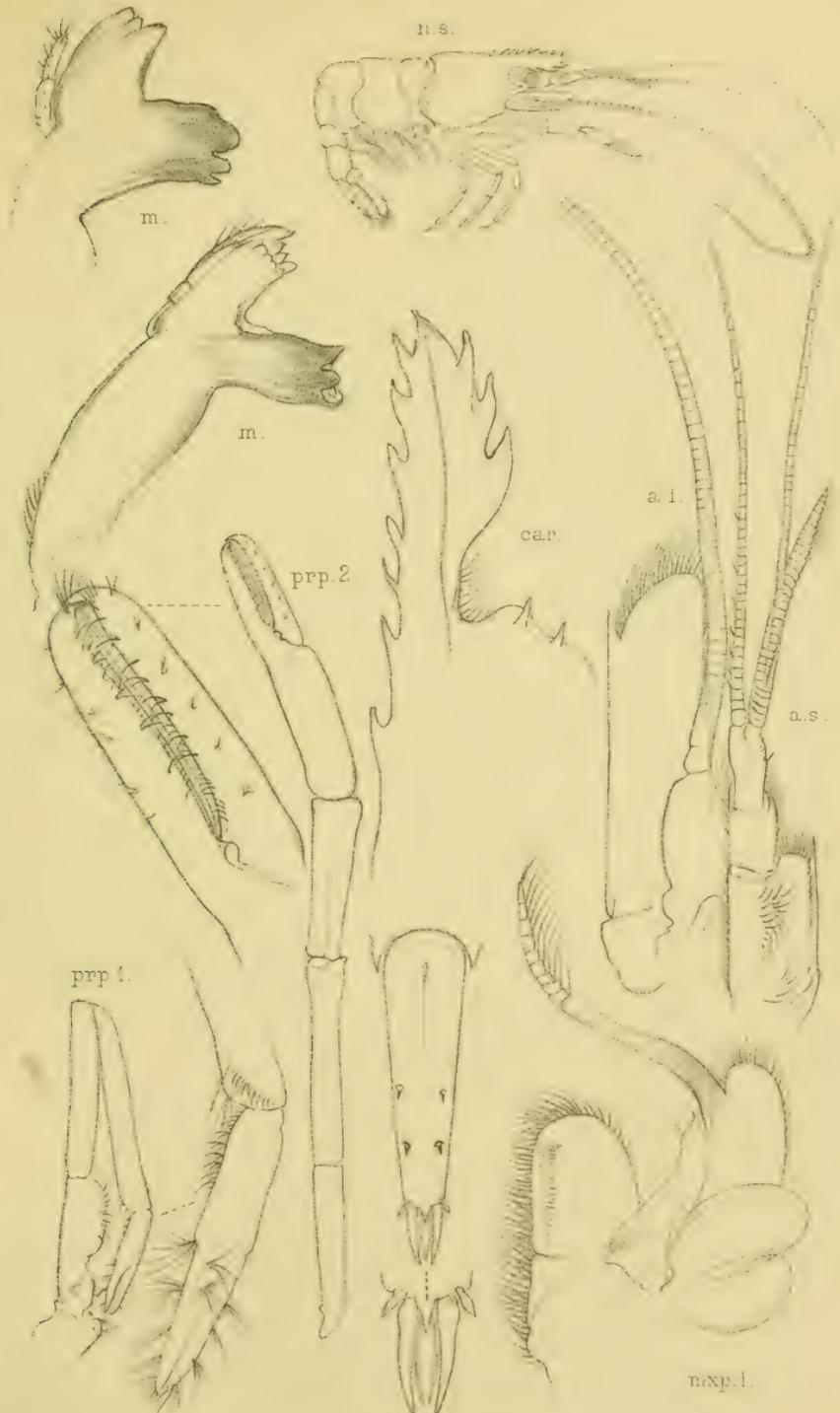
T

West, Newman lith.

PLATE XVIII. (Crustacea, Plate LXXXII.)

Leander gilchristi, n. sp.

- n.s. Specimen in lateral view, of the natural size.
- car. Rostrum and frontal margin in lateral view, much enlarged.
- T. Telson in dorsal view, with further enlargement of the apex.
- a.s, a.i. First antenna, two of the flagella incomplete; second antenna, with peduncle and flagellum incomplete.
- m., m. Upper or inner view of the left mandible, and lower or outer view of molar, incisor process, and palp of the right mandible.
- mxp. 1. First maxilliped, on the same scale as the mandibles.
- prp. 1, prp. 2. First peraeopod, with chela and distal end of carpus more highly magnified; last five joints of second peraeopod, with the fingers of the chela more highly magnified, these extra enlargements agreeing with the mouth organs.



Del. T. R. R. Stebbing.

West, Newman lith.

PLATE XIX. (Crustacea, Plate LXXXIII.)

Palaemonetes natalensis, n. sp.

n.s. Line indicating length of the specimen from apex of rostrum to apex of telson.

car. Carapace in lateral view, with further enlargement of part of the rostrum.

T. Telson in dorsal view.

a.s., a.i. First antenna, and part of the second, showing distal portion of the scale and basal portion of the flagellum.

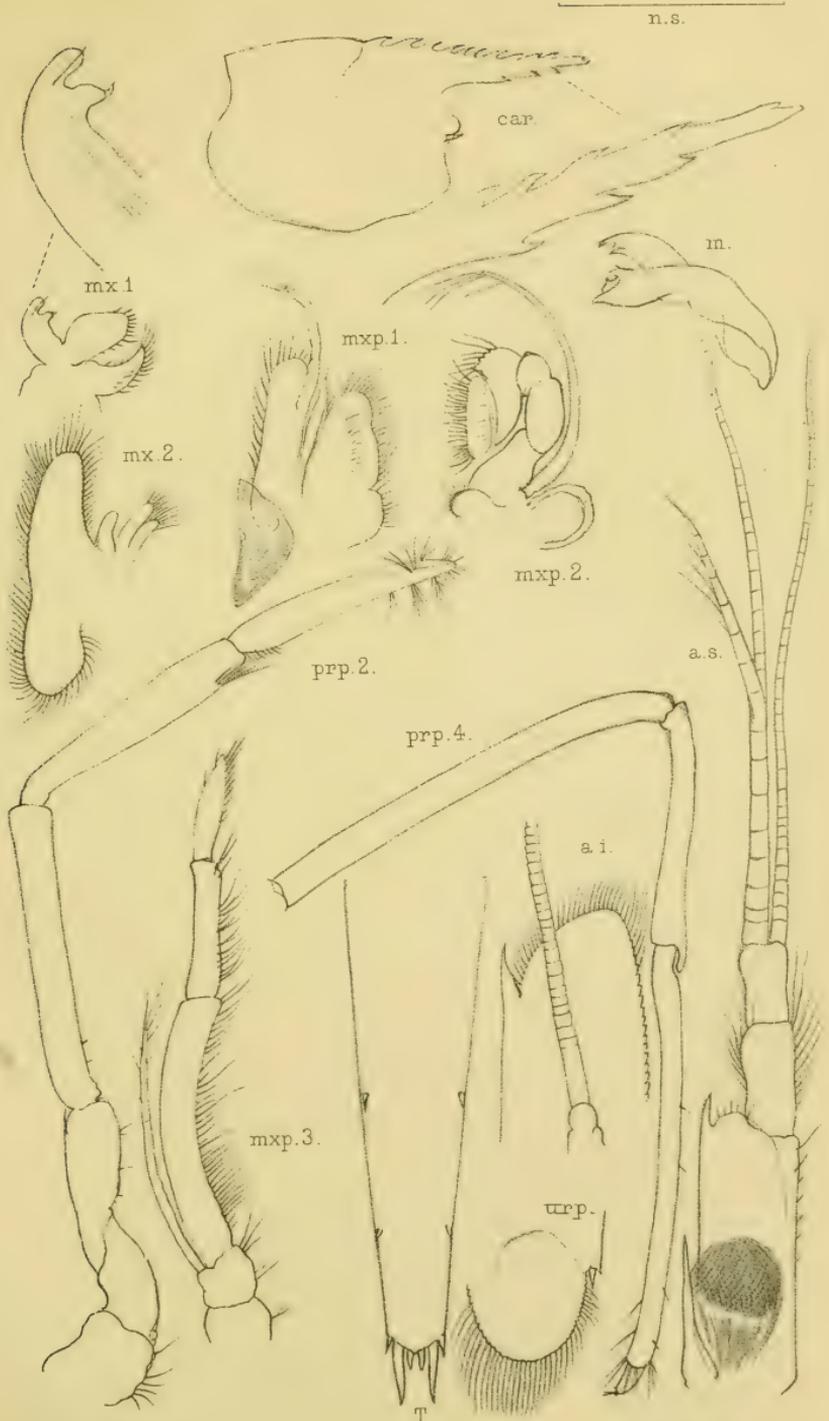
m., mx. 1. Mandible, and first maxilla, with further enlargement of the palp.

mx. 2, mxp. 1, mxp. 2, mxp. 3. Second maxilla, and first, second, and third maxillipeds.

prp. 2, prp. 4. Second pereopod, and last four joints of the fourth.

urp. Distal part of outer ramus of a uropod.

All figures are drawn to a uniform scale, except the carapace, which is less enlarged, and the separate palp of the first maxilla, which is more enlarged than the rest.



Del. T.R.R. Stebbing.

West, Newman lith.

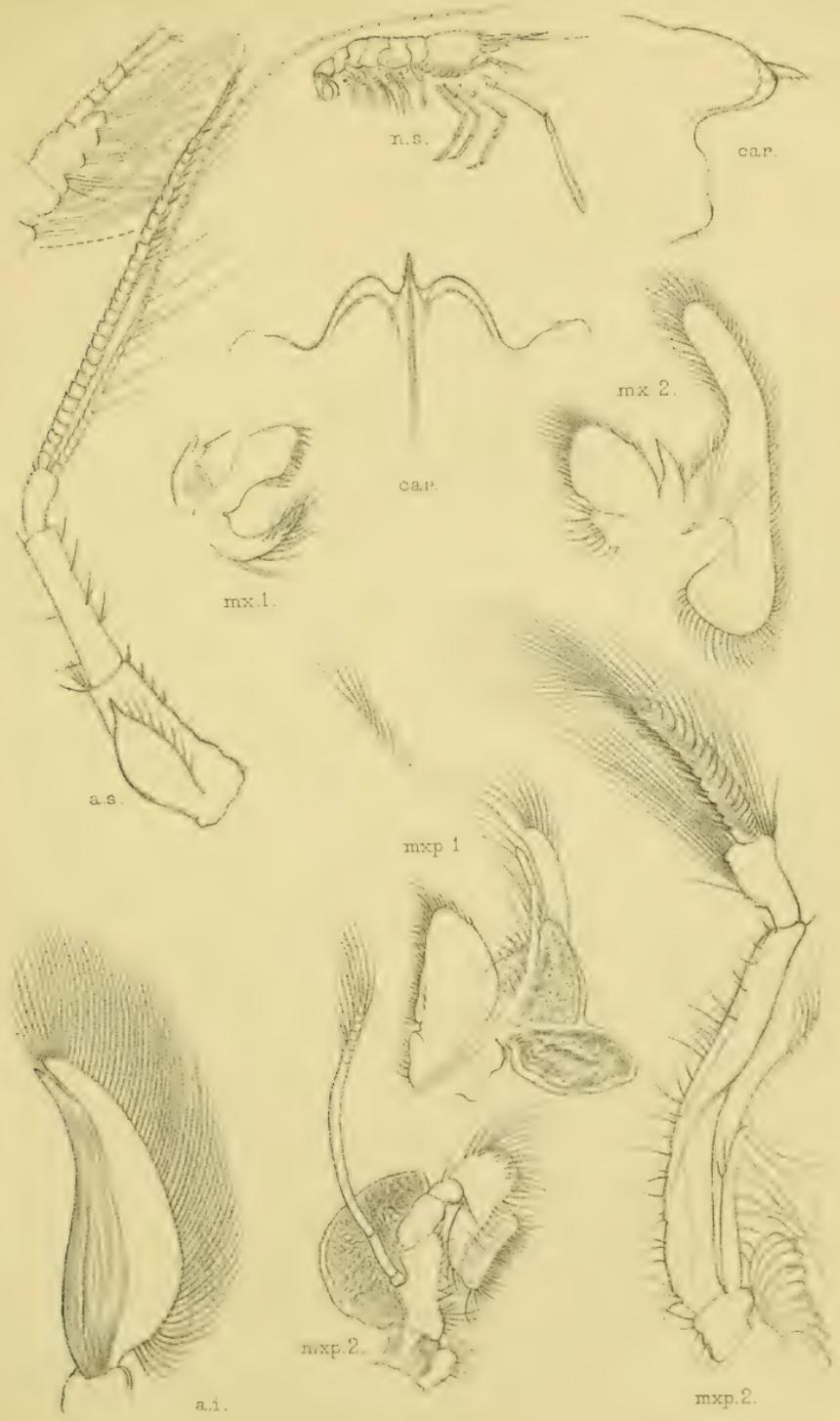
PALAEEMONETES NATALENSIS, n.sp.

PLATE XX. (Crustacea, Plate LXXXIV.)

Alpheus notabilis, n. sp.

- n.s. The specimen from the right side, natural size.
- car. Front of carapace in dorsal view and from the right side, magnified.
- a.s. One of the first antennae, with higher magnification of a small portion.
- a.i. Scale of the second antenna.
- mx. 1, mx. 2. First and second maxillae.
- mxp. 1, mxp. 2, mxp. 3. First, second, and third maxillipeds.

With the exception above-mentioned, all the parts in this and the next plate are drawn to a uniform scale.



Del. T.R.R. Stebbing.

West, Newman lith.





PLATE XXI. (Crustacea, Plate LXXXV.)

Alpheus notabilis, n. sp.

l.i. Lower lip.

m. Mandible.

