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IN  
SOUTH AFRICA.

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SOUTH AFRICAN CRUSTACEA.

PART II.

BY THE

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During the last two or three years Dr. Gilchrist's "Marine Investigations" have produced a very copious supply of crustaceans, and for the very highly satisfactory state in which the specimens have reached England he wishes me to recognize the valuable assistance he has received from Captain Turbyne. In this second instalment of my report several species are figured and described which claim the interest of being new to science. Others have been treated with more or less fulness of detail in order to establish or discuss their identity with forms already named by earlier authorities. This treatment seems especially requisite whenever a species is assigned to a locality distant from its previously known range. It certainly involves much repetition in the literature of natural history, but without it questions of distribution may be completely confused by the list of a local fauna. All depends on the sometimes shadowy guarantee of the compiler's credit. In the present report the point which has the best right to engage attention is, I venture to think, the rapidly accumulating evidence that, at least in regard to Crustacea, the marine fauna of South Africa stretches forth its hands both to the east and to the west, or rather, swings them round to all points of the compass. Those species which it claims for its own make often a very close approach to oriental and occidental forms which in some cases have hitherto been known only from distant localities. In some instances a South African form is to all appearance quite indistinguishable from a European or other far-off species, but future research may show that the interval is bridged by many intermediate stations. That some forms vary considerably in the captures of a single dredging, while others seem to remain constant over a vast range, adds considerably to the responsibility of specific determination. This difference of conditions, however, may be explained as more apparent than real. Species that are gregarious and so get taken in large family groups, display conspicuously the variations of

sex and age, which court little attention in others that from their great size or their habits of life are, as a rule, taken one by one.

## CRUSTACEA MALACOSTRACA.

### BRACHYURA GENUINA.

1841. *Brachyura*, de Haan, Crustacea Japonica, decas quinta, p. 112.  
 1880. *Brachyura genuina*, Boas, Studier over Decapodernes Slaegtskabforhold, p. 138.  
 1899. *Brachyura genuina*, A. Milne-Edwards and Bouvier, Crust. Décap. Hirondelle et Princesse-Alice, Monaco, fasc. 13, pp. 3, 15.  
 1899. *Brachyura vera*, Alcock, Deep-sea Brachyura R.I.M.S.S. Investigator, p. 39.  
 1900. *Brachyura genuina*, A. Milne-Edwards and Bouvier, Crust. Déc. du Travailleur et du Talisman, p. 21.

The genuine Brachyura as distinguished from the Brachyura *Anomala* include four divisions—the Oxyrrhyncha, Cyclometopa, Catometopa, and Oxystomata—the family Raninidae being included in the last of the four.

### OXYRRHYNCHA.

#### FAM. : MAIIDAE.

1895. *Maiidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 64, pt. 2, p. 160.  
 1899. *Maiidae*, Alcock, Deep-sea Brachyura Investigator, p. 39.  
 1900. *Maiidae*, M. J. Rathbun, The American Naturalist, vol. 34, p. 504.

This family is sometimes sub-divided into the Inachidae, the Maiidae, and the Periceridae. Of the two genera here noticed, Alcock places *Platymaia* in a sub-family Inachinae, and *Scyramathia* in a sub-family Pisinae. Since *Pisa*, Leach, is a synonym of the same author's *Blastus*, Pisinae, if upheld, would become Blastinae, or, as a family, Blastidae.

#### GEN.: PLATYMAIA, Miers.

1886. *Platymaia*, Miers, Challenger Brachyura, Reports, vol. 17, p. 12.  
 1893. *Platymaia*, Stebbing, History of Crustacea, Internat. Sci. Ser., vol. 74, p. 110.

1895. *Platymaia*, Alcock, Journ. Asiat. Soc. Bengal, vol. 64, pt. 2, p. 180.

1899. *Platymaia*, Alcock, Deep-sea Brachyura of R.I.M.S.S. Investigator, p. 45.

Carapace suborbicular. Rostrum tridentate. No preocular spine, but a post-ocular spine against which the eye is retractile, but which affords no concealment to the eye. Eyes large, with short eye-stalks. Epitome small, transverse. Basal antennal joint short, cylindrical, free; the flagellum and part of the peduncle visible from above. Third maxillipeds with the fourth joint narrow, and bearing the next joint at its summit. Chelipeds in the adult male long, with a long inflated club-shaped palm; in the female, short and slender. Ambulatory legs long, some of them spiny, fingers of the hinder pairs compressed. Pleon in both sexes with all the segments separate.

The above definition is borrowed from Alcock, with some modifications to suit the new species here described. The account of the chelipeds in the adult male still, however, rests only on the type species, *Platymaia wyvillethomsoni*, Miers, of which a magnificent male specimen is figured by Alcock and Anderson, in the Illustrations of the Zoology of the R.I.M.S.S. Investigator, Crustacea, pl. 16, 1896. In that species both sexes have the penultimate joint in the last three pairs of legs somewhat dilated and compressed, but there is no dilatation worthy of remark in the corresponding part of the new species.

PLATYMAIA TURBYNEI, n. sp.

PLATE 5.

The type species of the genus was dredged by the "Challenger" north of the Admiralty Islands, and by the "Investigator" in the Andaman Sea. More recently the "Valdivia" procured it rather plentifully at the Nicobar Islands (Chun, Aus den Tiefen des Weltmeeres, pp. 396, 370, fig. in text). Accordingly, notwithstanding the differences between the sexes and between the younger and older stages pointed out by Major Alcock, the figures by several independent observers show that its general configuration is fairly constant. The new African species agrees with it in too many points to admit of generic separation, though specifically it is very obviously distinct.

The distinguishing marks are the prolongation of the central spine of the depressed and then upward turned rostrum much in advance of the two lateral spines; the shape of the carapace, which has the hind margin much more broadly rounded; the proportion of the ambulatory legs to one another, the proportions of their joints, and the shape of the penultimate joint in the hinder limbs.

The middle spine of the rostrum forms a considerable angle below with the inter-antennular septum. The most conspicuous spines of the carapace in dorsal view, beside those of the rostrum and the pair that flank the eyes, are three spaced about the middle of each side and two longitudinally placed at about the middle of the back. These have a pair transversely placed behind them and three pairs strongly diverging from before backward on either side of them. Behind the rostrum six small spines stretch across the carapace in a shallow curve. There are others round the hind margin, and a few minute prickles occur in various parts. The sternal plastron has rather conspicuous prickles across the centre in the three middle divisions. The first segment of the pleon is square, with concave sides, the next two are the widest, the fourth narrows to the fifth, which is the same width as the longer sixth and almost semi-circular seventh. From the shape of the narrow pleon and the small size of the chelipeds it may be surmised that the specimens at present at command are young males.

The eyes in formalin are reddish brown.

The second antennae readily fold back. The slender flagellum is longer than the peduncle.

The third maxillipeds agree with Alcock's description of those in the other species. The third joint is greatly broader than the fourth, the seventh is longer than either the fifth or the sixth. All these joints are spinose, the third and fourth having on the surface and at the outer margin rows of denticles in addition to their numerous slender spines.

The chelipeds are much shorter, but not (as in female and young male of *P. seyvillethomsoni*) more slender than the other legs. They are very spinose, having the fifth joint short, the sixth rather long, with the trunk subequal in length to the finger, which fits closely over the thumb, their finely denticulate margins fitting one into the other. The second legs are between two and three times as long as the chelipeds, with the spinose finger which should perhaps be included among the characters of the genus. The penultimate joint has the long spines on the inner margin, which are also characteristic in both species. This joint is compressed and somewhat dilated, though not at the two extremities. Like the two preceding joints, it is spiny on both margins. It is about three-fourths of the length of the fourth joint, which is about twice as long as the finger. The third pair of legs are much longer but far less spiny, with similar proportions between the joints, except that the sixth, which widens a little distally, rather more nearly approaches the length of the fourth. The fourth pair have the spiny armature inconspicuous, but are furnished with two rows of long plumose setæ on the inner margin of the fifth and sixth joints, and for some way along the finger. They

are longer than the third pair by reason of having their fifth joint as long as the fourth. The fifth pair are scarcely at all spiny, but setose like the fourth, and in length subequal to the third, having their fourth and fifth joints slightly shorter and the sixth a little longer than the corresponding joints in that pair.

The limbs, as preserved, are pale, with broad orange bands.

Size: The specimen figured in dorsal view measures 31 mm. from tip of rostrum to hind margin, with a breadth of 26.5 mm. just below the lowest of the three lateral spines. The second specimen figured was rather smaller. A third is a little larger.

Locality: Cape Natal N. by E. (approx.) 24 miles. Depth, 440 fathoms. Bottom, mud.

The specific name is given in token of regard for Captain Turbyne, whose valuable services, first on board the "Medusa," then at the Marine Station, Granton, Edinburgh, subsequently at the Millport Marine Station, and of late years at the Cape, have been highly appreciated by all concerned with marine zoology.

GEN. : SCYRAMATHIA, A. Milne-Edwards.

1880. *Scyramathia*, A. Milne-Edwards, Bull. Mus. Comp. Zoöl. Harvard, vol. 8, p. 311.
1881. *Scyramathia*, A. Milne-Edwards, C. R. Acad. Sci., 5 déc. 1881.
1885. *Scyramathia*, Sars, Norwegian North-Atlantic Exp., Crustacea, pt. 1, p. 6.
1887. *Anamathia*, (part) S. I. Smith, Rep. U.S. Fish. Comm. for 1885, p. 625 (21).
1889. *Anamathia*, Pocock, Ann. Nat. Hist., Ser. 6, vol. 4, p. 425.
1893. *Scyramathia*, Stebbing, History of Crustacea, Internat. Sci. Ser., vol. 74, p. 119.
1894. *Scyramathia*, Milne-Edwards and Bouvier, Camp. Sci. Prince de Monaco, fasc. 7, p. 12.
1894. *Anamathia* (part), M. J. Rathbun, Proc. U.S. Mus., vol. 17, p. 61.
1895. *Anamathia* (part), Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 8.
1895. *Scyramathia*, Alcock, Journ. Asiat. Soc. Bengal, vol. 64, pt. 2, p. 200.
1899. *Scyramathia*, M.-Edwards and Bouvier, Camp. Sci., Prince de Monaco, fasc. 13, p. 43.
1899. *Scyramathia*, Alcock, Deep-sea Brachyura of Investigator, p. 51.
1900. *Scyramathia*, M.-Edwards and Bouvier, Exp. du Travailleur et du Talisman, Crust. Déc., pt. 1, p. 131.

In their latest work, Milne-Edwards and Bouvier define the genus as follows:—

“As in *Anamathia* the rostral horns are two; they are long and divergent, but at their base there is a supra-orbital spine which in *Anamathia* is wanting, and the orbital region offers special characters. The orbit is more complete than in the Crustacea of the neighbouring groups, and the eye is retractile hiding in a groove left between the carapace and a flattened projection behind the orbit. The basal joint of the external antennae is unarmed, and juts out a little so as to form a sort of orbital platform; it is flattened below; the movable portion of the antennae at its insertion is partially concealed under the rostrum, of which, being short, it does not reach the apex. The carapace is piriform, and its salient parts generally form flattened protuberances, which are somewhat analogous to the fungiform productions of the body in the genus *Eurygnomus*. The external maxillipeds are remarkable for the rounded form of the antero-external angle of the fourth joint, the opposite angle being truncate to receive the articulation of the palp.\* The feet are long and strong, the fingers of the chela are sharp. The first ambulatory foot reaches beyond the others; its joints are cylindrical, and end in a finger slightly curved and apically acute. The pleon has seven segments, and is without spines; in the male the seventh segment is narrow and attenuate at the end; in the female it is very broad. The branchiæ and the appendages are of the normal oxyrrhynchal type.

The authors of this definition assign to the genus only *Scyramathia carpenteri* (Norman) and *Scyramathia occidentalis* (Faxon). They do not agree with Faxon in placing these species in *Anamathia*, because the type of the latter, *A. rissoana* (Roux), ‘is well characterized by its small orbits, with upper margin entire, and without pre-orbital and post-orbital spines. They remark that the American species of *Anamathia*, *A. hystrix* (Stimpson), *A. crassa*, A. M.-Edw. (including *A. agassizi*, S. I. Smith), *A. tanneri*, Smith, and *A. modesta* (Stimpson), all have orbital spines, and might thus be distinguished from *A. rissoana*, forming a gradual transition to *Scyramathia*. But at all events, they conclude, the latter is distinguished from the former ‘by the external widening which the basal joint of the second antennæ forms under the orbit, by the absence of spines upon that joint, and, lastly, by the transformation of certain dorsal spines of *Anamathia* into low tubercles, ordinarily truncate at the extremity.’ *Scyra umbonata*, Stimpson, which A. Milne-Edwards had transferred to *Scyramathia*, is indirectly withdrawn from it by the joint authors. After alluding to the suspicion entertained by Sars that Stimpson’s species might even prove to be identical with *Scyramathia carpenteri*, they say, “it is easy to determine the profound differences which separate these two crustaceans, not only in

\* The authors use the expression “tigelle mobile” to designate the last three joints of the third maxillipeds, and also the movable part of the second antennæ, including stem joints and flagellum.

regard to the ornamentation of the carapace and to the form of the rostrum, but also to the relative length of the feet, thick and short in the American species, long and slender in the European."

It is unfortunate that Milne-Edwards and Bouvier seem to be unaware, not only of Alcock's work in 1899, but also of his earlier work in 1895 and 1898, so that they give no direct opinion with respect to the species which he includes in the genus *Scyramathia*. These are *S. pulchra* (Miers), of which *Anamathia livermorii*, Wood-Mason, is made a synonym; *S. rivers-andersoni*, Alcock; *S. beauchampi* (Alcock & Anderson); *S. globulifera* (Wood-Mason); *S. velutina* (Miers). It may, however, be inferred that the French authors would not accept these species, for the reception of which Alcock's definition of the genus is framed at various points differently from theirs. He speaks of the carapace as "armed either with tubercles, or with long spines much like those of *Anamathia* in their uniform size and definite arrangement," but the French definition is explained to require that some of the spines should be low tubercles, generally truncate at their extremity, as a matter of fact the low tubercles belonging to *S. occidentalis* (Faxon) and the flattened protuberances to *S. carpenteri* (Norman). That the palms of the chelipeds in the adult male are "broadened" is applicable to some of Alcock's species, but not to *S. carpenteri*, and whereas, according to Alcock, the mobile portion of the second antennæ is "freely exposed on either side of the rostrum," in the French definition, as we have seen, it is partially concealed.

The species about to be described is so closely allied to *S. carpenteri* that there can be no hesitation about placing it in the same genus.

#### SCYRAMATHIA HERTWIGI, Doflein.

1900. *Scyramathia Hertwigi*, Doflein, in Chun's *Aus den Tiefen des Weltmeeres*, fig. on p. 497.

#### PLATE 6.

The rostral horns are only one-fourth of the total length of the carapace, being therefore much shorter than in *S. carpenteri*, with which the dorsal ornamentation shows much in common. Down the centre are placed at intervals a minute spine, a long, narrow tabular elevation, connected by a very faint carina with a longer and much broader table, widest in front, and lastly a rugosity on the peak of the dorsal margin. The minute spine is flanked by a pair of ridge-like tubercles, the narrow table by two broad ear-shaped tables, the broad tables by two small oval tables, a strong



curved forward-pointing tabular tooth projecting on either side of the carapace from between the large and small sub-lateral tables. The sternal plastron has deep triangular pits opposite the insertions of the legs. Of the pleon the second and third segments are much wider than the others; the third narrows distally, the sixth distally widening a little.

The second antennæ do not reach the ends of the rostral horns.

The chelipeds are very nearly as long as the first ambulatory legs, exceeding in size those of any other species attributed to this genus. The arm has three tuberculate ridges; the short wrist also has three crests; the hand is as long as the carapace rostrum included, by these proportions differing from other species, the ends of the thumb and finger fit closely together, the inner margin of each being divided into six small teeth; the basal half of the finger has a small and a large prominence, the cavity between them being filled by a tooth on the thumb, but the cavity beyond the large prominence leaving a gap. In the ambulatory feet the arm is longer than the hand, and the finger is more than half as long as the hand, with a little smooth nail, but otherwise thickly coated with spines: the rest of the limb, though smoother in appearance, is closely invested with the tuberculiform apically pointed cutaneous vesicles described by Sars, which also occur on the pleon, the mouth organs, and various parts of the body. The presence of these remarkable objects is expressly noted for *S. carpenteri* and for *S. occidentalis*, and is perhaps intended by the "short felty pubescence" which Miers describes as investing *Fugettia velutina*. It is not specified by Alcock either for that species or for the others which he refers to *Scyamathia*.

Length of carapace, 55 mm., breadth, 33 mm., length of rostrum, 14 mm.; first ambulatory leg more than twice as long as the carapace.

**Habitat.** A single specimen, male, taken 28 miles off Lion's Head, from a depth of 140 fathoms.

The discussion of the genus, and the description of the present species with the figure of it were completed before I had had an opportunity of consulting Professor Chun's volume, but on seeing there Doflein's figure of *S. hertwigi*, though it is unaccompanied by any description, I could not resist the conviction that it represented the very species I had been studying.

#### CYCLOMETOPA.

#### FAM. : PORTUNIDAE.

1899. *Portunidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 4.

Of the three genera here noticed, *Charybdis* and *Lufa* are assigned by Alcock to a sub-family Lupinae, and *Ovalipes* to a sub-family Portuninae.

GEN. : CHARYBDIS, de Haan.