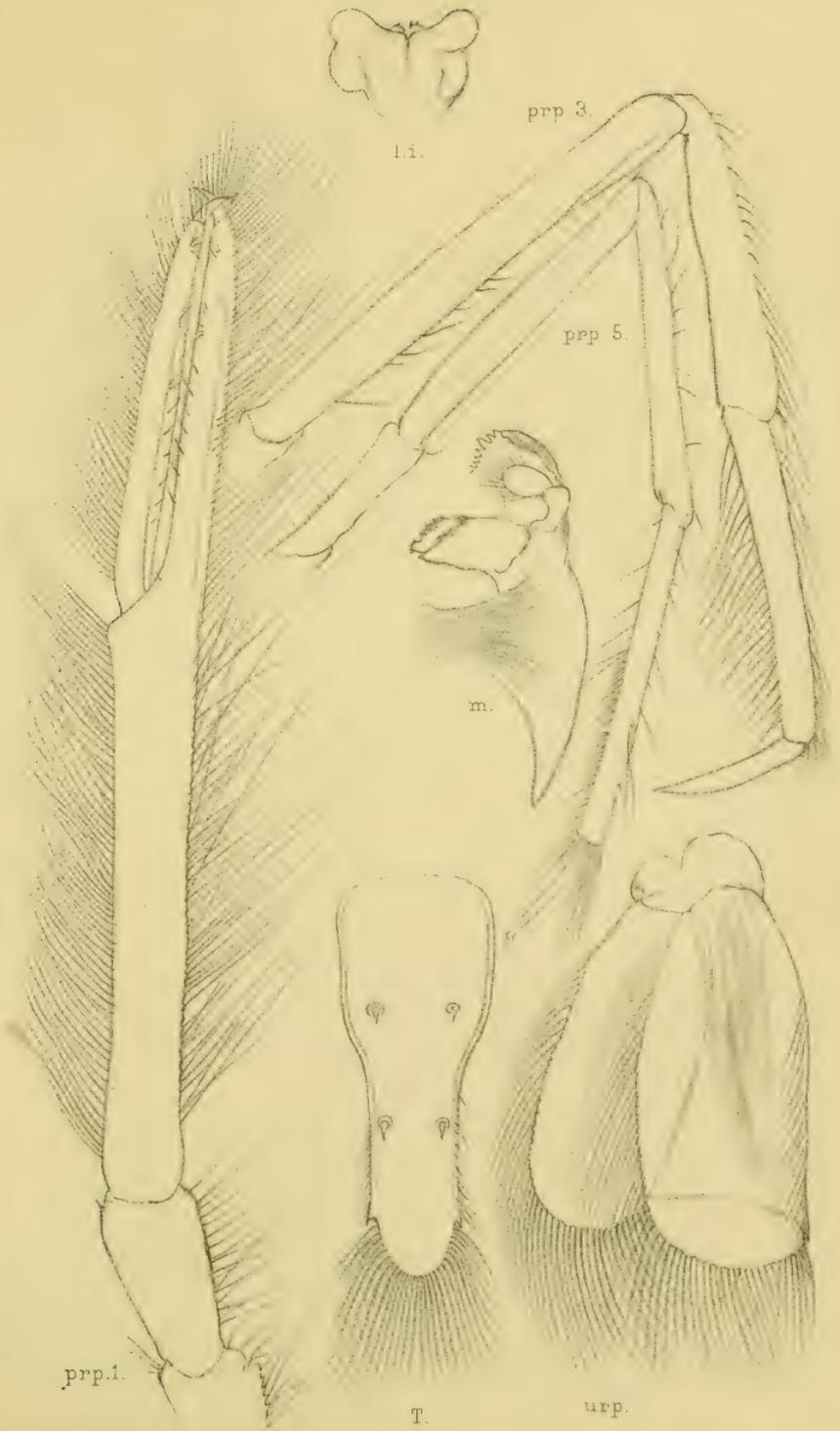
prp. 1. The last three joints of one of the first pair of peraeopods.

prp. 3. The last four joints of the third peraeopod.

prp. 5. The last five joints of the fifth peraeopod.

urp. One of the uropods.

T. The telson.



Del. T.R.R. Stebbing.

West, Newman lith.

ALPHEUS NOTABILIS, n.sp.

PLATE XXII. (Crustacea, Plate LXXXVI.)

Alpheus dissodontonotus, n. sp.

car., n.s. Carapace of the specimen in lateral view, leaning slightly to the right, of natural size; with the anterior portion, above, greatly enlarged, and, below, the anterior portion in dorsal view less enlarged.

T. The telson in dorsal view.

a.i. Scale of the second antenna.

m. A mandible from the inner side, with enlargement of the incisor process and the molar.

mx. 1, mx. 2. The first and second maxillae.

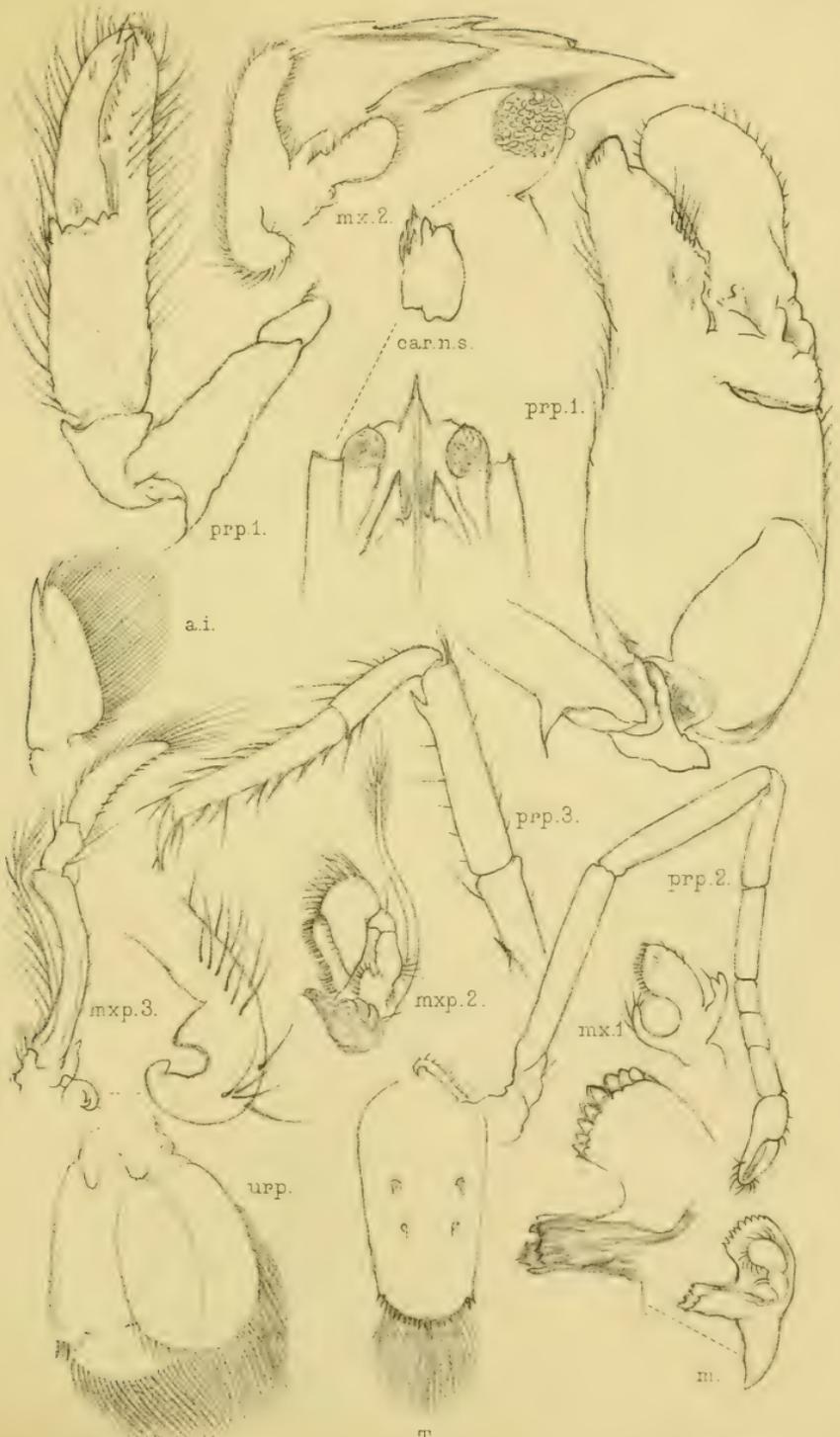
mxp. 2, mxp. 3. The second and third maxillipeds, with terminal part of the third's little epipod greatly enlarged.

prp. 1, prp. 1. The first peracopods, the figure on the right representing the large left cheliped, that on the left the smaller right cheliped.

prp. 2, prp. 3. The second peracopod and last five joints of the third.

urp. One of the uropods.

The magnification is uniform for all the figures, except the carapace, which is not magnified, and its anterior portion in lateral view, which agrees with the extra enlargement of the mandibles, and part of the epipod of the third maxilliped more enlarged than any other figure.



Del. T.R.R. Stebbing.

T.

West, Newman lith.

ALPHEUS DISSODONTONOTUS, n. sp.

PLATE XXIII. (Crustacea, Plate LXXXVII.)

Synalpheus anisocheir, n. sp.

n s. Line indicating natural size of the specimen.

car. Front of carapace.

T. Telson in dorsal view.

a.s., a.i. First antenna, with one of the flagella not quite complete; second antenna without the flagellum.

m., m. One of the mandibles on the left of the plate, on the right its incisor process more highly magnified.

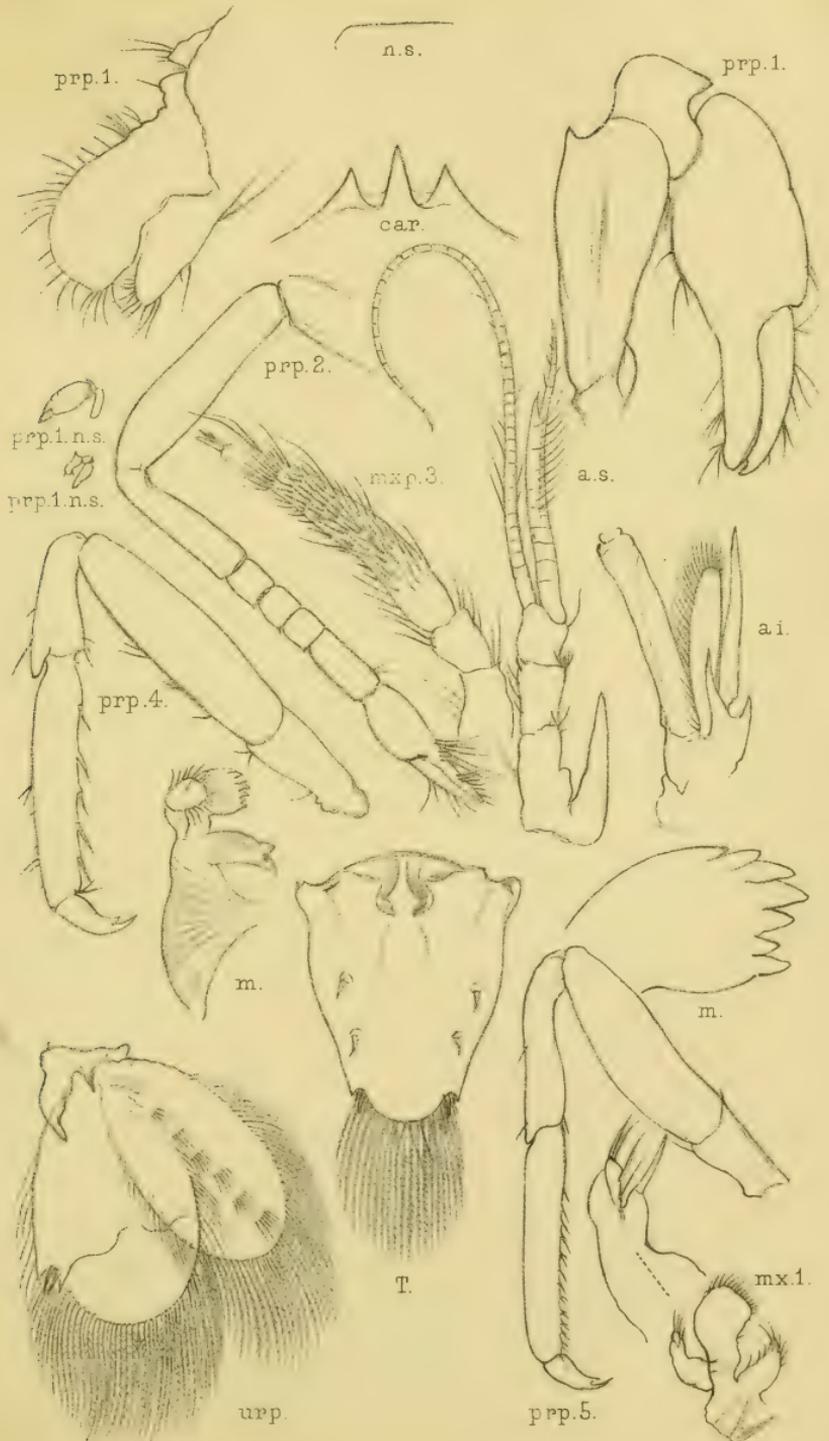
mx. 1. First maxilla, with higher magnification of the palp.

mxp. 3. Two terminal joints of the third maxilliped.

prp. 1, prp. 1, prp. 1, n.s., prp. 1, n.s. The fingers of the larger cheliped, and last four joints of the smaller cheliped, and the last four joints of each represented of the natural size.

prps. 2, 4, 5. Second, fourth, and fifth pereopods without the basal joints.

urp. One of the uropods.