1833. *Charybdis*, de Haan, Crustacea Japonica, decas prima, p. 10.  
 1834. *Thalamita* (part), H. Milne-Edwards, Hist. Nat. Crustacés, vol. 1, p. 462.  
 1838. *Charybdis*, M'Leay, Illustrations Zool. South Africa (Smith), Invertebrates, p. 61.  
 1843. *Charybdis*, Krauss, Die Südafrik. Crustaceen, p. 24.  
 1852. *Charybdis*, Dana, U.S. Expl. Exp., vol. 13, p. 285.  
 1860. *Goniosoma* (preocc.), A. Milne-Edwards, Ann. Sci. Nat., ser. 4, vol. 14, p. 263.  
 1886. *Goniosoma*, Miers, Challenger Brachyura, Reports, vol. 17, p. 189.  
 1893. *Charybdis*, Stebbing, History of Crustacea, p. 69.  
 1897. *Charybdis*, Rathbun, Proc. Biol. Soc., Washington, vol. 11, p. 161.  
 1899. *Charybdis* (*Goniosoma*), Alcock, Jour. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 47.

The genus *Portunus* was divided by de Haan into many subgenera. To one of these he gave the preoccupied name *Oceanus*, assigning to it the single species *Cancer cruciatus* Herbst. This has been transferred to de Haan's next subgenus *Charybdis*. Fault was found with this name because of its resemblance to the earlier *Charybdea* or *Carybdea* of Péron and Lesueur. On this inadequate ground *Goniosoma* was substituted, which by the irony of fate was itself really preoccupied.

CHARYBDIS CRUCIATUS (Herbst).

1794. *Cancer cruciatus*, Herbst, Krabben und Krebse, vol. 2, pt. 5, p. 155, pl. 8, fig. 53, pl. 38, fig. 1.  
 1798. *Portunus crucifer*, Fabricius, Suppl. Ent. Syst., p. 364.  
 1833. *Portunus* (*Oceanus*) *crucifer*, de Haan, Crustacea Japonica, decas prima, p. 10.  
 1834. *Thalamita crucifera*, H. Milne-Edwards, Hist. Nat. Crustacés, vol. 1, p. 462.  
 1835. *Portunus* (*Oceanus*) *crucifer*, de Haan, Crustacea Japonica, decas secunda, p. 40.  
 1852. *Charybdis crucifera*, Dana, U.S. Expl. Exp., vol. 13, p. 286, pl. 17, fig. 11.

1861. *Goniosoma cruciferum*, A. Milne-Edwards, Arch. Mus. Hist. Nat., vol. 10, p. 371.  
 1886. *Goniosoma cruciferum*, Miers, Challenger Brachyura, Reports, vol. 17, p. 191.  
 1887. *Goniosoma cruciferum*, de Man, Journ. Linn. Soc. London, vol. 22, p. 79, pl. 5, fig 1.  
 1893. *Charybdis cruciatus*, Stebbing, History of Crustacea, p. 70.  
 1899. *Charybdis (Goniosoma) crucifera*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 51.  
 α/ 1902. *Goniosoma cruciferum*, Lanchester, Proc. Zool. Soc. London, p. 545.

In 1783, Herbst, Krabben und Krebse, pts. 2-5, p. 153, pl. 7, fig. 52, pl. 8, fig. 53, described a species under the name *Cancer sexdentatus*. In 1794 he recognised that the carapace represented on pl. 7, fig. 52, belonged to a distinct species from that represented on pl. 8, fig. 53, and pl. 38, fig 1. Milne-Edwards, Hist. Nat. Crust., vol. 1, p. 462, 1834, introduces some confusion into the synonymy by referring to Herbst's *C. sexdentatus*, pl. 7, fig. 52, as a possible synonym of his *C. cruciatus*, without noticing pl. 8, fig. 53, which really belongs to that species. On p. 463 he gives "*Cancer sexdentatus*. Forsk" as a synonym of *Thalamita annulata* (Fabricius), thus leading to the supposition that Herbst's *C. sexdentatus* was a name preoccupied by Forskäl in 1775. But I cannot find that Forskäl ever used the name in question, though he described a species *Cancer serratus*, with "*fronte sexdentata*." *Cancer feriatus*, Linn., 1758, is based on fig. P. of pl. 6 in Rumph's Amboinsche Rariteitkamer, 1705, and Herbst identifies his *C. sexdentatus* with the same figure. But he claims, on the ground of the description given by Linnaeus, that *C. feriatus* cannot be the same species. There can, however, be little doubt that Linnaeus drew up his description in a rough and ready and inadequate fashion from the figure in Rumph's volume, and it is rather difficult to avoid the conclusion that this figure represents *C. cruciatus*. If that were admitted, the Linnean name would have to be restored. But the matter is too vague for such a decision.

A dried female specimen of this beautiful species from the Cape shows the characteristic cross on the carapace, pale on a maroon ground. The carapace measured between the tips of the lowest lateral spines was 122 mm., or nearly 5 inches broad; the length from the apex of a submedian tooth to the hind margin is 80 mm., or 3 inches and a fifth. The fifth segment of the pleon is 55 mm. across, the triangular seventh segment is 17 mm. broad at the base.

Locality:—Port Alfred.

## GEN. : LUPA, Leach.

1813. *Lupa*, Leach, Edinburgh Encyclopædia, vol. 7, p. 390, Art. Crustaceology.  
 1825. *Lupa*, Deamarest, Consid. gén. Crustacés, p. 97.  
 1833. *Neptunus*, de Haan, Crustacea Japonica, decas 1, p. 7.  
 1834. *Lupca*, Milne-Edwards, Hist. Nat. Crust., vol. 1, p. 445.  
 Date? *Lupa*, Milne-Edwards, Règne Animal Cuvier, Ed. Fortin and Masson, Crustacés, p. 46.  
 1886. *Neptunus*, Miers, Challenger Brachyura, Reports, vol. 17, p. 172.  
 1897. *Portunus*, Rathbun, Proc. Biol. Soc. Washington, vol. 11, p. 155.  
 1900. *Portunus*, Rathbun, The American Naturalist, vol. 34, p. 140.

*Neptunus*, de Haan, is a subgenus of *Portunus*, Fabricius. *Neptunus*, Miers, is a subgenus of *Neptunus*, de Haan. *Portunus*, Rathbun, is a subgenus of *Portunus*, Latreille. Miss Rathbun points out that those who do not accept what she supposes to be Latreille's restriction of *Portunus*, Fabricius, must use *Lupa* in place of de Haan's *Neptunus*, the latter being clearly a synonym of the former. In the valuable key which Miss Rathbun supplies in 1900 to the families, genera, and species of the Cyclometopa, the character shown for distinguishing *Callinectes*, Stimpson, from the genus *Lupa* of Leach is that in the former the pleon of the male is T-shaped, but in the latter triangular.

## LUPA SANGUINOLENTA, Herbst.

1783. *Cancer sanguinolentus*, Herbst, vol. 1, pts. 2-5, p. 161, pl. 8, figs. 56, 57.  
 1798. *Portunus sanguinolentus*, Fabricius, Supplementum Ent. Syst., p. 367.  
 1833. *Portunus (Neptunus) sanguinolentus*, de Haan, Crust. Japonica, decas 1, p. 8.  
 1834. *Lupca sanguinolenta*, Milne-Edwards, Hist. Nat. Crust., vol. 1, p. 451.  
 Date? *Lupa sanguinolenta*, Milne-Edwards, Règne Animal Cuvier, pl. 10, fig. 1, 1 a-c.  
 1861. *Neptunus sanguinolentus*, A. Milne-Edwards, Arch. Mus. Hist. Nat., vol. 10, p. 319.  
 1886. *Neptunus (Neptunus) sanguinolentus*, Miers, Challenger Brachyura, Reports, vol. 17, p. 174.  
 1899. *Neptunus sanguinolentus*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 32.

As Miers observes, the three large brightly-coloured, equidistant and irregularly oval spots on the hinder part of the carapace

are very constant and characteristic of this species. There is also to be noticed a cherry red spot on the hand of the chelipeds, close to the base of the movable finger. This is shown in Herbst's figure, and in the South African specimen (preserved in formalin) this spot still retains its colour, while the three on the carapace have so faded as to require close inspection before they can be discerned. The penultimate segment of the pleon is not very broad, and widens a little from the base before narrowing to its distal extremity, so that the shape of the pleon makes some approach to that of *Callinectes*.

Locality:—Two-and-a-half miles off Cape St. Blaize.

GEN.: OVALIPES, Rathbun.

1825. *Platyonichus* (preocc.) Latreille, *Encycl. Méth. Entom.*, vol. 10, p. 151.
1833. *Anisopus* (preocc.) de Haan, *Crustacea Japonica*, decas 1, p. 12.
1834. *Platyonichus*, Milne-Edwards, *Hist. Nat. Crust.*, vol. 1, p. 435.
1838. *Xaiva*, M'Leay, *Illustrations Zool. South Africa* (Smith), *Invertebrates*, p. 62.
1843. *Anisopus*, Krauss, *Die südafrik. Crustaceen*, p. 27.
1886. *Platyonichus*, Miers, *Challenger Brachyura*, Reports, vol. 17, p. 201.
1897. *Xaiva*, Rathbun, *Proc. Biol. Soc. Washington*, vol. 11, p. 158.
1898. *Ovalipes*, Rathbun, *Proc. U.S. Mus.*, vol. 21, p. 597.
- Platyonichus*, Latreille, 1818, as explained by Bell and Miss M. J. Rathbun, is a synonym of *Portumnus*, Leach, 1813, and is distinct from *Platyonichus*, Latreille, 1825, which must, therefore, lapse as preoccupied. The same fate befalls *Anisopus*, de Haan, the name having been already used in 1803. M'Leay retains de Haan's *Anisopus*, and beside it establishes a new subgenus *Xaiva*, not easily distinguishable from it, so that the latter name seemed available for the species previously known as *Platyonichus ocellatus* (Herbst) and its allies. These allies, in the Challenger Brachyura by Miers, are named "*Platyonichus bipustulatus*, Milne-Edwards, and *P. iridescens*, n. sp." In 1898 Miss Rathbun withdrew the suggestion that *Xaiva* could be used as their generic name, and writes:—"It has since been brought to my attention that the type of *Xaiva*, *X. pulchella*, MacLeay, is more nearly related to *Portumnus* than it is to the species *ocellatus* and *bipustulatus*." For these last, therefore, I am obliged to propose a new name. *Ovalipes* differs from *Portumnus* and *Xaiva* in having the

last joint of the fifth pair of feet broadly oval, rounded at the extremity, instead of lanceolate and acute; the basal joint of the antennulæ advanced and visible in a dorsal view between the frontal teeth; the chelipeds elongate; the abdomen of the male oblong instead of narrow triangular.

OVALIPES TRIMACULATUS (de Haan).

1833. *Anisopus trimaculata*, de Haan, Crust. Japonica, decas I, p. 13.  
 1834. *Platyonichus bipustulatus*, Milne-Edwards, Hist. Nat. Crust., vol. I, p. 437, pl. 17, fig. 7-10.  
 1838. *Anisopus trimaculatus*, M'Leay, Illustrations Zool. South Africa, p. 62.  
 1843. *Anisopus trimaculatus*, Krauss, die südafrik. Crustaceen, p. 27.

The *Anisopus* of de Haan was instituted as a subgenus of *Corystes*, and to it he assigned in 1833 his own species *punctata* and *trimaculata*, with the addition of *ocellata*, Herbst, doubtfully. To the name *trimaculata* n. sp. he subjoined "(Seba T. xviii, fig. 9). Dr. Horstok a littore Promontorii Bonae Spei." That the specimen forwarded to me from the Cape belongs to de Haan's species *trimaculata* is beyond question, but the proper name for it may be debated. In 1834 Milne-Edwards described his *Platyonichus bipustulatus*, from the Indian Ocean, and the figure of this in his (undated) At'as shows it to be identical with de Haan's *trimaculata*. In 1835 de Haan, decas 2, p. 44 (pl. 2, fig. 1, ♀) describes *Corystes (Anisopus) punctata*, n. sp., and adds a note that *Platyonichus bipustulatus*, Milne-Edwards, appears to agree with the other species of this subgenus, which Horstok had procured at the Cape, and which was distinguished from *C. punctata* by shorter frontal and blunter lateral teeth, by having the thorax marked behind with two blood-red spots, the hands reddening on the inner side, the thorax and chelae yellow scarcely rubro-punctate or granulate. That he speaks of only two spots on the carapace of his trimaculate species is due to the fact that the arcuate middle spot is common both to this and *punctata*. In his index, p. 233, he mentions *punctata* alone, not naming either *trimaculata* or *bipustulatus*. Miers in 1876 and 1886 gives as synonyms of *P. hypustulatus*, *Anisopus punctatus*, de Haan, *Platyonichus purpureus*, Dana, and *Portunus catharus*, White. Haswell, in his Catalogue of Australian Malacostraca, 1882, does the same, except that he does not give the reference to White. It may be questioned whether the distinctions drawn by de Haan, depending chiefly on colour markings, are of specific value. It may also be questioned whether the character implied in the specific name, apart from

the reference to Seba, would give his specific name priority over that used by Milne-Edwards. The description by the latter author does not suffice to distinguish between the two forms recorded by de Haan. Milne-Edwards says nothing about the colour, and his coloured figure was probably not published till some years later. On the other hand, Seba's pl. 18, f. 9, shows three frontal teeth instead of four, is devoid of the three spots, which are not alluded to in the description, vol. 3, p. 44. "Color ab omni parte idem dilute flavus, splendens." But if *bipustulatus* is identified with *punctatus*, the priority cannot reasonably be refused to the latter name, since in 1833 it was assigned to a well-defined genus, quite as good for its identification as the specific description given by Milne-Edwards in the following year. In the generic definition de Haan calls attention to the peculiar structure of the seventh joint in the second pair of trunk legs. This finger in the adult male is falciform, dilated, and on the hind margin deeply grooved. The fissuring begins a little way from the base, and then the edges spread out, so as to give a somewhat flattened appearance to the back of the finger viewed from above. In the specific account he mentions that the femora of these same feet have a transverse membranaceous crest on the superior apex, which Miers also notices, saying, "above the articulation the margin of the thigh is raised, and forms a crest." All that I can perceive is a transverse ridge on the distal margin of the fourth joint, which is commonly called the arm, not the thigh. Krauss, who remarks the three spots on the carapace, says that *trimaaculatus* is scarcely distinct from *punctatus*, though he upholds its name and reduces *bipustulatus* to a synonym. He says it is very common in Table Bay, and prefers sandy, sheltered wastes, suitable to its thin, brittle shell, and in harmony with its colouring, which in the ground work is yellow, though sprinkled with blood-red dots, in addition to the half-moon shaped median and the two postero-lateral spots.

Locality:—False Bay.

#### CATOMETOPA.

1900. *Catometopa*, Alcock, Journ. Asiat. Soc. Bengal, vol. 69, pt. 2, p. 281.

Alcock says, "The *Catometopa* may be divided into 9 families. One of these, the *Gonoplacidæ*, so closely approaches the Cyclometope family *Xanthidæ* that such Xanthoid forms as *Geryon* and *Camptoplax* have by some authors been included in it, while, on the other hand, some of its constituent genera, such as *Gonoplax* and *Carcinoplax*, have been ranged among the Cyclometopes."

## FAM. : GONEPLACIDAE.

1900. *Goneplacidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 69, pt. 2, pp. 283, 297.

The following definition is given by Alcock:—"Marine Catometopes closely resembling Cyclometopes. The palp of the external maxillipeds articulates at or near the antero-internal angle of the merus [fourth joint], never at the antero-external angle or at the middle of the anterior border; the exognath of the external maxillipeds is of normal size and is not concealed. The inter-antennular septum is a thin plate. The division of the orbit into two fossae is not accented."

## GEN. : GONEPLAX, Leach.

1813-1814. *Goneplax*, Leach, Edinb. Encycl., vol. 7, p. 430. Art. Crustaceology.

1815. *Goneplax*, Leach, Trans. Linn. Soc. London, vol. 11, p. 323.

1816. *Goneplax*, Leach, Encycl. Brit., p. 413, Art. Annulosa.

1837. *Goneplax*, Milne-Edwards, Hist. Nat. Crust. vol. 2, p. 60.

1853. *Goneplax*, Bell, British Stalk-eyed Crustacea, p. 129.

1886. *Goneplax*, Miers, Challenger Brachyura, Reports, vol. 17, p. 245.

1873. *Goneplax*, Stebbing, History of Crustacea, p. 91.

1900. *Goneplax*, Alcock, Journ. Asiat. Soc. Bengal, vol. 69, pt. 2, p. 316.

Several other references might be given, but they can be easily traced. The name first appears in the form *Goneplat* at page 393 of Leach's Crustaceology, but he then gives *Ocypode angulata*, as the sixth species of *Ocypode*, though appending the following paragraph:—"Cancer angulatus of Linné, Fabricius, and Pennant; *Ocypode bispinosa* of Lamarck; *Goneplat bispinosa*, Leach, MSS. Vide *Goneplat* in Index." i / i

I cannot regard this as an institution of the genus *Goneplat*, while its only species is retained under *Ocypode*. In the Index the name given is not *Goneplat*, but *Goneplax*, with a reference to page 432, although it is on page 430 that *Goneplax* is in fact defined. The reference to Linné is also misleading, since *Cancer angulatus* is a species dating from Pennant in 1777, and is subsequently mentioned, not by Linnæus, but in Gmelin's edition of the *Systema Naturæ*.

## GONEPLAX ANCULATA (Pennant).

1777. *Cancer angulatus*, Pennant, British Zoology, vol. 4, p. 7, pl. 5, fig. 10.