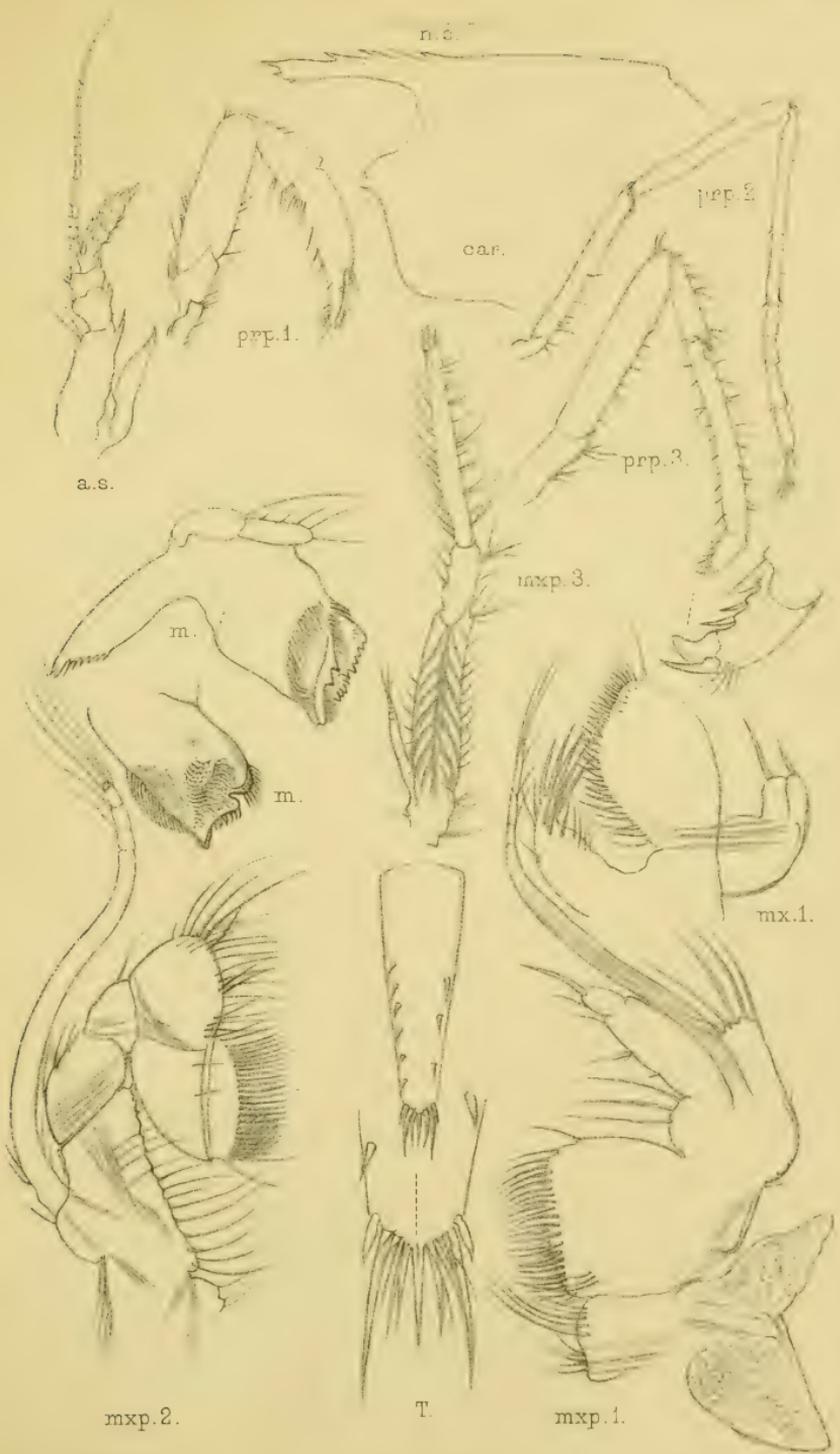
Del. T.R.R. Stebbing.

West, Newman lith.

PLATE XXIV. (Crustacea, Plate LXXXVIII.)

Spirontocaris pax, n. sp.

- n.s. Line indicating total length of the specimen.
car. Partial outline of the carapace, showing the teeth.
T. Telson in dorsal aspect, with further enlargement of the distal part.
a.s. First antenna.
m., m. The molar of one mandible, the cutting plate, molar, and palp of the other.
mx. 1, mxp. 1, mxp. 2. First maxilla, first and second maxillipeds; these and the mandibles are on a uniform scale with the further enlargement of the telson and foot of the third peracopod, the other parts being on a uniform scale of lower magnification.
mxp. 2, prp. 1, prp. 2, prp. 3. The third maxilliped and first three peracopods.



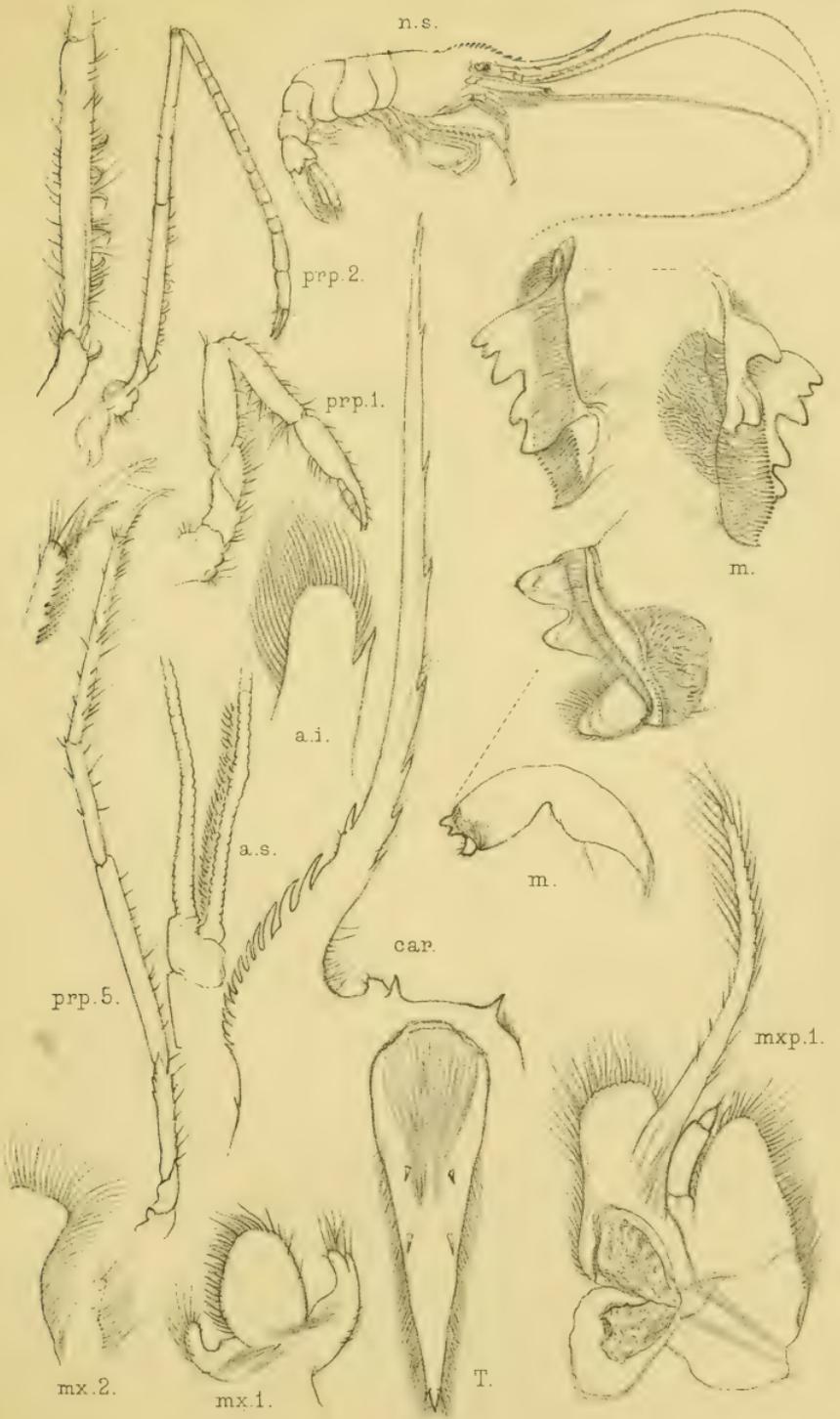
Del. T.R.R. Stebbing.

West, Newman lith.

PLATE XXV. (Crustacea, Plate LXXXIX.)

Exhippolytmata tugelae, n. g. et sp.

- n.s. Lateral view of specimen, natural size.
- car. Lateral view of rostral and frontal area of carapace, enlarged.
- T. Dorsal view of telson enlarged to the same scale.
- a.s. Distal part of peduncle and proximal parts of the flagella of the first antenna.
- a.i. Distal part of scale of second antenna.
- m., mx. 1, mx. 2, mxp. Mandible, part of first maxilla, second maxilla, first maxilliped. These parts are on a higher scale of magnification than the parts already mentioned, and the distal parts of the mandibles are still more highly magnified, the lower figure referring to the mandible figured in its entirety, the other two figures showing the corresponding edges of its companion as seen from opposite sides. The mandibles are illustrated from a separate specimen.
- prp. 1, prp. 2, prp. 5. The first, second, and fifth pereopods, uniform in scale with the telson, but the fourth joint of the second, and the finger of the fifth with adjacent part of its sixth joint, further magnified.



Del. T.R.R. Stebbing.

West, Newman lith.



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PART I.

2.—*South African Crustacea* (Part IX of S.A. Crustacea, for the Marine Investigations in South Africa).—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Memb. of New Zealand Inst., Hon. Fellow Worcester College, Oxford. (With Plates I-VIII of Vol. XVII. Plates XC-XCVII of Crustacea.)



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(Plates I-VIII of Vol. XVII. Plates XC-XCVII of Crustacea.)

OF the eighteen species here considered, sixteen belong to the Malacostraca and two to the parasitic Copepoda. Three of the plates refer to species discussed in Part VIII of these Investigations, and illustrations are offered of forms named by various authors in cases where it seemed desirable by this means either to establish the identification of the specimens concerned or to give experts a reasonable opportunity of correcting it.

With regard to *Philocheras megalocheir*, described in Part VIII, it is right to mention that Mr. Stanley Kemp in 1912 argued that *Pontophilus*, Leach, and *Philocheras* were so connected by intermediate species that *Philocheras* could not properly be separated from the earlier *Pontophilus*. It is interesting to remember that for a long time science was engaged in splitting up comprehensive genera such as *Cancer* into an endless number of subdivisions. Now, with the discovery of links and gradations, there is a natural tendency to reunite the severed parts.

MALACOSTRACA.

Brachyura.

TRIBE OXYRRHYNCHA.

FAMILY INACHIDAE.

GEN. ACHAEOPSIS, Stimpson.

1857. *Achaeopsis*, Stimpson, Pr. Ac. Sci. Philad., vol. 9, p. 219.
 1873. *Dorynchus*, Norman Wyville-Thomson, Depths of the Sea,
 p. 174, fig. 34.
 1880. *Lisponathus*, A. Milne-Edwards, Crust. reg. Mexicaine, p. 349.
 1893. *Achaeopsis*, Ortmann, Zool. Jahrb., vol. 7, p. 36.
 1910. *Achaeopsis* and *Dorynchus*, Stebbing, in these Annals, vol. 6,
 pt. 4, p. 285.
 1911. *Achaeopsis*, Rathbun, Tr. Linn. Soc. London, vol. 14, pt. 2,
 p. 247.
 1916. „ Rathbun, Pr. U.S. Mus., vol. 50, p. 535.

Additional references for the united genera will be found in these Annals for 1910. *A. superciliaris*, Ortmann, and the little *A. sulucensis*, Rathbun, seem to be closely related one to the other, but well distinguished from other species by the large median spine of the carapace.

ACHAEOPSIS THOMSONI (Norman).

Plate XC.

1873. *Dorynchus thomsoni*, Norman, Depths of the Sea, p. 174, fig. 34.
 1910. „ „ Stebbing, Ann. S. Afr. Mus., vol. 6, pt. 4,
 p. 286.
 1911. *Achaeopsis thomsoni*, Rathbun, Tr. Linn. Soc. London, vol. 14,
 pt. 2, p. 247.

Among many females laden with ova and smaller males the specimen here figured was conspicuous by its chelipeds strikingly larger than in any other specimen, and with the palm very much longer than the fingers. In other respects there appeared to be no trustworthy marks of difference to justify the naming of a new species. The parallelism or divergence of the horns of the rostrum is certainly a variable character. All the specimens examined, of either sex, have the strongly curved process on the ventral surface of the rostrum

in front of the recesses for the first antennae. In the male the pleon is bent at the third (the widest) segment, so that the first and second segments occupy a position nearly, if not quite, at right angles with the last three segments. From the second segment nearly to the end of the pleon there is a raised central lobe. In the female this lobe begins on the first segment, which is the narrowest, while the fifth is the broadest, the sixth also being very broad, the whole forming a capacious bowl for the ova.

The male specimen here figured is about 24 mm. long by 17 mm. broad.

Locality. Vasco de Gama S. 75° E., 13½ miles. Depth 166 fathoms. No. 248. Sent by Dr. Gilchrist.

GEN. HYASTENUS, White.

1847. *Hyastenus*, White, Proc. Zool. Soc. London, p. 56.
 1913. „ Calman, Ann. Nat. Hist., ser. 8, vol. 11, p. 313.
 1916. „ M. J. Rathbun, Proc. U.S. Mus., vol. 50, pp. 542-548.

Dr. Calman explains that it is *Pisā̄aries*, Latreille, which has been referred to *Hyastenus*, not *Halimus aries*, Latreille (in Guérin), so that the supposed necessity for making *Hyastenus* a synonym of *Halimus* does not arise.

HYASTENUS UNCIFER, Calman.

1909. *Hyastenus uncifer*, Calman, Proc. Zool. Soc. London, pp. 705, 712, pl. 72, figs. 8, 9.
 1911. *Halimus uncifer*, Mary J. Rathbun, Trans. Linn. Soc. London, vol. 14, pt. 2, p. 252, pl. 20, fig. 7.

Both authors lay stress on the marginal teeth of the fingers in the ambulatory legs as a distinctive feature. But Dr. de Man in his description of *Hyastenus hilgendorfi* (J. Linn. Soc. London, vol. 22, p. 18, 1887) says: “The dactylopodites are armed with a row of acute spinules along their inner margins; these spinules gradually increase in length towards the tip.” In the specimen which I am referring to Calman's species these spinules were completely concealed until the organism was removed, which covered almost the whole of the upper surface of the body and the fingers with a close, felt-like matting. The skin when uncovered had a satiny, dull red appearance.

The horns measured along the inner margin are 21 mm. long, the interval between the tips is 13 mm., and the length from

the middle of that interval to the base is 18 mm. From that base to the foremost median spine of the carapace the length is 8 mm., and thence to the hindmost slightly procurved spine 30 mm. Between the tips of the lateral strongly projecting branchial spines the breadth is 36 mm., and between the bases of those spines 26 mm. The breadth at the obscure eyes is 10 mm. The length of the chelae (hand and finger) is 17 mm., of which the finger on the left takes 7 mm., the right finger being slightly shorter. The finger of the fifth peraeopod is 8 mm. long.

The hindmost spine of the carapace is preceded at a distance of 10 mm. not by another spine or tubercle, but by a very prominent swelling.

The terminal segment of the narrow tuberculate pleon of this male specimen is triangular with the tip slightly truncate.

Calman states that "the basal antennal segment has a sharp spine at the antero-external angle." In clearing the coat of the present specimen I may have removed this spine. I cannot certify its presence. Unless the hypothesis be admitted that the relative lengths of horns and spines are subject to much variation, a new species might have to be coined for the specimen here described.

Locality. Umsunduzi River, Pietermaritzburg. No. 228.

MACRURA ANOMALA.

TRIBE GALATHEIDEA.

FAMILY GALATHEIDÆ.

GEN. GALATHEA, Fabricius.

For these systematic divisions see the General Catalogue in these Annals, vol. 6, pt. 4, pp. 349, 360, 362.

GALATHEA INTERMEDIA, Liljeborg.

- | | | |
|-------|------------------------------|---|
| 1851. | <i>Galathea intermedia</i> , | Liljeborg, Ofvers. Vet. Akad. Forhandl., p. 21. |
| 1888. | " | Bonnier, Contrib. Faune Marine de Wime-
reux, p. 44. |
| 1894. | " | A. M.-Edwards et Bouvier, Camp. Sci.
Monaco, Fasc. 7, pt. 1, pp. 79, 81, pl. 8,
figs. 1-10. |
| 1900. | " | A. M.-Edwards et Bouvier, Crust. Décap.
Travailleur et Talisman, p. 277. |

The late Monsieur Jules Bonnier has given (*loc. cit.*) an elaborate bibliography of this small species. The specimen which I now assign to it was without the first and second peraeopods, and the third and fourth, though present on one side, were only in a state of recuperation. It was otherwise in good condition and probably adult, the carapace being 8 mm. long, therefore near to the size of 9 mm., which Bonnier gives as its measurement in an adult male. There are some slight differences in detail. Behind the rostral region on the median line of the carapace Bonnier gives only a couple of spinules placed transversely. In the African specimen there are four. The eyes are rather stouter. In the first antennae the two sharp prolongations of the characteristic basal joint have each below the apex a long spine which reaches well beyond the apex of the prolongation, in place of the seta which in Bonnier's figure does not reach the apex. Bonnier finds the telson divided into two symmetrical halves by the distal groove. The African specimen shows a slight inequality in the two lobes. These small variations, apart from possible differences in the missing peraeopods, can have no specific importance, since the mouth-organs as well as the size and superficial details all conform to the northern standard.

Locality. Seal Island, W.S.W. (Mossel Bay). No. 238.

MACRURA GENUINA.

TRIBE THALASSINIDEA.

FAMILY AXIIDAE.

GEN. CALOCARIS, Bell.

CALOCARIS ALCOCKI, McArdle.

Plate XCI.

(The discussion of this species appeared last year (1915) in these *Annals*, vol. 15, pt. 2, p. 59.)

TRIBE ERYONIDEA.

(See General Catalogue of S.A. Crustacea, p. 377.)

FAMILY ERYONIDAE.

1910. *Eryonidae*, Stebbing, Ann. S.A. Mus., vol. 6, pt. 4, p. 377.
 1914. " Selbie, Fisheries, Ireland, Sci. Invest., pt. 1, p. 8.
 1916. " de Man, Siboga Exp., vol. 39a², p. 1.

Dr. de Man now assigns to this family the genera *Polycheles*, Heller, 1862, *Willemoesia*, Grote, 1873, *Eryoneicus*, Bate, 1882, *Stereomastis*, Bate, 1888, and gives lists of all the species to be apportioned to these genera respectively. He considers that Alcock was right in distinguishing the two groups which he named *Polycheles* and *Pentacheles*, but that his *Polycheles* should properly be identified with Bate's *Stereomastis* and that *Pentacheles*, Bate, 1878, should lapse as a synonym of Heller's *Polycheles*.

GEN. POLYCHELES, Heller.

1862. *Polycheles*, Heller, Sitz. K. Akad. Wiss. Wien, vol. 45, p. 389.
 1912. „ (part), Kemp and Sewell, Records Indian Mus.,
 vol. 7, pt. 1, no. 2, p. 23.
 1914. „ „ Selbie, Fisheries, Ireland, Sci. Invest., pt. 1,
 p. 9.
 1916. „ de Man, Siboga Exp., vol. 39a², p. 1.

As characters for the genus Dr. de Man proposes the following: The thoracic legs, except the last pair, provided with epipods, normal but varying in length; the epipod of the third maxillipeds also of variable size, but, so far as known, rudimentary only in *P. tanneri*, Faxon; the lateral borders of the carapace commonly armed with more than twenty spines, except in the small and probably juvenile form, *P. obscurus* (Bate); the median dorsal carina of the carapace usually double, granulated, rarely nodulated, and in most cases presenting no definite small number of spines, being often traversed by bead-like tubercles or granulations or covered with crowded spinules; the first abdominal tergum, finally, is probably never armed with the two small spines at and near the outer ends of the anterior border, that generally occur in the species of *Stereomastis*.

POLYCHELES DEMANI, n. sp.

Plate XCII.

1908. *Polycheles beaumontii* (?), Stebbing, Ann. S. Afr. Mus., vol. 6,
 pt. 1, p. 25.
 1910. „ „ (?), Stebbing, Ann. S. Afr. Mus., vol. 6,
 pt. 4, p. 377.

In naming this species after my friend Dr. de Man I now accept the opinion expressed in his latest very valuable work,

in which he agrees with the late Mr. C. M. Selbie, that this form is distinct from Alcock's *P. beaumontii* and the *P. granulatus*, Faxon. In common with Miss Rathbun, those authors regard *P. beaumontii* as a synonym of Faxon's species.

In 1908 I gave some particulars of a male and of a female specimen, both taken in localities near to that from which the female now figured was obtained. The measurements are very similar, the length from the base of the rostral spines to apex of telson being 130 mm.; but from the foremost lateral spine to a point parallel with the tip of the telson the interval is 138 mm.; greatest breadth of carapace 51 mm.; the length of the telson detached is 26 mm. The longer flagellum of the first antenna measured 78 mm., its companion about 22 mm.; the flagellum of the second antenna was 70 mm. long.

The lateral teeth of the carapace form sets of 7, 4, and 20 or 21: at the base of the rostral pair there is a small unpaired denticle; in various parts of the surface there are small teeth some of which show a symmetrical arrangement, but for many this is doubtful, because of the short pubescence which conceals them. This dark felt puts the carapace in strong contrast with the smooth polished pleon. Of this the first four segments have each a small forward-pointing carinal tooth, the fifth a carinal elevation, while the sixth is quite devoid of a carina. The telson has a pair of converging ridges, distant both from the base and the apex.

The third maxillipeds have a well-developed, but slender, epipod.

In the first peraeopods the third joint is 24 mm. long, the fourth 43 mm., the fifth 30 mm., the sixth 50 mm., and the finger 25 mm. The denticles on the distal half of the fourth joint are in this specimen very small, successively diminishing. In the fifth peraeopods the fifth and sixth joints and the finger are longitudinally carinate, with long setae springing from the carina; the process of the sixth joint is feebly carinate, and its tip meets that of the finger.

Numerous small ova were attached to the pleopods of this specimen.

Locality. Cape Point Lighthouse approx. NE. 40 miles; depth 560-700 fathoms. No. 182.

GEN. STEREOMASTIS, Bate.

1901. *Polycheles*, Alcock (not Heller), Catal. Indian Deep-sea Crustacea, Macrura and Anomala, p. 166.
1902. „ Stebbing, S.A. Crustacea, pt. 2, p. 35.
1908. „ (part), Stebbing, S.A. Crustacea, pt. 4, p. 25.
1910. „ „ Stebbing, S.A. Crustacea, pt. 5, p. 377.
1912. „ „ Kemp and Sewell, Records Indian Mus., vol. 7, pt. 1, no. 2, p. 23.
1914. „ „ Selbie, Fisheries, Ireland, Sci. Invest., pt. 1, p. 9.
1916. *Stereomastis*, de Man, Siboga Exp., vol. 39a², p. 1.

For assigning species to this genus de Man gives the following characters: The lateral margins of the carapace are constantly armed with fewer than 20 spines; the median dorsal ridge of the carapace carries a definite number of 4 to 7 spines, the outer angles of the anterior border of the first pleon segment have 2 spines in all the known species except *Stereomastis ceratus* (Alcock), and the epipod of the third maxillipeds is rudimentary, while on the thoracic legs it is a membranous expansion of the base of the podobranch.

Consequently the species which in 1902 I called *Polycheles sculptus*, S. I. Smith, should now be named *Stereomastis sculptus* (Smith). In the general catalogue of S.A. Crustacea, p. 377, 1910, by a misprint the Museum number for this species is given as 182, instead of 152, the former number belonging to the new species of *Polycheles* here described.

STEREOMASTIS NANUS (S. I. Smith).

1884. *Pentacheles nanus*, Smith, Rep. U.S. Mus., Fish. Comm. for 1882, p. 359.
1908. *Polycheles nanus*, Stebbing, S.A. Crustacea, pt. 4, p. 27.
1916. *Stereomastis nana*, de Man, Siboga Exp., vol. 39a², pp. 2, 4, 20

Having now examined and in part dissected a specimen little more than an inch in length, with the pleon in good condition, and the other parts fairly so, I do not hesitate to assign it to this species. But the third, fourth, and fifth pleon-segments have the large recurved carinal teeth each surmounted by a little denticle, which is not shown in figures of this species or of the very similar *S. andamanensis* (Alcock).

Locality. Table Mountain N. 79 E., distant 40 miles. Depth 250 fathoms. No. 70.

Mr. Selbie in 1914 describes and figures *Polycheles nanus* (Smith), var. *Grimaldii*, Bouvier.

TRIBE PENAEIDEA.

FAMILY PENAEIDAE.

See General Catalogue of S.A. Crustacea, p. 379, and add

1911. *Penaeidae*, de Man, Siboga Exp., vol. 39a, pt. 1, p. 1.
 1915. „ Kemp, Mem. Indian Mus., vol. 5, p. 316.

GEN. AMALOPENAEUS, S. I. Smith.

1882. *Amalopenaeus*, Smith, Bull. Mus. Comp. Zoöl., vol. 10, p. 86.
 1910. „ Kemp, Fisheries, Ireland, Sci. Invest., p. 13.

For references to *Gennadas*, Bate, with which this genus has been by many authors considered synonymous, see Trans. R. Soc. Edinburgh, vol. 50, pt. 2, p. 282, 1914.

AMALOPENAEUS ELEGANS, S. I. Smith.

1882. *Amalopenaeus elegans*, Smith, Bull. Mus. Comp. Zoöl., vol. 10,
 p. 87, pl. 14, figs. 8-14, pl. 15, figs. 1-5.
 1908. *Gennadas elegans*, Bouvier, Rés. Comp. Sci. Monaco, fasc. 33,
 p. 35, pl. 7.
 1910. *Amalopenaeus elegans*, Kemp, Fisheries, Ireland, Sci. Invest.,
 p. 14, pl. 1, figs. 1-16.

This attractive species has been amply illustrated by the three authors above mentioned, and also by Lo Bianco and Riggio, whose figures I have not seen. The length appears rarely to exceed 30 mm., but Kemp mentions a specimen of 38 mm. The South African specimen is 33.5 mm. long. After 16 years in formalin there are still spots of a rich blue on the first four pairs of peraeopods, some less vivid on the first antennae, purplish on the stalks of the golden yellow eyes, with the mouth organs darkly red and the carapace covering a lighter red substance, its own rostrum and probably all the rest of it being pellucid.

Locality. Cape Point Lighthouse S. 83° E., 35½ miles.
 Depth 360 fathoms. No. 66.

GEN. PENAEUS, J. C. Fabricius.

(For references see South African Crustacea in these Annals, in the years 1910, 1914, 1915.)

PENAEUS INDICUS, Milne Edwards.

1837. *Penacus indicus*, Milne Edwards, Hist. Nat. Crustacés, vol. 2, p. 415.
 1906. *Penacus indicus*, Alcock, Catal. Indian Macrura, p. 12, pl. 1,
 figs. 3, 3a (with synonymy).
 1915. *Penaeus indicus*, Kemp, Mem. Indian Mus., vol. 5, p. 319.

The specimens which I refer to this species have a thelycum corresponding with that which Bate figures in the Ann. Nat. Hist., ser. 5, vol. 8, pl. 12, fig. 5 *vp.*, 1881. They are far smaller than the length of about 6 in. with which Milne Edwards, or 8 in. with which Alcock, credits the species, one of them having a total of 64 mm., the other of about 60 mm., in the former the carapace being 43.5 mm. long, in the latter 39 mm. The larger specimen has 7 dorsal teeth on the rostral carina, the seventh very far from the apex, the ventral teeth being 5 in number. In the other case there are 8 dorsal teeth and only 3 widely spaced ventral. In each case 3 of the teeth are behind the base of the eye-stalk. The characters answer to Alcock's statement, "This is an extremely variable species, especially in respect of the length of the rostrum, which in young individuals projects far beyond the tip of the antennal scales, whereas in adults it is often not longer than that of *P. monodon*." In 1888 Spence Bate retains the species, but is inclined to believe it an over-toothed variety of *P. monodon*, with which he further identifies *P. semisulcatus*, de Haan. In 1892 de Man described and figured a variety *longirostris*, which he retains in his "Siboga" treatise, 1911-1913.

Our specimens have the fifth and sixth pleon segments carinate, the sixth of the same length as the telson, which is longitudinally sulcate, acute at the apex, the sides setose but without spines. In the smaller specimen the flagella of the first antennae were 18 mm. long, but the flagellum of the second antenna 140 mm., thus more than twice the length of the body. The third peraeopod reached the extremity of the scale of the second antenna, the fifth is longer than the fourth.

Locality. Umgeni River, Durban. A 1191.

GEN. SOLENOCERA, Lucas.

(See these Annals, vol. 15, pt. 2, p. 66, 1915.)

SOLENOCERA AFRICANUS, n. sp.