1782. *Cancer angulatus*, Herbst, Krabben und Krebse, vol. 1, p. 85, pl. 1, fig. 13.  
 1788. *Cancer angulatus*, Gmelin's Syst. Nat., vol. 1, p. 2971.  
 1793. *Cancer angulatus*, Fabricius, Ent. Syst., vol. 2, p. 449.  
 1802. *Ocypoda angulata*, Bosc, Hist. Nat. Crust., vol. 1, p. 198.  
 1813. *Ocyfode angulata*, Leach, Edinb. Encycl., vol. 7, p. 393.  
 1813-14. *Goneplax angulata*, Leach, Edinb. Encycl., vol. 7, p. 430.  
 1815. *Goneplax bispinosa*, Leach, Trans. Linn. Soc. London, vol. 11, p. 323.  
 1816. *Goneplax bispinosa*, Leach Encycl. Brit., p. 413, Art. Annulosa.  
 1817. *Goneplax bispinosa*, Leach, Malacostraca Podophthal-mata Britanniae, text to pl. 13.  
 1829. *Goneplax angulatus*, Latreille, Règne Animal, vol. 4, p. 43.  
 1837. *Goneplax angulata*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 61.  
 1853. *Goneplax angulata*, Bell, Brit. Stalk-eyed Crust., p. 131, fig. in text.

1893. *Goneplax rhomboides*, Stebbing, History of Crustacea, p. 92.  
 The South African specimen completely agrees with Bell's description of this well-known species. It has the two pairs of lateral spines of the carapace well developed and very acute: the arm or fourth joint of the cheliped has the small spine near the middle of its upper side, and a similar spine on the inner margin of the fifth joint; the chelipeds are nearly alike, but that on the right side shows a cavity between the fingers in their proximal half, while that on the left side has the fingers close together in their whole length. The colouring, as in English specimens, is more reddened across the upper half of the carapace, and paler, yellowish on the lower half. Latreille and Milne-Edwards were disposed to unite this species with the earlier *Cancer rhomboides*, Linn., which is distinguished from it by having no lower lateral spine on the carapace, or at most, a little tubercle in its place. It must be admitted that the distinction, though marked, is not by itself highly important. Yet there is some convenience in retaining both specific names, as is done by Milne-Edwards, Carus, and others.

Locality:—Trawled 11 miles off Cape St. Blaize.

#### OXYSTOMATA.

1896. *Oxystoma* or *Leucosoidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, p. 135.  
 1900. *Oxystomata*, M. J. Rathbun, The American Naturalist, vol. 34, p. 515.

An account of this tribe as now including the Raninidae, with

the principal references to de Haan, Miers, Ortmann, etc., will be found in Alcock's work above cited.

FAM.: LEUCOSIIDAE.

For an account of this family, and several sub-divisions of it or "alliances," the same work (p. 164) may be consulted.

GEN.: PHILYRA, Leach.

1817. *Philyra*, Leach, Zool. Miscell., vol. 3, p. 18.  
 1837. *Philyra*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 131.  
 1855. *Philyra*, Bell, Trans. Linn. Soc. London, vol. 21, p. 299.  
 1877. *Philyra*, Targioni Tozzetti, Crost. Brachyuri e Anomouri, Magenta, p. 196.  
 1886. *Philyra*, Miers, Challenger Brachyura, Reports, vol. 17, p. 320.  
 1892. *Philyra*, Ortmann, Zool. Jahrb., vol. 6, p. 582.  
 1896. *Philyra*, Alcock, Journ. Asiat. Soc. Bengal, vol. 65, pt. 2, p. 237.  
 1900. *Philyra*, M. J. Rathbun, The American Naturalist, vol. 34, p. 517.

Alcock observes that *Philyra* can be at once distinguished from *Leucosia* by the absence of a thoracic sinus, and under *Leucosia* explains that the lateral epibranchial angles of the carapace form on either side a distinct lobe, which is bent downwards towards the base of the chelipeds to form the eave of a deep sinuous depression in the side wall of the carapace, known as the thoracic sinus. Bell points out that the extraordinary dilatation of the exopod in the third maxillipeds, which had been regarded as the essential characteristic of *Philyra*, varies greatly in degree in the several species.

PHILYRA PUNCTATA, Bell.

1855. *Philyra punctata*, Bell, Trans. Linn. Soc. London, vol. 21, p. 291, pl. 33, fig. 2.

In agreement with Bell's description, the carapace is nearly orbicular, smooth, punctate in every part. Except for a small interval in front, the carapace is entirely surrounded by a beaded line, the little beads or projections showing in most part of the circumference considerable inequality. Similar ornaments fringe the fourth joint of the third maxillipeds and the hind margin or a transverse ridge of the first and second pleon-segments. The third maxillipeds in this species have the fourth joint very much

shorter than the third, the exopod moderately expanded. In the chelipeds the finger and thumb have three or four teeth at the distal part of each inner margin, not large, but more decidedly developed than any on the earlier part of the margins. In the male the third, fourth, and fifth segments of the pleon are coalesced, in the female, these, together with the sixth.

Length of carapace in the male specimen, 11.25 mm. by a breadth of 10 mm.

Locality:—Mossel Bay.

Bell's specimen, half an inch in length of carapace, was dredged in Simon's Bay, between four and seven fathoms, on sand.

### BRACHYURA ANOMALA.

1839. *Dromiacea* de Haan, *Crustacea Japonica*, decas quarta, p. 102.  
 1880. *Dromiaceae*, Boas, *Studier over Decapodernes Slaegtskabforhold*, p. 138.  
 1893. *Brachyura anomala* (part), Stebbing, *History of Crustacea*, p. 133.  
 1899. *Dromiaceae*, A. Milne-Edwards and Bouvier, *Crust. Dé cap. de l'Hirondelle et de la Princesse Alice*, Monaco, fasc. 13, p. 8.  
 1899. *Brachyura anomala*, Alcock, *Deep-sea Brachyura R.I.M.S.S. Investigator*, p. 6.  
 1900. *Dromiaceae*, A. Milne-Edwards and Bouvier, *Crust. Dée. du Travailleur et du Talisman*, p. 5.  
 1901. *Dromides* or *Dromiacea*, Alcock, *Catalogue of the Indian Decapod Crustacea*, fasc. 1, p. 28.

e/  
 The French authors above cited divide the *Brachyura* into *Dromiæae* or *Brachyures primitifs* and *Brachyura genuina*. The *Dromiacea* or *Brachyura anomala* comprise three legions or three families, *Dromiidae*, *Homolidae*, and *Dynomeneidae*, in accordance with Ortmann's arrangement of the *Dromiidea* in 1892. The authors who have taken the lead in re-establishing this classification have fully recognized the claim of de Haan to its origination. He included in his *Dromiacea* the four genera *Dynomene*, *Homola*, *Dromia*, *Latreillia*, remarking that "the *Dromiacea*, with exclusion of *Lithodidae*, seem to be far removed from the *Anomoura*, and especially from the *Raninoidea* and *Paguridea*." So circumscribed, he concludes that they ought not to be separated from the *Brachyura*. Alcock, whose classification is at once the most recent and the most fully and clearly explained, divides the *Brachyura anomala* into two tribes, the *Dromiidea* and *Homolidea*, the former including the three

families Homoldromiidae, Dromiidae, and Dynomenidae, the latter embracing the Homolidae and Latreilliidae. o/

FAM.: DROMIIDAE.

1899. *Dromiidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 135.  
 1901. *Dromiidae*, Alcock, Catal. Indian Decapod Crustacea Brachyura primigenia, p. 37.

The family, as recently restricted by Alcock, contains the genera *Dromia*, *Eudromia*, *Sphaerodromia*, *Conchoecetes*, *Hypconcha*, *Cryptodromia*, *Petalomera*, *Pseudodromia*, and *Lasiodromia*. *Dromidia*, Stimpson, including *Dromidiopsis*, Borradaile, is regarded as a sub-genus of *Dromia*. *Lasiodromia* is a new name not unreasonably substituted for *Homalodromia*, Miers, which is distinct from the earlier *Homolodromia*, A. Milne-Edwards, in a different family; but Alcock remains uncertain whether *Lasiodromia* should be separated from Stimpson's *Pseudodromia*. He is also doubtful whether *Asciophilus*, Richters, should be allotted to this family.

GEN.: CONCHOECETES, Stimpson.

1858. *Conchoecetes*, Stimpson, Proc. Acad. Philad., p. 226 (64).  
 1887. *Conchoecetes*, A. O. Walker, Journ. Linn. Soc. London, vol. 20, pp. 108, 111.  
 1888. *Conchoecetes*, Henderson, Challenger Anomura, Reports, vol. 27, p. 17.  
 1893. *Conchoecetes*, Stebbing, History of Crustacea, p. 135.  
 1899. *Conchoecetes*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, p. 150.  
 1901. *Conchoecetes*, Alcock, Catal. Indian Decap. Crust., Brachyura primigenia, p. 40.

In this genus the carapace is depressed, subpentagonal; the fifth pair of legs, which are turned forwards along the sides of the carapace, are short and slender, not subchelate, with the finger minute; the preceding pair are not elongate, but robust, with a strong hooked finger, folding round the edge of the mollusc-valve, its grip upon which is aided by the obtuse process of the preceding joint.

CONCHOECETES ARTIFICIOSUS (Fabricius).

1798. *Dromia artificiosa*, Fabricius, Supplementum Ent. Syst., p. 360.

1803. *Cancer artificiosa*, Herbst, Krabben und Krebse, vol. 3, pt. 3, p. 54, pl. 58, fig. 7.  
 1837. *Dromia artificiosa*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 176, foot-note to account of *D. fallax*, Lamarck.  
 1858. *Conchoecetes artificiosus*, Stimpson, Proc. Acad. Philad., p. 240 (78).  
 1882. *Dromia conchifera*, Haswell, Catal. Austral. Crust., p. 141, pl. 3, fig. 4 (and Proc. Linn. Soc. N.S. Wales, vol. 6, p. 757).  
 1887. *Conchoecetes conchifera*, A. O. Walker, Journ. Linn. Soc. London, vol. 20, pp. 108, 111.  
 1899. *Conchoecetes artificiosus*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, p. 151.  
 1901. *Conchoecetes artificiosus*, Alcock, Catal. Indian Decap. Crust., Brachyura primigenia, p. 41, pl. 3, fig. 16.

The short close pubescence which covers this species is said by Haswell to be green. In formalin it is brown, with perhaps a greenish shade in it. I do not find the dimensions given by any author except Haswell, who reports it from Port Denison and Port Molle, and gives length  $\frac{2}{3}\frac{1}{2}$  in.; breadth,  $\frac{5}{8}$  in. The specimen from South Africa has the carapace in the median line 21.25 mm. long, and its greatest breadth 22.25 mm., the breadth, therefore, being a little greater than the length, instead of the reverse as in the Australian specimen. But it must be remembered that the median line is measured from the central tooth of the front, which is smaller and less advanced than its two companions. A line from either of these to the hind margin gives the carapace of the African specimen a length of 22-50. The dorsal length in the median line, including the three protruded segments of the pleon, is 30 mm.

In forwarding the specimen from Cape Town, Dr. Gilchrist informed me that the animal had been tied into its valve when procured, in order to show how the shell is held, otherwise these creatures, when brought on deck, speedily leave their covert. The fourth pair of legs are, in fact, still grasping the shell valve in a defiant manner, though they appear to have shaken off the rest of the animal as a useless incumbrance, and by this detachment facility of examination was considerably increased.

Locality:—Amatikulu\* River N.W., distant  $7\frac{1}{2}$  miles (coast of Zululand), from 26 fathoms.

FAM.: HOMOLIDÆ.

1888. *Homolidae*, Henderson, Challenger Anomura, Reports, vol. 27, p. 18.  
 1892. *Homolidae*, Ortmann, Zool. Jahrb., vol. 6, p. 540.

1893. *Homolidæ*, Stebbing, History of Crustacea, p. 137.  
 1899. *Homolinae*, M.-Edw. and Bouvier, Crust. Hirondelle et Princesse Alice, pp. 9, 10.  
 1899. *Homolidæ*, Alcock, Deep-sea Brachyura Investigator, p. 6.  
 1899. *Homolidæ* (restricted), Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, p. 154.  
 1900. *Homolinae*, M.-Edwards and Bouvier, Crust. Travailleur et Talisman, p. 10.  
 1901. *Homolidæ* (restricted), Alcock, Catal. Indian Decapod Crustacea, p. 59.

In 1899 the French authors recognised in this family seven genera, *Paromola*, *Paromolopsis*, and *Hypsophrys*, instituted by Wood-Mason; *Homologenus* and *Latreillopsis*, by Henderson; *Homola*, Leach; and *Latreillia*, Roux. They remark that the species of *Paromola* are the primitive forms of the group, and that *Latreillia* is linked to it by the intravention of *Latreillopsis*. Alcock distinguishes three sub-genera of *Homola*, namely, *Homola*, *Homolax*, and *Paromola*. This writer also, in the Journ. Asiat. Soc. Bengal vol. 68, p. 155, 1899, separates *Latreillopsis* and *Latreillia* from the Homolidæ, placing them in a new family Latreillidæ, in this respect following the lead of S. I. Smith, who in 1883 distinguished the Latreillidea from the Homolidea, although with Alcock Homolidea is an over-group embracing the two families, the Latreillidæ (or rather Latreilliidæ) being distinguished by very elongate eye-stalks, by having eight pairs of gill plumes, and no epipods on the trunk legs, while in the Homolidæ the eye-stalks are not so elongate, the gill plumes are in thirteen or fourteen pairs, and there are epipods on the chelipeds and often on the two following pairs of legs.

GEN.: HOMOLA, Leach.

1815. *Homola*, Leach, Trans. Linn. Soc. London, vol. 11., p. 324.  
 1863. *Homola*, Heller, Crust. des südlichen Europa, p. 148.  
 1896. *Homola*, Bouvier, Bulletin Soc. Philomathique de Paris, vol. 8, p. 70 (37), etc.  
 1901. *Homola*, Alcock, Indian Decapod Crustacea, fasc. 1. p. 60.

The very numerous references to this genus can be traced from those here given for the family and the typical species. For *Homola* as a subgenus, Alcock names *H. barbata* as the type, for *Homolax* *H. megalops*, Alcock, and for *Paromola*, Wood-Mason, *H. cuvieri* (Risso). For the sub genus *Homola* he gives the following character:—

Carapace quadrate, its broadest part being in front, across the middle of the gastric region: the *lincae anomuricae* keep close to the lateral borders, and are rather inconspicuous. Rostrum a

bifid tooth, with a small spine or tooth on either side of its base. The last pair of legs reach to the end [of the carpus, *i.e.*, fifth joint]\* of the preceding pair."

The species allotted to this subgenus are *H. barbata* (Fabricius), *H. vigil*, A. Milne-Edwards; *H. orientalis*, Henderson; and *H. andamanica*, Alcock; but the last is regarded as possibly a synonym of Henderson's species, and probably only a variety of *H. barbata*.

#### HOMOLA BARBATA (Fabricius).

1793. *Cancer barbatus*, Fabricius, Ent. Syst., vol. 2, p. 460, No. 76.  
 1796. *Cancer barbatus*, Herbst, Krabben und Krebse, vol. 2, pt. 6, p. 166, pl. 42, fig. 3.  
 1815. *Homola spinifrons*, Leach, Trans. Linn. Soc. London, vol. 11, p. 324.  
 1837. *Homola spinifrons*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 183, pl. 22, fig. 1-4, and in the undated Règne Animal (Ed. Fortin, Masson et Cie), pl. 39, fig. 2.  
 1847. *Homola barbata*, White, Crustacea in British Museum, p. 55.  
 1863. *Homola spinifrons*, Heller, Crust. des südlichen Europa, p. 149, pl. 4, figs. 12, 13.  
 1884. *Homola barbata*, S. I. Smith, Fishery Report for 1882, p. 351 (7).  
 1888. *Homola barbata*, Henderson, Challenger Anomura, Reports, vol. 27, p. 18.  
 1899. *Homola barbata*, Alcock, Journ. Asiatic Soc. Bengal, vol. 68, pt. 2, p. 156.  
 1900. *Homola barbata*, Milne-Edwards and Bouvier, Crust. Décap. Travailleur et Talisman, p. 10.  
 1901. *Homola barbata*, Alcock, Indian Decapod Crustacea, fasc. 1, p. 79.

Many more references are given in Alcock's last-mentioned work, including, doubtfully, *H. spinipes*, Guilding, Trans. Linn. Soc., vol. 14, p. 334, 1825. In 1818 Lamarck assigned the species as named by Leach to *Dorippe*. White, probably following Desmarest, suggests that it may be a representative of Rafinesque's genus *Thelxiope*. The specific name given by Fabricius was by many authors ignored in favour of Leach's *spinifrons*. H. Milne-Edwards, Heller, Henderson, A. Milne-Edwards and Bouvier, agree in assigning the name *barbatus* to Herbst, though Herbst himself gives the reference for it to Fabricius. White refers both to Fabricius and Herbst, but inverts the order. Alcock puts the whole matter rightly, except

\* A comparison of this quotation from the Catalogue of 1901 with the corresponding passage in the Journ. Asiat. Soc., 1899, shows that the words in brackets were accidentally omitted.

that the reference to Fabricius is unfortunately printed as p. 450 instead of 460. Fabricius himself has a species *Cancer spinifrons*, which was instituted by Herbst in 1785, *Krabben und Krabben*, vol. 1, pt. 6, p. 185, pl. 11, fig. 65. This species has nothing whatever to do with Leach's *Homola spinifrons*, but for those who may wish to verify this by the original authorities it should be mentioned that Fabricius twice gives a misleading reference to Herbst. In the *Ent. Syst.*, vol. 2, p. 455, he refers to "Cancer spinifrons, Herbst. Cancr. tab. 9. fig 58.," and in the *Supplementum* he repeats this reference after one to his own work, as though he himself were the author of the species.