As this species makes a near approach to *S. siphonoceros* (Philippi), as recently described and figured by Mr. Stanley Kemp, the following points of difference may be noted. The eyes cannot be described as "grey, with a coppery reflection," but are rather of a deep brownish red. The carina on the sixth pleon-segment is not "produced posteriorly to a short spine." The flagella of the first antennæ are longer as compared with the carapace. The teeth of the rostral carina have a different arrangement. The mandibles, though agreeing fairly as to the palps, have a very different cutting edge. In the second maxillipeds the terminal joint is here longer instead of shorter than the penultimate. And in the petasma of the male this species seems to have a more specialised form.

From *S. comatus*, the South African species described last year, the present form is separated by its shallower rostrum with a different dentation, the want of a postero-dorsal tooth to end the carina of the sixth pleon-segment, the different cutting-edge of the mandibles and the shorter penultimate joint of their palp, in addition to the very different though remotely allied form of the petasma. The same terms may be applied to the petasma of *S. melantho*, de Man, but here again additional differences point to the propriety of specific distinction.

The female, 70.5 mm. long, has the carapace 22.5 mm., and the pleon 48 mm. in length, from the apex of the rostrum to the cervical groove measuring 13.5 mm., the faintly continued carina to the end of the carapace accounting for 9 mm. The third to the sixth pleon-segments are all carinate, the sixth scarcely as long as the fifth; the sulcate telson closely agrees with that of *S. comatus*, its lateral processes being much stronger than those shown for *S. melantho*, de Man, and rather further from the apex than in *S. siphonoceros*. The slightly incomplete flagella of the first antennæ are 32 mm. long. In the male, which was about 53 mm. in length, these flagella were 26 mm. long, the carapace 18 mm. The apex of the rostrum, acute in the female, is slightly damaged in the male specimen. The flagella of the first antenna bear witness alike to their importance as a generic character and as constituents of a respiratory tube by their persistence years after death in springing back, when released from separation, to reform the tube. In the petasma the shorter inner lamina differs from all the forms above compared by its bidentate apical crook, but something similar, though not the same, is seen in *S. agassizii*, Faxon.

Locality. Sebastian Bluff NW. $\frac{3}{4}$ W., 8 miles; depth 34 fathoms. A 1213.

TRIBE CARIDEA.

FAMILY PALAEMONIDÆ.

1915. *Palaemonidae*. Borradaile, Ann. Nat. Hist., ser. 8, vol. 15,
p. 206.
1915. „ „ Kemp, Mem. Indian Mus., vol. 5, p. 264.

GEN. LEANDER, Desmarest.

(For the family and genus see also references in Trans. R. Soc., Edinburgh, vol. 50, pt. 2, p. 286, 1914, and these Annals, vol. 15, pt. 2, p. 75, 1915, and add 1915, Kemp. Mem. Indian Mus., vol. 5, p. 273.)

LEANDER PACIFICUS, Stimpson.

Plate XCIIIb.

1860. *Leander pacificus*, Stimpson, Pr. Ac. Philad., vol. 12, p. 40
(109).
1888. „ „ de Man, Arch. Naturg. Jahrg. 53, p. 559.
1902. „ „ de Man, Abhandl. Senckenb. Nat. Gesell-
schaft, vol. 25, pt. 3, p. 806.

The specimen figured measured 54 mm., the measurement taken being from apex of rostrum to the end of the second pleon-segment and thence to apex of telson. The dorsal carina shows nine teeth, the foremost small, not far from the acute apex, but considerably in advance of the main series, seven in number, with the hindmost or ninth smaller than any of the seven and a little remote. The ventral teeth are five, the foremost small, midway between the apex and the first of the serial dorsal seven, the hindmost of the ventral five being just under the antepenultimate of the dorsal seven. The telson is rather shorter than the inner blade of the uropods, and has the first pair of dorsal spines much below the middle, and about as far from the second pair as those are from the narrow apical margin, which has a central spine-like apex of the same length as its lateral pair of spines, the long spines between it and them being nearly three times as long, with the usual pair of setae of nearly the same length as the long spines.

The eyes as preserved are grey, with two black spots adjoining the peduncle, the divisions of which are alternately orange and white.

The two pairs of antennae agree closely with those of *L. peringueyi*. In the first pair the longer flagellum is 28 mm. long, its companion in brief attachment to it being about 6.5 mm. in length, while the free flagellum is 19 mm. long, The flagellum of the second antennae I make out to be 56 mm. in length.

The mandibles belong to the group which have the palp three-jointed. The third joint in this species is little longer than the first. In the first maxillae the blunt inner lobe of the bifid apex has the sinuous spine which has been observed in other species. In the third maxillipeds the antepenultimate joint is less curved than in *L. peringueyi*. The first peraeopods have the chela three-fifths the length of the wrist, the fingers subequal to the palm; in the second pair the movable finger is seven-ninths the length of the palm, which is a little shorter than the wrist.

Dr. Gilchrist reported the colour as dark green in parts which turned red, but the red has since disappeared.

Locality. Little Brak River, Mossel Bay. No. 23.

This widely distributed and rather variable species has been several times described, but, so far as I can find, has not hitherto been figured.

FAMILY OPLOPHORIDAE.

GEN. ACANTHEPHYRA, A. Milne-Edwards.

ACANTHEPHYRA BRACHYTELSONIS, Bate.

Plate XCIV.

(This species was discussed last year—1915—in these Annals, vol. 15, pt. 2, p. 97.)

FAMILY NEMATOCARCINIDAE.

GEN. NEMATOCARCINUS, A. Milne-Edwards.

NEMATOCARCINUS PARVIDENTATUS, Bate.

Plate XCV.

(For discussion of the species, see these Annals, vol. 15, pt. 2, p. 99.)

SCHIZOPODA.

Order Mysidacea.

See General Catalogue of S.A. Crustacea, p. 395, and add
1912. *Schizopoda*, Hansen, Mem. Mus. Comp. Zoöl. Harvard, vol. 35,
p. 175.

FAMILY LOPHOGASTRIDAE.

GEN. GNATHOPHAUSIA, von Willemoes Suhm.

(See General Catalogue, pp. 401, 402.)

GNATHOPHAUSIA ZOEAE, Suhm.

1875. *Gnathophausia zoea*, Suhm, Trans. Linn. Soc. London, ser. 2,
vol. 1, p. 32, pl. 9, figs. 2-15, pl. 10, fig. 4.
1885. " " Sars, Rep. Voy. Challenger, vol. 13, pt. 37,
p. 44, pl. 6, figs. 6-10.
1906. " " Ortmann, Pr. U.S. Mus., vol. 31, pp. 28, 42
pl. 2, figs. 2a, 2b.
1908. " " Hansen, Ingolf-Exp., vol. 3, pt. 2, p. 93,
pl. 4, figs. 3a-e.
1910. " " Hansen, Siboga Exp., vol. 37, p. 17.
1912. " " Hansen, Mem. Mus. Comp. Zoöl. Harvard,
vol. 35, p. 186.

Ortmann and Hansen agree in making *G. willemoesii*, Sars, a synonym of *G. zoea*, to which Hansen adds *G. sarsii*, Wood-Mason, already regarded by Ortmann as merely a variety of *G. zoea*. In the specimen here assigned to that species "the outer spine of the antennal squama projects" rather considerably "beyond the end of the lamellar lobe," but not nearly so much as shown for *G. longispina* of Sars. This feature may probably be subject to considerable variation. The supra-orbital spine, antennal spine, and branchiostegal expansion answer the figure given by Sars. The total length from the apex of the rostrum to the end of the telson is 66 mm. The rostrum, apparently complete, is 25.5 mm. long, the whole carapace from apex of rostrum to the end of the hinder process being 56.5 mm. in length.

Locality. Cape Point N. 81° E., 32 miles; depth 460-630 fathoms. A 1312.

ISOPODA.

TRIBE FLABELLIFERA.

FAMILY EURYDICIDAE.

GEN. CIROLANA, Leach.

(For references see these Annals, vol. 6, pt. 4, pp. 419, 421.)

CIROLANA CRANCHII, Leach.

1818. *Cirolana cranchii*, Leach, Dict. Sci. Nat., vol. 12, p. 347.
 1890. „ „ Hansen, Vid. Selsk. Skr., ser. 6, vol. 5, pp.
 321, 341, pl. 3, figs. 3-3l.

In these Annals, vol. 10, pt. 11, p. 351a, pl. 30B, 1914, Mr. Barnard describes and illustrates *Cirolana vicina*, n. sp., distinguishing it from *C. cranchii*, Leach, and *C. parvus*, Hansen. It is a case somewhat parallel to one previously mentioned, but here concerning species instead of genera. *C. vicina* seems to tie *C. parvus* so closely to *C. cranchii* that one name may well serve for all three.

The specimen which I have especially examined has the male stilet of the second pleopod well developed. It agrees thoroughly in shape with Hansen's fig. 3i of the male telson and uropod of *C. cranchii*, the rami being acute, not sub-bifid. The number of the spines on the telsonic apex is 12. Thus two of the five characters relied on for distinguishing *C. vicina* are wanting. The rather uncertain difference in size of specimens, between 15 and 13 mm., surely is not of specific importance, and the comparative slenderness of the legs is not a very striking feature. There is still the distinction that in the second gnathopods and first peraeopods the fourth joint is not produced externally in *C. vicina* as it is in *C. cranchii*. Yet even in that respect specimens show that the non-production is far from absolute.

Locality. Sebastian Bay, beach, low tide. No. 132.

AMPHIPODA.

TRIBE GAMMARIDEA.

FAMILY LYSIANASSIDAE.

GEN. ICHNOPUS, A. Costa.

For these systematic divisions I may refer to Das Tierreich, Lieferung 21, pp. 1, 5, 6, 52, published in 1906. Here, however, I must add hearty thanks to my friend A. O. Walker, Esq., F.L.S., who has sorted into their genera a mass of South African Amphipoda, a tedious and time-absorbing task, even when lightened in his case by extensive knowledge of the subject and long-continued interest in it. *Ichnopus serricrus*, Walker, was added to the genus in 1909.

ICHNOPUS MACROBETOMMA, n. sp.

Plate XCVIA.

This species is at once remarkable for the large dark eyes, with innumerable little components, occupying almost the whole surface of the head, at the top of which they are contiguous, while in lateral view the front outline of each eye suggests a capital **B**, to which formation the specific name refers. There are many points of agreement with *I. spinicornis* and *I. taurus*, the approximation being the closer to the latter species, the palp of the first maxillae having the peculiar widening of its distal joint just below the spine margin, as shown in Heller's figure, and the finger of the first gnathopod being of the structure which he shows, except that here there are ten spines on its widened base.

The first antennae have a secondary flagellum of ten joints, the first of them considerably the longest. The mandibles are similar to those which Della Valle figures for *I. taurus*, differing from those figured by Sars for *I. spinicornis*, though the palps agree. In our specimen between the cutting edge and molar there is a spine row of very short spines, perhaps worn down by use; on the upper edge of the retroverted molar there are prominent teeth, none visible on the lower edge, the reverse of this appearing in Della Valle's figure. Of the inner plate of the first maxillae I cannot speak, as it was unfortunately broken. Heller's figure of it for *I. taurus* does not agree with Della Valle's.

In the first and second pereopods the fourth and sixth joints are longer than the fifth, this and the fourth being fringed with setae on

the hind margin. The three following pairs have short spines on both margins of the fourth, fifth, and sixth joints; the fifth and sixth are very slender.

The third uropods end very acutely, the outer branch having, according to Sars, a distinct terminal joint, a character attested in the present species by its flatness and mode of attachment rather than its size. The telson, cleft for seven-ninths of its length, in the preserved specimen was held erect. It is of glass-like transparency, a quality which in other parts of the organism obscured the outlines.

From the top of the head to the end of the third pleon segment the bent specimen measured a little less than 8 mm. At full stretch it might have been 15 mm. long, with the upper antennae about 5 and the lower 8 mm. in length.

Locality. 33° 9' 30'' S., 28° 3' 00'' E. Depth 47 fathoms. No. 84.

FAMILY METOPIIDAE.

GEN. METOPA, Boeck.

(The family and genus are described in Das Tierreich, Lief. 21, pp. 171, 172, 724.)

METOPA ROTUNDUS, n. sp.

Plate XCVIb.

The specimen, a female with some well-advanced young, in its firmly rounded position measured not more than 3 mm. in a straight line from the head to the third pleon-segment, the depth at the fourth side-plate being about 2 mm.

The eye is round, of moderate size. The antennae in both pairs have the flagella shorter than the peduncles, tapering, seven- or eight-jointed; the first joint of the peduncle in the first pair longer than the second and third joints combined, the last joint in the second pair only slightly shorter than the penultimate.

The upper lip is more unequally bilobed than that of *Metopa alderii* (Bate) as figured by Sars, nor does the mandible show the spine-row which Sars figures for that species. The maxillæ and maxillipeds appear to agree with those of the species named.

In the first gnathopods the sides of the hand are parallel as far as the commencement of the oblique palm, over which the smooth finger bends, only the extreme tip overlapping it. The fifth joint is wider but little longer than the hand. The second gnathopod is far more robust, the wrist broader than long, the hand massive, with a

convex serrate palm, abruptly descending to form a cavity, within which the apex of the strong curved finger meets a transverse row of spinules and some palm-defining spines. Whether the cavity is open on both sides it is difficult to say. Possibly the finger rests against a transparent cuticle on one side.

The first peraeopod is rather longer than the second. The third is distinguished from the two following pairs by the slenderness of its second and fourth joints, the fourth joint in the last two pairs being extended completely over the fifth joint.

The first uropods are as usual much the longest; the second are intermediate in length. The third pair have the peduncle longer than the ramus, of which the first joint is longer than the almost spine-like second.

The telson, only seen in uplifted lateral view, appears to have a single pair of lateral spinules.

Locality. Gericke Point N. by E., 9 miles. Depth 42 fathoms. No. 186.

ENTOMOSTRACA.

Copepoda.

TRIBE CALIGIDEA.

FAMILY CALIGIDAE.

(See General Catalogue of S.A. Crustacea, p. 558, 1910. To the species there mentioned may be added *Pandaras lugubris*, Heller, 1866, of which a specimen, taken from a shark, has been sent by Mr. Gibson from Natal to Dr. G. S. Brady, F.R.S.)

GEN. ACHTHEINUS, C. B. Wilson.

1908. *Achtheinus*, Wilson, Proc. U.S. Mus., vol. 35, p. 450.

1911. „ Wilson, Proc. U.S. Mus., vol. 39, pp. 630, 632.

In 1849 Dana presented to the American Academy of Sciences his description of a new genus and species which he called *Lepidopus armatus*. The account was published in the Proceedings and also in the thirteenth volume of the U.S. Exploring Expedition. To the text of 1853 figures were added in 1855 on pl. 95 of the Atlas. The generic name being preoccupied, Steenstrup and Lütken in 1861 changed it to *Perissopus*, a genus which they instituted for *P. dentatus* n. sp., including with

some doubt *P. armatus* (Dana). This arrangement was accepted by Bassett-Smith in 1899, but rejected by C. B. Wilson in 1907, who separated Dana's species under the new generic name of *Pholidopus*. All the available information appears to be derived from Dana, whose report seems to depend on a single specimen of the female sex, a third of an inch long, without egg-strings. Under the circumstances it is allowable to suggest that Dana may have made mistakes in the minute and difficult details which separate *Pholidopus* from *Achtheinus*. Thus, he represents the third and fourth pairs of feet as alike having the rami one-jointed, but he only figures separately one of these two pairs, and may have taken for granted that the third was like the fourth. He records the first pair as uniramous, but these minute limbs might easily have lost one of the branches in the process of dissection. In *Achtheinus* all four pairs of feet are biramous, and only the fourth pair have the rami one-jointed. Since, however, Wilson has now instituted *Achtheinus* with well-ascertained characters, the merely conjectural identity of *Pholidopus* may stand aside.

It should be noticed that Wilson in his account of *Achtheinus dentatus* says, "The present specimens agree in every generic particular with the type species *A. oblongus*." Still, in diagnosing the female of the latter he says, "Genital segment much smaller than the carapace," whereas in *A. dentatus* it is much larger than the carapace.

ACHTHEINUS DENTATUS, Wilson.

Plate XCVII.

1911. *Achtheinus dentatus*, Wilson, Proc. U.S. Mus., vol. 39, p. 630, pl. 67, figs. 22-31.

The female sex has been fully described by Wilson, whose figure shows the relative length and breadth of the carapace more accurately than mine does, which from a depression of the front disguised the true length. This is in fact somewhat greater than the breadth.

One male was found in close attachment to the underside of a female. The carapace is more than twice as broad as the following segments and longer than the whole five of them together. Of these the first three combined are little longer than the fourth, which equals them in breadth and is more

than twice as broad as the pentagonal fifth. The short rami of the latter are fringed each with four setae, and a spicule on either side of the setae. The second antennae are similar in character to those of the female, but less elongate and without reverted teeth. The mouth-organs showed near agreement with those of the female, with the maxillipeds stronger.

The specimens measured varied between 5.5 and 6.5 mm. in length for the females, with egg-strings about three times as long; the male was a little over 3 mm. in length.

Locality. Algoa Bay. The parasites were obtained by Dr. Gilchrist from the tail of a shark.

FAMILY LERNAEIDAE.

(See General Catalogue of S.A. Crustacea, p. 560.)

GEN. LERNEAENICUS, Lesueur.

1824. *Lerneaeenicus*, Lesueur, Journ. Ac. Philad., vol. 3.
 1861. *Lernaenicus*, Steenstrup and Lütken, K. Danske Vid. Selsk. Skr., ser. 5, vol. 5, pp. 398, 400.
 1861. *Lerneaeenicus*, Steenstrup and Lütken, loc. cit., pp. 401, 432.
 1899. *Lernaenicus*, Bassett-Smith, Pr. Zool. Soc. London, p. 484.
 1908. „ Wilson, Proc. U.S. Mus., vol. 35, p. 458.

It is obvious that Steenstrup and Lütken, from whom I borrow the reference to Lesueur, must be giving the original spelling of the generic name in their list of corrigenda on p. 432. They there note an additional erratum on p. 347, where *Lernaenicus* is printed instead of *Lerneaeenicus*.

LERNEAENICUS MEDUSAEUS?, Wilson.

1908. *Lernaenicus medusaeus*?, Wilson, Proc. U.S. Mus., vol. 35, p. 458, pl. 76, figs. 99, 100.

On a small fish, which Dr. Gilchrist informed me he had named *Scopelus argenteus*, there occurred a parasite displaying a genital segment and neck, together 6.5 mm. long, with egg-strings not quite double that length. The very short neck, sharply bent, left the remainder of the animal immersed between the gills of the fish, but so firmly embedded in its tissues that very patient endeavours produced no intelligible result, except such as might well correspond with that described

and figured by Wilson for his species. He says of the part in question, "When buried in the tissues of the host this mass of processes forms a most effective attachment organ." Of the visible portion he says, "genital portion cylindrical without posterior processes: no abdomen," in agreement with our specimen. The identification is hypothetical, but plausible.

Locality. The fish was taken, "Constable Hill (near Saldanha Bay) bearing E. $\frac{3}{4}$ S., distant $19\frac{1}{2}$ miles, and Green Point bearing SE. by E. $\frac{1}{2}$ E., distant 36 miles." No. 177.

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* Mr. K. H. Barnard, Ann. S.A.M., vol. xv., p. 123, identifies this species with *I. taurus* (Costa).

EXPLANATION OF PLATES.

PLATE I. (Crustacea, Plate XC.)

Achaopsis thomsoni (Norman).

n.s. Dorsal view of a male specimen, natural size, showing the left cheliped and last two ambulatory legs in position; the right cheliped detached, its fixed finger broken; the other limbs missing. Parts of the carapace magnified, in ventral aspect, are shown in the median line, and a lateral view on the right shows the eye, the first and second antennae, and the rostrum with its strongly curved ventral process.

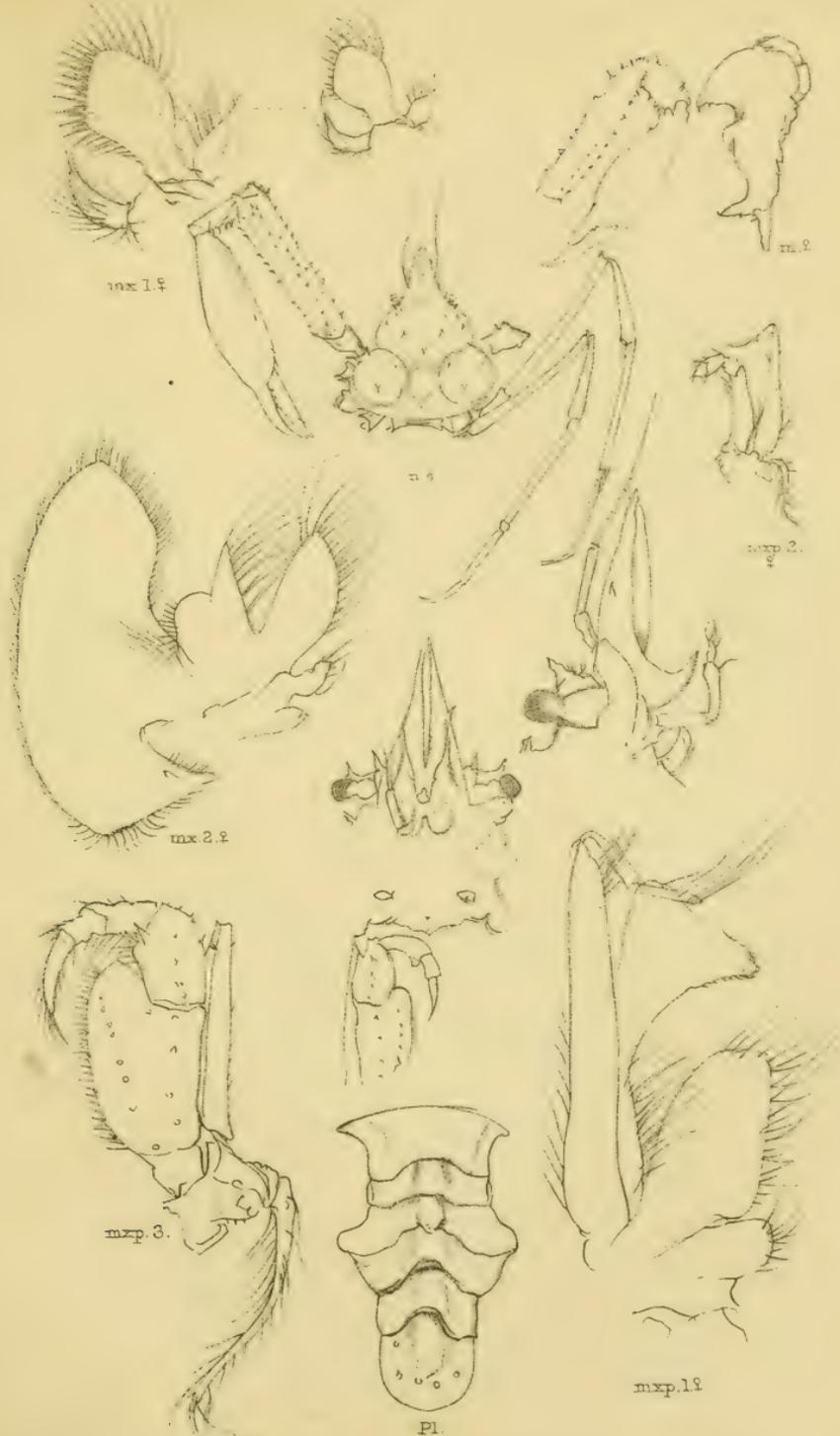
Pl. The pleon flattened out.

The remaining figures are from a female specimen.

m. ♀, mx. 1, ♀. The mandible and first maxilla, the latter with further magnification.

mx. 2, ♀, mxp. 1, ♀. The second maxilla and first maxilliped, uniform with higher magnification of first maxilla.

mxp. 2, ♀, mxp. 3, ♀. Second and third maxillipeds, magnified to the same scale as the mandible.



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Adlard & West, Newman, lith.

PLATE II. (Crustacea, Plate XCI.)

Calocaris atcocki, McArdle.

- n.s. Specimen in lateral view, natural size; fourth peraeopod missing on that side, as also flagellum of second antenna and one of the flagella of the first.
- car. Dorsal view of carapace much enlarged, with first antenna on the left, second on the right, both imperfect; eyes partially seen.
- T., urp. Telson in dorsal view, and one of the uropods.
- m., mp. One of the mandibles and palp of the other.
- l.i., mx. 1, mx. 2, mxp. 1, mxp. 2. Lower lip, first and second maxillae, first and second maxillipeds.
- mxp. 3, prp. 5, plp. 1, plp. 2, plp. 5. Third maxilliped, fifth peraeopod, first, second, and fifth pleopods. For considerations of space these parts are less highly magnified than the others, except in regard to the extra figures showing the dentate margin in the third maxilliped and the peculiar apical joints of the first and second pleopods.

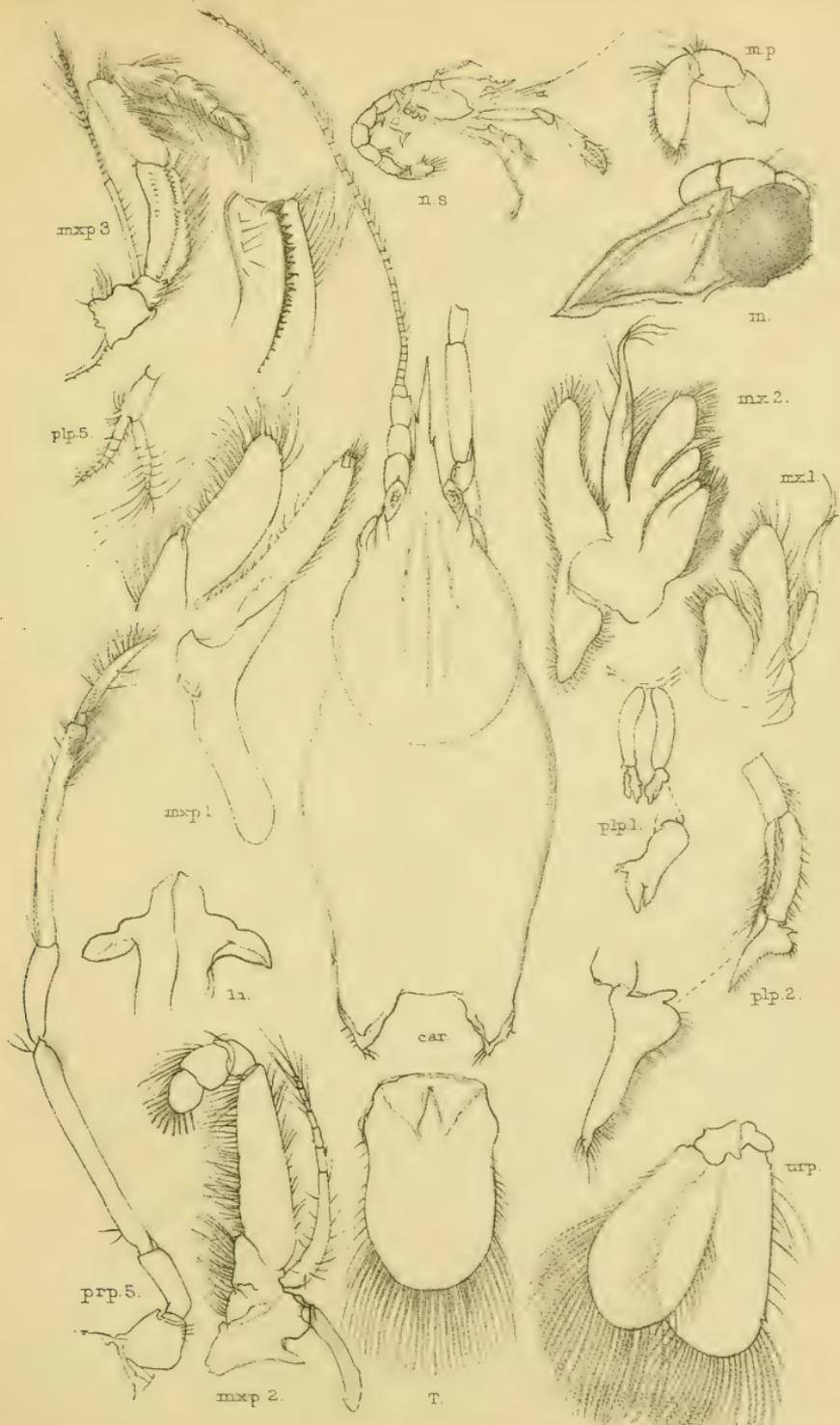


PLATE III. (Crustacea, Plate XCII.)