The South African specimen has the carapace ornamented as figured by Milne-Edwards and described by Heller, and likewise in agreement with the account given by Alcock of his *Homola andamanica*. There are 13 spines between the short, slightly depressed bifid rostrum and the cervical groove, and down each side there is a row, beginning with a large tooth-like spine, followed by a smaller one, and then by diminishing denticles to the number of a dozen. The epistome has a central upturned spine. The fourth joint of the third maxilliped being abruptly narrowed in the distal half, looks as if a piece had been cut out of its outer margin. The fourth joint in the four pairs of ambulatory legs is setose or spinulose on the inner margin, but seems devoid of the tooth spines which are characteristic of *H. andamanica*.

Length, 29 mm.

Locality:—False Bay, from 32 fathoms.

#### FAM.: LATREILLIIDÆ.

1899. *Latreillidae*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, pt. 2, pp. 130, 165.  
1901. *Latreillidae*, Alcock, Catal. Indian Decapod Crustacea, p. 70.

For the distinction of this family from the Homolidæ see page 21.

#### GEN.: LATREILLIA, Roux.

1828. *Latreillia*, Roux, Crustacés de la Méditerranée, livraison 5, pl. 22.  
1834. *Latreillia*, H. Milne-Edwards, Hist. Nat. Crust., vol. 1, p. 277.  
1839. *Latreillia*, de Haan, Crustacea Japonica, decas quarta, p. 105.  
1863. *Latreillia*, Heller, Crust. südl. Europa, p. 146.



1888. *Latreillia*, Henderson, Challenger Anomura, Reports, vol. 27, p. 23.  
 1893. *Latreillia*, Stebbing, History of Crustacea, p. 137.  
 1894. *Latreillia*, A. Milne-Edwards and Bouvier, Crust. Déc. Hirondelle, fasc. 7, p. 59.  
 1897. *Latreillia*, Bouvier, Bull. Soc. Philom. Paris, Ser. 8, vol. 8, pp. 30, etc.  
 1899. *Latreillia*, M.-Edwards and Bouvier, Crust. Hirondelle et Princesse-Alice, fasc. 13, p. 13.  
 1899. *Latreillia*, Alcock, Journ. Asiatic Soc. Bengal, vol. 68, pt. 2, p. 167.  
 1901. *Latreillia*, Alcock, Indian Dec. Crust., fasc. 1, p. 70.

To this genus have been assigned five species—*L. elegans*, Roux; *L. valida*, de Haan; *L. pennifera*, Alcock; *L. phalangium*, de Haan; *L. australiensis*, Henderson. The latter two are set apart from the first three by having the fifth trunk legs of much less considerable length. The resemblances and differences in the first three are discussed under the following specific description:—

#### LATREILLIA ELEGANS, ROUX.

1828. *Latreillia elegans*, Roux, Crust. Médit., pl. 22.  
 1834. *Latreillia elegans*, Milne-Edwards, Hist. Nat. Crust., vol. 1, p. 277.  
 1839. *Latreillia elegans*, de Haan, Crust. Japonica, decas quarta, p. 108.  
 1849. *Latreillia elegans*, Lucas, Crust. Algérie, p. 3, pl. 1, fig. 1.  
 1863. *Latreillia elegans*, Heller, Crust. des südlichen Europa, p. 147, pl. 4, fig. 14.  
 1883. *Latreillia elegans*, Smith, Proc. U.S. Mus., vol. 6, No. 1, p. 23.  
 1884. *Latreillia elegans*, Smith, Annual Fishery Report U.S. for 1882, p. 351 (7), pl. 2, fig. 2, 2a, pl. 3, fig. 1.  
 1886. *Latreillia elegans*, Smith, Ann. Fishery Report for 1885, p. 33.  
 1894. *Latreillea elegans*, A. M.-Edwards and Bouvier, Crust. Décap. Hirondelle, Monaco, fasc. 7, p. 59, pl. 6, figs. 13-15.  
 1899. *Latreillea elegans*, A. M.-Edwards and Bouvier, Crust. Princesse-Alice, Monaco, fasc. 13, p. 13.  
 1900. *Latreillea elegans*, A. M.-Edwards and Bouvier, Crust. Décap. Travailleur et Talisman, p. 13.  
 1901. *Latreillia elegans*, Alcock, Indian Decapod Crustacea, p. 80 (Synonymy).

To the above should perhaps be added:—

1839. *Latreillia valida*, de Haan, Crust. Japonica, decas quarta, p. 107, pl. 30, fig. 1.

1888. *Latreillia valida*, Henderson, Challenger, Macrura, Reports, vol. 27, p. 24.  
 1893. *Latreillia valida*, Stebbing, History of Crustacea, p. 137, pl. 5 (from de Haan).  
 1899. *Latreillia pennifera*, Alcock, Journ. Asiat. Soc. Bengal, vol. 68, p. 168.  
 1901. *Latreillia pennifera*, Alcock, Indian Decapod Crustacea, p. 71, pl. 7, fig. 27.

It should be observed that Major Alcock himself introduces his species with the remark that it is "very closely related to *L. elegans*, Roux." The specific name which he gives to the Indian form is highly appropriate to the penultimate joint in the last pair of legs, it being, as he says, "plumed on both sides so as to exactly resemble the vane of a feather." This character is equally conspicuous in the specimen forwarded to me from the Cape, but when originally describing this form before I had seen Major Alcock's figure and description, I persuaded myself that it was identical with de Haan's *L. valida*, and that the remarkable feathering had not attracted that author's attention in a dried example or had been by some accidental circumstance removed. In point of fact, de Haan's artist does give a fringe of setules to the joint in question. But the same joint is drawn by S. I. Smith very distinctly feathered on both sides in a United States specimen of *L. elegans*, and the feathering at least for one margin is shown with equal clearness in the figures given by Lucas for a Mediterranean example of the same species. De Haan distinguishes *L. elegans* from the Japanese form by its not having a dorsal spine on the gastric region, by the greater length of the eye-stalks and frontal spines, by the fourth segment of the pleon being bispinose in the middle, and by the thinner legs. Roux only had female specimens, and de Haan does not claim to have examined any but one from Roux' own collection, so that Heller's statement that de Haan observed the male also seems to be a mistake. But de Haan's statement that the composite fourth segment of the pleon in the female of *L. elegans* is bispinose in the middle must also be mistaken. Milne-Edwards, Lucas, Heller, agree in stating that the two pairs of spines on this segment are lateral or sublateral. The lower pair seem to be minute. A distinction depending on the comparative lengths of eye-stalks and frontal spines cannot well be trusted, since they are apparently not a little variable. In a detail figure Smith represents the spines as quite unsymmetrical. Any difference in the thickness of the legs between the forms here compared seems unappreciable, so that for specific distinction nothing remains but the presence or absence of two or three insignificant-looking spines and the greater or less length of the setæ on a particular joint.

The South African specimen has the frontal spines extending along the basal joint of the eye-stalk just to the thicker terminal

joint; they have a denticle on the outer side at the base and another a little higher, and near the apex two with an inward direction. Alcock speaks of them in *L. pennifera* as occasionally bearing some tiny secondary spinules, and Heller says in regard to *L. elegans* that they have one or two little denticles below on the outer side, and generally another denticle outward at the base over the insertion of the first peduncular joint of the inner antennæ. The first antennæ, straightened out, would reach the end of the frontal spines. The chelipeds agree with Alcock's and Heller's descriptions, in having spines along the fourth joint, the following joints smooth, but the slender finger which just matches the thumb is not half as long as the carpus or fifth joint. Heller says that this finger is "only half as long as the carpus." Alcock says "the fingers are not half the length of the palm." The long second and third legs agree also with the descriptions in the two authors just mentioned, the fourth joint being distinctly spinose, the fifth sparsely so, the sixth chiefly at the slightly dilated apical portion, and the finger on its outer margin. The fourth pair of limbs is missing. The fifth pair, though shorter than the preceding third pair, reach well beyond its fifth joint; they have the fourth and fifth joints spinose, the sixth feathered on both margins with plumose setæ, the finger, as in Alcock's description and Smith's figure "extremely short." The pleon has a median spine on the second and on the third segment, and one at each side of the base of the composite fourth; the terminal segment ends very acutely. The pleon is enormously distended by a multitude of small eggs. Milne-Edwards and Bouvier refer to the small and numerous eggs in this species, and S. I. Smith calculated that a specimen, of which the carapace without the rostral spines was 12 mm. long, was carrying 1,650 eggs. The length mentioned by Professor Smith fairly corresponds with that of the specimen here described. Henri Milne-Edwards gives the length as about an inch, but the measurement does not convey much meaning, as it may or may not include the frontal spines and the three segments of the pleon which are visible in a dorsal view. The pleon of the male is said by Lucas and Heller to be entirely smooth. For *L. valida* de Haan says that the second segment in the male is "unispinosus." Alcock describes the pleon of the female in *L. pennifera* in agreement with that of the South African form, but does not say whether the male has the pleon free from spines or not.

Orange banding is perceptible on the limbs, eye-stalks, and frontal spines, but the carapace (in formalin) is colourless.

Locality:—Two miles N. by W. of Umbwalumi River, Natal, from 25 fathoms.

## MACRURA ANOMALA.

By the most recent arrangement these are divided into Paguridea, Galatheidea, and Hippidea. As Alcock explains in his Catalogue of Indian Deep-Sea Crustacea, p. 204, 1901, they are the Anomala of de Haan and Boas, and differ "from the *Anomura* of Milne-Edwards in the exclusion of the *Dromidae*, *Homolidae*, *Raninidae*, and *Pactolus*, and in the inclusion of the Galatheidae: from the *Anomoura* of Dana in the exclusion of the *Anomoura superiora*: from the *Anomura* of Henderson in the exclusion of the *Dromidea* and *Raninidea*, and they correspond with the *Anomoura Schizosomi* of Stimpson."\* Of the five legions adopted for their classification in my History of Crustacea, 1893, the Pagurinea and Lithodinea belong to the Paguridea, the Porcellaninea and Galatheinea to the Galatheidea. This last tribe is now divided by Ortmann and by Alcock into four sections or families—Aeglaeidae, Porcellanidae, Galatheidae, and Uroptychidae. A. Milne-Edwards and Bouvier (1899) prefer to use a slightly different terminology, speaking of a family Galatheidæ, with three sub-families—Aegleinæ, Galatheinæ, Diptycinæ, the Galatheinæ comprising two tribes, the "Galatheinés and Porcellaniens."

## FAM.: PORCELLANIDAE.

Henderson, in his Report on the Challenger Anomura, gives the Porcellanidæ without definition as the single family of the Porcellanodea, which is his Section A of the Galatheidea. He gives the following definition of the section, which will apply to the single family:—

"Carapace broadly ovate, smooth, with the regions but faintly defined; the front usually trilobed, and the processes never of great length. Chelipedes broad and often flattened, the ambulatory limbs robust and of moderate length. Antennules concealed; the antennal peduncle directed backwards. Eyes always pigmented and partially concealed in orbits. External maxillipedes with the ischium [third joint] broad, and the merus [fourth joint] provided with a prominent internal lobe. Abdomen bent under the thorax; females with two (or three) pairs of slender uniramous appendages borne on the fourth, fifth, (and third) segments; males with a single genital pair on the second segment.

\* Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 163 uses the expression "Section des Décapodes Anomoures;" Dana, U.S. Expl. Exp., Crustacea, pp. 1429, 1430, following upon Section 1, *Anomoura superiora*, has Section 2, *Anomoura media*, Section 3, *Anomoura submedia*, and Section 4, *Anomoura inferiora*; Stimpson, in part 7 of his Prodrömus, Proc. Acad. Sci. Philad., 1858, at p. 65 introduces the *Schizosomi* as second division of the Crustacea Anomoura.

## GEN.: PORCELLANA, Lamarck.

1801. *Porcellana*, Lamarck, Syst. Anim. sans vertèbres, p. 153.  
 1858. *Porcellana* (restricted), Stimpson, Proc. Acad. Sci. Philad.,  
 p. 228 (60).  
 1886. *Porcellana*, Henderson, Challenger Anomura, Reports,  
 vol. 27, p. 109.

Henderson, who gives a long list of references, supplies the following definition:—"Carapace suborbicular or subovate, the length usually greater than the breadth. Frontal region prominent and dentate, the teeth usually well developed. Eyes of moderate size, the orbits deep. Chelipeds moderately flattened, the carpus short and usually provided with a single projecting lobe near the proximal end of the internal margin; the digits frequently contorted. Ambulatory limbs with the dactyli short and robust, terminating in a single claw."

## PORCELLANA DEHAANII, Krauss.

1843. *Porcellana dehaanii*, Krauss, Die südafrik. Crustaceen, p.  
 59, pl. 4, fig. 2.  
 1858. *Porcellana Dehaani*, Stimpson, Proc. Acad. Sci. Philad., p.  
 229 (67).  
 1858. *Porcellana streptocheles*, Stimpson, Proc. Acad. Sci.  
 Philad., pp. 229 (67), 243 (81).  
 1886. *Porcellana streptocheles*, Henderson, Challenger Anomura,  
 Reports, vol. 27, p. 110.

Stimpson distinguishes his species from that of Krauss by its having the carapace bare, the front broader, the median tooth less prominent, and the super-antennary margin not denticulate. But according to Henderson "in the Challenger specimens short stout hairs arranged in tufts are noticeable on the gastric, cardiac, and bronchial areas." In our specimens there are two conspicuous tufts behind the front on the gastric area, but no others; the median tooth is with or without hairs, and a little more prominent than the other two frontal teeth; below a notch under the second antenna there is a sub-marginal ridge of four or five little lateral denticles, the lowest but one being slightly the largest. Henderson recognizes that *P. streptocheles* is closely allied to *P. dehaanii*, but observes that in the latter "the chelipeds are smooth and the carpi unarmed, the median frontal tooth is conical and prominent, and the antero-lateral margin of the carapace is denticulate over the insertion of the antennal peduncle." These differences, however, may in part be attributed to the state of individual specimens and in part to the observer's opinion of what was worth noting. Krauss speaks of the carpus as having the margin entire, while Stimpson speaks of it as smooth, ~~obsoletely~~ 2-3 dentate on

each side. On the important character of the contorted smaller chela, with its gaping fingers, both of them strongly pilose on the inner margin, they are agreed. That Stimpson speaks of the fourth joint in the walking legs as "*gracilis*" may be explained by supposing him to refer to the thickness of the joint, not to its breadth.

Locality:—False Bay. The Challenger specimens and Stimpson's were taken in Simon's Bay. Krauss describes his as very common in the sinuosities of *Eschara foliacea*, Linn., on the terraces of the Natal coast.

FAM.: GALATHEIDAE.

1899. *Galatheidæ*, Ortmann, Bronn's Thierreich, Malacostraca, p. 1,150.

1901. *Galatheidæ*, Alcock, Catal. Indian Deep-Sea Crust., Macrura, and Anomala, p. 236.

Though the family Galatheidæ is not a new one, its present restriction is quite recent. Alcock distinguishes it from the companion family Uroptychidæ as follows:—

"The telson, which is not folded beneath the preceding abdominal somite, is distinctly made up of plates which suggest a tergum and a pair of appendages modified; the last thoracic sternum is narrow, but well formed; the antennal peduncle appears to be four-jointed, the second and third joints being united; the incisor edge of the mandible is entire; a foliaceous epipodite is present on the first maxillipeds, and a flagelliform epipodite is almost always present on the external maxillipeds."

In *Galathea* and *Munida* the exopod of the first maxillipeds terminates in a flagellum, and the eyes are faceted and well-pigmented, none of which characters belong to the genera *Munidopsis* and *Galacantha*.

GEN.: MUNIDA, Leach.

1820. *Munida*, Leach, Dict. Sci. Nat., vol. 18, p. 52.

1853. *Munida*, Bell, Brit. Stalk-eyed Crust., p. 206.

1888. *Munida*, Henderson, Challenger Anomura, Reports, vol. 27, p. 123.

1888. *Munida*, Bonnier, Bull. Sci. France-Belgique, ser. 3, vol. 1, p. 78.

1894. *Munida*, A. Milne-Edwards and Bouvier, Crust. décap. Hirondelle, fasc. 7. Monaco, p. 83.

1901. *Munida*, Alcock, Catal. Indian Deep-Sea Crust., Macrura and Anomala, p. 237.

Numerous other references can be traced from the above, and from the following account of a species. The characters used for

distinguishing this genus from *Galathea* are not of high importance. Henderson, with whom other authors are in substantial agreement, notes that the rostrum is slender and stiliform, with a well-developed supraorbital spine on either side of its base; that the carapace has the surface usually spinulose and the cardiac area as a rule distinctly circumscribed; that the chelipeds and ambulatory limbs are elongated and slender, and that one or more of the pleon segments usually has a series of spinules on the anterior margin.

MUNIDA SANCTI-PAULI, Henderson.

1885. *Munida militaris* (?), Henderson, Ann. Nat. Hist., ser. 5, vol. 16, p. 410.  
 1885. *Munida Sancti-Pauli*, Henderson, Ann. Nat. Hist. ser. 5, vol. 16, p. 411.  
 1888. *Munida Sancti-Pauli*, Henderson, Challenger Anomura, Reports, vol. 27, p. 142, pl. 3, fig. 6.  
 1894. *Munida Sancti-Pauli*, A. Milne-Edwards and Bouvier, Ann. Sci. Nat., ser. 7, vol. 16, pp. 229, 256.  
 1894. *Munida Sancti-Pauli*, A. Milne-Edwards and Bouvier, Crust. décap. Hirondelle, fasc. 7, p. 85 (M. Bourgeti on pl. 8, figs. 11-23).  
 1899. *Munida Sancti-Pauli*, A. Milne-Edwards and Bouvier, Crust. Hirondelle et Princesse-Alice, fasc. 13, Monaco, p. 74.  
 1900. *Munida Sancti-Pauli*, A. Milne-Edwards and Bouvier, Crust. décap. Travailleur et Talisman, p. 293, pl. 6, fig. 8, pl. 29, figs. 19-21.

On the gastric area the carapace has a transverse row of from six to eight spinules parallel to the frontal margin; there are seven teeth on the lateral margin, the largest in front; the hind margin is unarmed. The second pleon segment has on its front margin eight to ten spinules; the remaining segments are glabrous. The third maxillipeds have on the fourth joint two prominent spines, the smaller of which is apical. The chelipeds are not so elongated as in *Munida rugosa*; their joints are strongly spinose; there is little cavity and sometimes none between the closed fingers; the movable one has a tolerably conspicuous spine on its outer margin near the base, and near the base of its cutting edge one or two variably conspicuous teeth or tubercles. The sternal plastron is without the numerous striated lines observable in *Munida rugosa*.

In their latest work Milne-Edwards and Bouvier say that *M. heteracantha* Ortmann (1892), *M. militaris* Henderson (1885), and *M. propinqua* Faxon (1895) belong to the same group as *M. sancti-pauli*, all with two spines on the fourth joint of the third

maxillipeds, but they recognize that in *M. heteracantha* the eyes are less dilated, and that there are some differences in the armature of *M. propinqua*, but they cannot find any distinction between *M. militaris* Henderson (1885) and his *M. sancti-pauli*. Henderson himself had already made his *M. vitiensis* a synonym and reduced his *M. curvirostris* to a variety of *M. militaris*. In *M. propinqua* there seem to be more differences of armature than those noticed by the French authors, and in *M. militaris* there are a few. But if, as those authors suggest, *M. militaris* and *M. sancti-pauli* should be regarded as one species, *M. militaris*, as the earlier name is the one that ought to stand, unless that also ought to be superseded by *M. miles* A. Milne-Edwards (1880).

Locality:—Buffalo River north 10 miles. Depth, 310 fathoms. Bottom, coral and mud. The greatest depth recorded is that of a specimen taken by the Prince of Monaco at the Azores in 758 fathoms.

FAM.: UROPTYCHIDÆ.

1892. *Chirostylidae*, Ortmann, Zool. Jahrb., vol. 6, p. 244.  
 1894. "*Diptycinés*," A. Milne-Edwards and Bouvier, Ann. Sci Nat., ser. 7, vol. 16, pp. 296, 312.  
 1896. *Chirostylidae*, Ortmann, Zool. Jahrb., vol. 9, p. 433.  
 1896. *Diptycinae*, Bouvier, Bull. Soc. Eatom. France, vol. 65, p. 312.  
 1900. *Diptycinae*, A. Milne-Edwards and Bouvier, Crust. décap. Travailleur et Talisman, p. 350.  
 1901. *Uroptychidae*, Alcock, Catal. Indian Deep-Sea Crust., Macrura and Anomala, p. 278.

The first name of the family was based on *Chirostylus*, a synonym of the earlier *Ptychogaster*. The second claimant was derived from the pre-occupied name *Diptychus*, for which Henderson substituted *Uroptychus*, and that seems to form a proper foundation for the name of the family, which has been detached from the Galatheidæ.

*Diptychus* and *Ptychogaster* were both instituted by A. Milne-Edwards in 1880, but the former took precedence.

The characters distinguishing this family from the Galatheidæ are given by Alcock as follows:—

"The telson, which is transversely fissured, is, along with the caudal swimmerets, folded beneath the preceding abdominal somites; the last thoracic sternum is more or less atrophied; the antennal peduncle is five-jointed, the third joint being quite distinct from the second; the incisor edge of the mandible is serrated; no epipodites on any of the maxillipeds." It will be easily understood that the folding in of the telson suggested the



name *Uroptychus*, tail-folding, and that the accession of this fold to the ordinary infolding of the pleon suggested the name *Diptychus*, double-folding.

GEN. : UROPTYCHUS, Henderson.

1880. *Diptychus* (pre-occ.), A. Milne-Edwards, Bull. Mus. Comp. Zoöl. Harvard, vol. 8, p. 61.  
 1888. *Uroptychus*, Henderson, Challenger Anomura, Reports, vol. 27, p. 173.  
 1888. *Diptychus*, Bonnier, Bull. Sci. France-Belgique, ser. 3, vol. 1, p. 83.  
 1892. *Uroptychus*, Ortmann, Zool. Jahrb., vol. 6, p. 248.  
 1893. *Uroptychus*, Stebbing, History of Crustacea, p. 177.  
 1894. *Diptychus*, A. Milne-Edwards and Bouvier, Crust. décap. Hirondelle, Monaco, fasc. 7, p. 87.  
 1895. *Uroptychus*, Faxon, Mem. Mus. Comp. Zoöl, Harvard, vol. 18, p. 101.  
 1899. *Diptychus*, A. Milne-Edwards and Bouvier, Crust. décap., Monaco, fasc. 13, p. 87.  
 1901. *Uroptychus*, Alcock, Catal. Indian Deep-Sea Crust., Macrura and Anomala, p. 281.

The strongly developed exopod or acicle of the second antennæ is a characteristic feature of the genus.

UROPTYCHUS NITIDUS (A. Milne-Edwards).

1888. *Diptychus nitidus*, A. Milne-Edwards, Bull. Mus. Comp. Zoöl. Harvard, vol. 8, p. 62.  
 1888. *Uroptychus nitidus*, Henderson, Challenger Anomura, Reports, vol. 27, p. 174, pl. 21, fig. 6.  
 1894. *Uroptychus nitidus*, Alcock and Anderson, Journ. Asiat. Soc. Bengal, vol. 63, pt. 2, p. 33.  
 1894. *Diptychus nitidus*, var. *concolor*, A. Milne-Edwards and Bouvier, Ann. Sci. Nat., Zool. ser. 7, vol. 16, pp. 225, etc., figs. 16, 21.  
 1896. *Uroptychus nitidus*, var. *concolor*, Caullery, Campagne Caudan, fasc. 2, p. 393.  
 1899. *Diptychus nitidus*, var. *concolor*, A. Milne-Edwards and Bouvier, Crust. décap. Monaco, fasc. 13, p. 87, pl. 1, fig. 2.  
 1900. *Diptychus nitidus*, var. *concolor*, A. Milne-Edwards and Bouvier, Crust. décap. Travailleur et Talisman, p. 360, pl. 4, fig. 4, pl. 32, figs. 15-19.

Faxon, in his stalk-eyed crustacea of the Albatross (Mem. Mus. Comp. Zool., vol. 18, p. 101, pl. 26, fig. 1, 1a, 1895), describes a var. *occidentalis*. Milne-Edwards and Bouvier notice several variations of their var. *concolor*, the form with which the South African specimens should be identified, if a varietal name is necessary. The distinctions drawn by the French authors between the typical form and the var. *concolor* refer to the antennæ, the mandibles and the trunk legs. The variety has sharp denticles on the ventral surface of the third and fourth joints of the chelipeds, where the type is almost smooth. In the African specimens the third joint is almost smooth, the fourth and fifth joints have rows of rather sharp little tubercles; the fifth joint is almost cylindrical as in *concolor* rather than obtusely angled above as in the type. A dissected specimen has the cutting edge of the mandible divided into ten teeth, and the walking legs have ten spines on the concave margin of the finger, characters which are used to distinguish *concolor* from the typical form, which has twelve teeth to the mandibular edge and twelve spines on the finger margin. The fingers of the chelipeds are hairy at the extremity, but in this respect not so densely and beautifully ornamented as the last two joints of the third maxillipeds.

Locality:—Cape Natal N. by E. (approx.) 24 miles. Depth, 440 fathoms. Bottom, mud.

#### MACRURA GENUINA.

Under the title of "Macrura Astacides," Alcock in his "Descriptive Catalogue of the Indian Deep-Sea Crustacea, Decapoda Macrura and Anomala," 1901, has recently given a synopsis of the families Nephropsidæ, Eryonidæ, Palinuridæ, Scyllaridæ, Axiidæ, and Callinassidæ. As these include all the families of genuine Macrura with which we are here concerned, it will be sufficient to refer the reader to the work mentioned.

#### FAM.: NEPHROPSIDÆ.

##### GEN.: NEPHROPSIS, Wood-Mason.

1873. *Nephropsis*, Wood-Mason, Journ. Asiat. Soc. Bengal, vol. 42, pt. 2, p. 39, and Ann. Nat. Hist., ser. 4, vol. 12, p. 59.  
 1874. *Nephropsis*, A. Milne-Edwards, Ann. Sci. Nat., ser. 5, vol. 19.  
 1879. *Nephropsis*, Norman, Ann. Nat. Hist., ser. 5, vol. 4, p. 182.  
 1881. *Nephropsis*, S. I. Smith, Proc. U.S. Mus. for 1880, p. 431.  
 1888. *Nephropsis*, Bate, Challenger Macrura, Reports, vol. 24, p. 165.

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1893. *Nephropsis*, Stebbing, History of Crustacea, p. 206.  
 1895. *Nephropsis*, Faxon, Mem. Mus. Comp. Zool. Harvard, vol. 18, p. 127.  
 1901. *Nephropsis*, Alcock, Indian Deep-Sea Crustacea, *Macrura* and *Anomala*, p. 157.

In this genus, which is distinguished from its nearest neighbours by having no scale to the second antennæ, Alcock discriminates five Indian species—*stewarti* Wood-Mason, *carpenteri* Wood-Mason, *atlantica* Norman, *ensirostris* Alcock, and *sulmi* Bate. Faxon describes *occidentalis* from the neighbourhood of Acapulco, Mexico, and identifies *aculeatus* Smith and *rosca* Bate with the earlier *agassizii* A. Milne-Edwards, 1880. Professor Smith described the species independently, only becoming acquainted with the account given by Milne-Edwards in time to add a note recognizing the priority of the French author.

#### NEPHROPSIS ATLANTICA, Norman.

1882. *Nephropsis atlantica*, Norman, Proc. R. Soc. Edin., vol. 11, p. 684.  
 1891. *Nephropsis atlantica*, Wood-Mason, Ann. Nat. Hist., ser. 6, vol. 7, p. 197, fig. 4 in text.  
 1896. *Nephropsis atlantica*, Caullery, Campagne Caudan, Ann. Univ. Lyon, p. 384.  
 1901. *Nephropsis atlantica*, Alcock, Indian Deep-Sea Crustacea, *Macrura* and *Anomala*, p. 161.

From the other Indian species *N. atlantica* is distinguished in Major Alcock's key by combining lateral spines on the rostrum, a spine on anterior margin of side-plate in second pleon-segment, with transverse suture of outer ramus of uropods. This combination distinguishes it also from *N. occidentalis*, since that is without the lateral spine on the second segment of the pleon. *N. atlantica* is variable in the lateral spines of the rostrum, having usually two pairs, sometimes three, occasionally one and a half. In accordance with this statement by Major Alcock, out of four specimens from South Africa, one has three pairs, two have two pairs, and one has a pair and a half of these spines. Dr. Faxon describes *N. occidentalis* as having only one pair, but adds that in one young example the rostrum is armed with two spines on one side and with one on the other side. In addition, however, to other differences, a sharp median spine on the base of the telson separates *N. occidentalis* from all the other species.

A female specimen, carrying a few large eggs, has the left cheliped 56 mm. long, but that on the right only 23 mm., its last five joints being a reproduction, quite hairless, slender and white, in contrast with the adjoining orange red, strongly setose third maxillipeds, which have the inner margin of the third joint toothed or nodulose.

Locality:—Cape Natal N. by E. (approx.) 24 miles. Depth, 440 fathoms. Bottom, mud.

## FAM.: ERYONIDAE.

1837. "*Tribu des Eryons*," Milne-Edwards, Hist. Nat. Crust., vol. 2, pp. 270, 278.  
 1841. *Eryonidae*, de Haan, Crust. Japonica, p. XIX., and Decas quinta, p. 149.  
 1852. *Eryonidae*, Dana, U.S. Expl. Exp., Crustacea, pt. 1, p. 515.  
 1880. *Eryontidae*, S. I. Smith, Proc. U.S. Mus. for 1879, p. 345.  
 1880. *Eryonidae*, Boas, Vidensk-Selsk. Skr., ser. 6, vol. 1, pp. 94, 184.  
 1884. *Eryonidae*, Bate, Geological Magazine, Decade 3, vol. 1, p. 307.  
 1888. *Eryonidae*, Bate, Challenger Macrura, Reports, vol. 24, p. 100.  
 1893. *Eryontidae*, Stebbing, History of Crustacea, p. 199.  
 1895. *Eryontidae*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 108.  
 1896. *Eryonidae*, Ortmann, Zool. Jahrb. vol. 9, pp. 427, 428.  
 1899. *Eryontidae*, Alcock and Anderson, Ann. Nat. Hist., ser. 7, vol. 3, p. 289.  
 1901. *Eryonidae*, Alcock, Catal. Deep-Sea Crustacea, Macrura and Anomala, p. 164.

Alcock supplies a full account of the characters of the family, and gives a synopsis of the genera belonging to "the Indian Necten and Benthos." These genera are *Polycheles* Heller, 1862, *Pentacheles* Bate, 1878, *Eryoneicus* Bate, 1882, and *Willemoesia* Grote, 1873.

## GEN.: POLYCHELES, Heller.

1862. *Polycheles*, Heller, Sitzungsber. K. Akad. Wiss. Wien, vol. 45, p. 389.  
 1863. *Polycheles*, Heller, Crust. südlichen Europa, p. 209.  
 1880. *Polycheles*, Smith, Proc. U.S. Mus. for 1879, p. 346.  
 1888. *Polycheles*, Bate, Challenger Macrura, Reports, vol. 24, p. 126.  
 1888. *Stereomastis*, Bate, Challenger Macrura, Reports, vol. 24, p. 154.  
 1895. *Polycheles*, Faxon, Mem. Mus. Comp. Zoöl. Harvard, vol. 18, p. 117.  
 1901. *Polycheles*, Alcock, Catal. Indian Deep-Sea Crustacea, Macrura and Anomala, p. 166.

Spence Bate separated *Pentacheles* from this genus on the ground that in the former all the five pairs of legs in both sexes were more or less perfectly chelate, whereas in *Polycheles* the fifth pair of the male was supposed to end in a simple finger. It subsequently appeared, however, that species evidently belonging to *Polycheles* had the fifth pair imperfectly chelate in the male, and that in all the species it was chelate in the female. Alcock now supplies a more important distinction, pointing out that in *Pentacheles* "the epipodite of the external maxillipeds is of fair size; those of the thoracic legs are normal epipodites ascending into the branchial chamber," but that in *Polycheles* "the epipodite of the external maxillipeds is a mere papilla; those of the thoracic legs are merely membranous expansions of the base of their podobranchiæ." When Professor S. I. Smith described the Nova Scotian *Polycheles sculptus* he admitted that he could not distinguish it from the Figian *Pentacheles auriculatus*, Bate, of which the characters had at that time been only briefly indicated. In his Challenger Report, Bate transferred the latter species to a genus *Stereomastis*, which, he says, "differs in nothing externally from *Pentacheles*, but is established to receive those species in which the mastigobranchial lash does not exist." But that, as Alcock now explains, is the very character on which the separation between *Polycheles* and *Pentacheles* must best be grounded. Faxon, however, unites both *Pentacheles* and *Stereomastis* with *Polycheles*, remarking that "an examination of a large number of species discloses a gradual transition in the development of the epipods, from large, well-developed organs through small, delicate and thin ones, to merest rudiments in the shape of small expansions at the base of the stem of the gill."

POLYCHELES SCULPTUS, S. I. Smith.

1880. *Polycheles sculptus*, Smith, Proc. U.S. Mus. for 1879, p. 346, pl. 7.  
 1899. *Pentacheles sculptus*, Alcock and Anderson, Ann. Nat. Hist., ser. 7, vol. 3, p. 239.  
 1901. *Polycheles sculptus*, Alcock, Catal. Indian Deep-Sea Crustacea, Macrura and Anomala, p. 170.

Alcock gives the synonymy, which includes *Polycheles spinosus* A. Milne-Edwards, 1880, and the name *Pentacheles sculptus*, which has been used both by Professor Smith himself and by Alcock and Anderson. The specimen from South Africa closely agrees in all external particulars with the minutely-detailed account given by the original describer, except that between the rostral spines and the cervical groove the median carina of the carapace has not only 1 + 2 + 1 spines, but an additional spine immediately behind the last of these. In *Polycheles phosphorus*, Alcock, the part in question carries 1 + 1 + 2 + 1 spines, but

has at the outer angle of the basal joint of the first antennæ only one denticle instead of the two found in *P. sculptus*, the chelipeds also showing some differences. In Professor Smith's specimen of *P. sculptus* the sublateral carina between the cervical groove and hind margin had also 5 small spines on one side and six on the other. The South African specimen has five on each side. Smith speaks of the longitudinally-furrowed carina of the sixth pleon segment as "inconspicuous," an epithet inapplicable to it in our specimen. In the fifth pair of legs the finger is notably longer than the thumb, which, though short, is quite distinct. The colouring (in formalin) shows on the carapace three rose-coloured areas, one central in the front of the cervical groove, and the other two behind it, lateral, of long triangular shape; the ground is a pale dull orange.

Dimensions:—Carapace in median line, 56.25 mm.; lateral margin, 63.75 mm. long; greatest breadth in front of cervical groove, 43.75 mm.; length of pleon, 70 mm.; of second antennæ, 70 mm. Total extension from apex of second antennæ to apex of telson, about 8 inches. Length of first chelipeds, nearly 140 mm., reaching, therefore, if fully extended considerably beyond the second antennæ, but as preserved they are strongly geniculate between the third and fourth joints.

Locality:—Cape Natal N. by E. (approx.) 24 miles. Depth, 440 fathoms. Bottom, mud.