Polycheles demani, n. sp.

- n.s. Female specimen in dorsal view, natural size; flagella of the antennae curtailed by want of space, the frontal and telsonic parts slightly fore-shortened, the epimeral parts of the pleon a little expanded from their natural aspect.
- th. Thelycum.
- T. The telson. This and all the other separate parts of natural size, except the terminal part of the fifth peraeopod.
- mxp. 1, 2, 3. First, second, and third maxillipeds.
- prp. 1. First peraeopod, the chela detached, for considerations of space.
- prp. 5. Fifth peraeopod on the right, with terminal portion on the left magnified.
- plp. 2. Second pleopod.

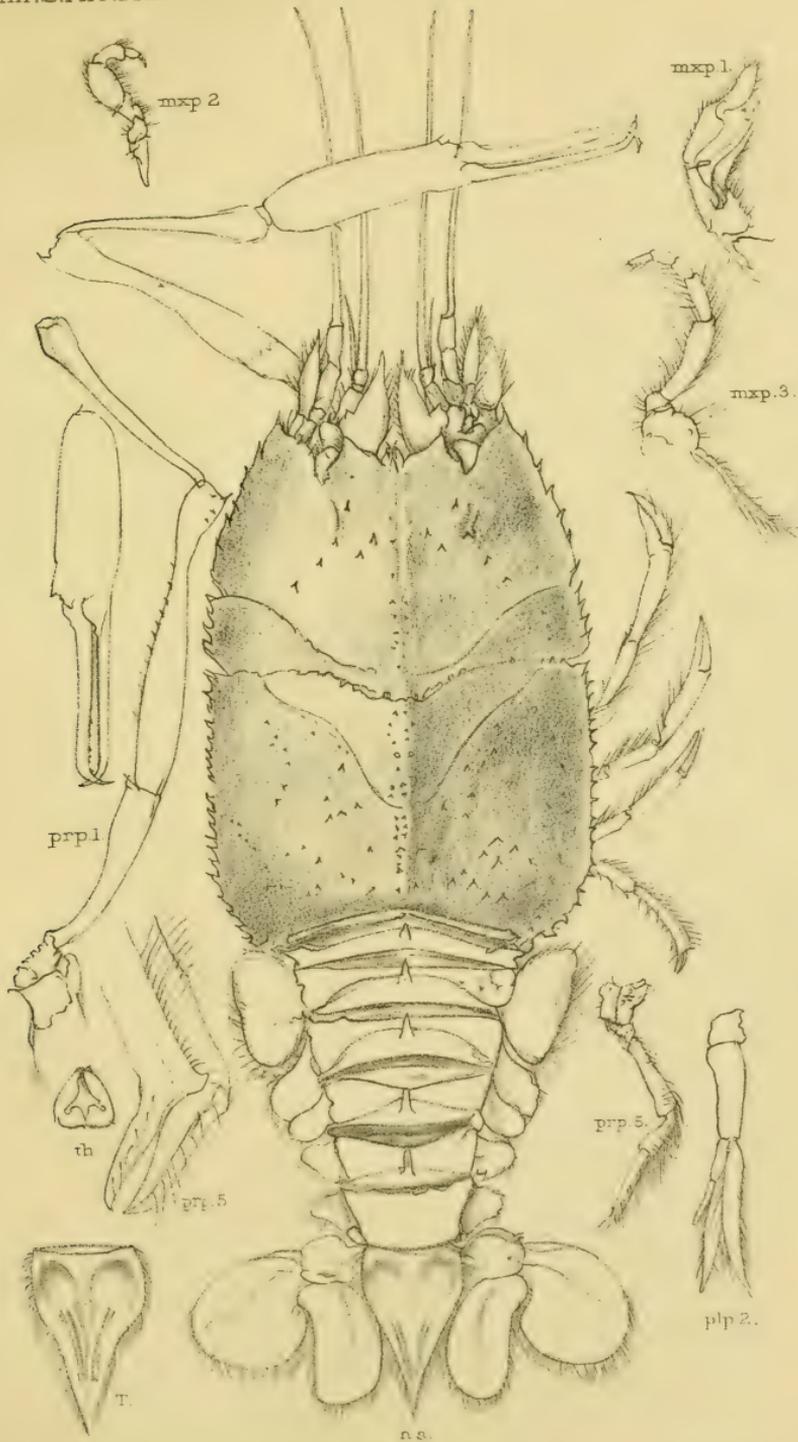


PLATE IVB. (Crustacea, Plate XCIII B.)

Leander pacificus, Stimpson.

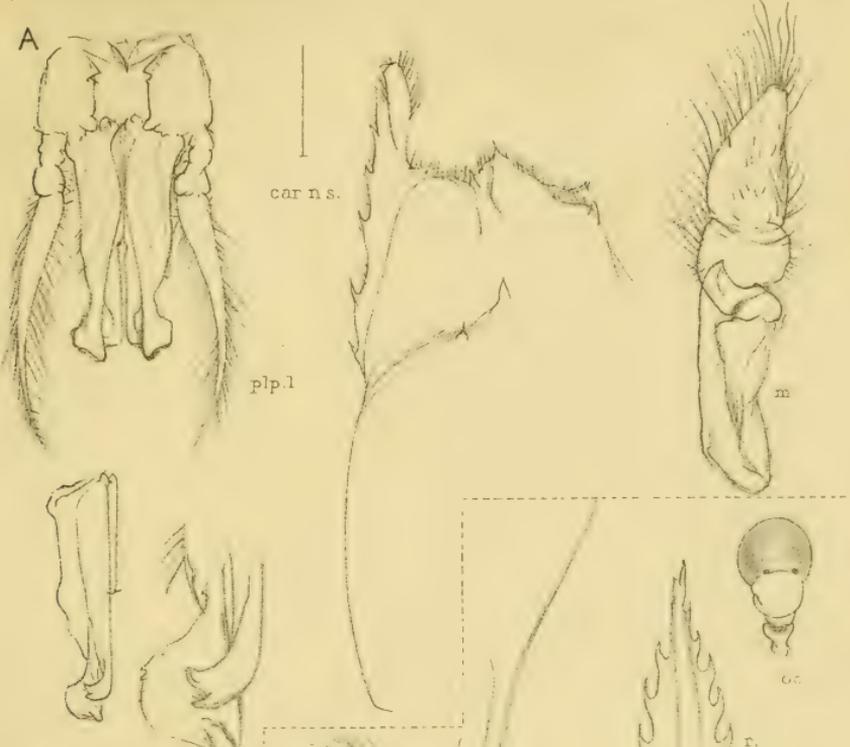
- n.s. Specimen in lateral view represented of the natural size.
r. The rostrum and adjoining part of carapace magnified.
oc. One of the eyes.
T., urp. Telson and uropod in dorsal aspect to the same scale as the rostrum,
with additional magnification of the end of the telson.
m.m. Parts of the mandibles on the higher scale.
mx. 1, mx. 2. First and second maxillae, on the same scale as the mandibles,
with apex of first maxilla more highly enlarged.

PLATE IVA. (Crustacea, Plate XCIIIA.)

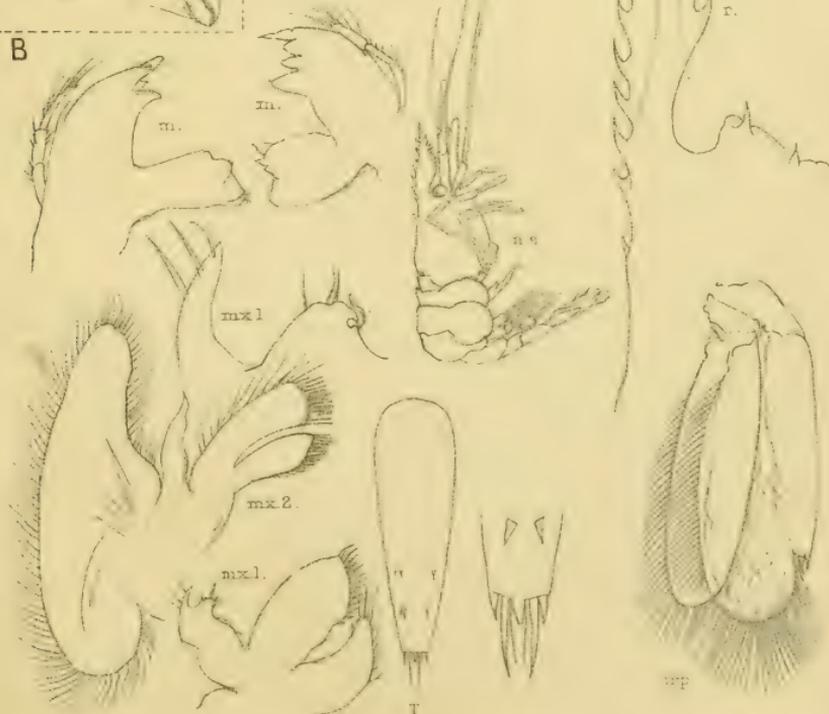
Solenocera africanus, n. sp. ♂.

- car. n.s. Line indicating actual length of the carapace partially figured in lateral view.
- m. Mandible, with cutting edge seen through the transparent base of the palp.
- plp. 1. The first pleopods with petasma from the convex side, one half of it also shown from the concave side, with the extremity of each lamina more highly magnified.

A



B



Dr. TRK Stubbins.

SOLENOCERA AFRICANUS, n.sp.

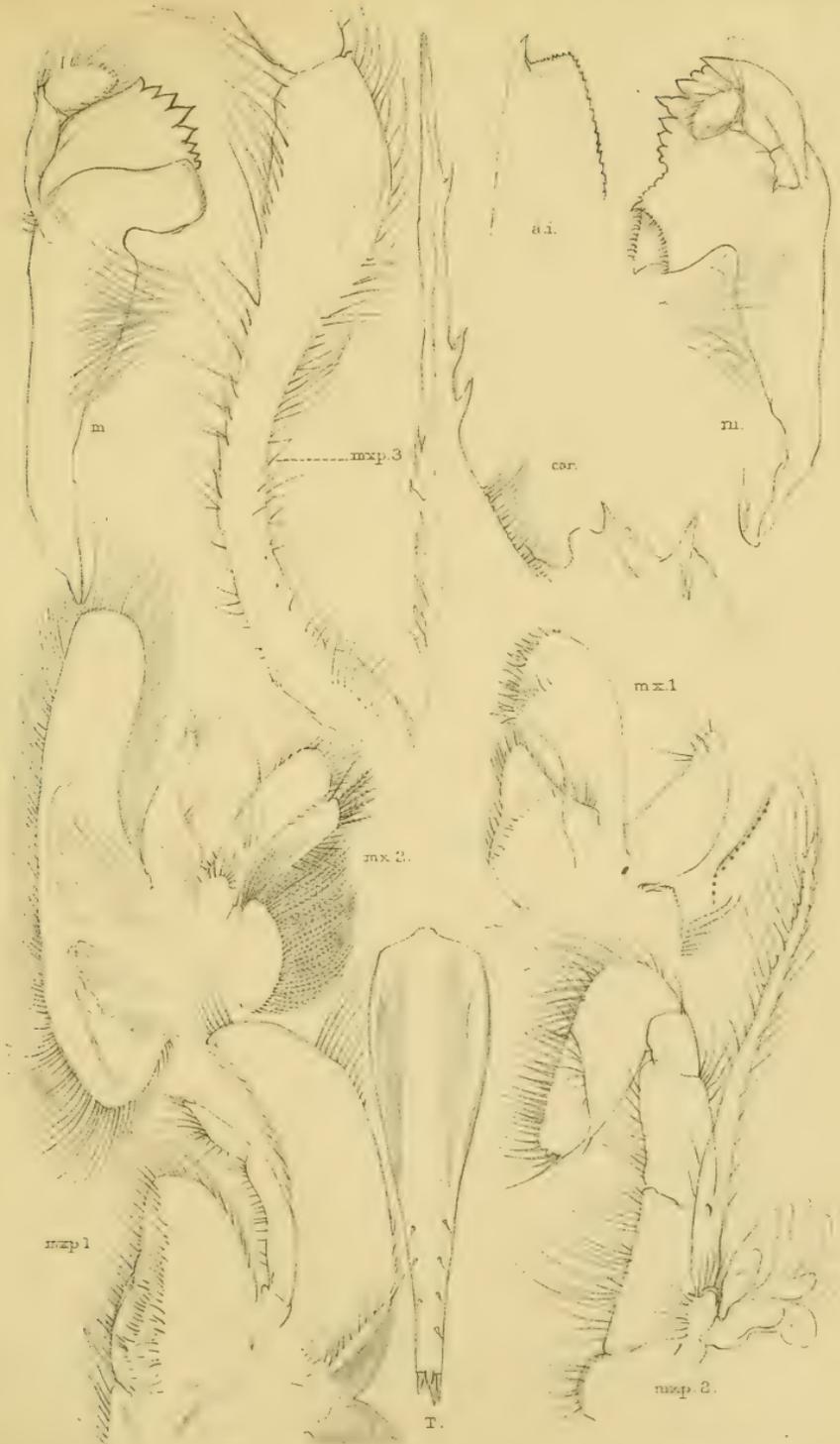
LEANDER PACIFICUS, Stimpson.

Alfred S. West, New York.

PLATE V. (Crustacea, Plate XCIV.)

Acanthephyra brachytelsonis, Bate.

- car. Rostrum and front of carapace in lateral view enlarged.
- T. Telson in dorsal view, enlargement uniform with that of the carapace.
- a.i. Apical portion of the scale of the second antennae, without its fringing setae, magnified to the same scale as the following figures.
- m.m. The mandibles from the inner or upper surface.
- mx. 1, mx. 2. First and second maxillae with one of the spiculate setae of the first more magnified.
- mxp. 1, mxp. 2. First and second maxillipeds.
- mxp. 3. Antepenultimate joint of the third maxillipeds.



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ACANTHEPHYRA BRACHYTELSONIS. Bate.

PLATE VI. (Crustacea, Plate XCV.)

Nematocarcinus parvidentatus, Bate.