#### FAM.: PALINURIDÆ.

1888. *Palinuridae*, Bate, Challenger Macrura, Reports, vol. 24, p. 74.  
 1891. *Palinuridae*, Ortmann, Zool. Jahrb., vol. 6, p. 14.  
 1893. *Palinuridae*, Stebbing, History of Crustacea, p. 195.  
 1897. *Palinuridae*, Ortmann, American Journal of Science, vol. 4, p. 290.  
 1900. *Palinuridae*, H. Woodward, The Geological Magazine, Decade 4, vol. 7, p. 394.  
 1900. *Palinuridae*, Stebbing, Marine Investigations South Africa, Crustacea, part 1, p. 29.

Ortmann in 1897 recognizes seven genera, which he arranges in three groups—1 *Palinurellus*, *Jasus*; 2 *Palinurus*, *Palinustus*, *Limparus*; 3 *Panulirus*, *Puculus*. Of these he says "the first may be called the more primitive, the second the typical, the third the more advanced group." Of *Palinustus* A. Milne-Edwards, 1880, he remarks that it "comes very near to *Palinurus*, and differs only in the weaker 'frontal horns,' which are placed on the outer edge of two very peculiar plates projecting horizontally from the frontal margin and truncated squarely at the apex." In regard to the fossil species described and figured

by Dr. Woodward as *Linuparus vancouverensis* (Whiteaves) and *L. canadensis* (Whiteaves) there is this difficulty, that the rostral part is defective, so that it is not clear why the species should be referred to *Linuparus* rather than to *Jasus*. It should be noted that the generic names *Scifex* Pfeffer, *Avus* Ortmann, and *Puer* Ortmann, were discarded from this family by the last named author in 1897 for very sufficient reasons.

GEN.: JASUS, Parker.

1883. *Jasus*, Parker, Nature, vol. 29, p. 190.  
 1884. *Jasus*, Parker, Trans. New Zealand Inst., vol. 16, p. 304.  
 1888. *Palinosytus*, Bate, Challenger Macrura, Reports, vol. 24, p. ix.  
 1888. *Palinostus*, Bate, Challenger Macrura, Reports, vol. 24, pp. ix.. 85.  
 1891. *Jasus*, Ortmann, Zool. Jahrb., vol. 6, pp. 14, 16.  
 1893. *Jasus*, Stebbing, History of Crustacea, p. 197.  
 1897. *Jasus*, Ortmann, American Journal of Science, vol. 4, p. 291.  
 1900. *Jasus*, Stebbing, Marine Invest. S. Africa, Crustacea, part 1, p. 30.

T. J. Parker instituted *Jasus* only as a subgenus, but subsequently claimed priority for it over Bate's *Palinostus*. Bate substituted *Palinosylns* for *Palinostus* on the ground that A. Milne-Edwards had employed *Palinustus* for the name of a new Scyllarid, distinct from Bate's *Palinosytus* and near to *Palinurus*.

JASUS LALANDII (Milne-Edwards).

1837. *Palinurus lalandii*, Milne-Edwards Hist. Nat. Crust., vol. 2, p. 293.  
 1843. *Palinurus lalandii*, Krauss, südafrik, Crust., p. 53.  
 1884. *Jasus lalandii*, Parker, Trans. New Zealand Institute for 1883, p. 297.  
 1888. *Palinostus lalandii*, Bate, Challenger Macrura, Reports, vol. 24, p. 86, pl. 11, fig. 1, pl. 11A, pl. 12, fig. 1.  
 1891. *Jasus lalandii*, Ortmann, Zool. Jahrb., vol. 6, p. 16.

Dr. Ortmann includes in the synonym the Chilian *Palinurus frontalis* of Milne-Edwards, loc. cit., p. 294, the *P. paulensis* from St. Paul in the Indian Ocean, Heller, 1862, which Heller himself had subsequently recognized as a young form of *lalandii* (Novara Crustacea, p. 98), and the *P. edwardsii*, Hutton (Trans. N.Z. Inst., 1875, p. 279), from New Zealand and Tasmania.

A distinguishing specific character is that the segments of the pleon are furrowed and almost or altogether covered with flattened squamiform tubercles. The colour (in formalin) is a rich red brown, according to Milne-Edwards irregularly spotted with yellow, but the pale markings are at least sometimes symmetrically arranged. The telson and adjacent parts show a fine purple. Krauss states that when alive it is dark green, with reddish and yellow spots, but that it becomes red in drying, or when kept in spirit. Milne-Edwards gives the length of the body as 15 inches; Krauss says it attains a length of 13 inches by a breadth of four and a half. The second antennæ are of great length, at least as long as the body.

Locality :—Hermanuspetrusfontein, Caledon District, near False Bay.

JASUS PARKERI, n. sp.

PLATE 7.

The rostrum is not very large, acute, upturned in advance of the clasping processes. The frontal horns are divergent, acute, with smooth margins, followed by two pairs of teeth slightly converging backward; a little behind these is a median tooth, followed by two parallel rows of submedian teeth, eight in a row, slightly graduated, the smallest at the hind margin of the carapace, all pointing upward and a little forward. On the outer side of each eye is a strong outstanding tooth, with a small subsidiary tooth on the upper part of its base; the next lateral tooth has an interrupted outer margin, and level with this there is a small tooth on the surface of the carapace behind the eye; the third lateral tooth is also large, but this is followed by a series of small teeth, twelve to fourteen on each side, not quite symmetrically arranged. Close over the sinuous hind margin is a series of minute tubercles, and some granules appear scattered above these, but otherwise the general surface is smooth, nor is there any well-marked cervical groove.

The first five pleon segments have a median carina, most strongly marked on the first three, the first, which is also the shortest, with a forward and upward-pointing tooth, the fourth with a minute, the fifth with a well-marked apical tooth. Each segment forms a large lateral tooth, of which the upper margin is serrate in the first segment, smooth in the rest; above this a boss in the first segment rises to the carapace, and there is a small denticle in the second; all but the first have a smaller lower tooth, and all clasp a little pleural tubercle of the following segment between two points. The sixth segment has two pairs of submedian teeth near the base and an apical median tooth, with a strong additional tooth over the peduncle of the uropods. The telson has four pairs of teeth diverging along the calcareous



part which ends in sharp lateral points, the membranous portion both of this and the uropods being slightly roughened.

The first antennæ have the first joint longer than the second and third together, the third about twice as long as the second, and rather longer than the inner flagellum; the outer flagellum is shorter than the inner, stouter at the base, and strongly setose on its inner margin. The second antennæ have the epistomial base deeply grooved in the middle. If this be taken to represent the first two joints of the peduncle, then the third (or first free) joint has two teeth on the outer, one on the upper, one on the inner side, with some serration also on the inner margin; the fourth joint has about 12 teeth in various sequences, and the fifth fourteen of various sizes. This peduncle does not reach the end of the third joint of the first antennæ: the flagellum is 9 inches long.

The five pairs of trunk legs are all simple and slender, decreasing in stoutness and increasing in length from the first to the fifth pair. The fourth joint is shorter in the first pair than in the second and in the second than in the third, but without sensible difference of length in the fourth and fifth. On the other hand, the length of the sixth joint sensibly increases from the first to the fifth pair, while it is considerably stouter in the first than in any of the succeeding pairs. The sternal plastron between these from a narrow base widens greatly, with a longitudinal median series of five teeth and two submedian on its hind margin. Laterally each of its divisions has two decided teeth, widest apart in the last division, and there more clearly than in the others, accompanied by some small denticles.

Of the pleon segments, the first one carries ventrally two sub-lateral teeth on its hind margin. The four pairs of pleopods are delicate oval plates fringed with short setæ. The uropods reach a little beyond the telson; the outer ramus is rather longer and broader than the inner.

The colour of the specimen in formalin is orange and orange-red, the flagella of the first antennæ, the fifth and sixth joints of the trunk limbs of the membranous part of the caudal fan, and the ventral surface of the pleon, except on the hind margin of each segment, being pallid.

The length from rostrum to end of telson is about four and a half inches, the carapace measuring 42 mm. by a breadth of 26 mm. : the telson 24 mm. by 15 mm.

Locality:—The single specimen—a male—was taken by shrimp trawl, Buffalo River north 15 miles. Depth, 310 fathoms. Bottom, coral and mud.

The specific name is given out of respect to the late Mr. T. J. Parker, who instituted the genus. To the remarkable armature of this beautiful species there is no resemblance, so far as I know, in any other living Palinurid hitherto described.

## FAM.: CALLIANASSIDAE.

1900. *Callianassidae*, Stebbing, Marine Investigations South Africa, Crustacea, pt. 1, p. 38.  
 1901. *Callianassidae*, Alcock, Indian Deep-Sea Crustacea, Macrura and Anomala, pp. 151, 197.

## GEN.: CALLIANASSA, Leach.

In connection with the description of *Callianassa kraussi* (South African Crustacea, p. 38, 1900) notice was taken of numerous species of this genus. It may here be worth while to add that Say's *Callianassa major* was in 1866 transferred by Stimpson to a new genus *Callichirus*, chiefly, as it seems, on the ground that the inner branch of the uropods is "very narrow, almost styliform." At the same date Stimpson instituted another new genus, *Glypturus*, with "caudal lamellæ deeply sculptured," for the species *G. acanthochirus*, which he distinguishes from *Callianassa grandimana* Gibbes, only by details of the cheliped. To these two species of *Glypturus* Miss Rathbun in 1900 adds a third *G. branneri*. Recently Mr. Lanchester has described a new *Callianassa* from the Malay Peninsula as *C. secura* (Proc. Zool. Soc. London, p. 555, 1902), closely related to *C. pachydactyla*, A. Milne-Edwards, and *C. amboinensis*, de Man.

In a paper on the decapod crustacea of West Africa, also in 1900, Miss Rathbun keeps distinct *Callianassa turnerana*, White, from *C. diademata*, Ortmann, the former being described as having a three-spined rostrum, the latter one that is five-spined. But it may be doubted whether this minute distinction in these large forms, exactly agreeing in the large chelipeds and the trilobed telson, is sufficient for the maintenance of Dr. Ortmann's species. *C. turnerana* is said to be at times prodigiously numerous, so that there may well be opportunity for small individual variations.

## CALLIANASSA ROTUNDICAUDATA, n. sp.

## PLATE 8.

The carapace is about two-sevenths of the total length of the body, the front being feebly advanced between and at each side of the bases of the first antennæ; its hind margin is fringed with some setules. The first two segments of the pleon are coalesced, and together are as long as the carapace, with no trace of pleopods; the third segment, which is half as long, carries at each distal corner a tuft of setæ, thickened with short, close-set plumosity; the two following shorter segments have similar tufts of setæ near the middle. The sixth segment is fringed laterally with setules, and has two rows of setæ on the hind margin. The

te'son is almost circular; its hind margin is fringed with setæ, two groups longer than the rest being inserted within the margin, and another group above the middle of the dorsal surface.

The eye-plates are somewhat triangular with the inner margins adjacent, and the pigmented portion at a little distance from the apex.

The first antennæ have the third joint considerably longer than the first and second together, and the flagella somewhat longer than the second and third joints together, these two joints and the slender inner flagellum having long plumose setæ. A setose slit forms the opening to the auditory apparatus of the first joint.

The second antennæ have a peduncle about as long as that of the first pair, the fifth joint slightly shorter than the fourth, the flagellum slender, longer than the peduncle, but not very elongate.

The cutting edge of the mandible is divided into ten or eleven small teeth, increasing in size from the ends of the row towards the middle of it.

The third maxillipeds have the third and fourth joints expanded, the third longer than broad, with a comb of minute teeth on the inner surface nearer to the outer than the inner margin; the fourth joint is broader than long, and widens distally; the fifth and sixth joints are subequal, longer than wide, each with a close-set group of spines on the inner surface; the seventh joint is narrower, rather shorter and blunt-ended.

In the larger first cheliped the fourth joint has a tooth proximally, and is then cup-shaped on the outer surface, but on the inner is much widened; it is a little longer than the preceding joint, which is widest distally; the fifth joint is nearly as wide as long, about as wide as the sixth, but only half as long; in the sixth the thumb is two-sevenths of the length, much narrower than the movable finger, with no gap between them. In the smaller cheliped the fourth joint is rather shorter than the preceding but wider, with no tooth; the fifth joint is shorter than the sixth, but longer than the palmar portion of it, the latter being not greatly longer than the narrow setose fingers.

The second chelipeds are very similar to those of *Callianassa kraussi*, but the following pair differ considerably from that species, the oval sixth joint having no backward produced lobe, and the finger, though laminar, being narrowly triangular. The fourth pair of feet are separated at their bases by a sternal plaque trilobed in front and bifid behind. These and the following pair are constructed much as in *C. kraussi* and *C. subterranea* (Montagu).

The pleopods on the third, fourth, and fifth pleon segments have the usual character, the fringing setæ being minutely plumose, and appearing as if consisting of numerous jointlets. The retinaculum is distally fringed with close-set, tiny spines.

The uropods have the inner branch oval, longer than the telson but narrower, the outer reaching beyond the inner, though scarcely so long; the outer branch fully as wide as the telson; both branches thickly fringed with long plumose setæ, and the outer with a surface row of spinules near the distal margin.

Length, 19 mm. A single specimen.

Locality:—St. Francis Bay. Lat., 34° 2' 45" S.; long., 25° 10' 00" E. Depth, 30-34 fathoms.

The specific name refers to the shape of the telson. From *C. subterranea*, which in several respects it approaches, the species is distinguished by the much longer palm of the great cheliped, the differently-shaped fingers, and apparently by the much smaller process of the fourth joint, the differently-placed dentate crest of the third maxillipeds, and the much smaller size of the animal. From *C. pachydactyla*, A. Milne-Edwards, it is distinguished by the dentate fourth joint of the larger first cheliped, and the elongate fifth joint of its smaller companion.

#### SCHIZOPODA.

1885. *Schizopoda*, Sars, Challenger Schizopoda, Reports, vol. 13.  
1900. *Schizopoda*, Stebbing, Proc. Zool. Soc. London, p. 537.

#### FAM.: LOPHOGASTRIDAE.

#### GEN.: LOPHOGASTER, M. Sars.

1857. *Lophogaster*, M. Sars, Forhandl. Skand. Naturf. Möde i Christiania, 1856, p. 160.  
1885. *Lophogaster*, G. O. Sars, Challenger Schizopoda Reports, vol. 13, p. 14.

#### LOPHOGASTER TYPICUS, M. Sars.

1857. *Lophogaster typicus*, M. Sars, Forhandl. Skand. Naturf. Möde i Christiania, 1856, p. 160.  
1862. *Ctenomysis alata*, Norman, Rep. Brit. Assoc., 1861, p. 151.  
1862. *Lophogaster typicus*, M. Sars, Christiania Universitetsprogram, pp. 1-37, pl. 1-3.  
1885. *Lophogaster typicus*, G. O. Sars, Challenger Schizopoda Reports, vol. 13, p. 14, pl. 1, figs. 1-7.  
1892. *Lophogaster typicus*, Norman, Ann. Nat. Hist. ser. 6, vol. 9, p. 459.

The references are taken from the last two authorities. Professor G. O. Sars describes three specimens from south of the Cape. One of these was a male, 25 mm. (an inch) long, with only three teeth on the outer margin of the antennal scale. The specimen now noted measured at least an inch, and has four teeth on the outer margin of the scale. The distal part of the telson was unfortunately broken off. The bipinnate branchiæ add much to the beauty of this species as the series is visible at each side of the translucent carapace, and two rows at right angles to the others meet along the centre of the ventral surface. Sars has called attention to the curious circumstance that this schizopod, first known from Norway and the Shetland Isles and then from the neighbourhood of the Cape, so far remains unknown from intermediate waters.

Locality:—Cape St. Blaize, N.E. by N.  $\frac{1}{4}$  N. 11 $\frac{1}{2}$  miles. Depth, 40 fathoms. Bottom, sand and rock.

#### STOMATOPODA.

1852. *Squilloidea*, Dana, U.S. Expl. Exp., vol. 13, Crustacea, p. 614.  
 1876. "*Stomatopoden*," Claus, Unters. geneal. Crustaceen-Systems, p. 70, etc.  
 1883. *Squillacea*, Boas, Morphologisches Jahrbuch, vol. 8, p. 574.  
 1885. *Stomatopoda*, Carus, Prodrömus Faunæ Mediterraneæ, vol. 1, p. 464.  
 1886. *Stomatopoda*, Brooks, Challenger Stomatopoda, Reports, vol. 16.  
 1893. *Stomatopoda*, Stebbing, History of Crustacea, p. 279.  
 1894. *Stomatopoda*, Alcock, Ann. Nat. Hist., ser. 6, vol. 13, p. 409.  
 1894. *Stomatopoda*, Bigelow, Proc. U.S. Mus., vol. 17, p. 490.  
 1895. *Stomatopoda*, Hansen, Isop. Cumac. und Stomatopoden Plankton-Exp., p. 64.

The name *Stomatopoda* of Latreille is far older than the term *Stomatopoda*, but the latter has the advantage of keeping in mind Latreille's authorship, without perpetuating the confusion involved in the group as he understood it.

#### FAM.: SQUILLIDÆ.

As this is the only family at present assigned to the order, the above references will be a sufficient guide to the sources of information, which are numerous.

## GEN.: SQUILLA, Fabricius.

1793. *Squilla*, Fabricius, Ent. Syst., vol. 2, p. 511.

Without setting forth the copious references to this genus in its enlarged and restricted acceptations, I will recommend the reader to consult Dr. Bigelow's paper above cited, only here taking from it the generic diagnosis:—

“Stomatopoda having the telson attached to the sixth abdominal segment by a movable joint; the hind body depressed and wide; the dactylus of the raptorial claw with usually not more than six teeth; as a rule, more than four intermediate denticles on the telson, which is usually longer than wide; and the inner basal spine of the uropod the longer of the two.”

## SQUILLA ARMATA, Milne-Edwards.

1837. *Squilla armata*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 521.  
 1849. *Squilla armata*, Nicolet, Gay's Hist. de Chile, Zool., vol. 3, p. 223.  
 1880. *Squilla armata*, Miers, Ann. Nat. Hist., ser. 5, vol. 5, p. 26.  
 1891. *Squilla armata*, Bigelow, Johns Hopkins Univ., Circ., 88.  
 1894. *Squilla armata*, Bigelow, Proc. U.S. Mus., vol. 17, p. 515, figs. 9 and 10 in text.

I borrow the references and accept the specific name from Dr. R. P. Bigelow's excellent account of the species. With some reason he appends a note of interrogation to its identification with the form named by Milne-Edwards and Gay. Milne-Edwards only says, “this species is extremely near to *Squilla mantis*, from which it is distinguished by the absence of crests on the carapace, and by the presence of two spiniform teeth on the upper face of the ophthalmic ring; the claws have seven teeth; length, three inches and a half; habitat, the coasts of Chili.” Dr. Bigelow's specimens were from various stations off the coast of Patagonia, had the dactylus of the raptorial claw “armed with seven to nine teeth, rarely six.” and varied in length from 60 to 122 mm.; they are described as having the “carapace with median carina obsolete or entirely absent, intermediate and lateral carinæ present on the posterior lateral lobes, anterior lateral angles produced into acute spines.” In the South African specimen there is one pair of distinctly marked though not strongly raised carinæ, and the dactylus of the claw has six teeth in addition to the terminal tooth. Apart from the above-mentioned carinæ, it agrees in all respects with Dr. Bigelow's description, and the telson, which he figures, is in this species rather peculiar. It has “a crest and a keel and a series of curved lines of pits on each side, six marginal spines, the submedian pair

with movable tips, no submedian denticles, ten to eleven small intermediate ones, and one lateral one." Each lateral and intermediate spine has a small tooth adjacent to its base on the inner side. Between the submedian spines the margin is divided by a deep median sinus into two rounded or somewhat quadrate, usually smooth, lobes.

Length, from tip of rostrum to apex of submedian spine of telson, 82.5 mm.

Locality:—Cape Point Lighthouse N.W. by W.  $\frac{1}{2}$  W.  $7\frac{3}{4}$  miles. Depth, 45 fathoms. Bottom, broken shells and a little mud.

GEN.: *LYSIOSQUILLA*, Dana.

1852. *Lysiosquilla*, Dana, U.S. Expl. Exp., vol. 13, Crustacea, p. 615.  
 1894. *Lysiosquilla*, Bigelow, Proc. U.S. Mus., vol. 17, p. 502.  
 1895. *Lysiosquilla*, Hansen, Isop. Cumiac. und Stomatopoden Plankton-Exp., p. 73.

As observed by Miers and others, the earlier name *Coronis*, Latreille, is preoccupied. Bigelow supplies the more important references and the following diagnosis:—

"Stomatopoda having the sixth abdominal segment separated from the telson by a movable joint; the hind body depressed, loosely articulated and wide; the dactylus of the raptorial claw without a basal enlargement, but with not less than five marginal teeth; no more than four denticles, and often only one, between the intermediate and submedian marginal spines of the telson, which is usually wider than long; and the outer spine of the basal prolongation of the uropod usually longer than the inner one."

*Erichthus Duvaucellii*, Guérin, Iconographie, Crustacés, p. 19. (*Erichthus Duvaucellii*, on pl. 24, fig. 3) is recognized by Brooks as the *Lysioerichthus* and by Hansen as the *Lysierichthus* larva of *Lysiosquilla maculata*.

*LYSIOSQUILLA MACULATA* (Fabricius).

1793. *Squilla maculata*, Fabricius, Ent. Syst., vol. 2, p. 511.  
 1793. *Cancer (Mantis) arenarius*, Herbst, Krabben und Krebse, vol. 2, pts. 3, 4, p. 96, pl. 33, fig. 2.  
 1837. *Squilla maculata*, Milne-Edwards, Hist. Nat. Crust., vol. 2, p. 518, pl. 26, figs. 11-15.  
 1852. *Lysiosquilla maculata*, Dana, U.S. Expl. Exp., vol. 13, Crustacea, p. 616.  
 1877. *Lysiosquilla maculata*, Miers, Proc. Zool. Soc. London, p. 138.  
 1880. *Lysiosquilla maculata*, Miers, Ann. Nat. Hist., ser. 5, vol. 5, pp. 5, 125, pl. 1, figs. 1, 2.

1886. *Lysiosquilla maculata*, Brooks, Challenger Stomatopoda, Reports, vol. 16, pp. 45, 110. pl. 10, figs. 1-7, pl. 11, figs. 4, 5.
1894. *Lysiosquilla maculata*, Bigelow, Proc. U.S. Mus., vol. 17, p. 508.
1895. *Lysiosquilla maculata*, Hansen, Isop. Cumac. und Stomatopoden Plankton-Exp., p. 74.
1898. *Lysiosquilla maculata*, Borradaile, Proc. Zool. Soc. London, p. 37.

Herbst gives a reference to Rumph's *Squilla arenaria terrestris*, "Rumph. Mus. tab. 3. fig. E," which Milne-Edwards cites as tab. 4, fig. E., while Fabricius refers to "Cancer arenarius, Rumph. Mus. tab. 3, fig. 2," and Bigelow quotes Rumph. Amboin. Rarit., p. 6, 1705. Rumph in his Amboinsche Rariteitkamer, p. 4, gives the alternative names *Locusta* or *Squilla Arenaria Terrestris*, and the species is represented full size on his plate 3, fig. E. Herbst adduces *Cancer arenarius*, etc., from "Linn. Mus. Adolph. Frid., p. 86," a work of 1754. Linnæus himself in 1758 gives the same reference for *Cancer mantis*, followed by a reference to "Rumph. Mus. t. 3, f. E., C. Arenarius." Since this habitat includes the Asiatic, Indian, and Mediterranean Seas, the Linnean species may be taken to cover *Squilla mantis* as well as *Lysiosquilla maculata*. The specific name which Herbst adopts with proper respect to his Dutch predecessor has generally been set aside as of later date than that given by Fabricius, but, so far as can be known, they are contemporary, for although Herbst's second volume is dated 1796, the parts of it in which *Cancer (Mantis) arenarius* was published belonged to 1793. In the conflict of claims the Fabrician name may be allowed a prescriptive preference.

This large and striking species cannot be identified simply by the transverse blue bands, since they are found also in *Squilla vittata*, Milne-Edwards, which Miers, following the lead of Milne-vittata, Milne-Edwards, which Miers, following the lead of Milne-Edwards himself, identifies with the earlier *Squilla* (now *Lysiosquilla*) *glabriuscula*, Lamarck. The latter has the dactylus armed with only 5·7 teeth, and sometimes fewer, whereas *L. maculata* has from 8·10. Herbst's figure, though coarsely executed, gives a very good general idea of the appearance.

The specific name chosen by Fabricius evidently refers to the colouring of the telson, for he speaks of "the last segment apically dark, with two whitish marginal spots." This is quite correct, but the broad distal dark-blue band is so much broken by the two white spots that the effect produced would rather lead one to speak of 3 blue spots. In Herbst's figure they are quite separated,



but not entirely in our specimen. The telson has a medio-dorsal triangular elevation, and is broadly truncated, with only two spines on either side above the truncation, between which and the lower spines there is a faint projection of the margin. The rostral plate is, as described by Milne-Edwards, cordiform and very pointed.

Length, 175 mm., or 7 inches from apex of rostrum to distal margin of telson.

Locality:—"Squilla procured at Durban (from Durban Museum)." A specimen nearly twelve inches long, sent me by Mr. W. R. Forrest from Antigua, differs from the form above described in not having the rostral point produced, in having the fifth pleon segment denticulate along the hind margin, except at the centre, the sixth denticulate in an arched proximal band and round the distal margin, and the telson with three spines on each side, and the truncate portion cut into five square teeth on one side and six on the other side of a small median emargination. Milne-Edwards, in his description, says that the hind margin of the telson is armed with three little obtuse "denticles" on each side of a little median emargination. We may infer, therefore, that the species is subject to some variation in minor details.

#### ISOPODA ANOMALA.

##### FAM.: APSEUDIDAE.

1896. *Apseudidae*, Sars, Crustacea of Norway, vol. 2, pt. 1, p. 5.  
 1902. *Apseudidae*, Harriet Richardson, Trans. Connect. Acad. Sci., vol. 11, p. 280.

##### GEN.: APSEUDES, Leach.

1813. *Apsudes*, Leach, Edinburgh Encyclopædia, vol. 7, p. 404.  
 1880. *Apsudes*, Sars, Arch. Naturv., vol. 7 (1881), extract, p. 7.  
 1886. *Apsudes*, Norman and Stebbing, Trans. Zool. Soc. London, vol. 12, part 4, p. 80.  
 1901. *Apsudes*, H. Richardson, Proc. U.S. Mus., vol. 23, p. 505.

From the references given numerous others can be obtained, both for the family and the genus.

##### APSEUDES GROSSIMANUS, Norman.

1870. *Apsudes grossimanus*, Norman, Proc. Royal Soc., p. 157.  
 1886. *Apsudes grossimanus*, Norman and Stebbing, Trans. Zool. Soc. London, vol. 12, part 4, p. 93, pl. 19.

This species is distinguished by its tridentate rostrum and the sharp tooth on each side of the carapace behind the distally rounded ocular processes. A female specimen, measuring fully 17 mm., had the marsupium bulging with numerous rather large eggs. The species has previously been taken in 90 fathoms off the south-west coast of Ireland, and in 748 fathoms off the Portuguese coast. The South African specimen above mentioned was taken in 245 fathoms, Table Mountain east 41 miles. Other specimens, also females, with the eggs showing a light red colour, were taken at a depth of 125 fathoms. Lion's Head S. 82° E. 27 miles.

#### ISOPODA GENUINA.

##### FAM.: CIROLANIDAE.

1900. *Cirolanidae*, Stebbing, Willey's Zoological Results, Part 5, p. 628.

The above reference will furnish several others to works of importance by H. J. Hansen and others on this family. It may, however, be added that in the Proc. Acad. Philadelphia, p. 187, 1891, Mr. J. E. Ives appends to his description of *Cirolana mafafa*, n. sp. a list of 33 species of *Cirolana* which had been named up to that date. This list was obviously drawn up before the additions and corrections published by Hansen in the preceding year with regard to this family could have come under the author's notice. It has its own independent value.

A new genus, *Cylopiasthus*, is added to the family by Miss H. Richardson in the Trans. Connect. Acad., vol. 12, p. 289, 1902.

##### GEN.: CIROLANA, Leach.

1818. *Cirolana*, Leach, Dict. Sci. Nat., vol. 12, p. 347.

1900. *Cirolana*, Stebbing, Willey's Zool. Results, Part 5, p. 629.

##### CIROLANA VENUSTICAUDA, n. sp.

##### PLATE 9.

1843. ? *Cirolana sculpta* (not Milne-Edwards), Krauss, Die süd-afrikanischen Crustaceen, p. 66.

Body about thrice as long as broad, by help of antennæ and uropods nearly parallel-sided. Head much broader than long,  
 A 1847. E

not deeply immersed in peræon, hind margin less wide than the slightly arched front, which has a well-marked process between the first antennæ. First peræon segment the longest, with hinder angles strongly rounded, the front ones squarely produced forward. Hind margins of the first four segments of peræon and first of pleon smooth, the rest tuberculate, almost imperceptibly on fifth peræon segment, on the others successively with greater prominence, the fifth pleon segment having also on each side of the centre a strong tubercle in advance of the hind margin. The telsonic segment carries anteriorly a median carina beginning with a small tooth or prominence and ending in a large one, this being followed by two pairs of tubercles, of which the surface has in addition one or two at the base on each side of the carina and many of various sizes along each margin. The slightly sinuous sides, where free from the uropods, are fringed each with seventeen spines in sets of six and eleven, interspersed with short plumose setæ, the narrowly rounded apex having a similar armature of four spines and accompanying setæ. Of the second and third peræon segments, the side-plates do not reach the hind margin of their respective segments, and in the former case are narrower behind than in front; in the other segments the side-plates have the hind margin produced backward, and agreeing as to sculpture with the hind margin of the segment, those of the seventh overlapping the first two segments of the pleon. The third pleon segment is the widest, and the fourth is wider than the fifth.

The eyes are dark in formalin, roughly rounded, of moderate size, with numerous small components.

First antennæ—The peduncle is clearly three-jointed, shorter than the flagellum, which has seventeen joints furnished with hyaline filaments.

Second antennæ—The first three joints of the peduncle are short, the fifth is longer than the fourth; the flagellum, about twice as long as the peduncle, attains to thirty-one joints.

The frontal lamina surmounting the epistome widens to the convex anterior border, from which it bends to meet the rostral point with an angular termination.

The mouth-organs; as will be seen from the figures, are in tolerably close agreement with what is usual in the genus. In the first maxillæ attention may be called to the little projecting horn on the outer side of the inner plate. Such a process is figured by Hansen for *Cirolana borealis* Lilljeborg, but not for *Cirolana ciongata* Milne-Edwards, nor for his own *Cirolana minuta*, nor do I find it in *Cirolana orientalis* Dana, which has in its place a minute spine, in agreement with *Cirolana japonica* Hansen; the process is feebly developed in *Cirolana pleonastica* and *Cirolana albicaudata*, which I have recently described.

First gnathopods—These are rather robust, the fourth joint fully as broad as long, with two rows of spines along the inner

margin, the short triangular fifth joint underriding the sixth and having its base deeply imbedded in the fourth. The finger is shorter than the sixth joint, and as in all the trunk limbs has a short, dark-coloured nail, preceded by a small spine, which gives a biunguiculate appearance to the joint.

Second gnathopods—The spines on inner margin of fourth joint are arranged in two sets separated by an unarmed interval; the fifth joint is small, but does not underride the sixth, nor is it imbedded in the fourth; the sixth joint is much less stout than in the preceding pair.

Peraeopods—The first pair is similar to the second gnathopods. The other four pairs have the joints longer, especially the last two pairs which are subequal. There are no plumose setæ on these limbs, but spines at the apices, and a few on the inner margins of the third to sixth joints.

Pleopods—The rami are broad in all of them.

Uropods—The peduncle is produced rather beyond the middle of the telsonic segment, but not quite to the middle of the inner ramus; this ramus is very broad, and reaches beyond the segment, its margin, except near the base, being closely fringed with spines and setæ; the outer ramus, though about as long as the inner, does not reach nearly so far back, and is much narrower, but with similar armature. Colour, in formalin, cream, with symmetrical brown markings on upper surface, but not on under surface or on appendages, except the uropods. Length, 15 mm., or a little less or more.

Locality:—Table Bay, and from "Red Bait" (a large Ascidian), Somerset West, shore.

Krauss, loc. cit., under *C. sculpta*, M.-Edw., says, "A species distinguished by the exceedingly pretty marking of the abdomen, which I have found in Table Bay. Yellowish green, with black speckles and spots. Length, 6 lines." Herklots in 1851 merely mentioned the name on Krauss's authority. Hansen doubts the identification, and is disposed to think, from the strong sculpturing of the pleon, that Milne-Edwards's species may be a *Corallana*. Milne-Edwards thus describes his *C. sculpta*:—"Head much broader than long, scarcely narrowed anteriorly, and little immersed in the thorax. Margin of the last thoracic rings and of the rings of the abdomen finely denticulate. The last segment of the abdomen furnished with a conical tooth on the median line, with a multitude of little crests, and ending behind acutely. Feet feeble, and scarcely hairy. Terminal plates of the uropods almost of the same size and apically acute. Length, about 9 lines. From the coast of Malabar."

The description of the uropods will not at all suit the present species, and the distance of habitat does not encourage the hypothesis of misdescription. Milne-Edwards also says that in his species the head is scarcely narrowed in front: in the South

African species it is plainly widened. The new specific name for the latter alludes to Krauss's remark upon the beautiful marking of the pleon.

*Cirolana FLUVIATILIS*, n. sp.

This species is closely allied to *Cirolana pleonastica*, described and figured in "Willey's Zoological Results," Part 5, p. 629, pl. 67A, 1900. Between the mouth organs of the two there seems to be no difference on which to lay any stress. It may, however, be mentioned that in the present species, out of the thirteen setæ fringing the inner plate of the second maxillæ, eight instead of three are conspicuously plumose, and in the maxillipeds the terminal joint narrows distally instead of widening. The antennæ are more distinctive, for here in the first pair the first two joints are clearly separate, the first distally widened, the third is as long as the preceding two combined; the flagellum consisting of ten or eleven unfurnished joints, is as in the other species equal in length to the peduncle; in the second pair the peduncle is a little longer than the first antennæ, its fifth joint is clearly longer than the fourth, the flagellum is more than twice as long as the peduncle, and consists of about forty joints, varying from under to over that number, of the earlier joints some fourteen or fifteen carrying rather conspicuous little tufts of setæ.

The surface of the peræon is somewhat pubescent, especially at the sides; the hind rim of the seventh segment carries about eighteen tubercles. Of the pleon, the third, fourth, and fifth segments have the hind margin tuberculate, the fourth has its sides strongly produced over the produced and rounded sides of the fifth, the produced lobes of the fourth having the peculiarity of a lateral slit, such as might be expected to indicate two segments in coalescence, of which there is here no question. The telsonic segment is triangular, with straight sides, the breadth at the base equal to the median length. At the upper part of each side there is a small ridge, and on either side of the middle line there is a partial carina formed in two or three sections, beginning near the base, but not reaching the narrowly-rounded apex, the ornamentation being thus a kind of link between that of *C. sulcata* and *C. pleonastica*. The lower half of the segment is fringed with plumose setæ, among which are four spines at the apex, and two on each side in notches above the apex, not as in *C. pleonastica*, eight together round the apex. The inner ramus of the uropods reaches beyond the telsonic segment, and is not a very broad oval, but broader and longer than the outer ramus. Colour (in formalin) uniform, a dull pinkish brown, probably not to be relied upon as characteristic. Size, 12 mm. long, by 4.5 mm. broad.