- car. Part of carapace in lateral view, on a lower scale of enlargement than other parts.
- T. Telson in dorsal view, with higher magnification of the spiniferous part.
- a.i. Apical part of the scale of the second antenna.
- m. One of the mandibles.
- mx. 1, mx. 2. The apical plate of the first maxilla and the corresponding part of the second.
- mxp. 1, mxp. 2, mxp. 3. The first, second, and third maxillipeds, the third on account of its great length less highly magnified than the other mouth organs, but the terminal spine more highly instead of less.
- plp. 1, plp. 2. The first and second pleopods, the second with higher magnification of the male appendage and retinaculum.
- urp. One of the uropods.

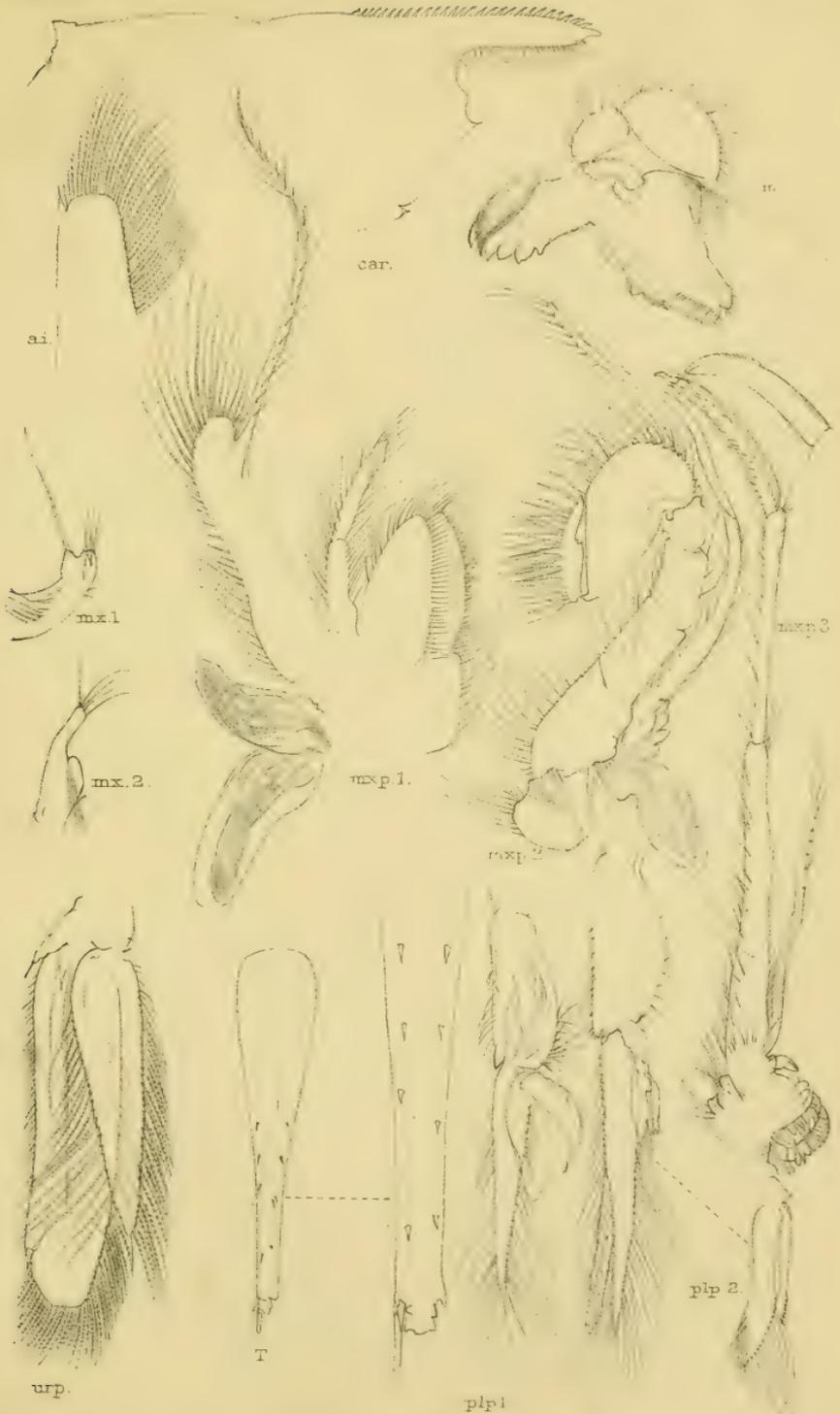


PLATE VIIb. (Crustacea. Plate XCVIb.)

Metopa rotundus, n. sp.

n.s. Line indicating natural size, measured round from head to third pleon-segment of the female specimen shown in lateral view.

a.s., a.i. First and second antennae.

l.s., m. Upper lip and mandible (the palp broken).

gn. 1, gn. 2. First and second gnathopods, with distal parts more highly magnified.

prps. 2, 3, 5. Second, third, and fifth pereopods (basal joint of fifth imperfect), sixth and seventh joints of second more highly magnified.

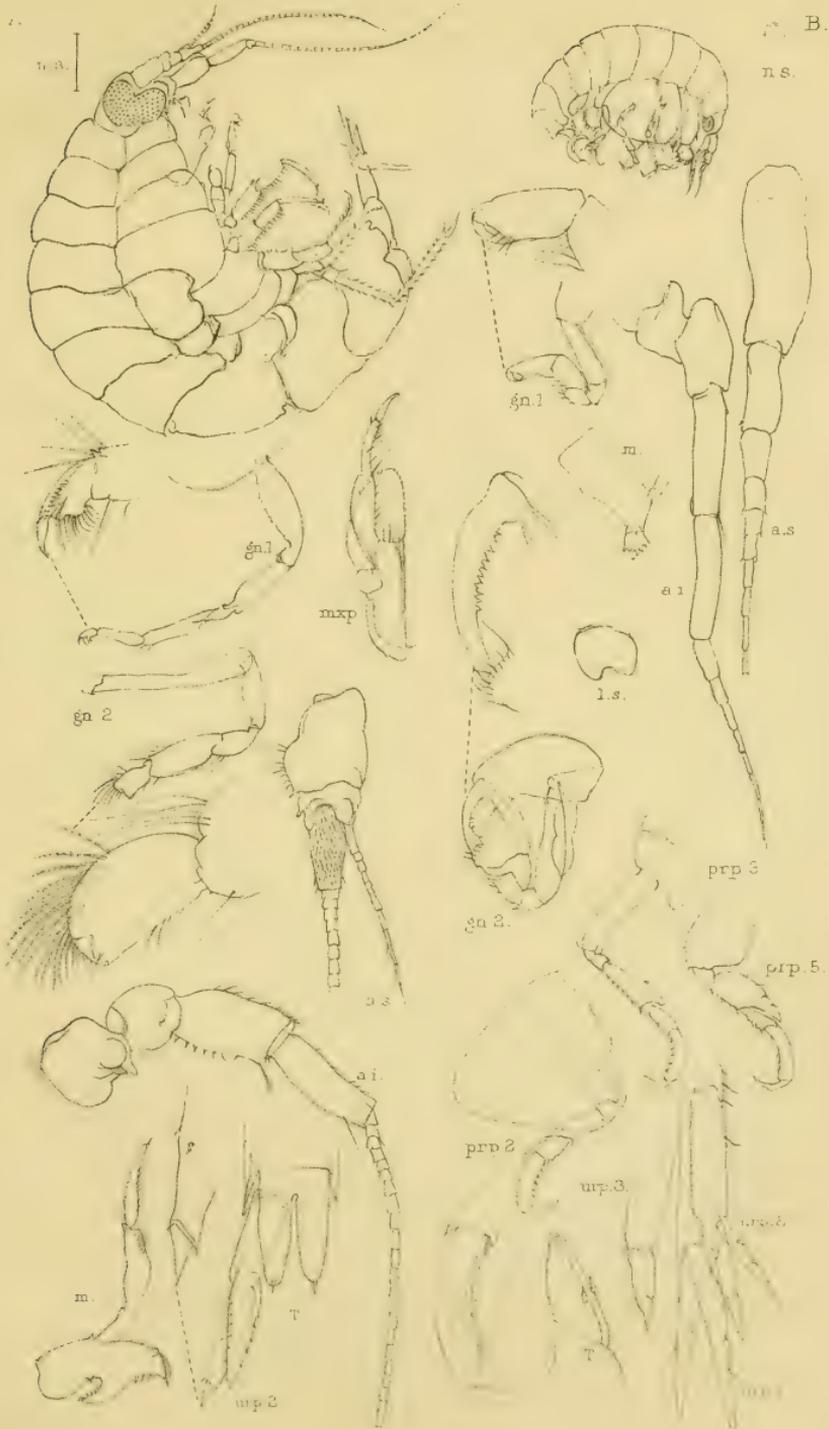
urps. 1, 2, 3, T. The three uropods and the telson, the latter upturned in lateral view.

The gnathopods and pereopods (except the extra enlargements) are on a lower scale than the other details.

PLATE VIIA. (Crustacea, Plate XCVIA.)

Ichnopus macrobetomma, n. sp.

- n.s. Line showing actual length from head to third pleon segment across the bent specimen, as shown in the adjoining figure.
- a.s., a.i. First and second antennae, the flagella only in part.
- m., mxp. One mandible and half the maxillipeds.
- gn. 1, gn. 2. The first and second gnathopods, with higher magnification of the finger of the first, of the hand and finger of the second.
- urp, T. Third uropod, with tip of exopod more highly magnified, and dorsal view of the telson.



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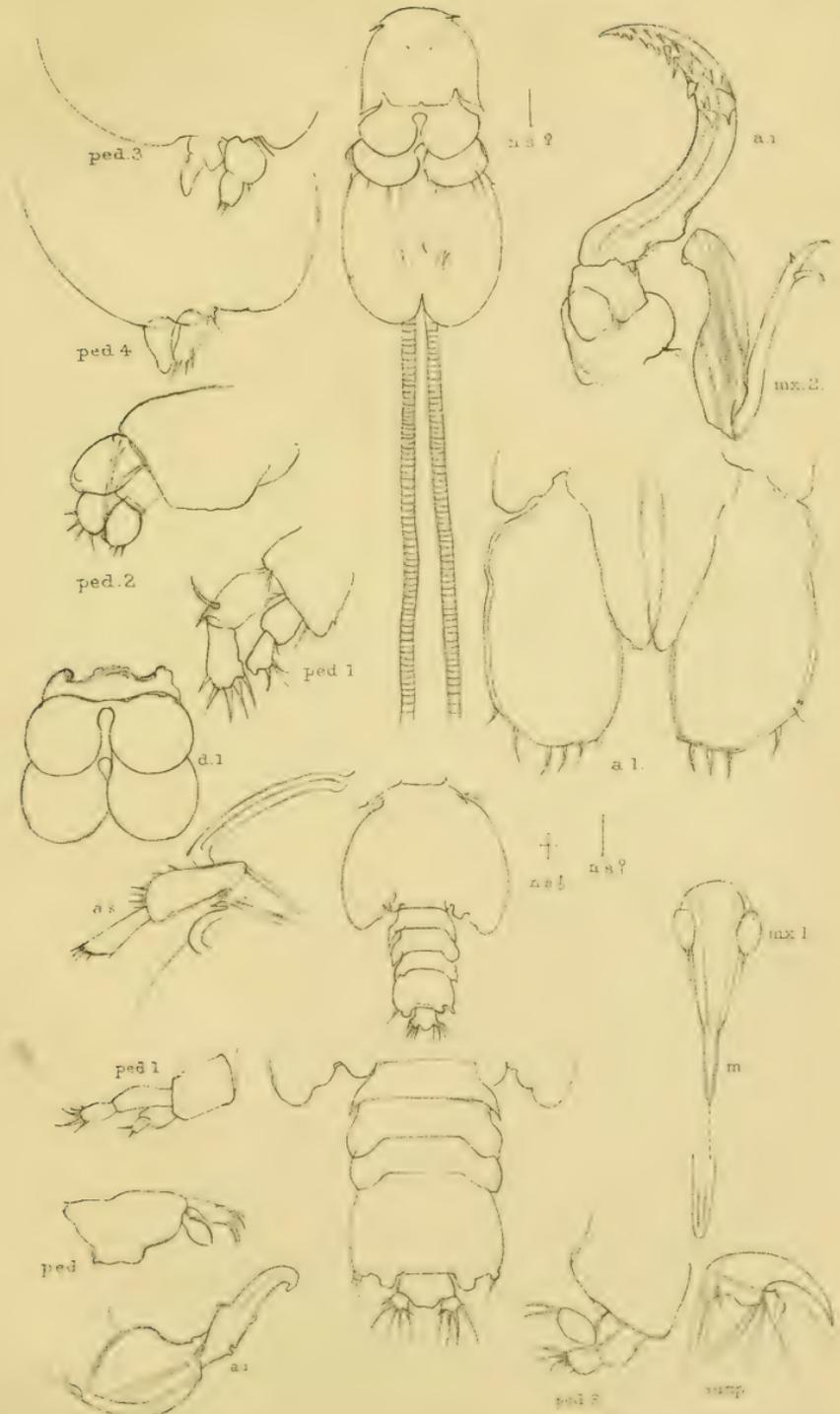
Adlard & West, Newman Job.

ICHNOPUS MACROBETOMMA, n. sp. METOPA ROTUNDUS n. sp.

PLATE VIII. (Crustacea, Plate XCVII.)

Aethinus dentatus, Wilson.

- n.s. ♀. Line indicating natural size of female specimen shown in dorsal view, with egg-strings incomplete. The following parts, in the upper half of the plate, of uniform magnification on a higher scale, were taken from the same specimen (except d.l.).
- a.i. Second antenna.
- mx. 2. Second maxilla.
- ped. 1, 2, 3, 4. First, second, third, and fourth feet, the expanded segment of the third and of the fourth incomplete.
- a.l. Anal laminae.
- d.l. Dorsal laminae, from a different specimen, detached from the carapace to show the small lateral laminae "covering the bases of the second legs" (Wilson), in connexion with the two following pairs of foliaceous laminae.
- n.s. ♂, n.s. ♀. Lines indicating natural size of male specimen shown in dorsal view, and of the female specimen to which it was attached. The following figures, uniform in magnification with the details of the female, are taken from the male.
- a.s., a.i. First antenna in position, and second antenna.
- m., mx. 1. Mouth-tube, with first maxillae and mandibles, the latter with additional magnification.
- mxp. Part of maxilliped.
- ped. 1, ped. 3, ped. 4. The first and third feet, and a foot which is probably the fourth.



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