Locality:—Two miles up the Buffalo River. This is described as a tidal river. The specific name alludes to the place of capture.

*C. pleonastica* was obtained at depths of 60 and 100 fathoms in Blanche Bay, New Britain.

1890. *Cirolana sulcata*, Hansen, Cirolanidæ, Vid. Selsk., ser. 6, vol. 3, p. 336 (100), pl. 2, fig. 5-5c.

This species, fully described and excellently figured by H. J. Hansen, is easily recognized by the peculiar sculpture of the telsonic segment, which has a medio-dorsal longitudinal furrow between two stout carinæ, which meet at their extremities.

Locality:—Somerset West, shore; from "red bait."

The specimens described by Hansen were taken in Simon's Bay.

FAM.: ÆGIDAE.

1879. *Ægidæ*, Schiödte and Meinert, Naturhistorisk Tidsskrift, ser. 3, vol. 12, p. 325.

1890. *Ægidæ*, Hansen, Vid. Selsk. Skr., ser. 6, vol. 3, p. 315 (79).

1893. *Ægidæ*, Stebbing, History of Crustacea, p. 347.

GEN.: ROCINELA, Leach.

1818. *Rocinela*, Leach, Dictionnaire des Sciences naturelles, vol. 12, pp. 348, 349.

1849. *Acherusia*, Lucas, Crust. Algérie, p. 78.

1867. *Rocinela*, Bate & Westwood, Brit. sessile-eyed Crustacea, vol. 2, pt. 17, p. 289.

1879. *Rocinela*, Schiödte and Meinert, Naturhistorisk Tidsskrift, ser. 3, vol. 12, p. 380.

1893. *Rocinela*, Stebbing, History of Crustacea, p. 348.

1897. *Rocinela*, Sars, Crustacea of Norway, vol. 2, p. 65.

ROCINELA DUMERILII, Lucas.

1849. *Acherusia Dumerilii*, Lucas, Crust. Algérie, p. 79, pl. 8, fig. 3.

1864. *Acherusia complanata*, Grube, Die Insel Lussin und ihre Meeresfauna, p. 76.

1879. *Rocinela Dumerilii*, Schiödte and Meinert, Nat. Tidsskrift, ser. 3, vol. 12, pp. 383, 391, pl. 12, figs. 4-9.

1886. *Rocinela Dumerilii*, Bovallius, Bihang till K. Svenska Vet. Akad. Handlingar, vol. 12, pp. 383, 391, pl. 12, figs. 11-19.

The South African specimen is not in absolute accord with the figures given either by Lucas or by Schiödte and Meinert in one

particular, for the head is strongly produced in front into a somewhat upturned rotundo-quadrata process, the sides of which are even a little incurved before diverging towards the eyes. From the authors mentioned one must infer that the process in their specimens, though more or less blunt at the top, was otherwise triangular.

The nearest approach in other described species of *Rocinela* to the shape of the process exhibited by the African specimen is in *R. oculata*, Harger, 1883, but that species is distinguished from *R. dumerilii* by being much broader in comparison with the length, by having the eyes contiguous instead of separated, and by having the inner ramus of the uropods slightly shorter than the outer, instead of distinctly longer. According to Bovallius, in the adult male of *dumerilii* the front of the head "shows an obtuse projection shorter than in the ovigerous female, but longer than in the virgo." Grube distinguished his *Acherusia complanata* from *dumerilii* only on the ground that its first pleon segment did not run out into strongly-produced joints, such as are shown in the figure given by Lucas, and the same distinction might be drawn for the African specimen, in which the first pleon segment is much less wide than those that follow, although its apices are sharper than theirs, but Schiödte and Meinert explain that in the ovigerous female the first pleon segment is in fact almost entirely concealed, though in the "virgo" it is broad and pretty fully uncovered. In their account they say that the tarsus (sixth joint) of the prehensile feet has three sharp spines in the ovigerous female, four in the "virgo." In the African specimen the joint in question has four spines, and the Danish authors figure four for both forms.

The eyes are large and dark, composed of about 140 ocelli, the facets easily catching the light. The well-marked medio-dorsal depression on the head, described by Lucas, is present. On the other hand, the longitudinal furrow on the telsonic segment which he says is pretty well marked, is rather to be imagined than perceived. Schiödte and Meinert speak of it as "lightly" shown in the ovigerous female, and "very lightly" in the "virgo." The colouring and size (an inch long), and all details except the frontal process, so well agree with earlier descriptions and figures of *R. dumerilii* that it would be rash to form a new species for this single specimen.

Locality:—Vasco de Gama Pt. S. 75° E. 13½ miles. Depth, 166 miles.

#### FAM.: CYMOTHOIDAE.

1900. *Cymothoidae*, Stebbing, South African Crustacea, Part I, p. 55; and Willey's Zool. Results, Part 5, p. 639.

## GEN.: NEROCILA, Leach.

1818. *Nerocila*, Leach, Dict. Sci. Nat., vol. 12, p. 351.  
 1880. *Nerocila*, Harger, U.S. Fishery Report for 1878, Part 6, p. 391.  
 1881. *Nerocila*, Schiödte and Meinert, Nat. Tidsskrift, ser. 3, vol. 13, p. 4.  
 1887. *Nerocila*, Bovallius, Bihang till K. Svenska Vet-Akad. Handlingar, vol. 12, pt. 4, No. 4, p. 3.  
 1893. *Nerocila*, Stebbing, History of Crustacea, p. 351.  
 Additional references, including the synonyms *Ichthyophilus*, Latreille, and *Emphyllia*, Koelbel, will be found in Schiödte and Meinert.

## NEROCILA CEPHALOTES, Schiödte and Meinert.

1881. *Nerocila cephalotes*, Schiödte and Meinert, Nat. Tidsskrift, ser. 3, vol. 13, p. 60, pl. 4, figs. 16-18.

In this species the head is broadly rounded in front, and behind fitted into the trilobate front margin of the first peræon segment. The angles of the sixth and seventh peræon segments are produced, acute, reaching beyond the still more acute apices of their side plates. The lateral angles of the first and second pleon segments much overlap those of the third and fourth segments, and in all four to a lateral view they have a somewhat hook-like shape. Our specimen is a female, with distended marsupial plates.

Locality:—Cape St. Blaize N.  $4\frac{1}{2}$  miles. Depth, 35 fathoms. Bottom, mud. Found on *Synaptura pectoralis*. Schiödte and Meinert examined a specimen from Cape Agulhas and another from the Cape of Good Hope, besides others.

## FAM.: IDOTEIDAE.

1900. *Idoteidae*, Stebbing, South African Crustacea, pt. 1, p. 51.  
 1901. *Idoteidae*, H. Richardson, Proc. U.S. Mus., vol. 23, p. 537.  
 For the synonymy see Part 1, p. 51, of the present work. To the references there given may be added *Idoteidae*, H. Richardson, The American Naturalist, vol. 34, p. 224, 1900, and *Les Idotées*, H. Milne-Edwards, Le Règne Animal, Edition par les Disciples de Cuvier, Crustacés, p. 201, pl. 69, date uncertain. Of the last work, published by Fortin, Masson et Cie, it should be remarked that the plates ought not to be neglected by the carcinologist, although the accompanying volume of text is of a very mean order. Here also it may be well to call attention to the circumstance that Guérin-Méneville, in his *Iconographie du Règne Animal de G. Cuvier*, a work vaguely dated 1820-1843, thinks the explana-



tion of the plates a fitting opportunity for describing a new genus and species, *Edotia tuberculata* from the Falkland Islands, and no less than three new species of *Idotea* from the Cape of Good Hope, all of these unfigured, and consequently a source of trouble to succeeding authors. The species assigned to *Idotea* are named *I. Latreillii*, *I. Edwardsii*, *I. distincta*. From Miers' revision of the family, however, it does not appear that any one of these three names can be retained, since with no little probability he identifies the first with *I. indica*, Milne-Edwards, the second with *Oniscus unguulatus*, Pallas, the third with *I. peronii*, Milne-Edwards.

From the following accounts it will be seen that within this family the mouth-organs present some interesting variations. Thus in *Glyptidotea* and less conspicuously in *Paridotea* the maxillipeds are seven-jointed, in *Idotea* they are six-jointed, in *Synidotea* five-jointed, in *Colidotea* four-jointed. These differences depend on coalescence occurring or not occurring between the fourth and fifth joints of the "palp," or between its second and third joints, or between both those pairs, and in case of *Colidotea* the first joint, in addition, loses its identity by coalescence either with the second joint of the stem or the second of the palp. In *Paridotea unguulata* I now incline to think that the second and third joints of the palp should be separately reckoned, though it is a point rather difficult to determine. In the same way the second and third joints in *Idotea indica* are far less distinctly separated than they are in *Idotea balthica*. The first maxillæ also show some curious differences in minute details. *Paridotea unguulata* has on the inner plate of these appendages five plumose setæ (not six, as stated on page 54 of Part I.) in *Glyptidotea* as in *Idotea* there are three, and in *Synidotea hirtipes* only two.

#### GLYPTIDOTEÆ, n. g.

Side-plates distinct in all peræon segments except the first. Pleon consisting of a single segment, with three pairs of lateral sutures at the base. Sculptured joints in peduncle of both pairs of antennæ. Second antennæ with the flagellum multi-articulate. Maxillipeds seven-jointed. All the trunk limbs more or less subchelate, the penultimate joint most dilated in the first pair.

By the sculpturing of the head and the strongly prehensile character of the limbs, the type species of this genus recalls *Glyptonotus*, while in other characters it resembles *Idotea* and *Synidotea*, but from all hitherto defined genera of the Idoteidæ it appears to be distinguished by its distinctly seven-jointed maxillipeds and its pleon sutures. The generic name is compounded in allusion to the mixture of characters.

## GLYPTIDOTEA LICHTENSTEINII, Krauss.

## PLATE 10.

1843. *Idotea lichtensteinii*, Krauss, Die südafrikanischen Crustaceen, p. 62, pl. 4, fig. 4.  
 1881. *Idotea Lichtensteinii*, Miers, Journ. Linn. Soc. London, vol. 16, p. 64.

The front of the head is trisinate, the median notch small and overhung by a large, blunt-ended, horizontal process of the dorsal carina, the lateral angles produced into blunt points directed slightly outwards in advance of the small, black, dorso-lateral, triangularly-rounded eyes, behind which the lateral margins converge to the faintly-concave hind border. The first peræon segment is short in the middle, but with the sides reaching forward to the eyes, flanking the head with broadly rounded plates, of which, however, the inner and the hinder margins are flattened. Of the six following segments the side-plates are all distinct in shape passing from oval to sub-quadrate, not produced backward, but matching the length of the segment, which is least in the seventh and greatest in the second and third, the latter with its side-plates presenting the greatest breadth. The pleon has a length equal to the first three segments of the peræon, the breadth at the base being not much less than the length, and nearly two and a half times the width of the apex, which is shallowly emarginate with rounded corners. The three pairs of sutures are dorsally successively shorter; ventrally they are very distinct. A median carina extends from the cephalic process on to the pleon, where it loses the rather moderate acuteness of its earlier portion, and near the middle of the segment bifurcates, being very faintly continued to each apical angle.

First antennæ—The first joint is deeply cut into several unequal lobes, among which is implanted the narrow stalk of the second joint; this in turn is divided into lobes at its widened distal extremity, receiving the shorter third joint, which also forms a little cup for the narrow base of the flagellum. The latter has the shape of a blade-bone, and has its convex margin closely set with fourteen semi-circular lobes, from each of which projects a pair of hyaline sensory filaments and two setules, or perhaps from the last two semi-circles there may be only one filament apiece. It is possible that these marginal divisions with their apparatus indicate a coalescence of many articulations to form this peculiarly shaped one-jointed flagellum.

Second antennæ—The first joint short; the second much wider, cut into deep lobes which encircle the third joint, this also being wide and lobed, but less strongly than the preceding, the fourth joint oblong, a little longer than wide, the fifth abruptly narrower, considerably longer; the flagellum longer than the peduncle, con-

sisting of seventeen joints, of which the first is the longest and the last minute, all apically fringed with inconspicuous setules.

Epistome strongly produced forward, its linguiform process being just concealed by the nasiform process of the head in a dorsal view, the narrow arms flanking the upper lip, which is triangular above and has the slightly convex lower margin covered with a thick moustache. Lower lip—The rotundo-quadrate lobes are rather strongly setulose. In the stomach near the entrance are two dark reniform masses very strongly setulose round the adjacent inner and the hinder margins. These correspond to what in the Amphipoda I have called organs of trituration, but which Professor Della Valle names "cardiac folds." In the Amphipoda they are often armed with numerous and powerful spines. The exterior of the stomach is covered like the rest of the animal with little scale-like markings.

Mandibles—The left mandible has the middle tooth of its cutting plate simple, but the tooth on each side deeply bifid; in the secondary plate there is one strong, horny-looking triangular tooth, and three spine-like teeth, two of them short; there are four or five crowded plumose spines in the spine-row, the molar is strong, with setules at the base, the oval crown setulose, a little serrate above, accompanied by a projecting group of setæ. The right mandible has two simple teeth and a third feebly trifid in the cutting plate, the secondary plate divided into feeble spine-like teeth, the crown of the molar serrate along one edge.

First maxillæ—The outer plate is surmounted by eleven crowded spines, the outermost but one being the strongest, the innermost six slender, forming two sets, each consisting of three graduated spines. The inner plate has three plumose setæ on the narrow apex.

Second maxillæ—The outermost plate has seven pectinate spines; the middle plate carries six; the considerably broader inner plate is distally fringed with several plumose setæ.

Maxillipeds—The inner margin of the first joint forms a rounded process beset with plumose setæ; its external part forms a broad base for the large distally narrowed epipod. The second joint is elongate, its apical process, distally fringed with setæ, reaches beyond the second joint of the palp, and somewhat above its base has a strong spine-hook, nearly at the level reached by the apex of the epipod. The first joint of the palp is small, the second widened, cup-like, with the inner margin much longer than the outer, the third joint similar but larger, and with less difference between the two margins; the fourth joint is much the longest, oval, but with truncate apex, on which is placed the small, but very distinct, oval fifth joint, this like the three preceding joints having setæ on the inner margin.

First gnathopods—Though the seven pairs of trunk limbs are all very similar in character, the first pair have certain distinctive features. They are the shortest, and have the sixth joint

shorter, and absolutely as well as relatively wider than it is in the other pairs; also on its outer surface this joint is armed with a great number of pectinate spines, which are wanting in the other pairs. The second joint is deeply channelled along the front, the third and fourth joints are distally widened, lobed on each side; the fifth joint is very short, not under-riding the sixth; the sixth obtains a subchelate character by help of a strong sub-basal spine confronting the finger, this spine being to appearance roughened with rows of minute teeth extending from near the base quite to its apex. The finger is biunguiculate, groups of setules or slender spines attending the stronger outer nail and the shorter inner one.

Second gnathopods and the peræopods—There is a gradual increase in the length of the limbs, the sixth joint becoming narrower and longer, but the differences otherwise not being very material. In all the limbs the peculiar denticulate spine of the sixth joint is conspicuous, and the finger shows an impression on the inner surface where its base rests against the circular apex of the sixth joint.

The pleopods do not seem to differ from those in the genus *Idotea*.

The uropods—These also are in close agreement with those of *Idotea*. The ramus is more than a third of the length of the peduncle, at its base nearly as broad as the length, which is greater on the convex outer than on the straight inner margin, the apical being obliquely truncate and faintly emarginate, rather more than half the basal breadth. There is no other plate, but a strongly plumose setæ about half as long as the ramus, and by this possibly the outer ramus is represented.

The colour in formalin is orange, with a pair of bright red spots on the front margins of the peræon segments from the second to the seventh. Small spots and stellate markings are visible under the microscope on many parts, including the maxillipeds, uropods, etc.

Length, about 24 mm. The single specimen carried numerous eggs within the four pairs of marsupial plates, and could not be flattened out for minutely exact measurements. Krauss gives the size of the specimen taken in the algæ of Table Bay as length 1 inch, breadth 3.7 lines.

Locality :—Dredged between Bird Island and the mainland, Algoa Bay, in 10 to 16 fathoms, on a bottom of sand, shells, and stone.

GEN.: SYNIDOTEA, Harger.

1878. *Synidotea*, Harger, Amer. Jour. Sci., ser. 3, vol. 15, p. 374.  
 1880. *Synidotea*, Harger, U.S. Fisheries Report for 1878, pt. 6, p. 350.

1881. *Edotia* (part), Miers, Journ. Linn. Soc. London, vol. 16, p. 65.  
 1885. *Synidotea*, Sars, Norwegian North Atlantic Exp., vol. 14, p. 116.  
 1895. *Stenosoma*, Dollfus, Feuille des Jeunes Naturalistes ser. 3, Année 25, No. 292, p. 9.  
 1897. *Synidotea*, Benedict, Proc. Acad. Philadelphia, p. 390.  
 1899. *Synidotea*, H. Richardson, Proc. U.S. Mus., vol. 21, p. 847.  
 1900. *Synidotea*, H. Richardson, American Naturalist, vol. 34, p. 227.  
 1901. *Synidotea*, H. Richardson, Proc. U.S. Mus., vol. 23, p. 541.

Of this genus an excellent little monograph was published by Dr. J. E. Benedict in 1897. He assigns to it fifteen species, and gives figures of the thirteen which had come under his own observation. The genus may be defined as follows:—

Sides of head in a dorsal view entire and not laterally produced. Side-plates of peræon coalesced with the segments. Pleon consisting of a single segment, with one pair of lateral sutures at the base. Eyes lateral. Second antennæ with well developed multi-articulate flagellum. Maxillipeds with three-jointed palp, or in other words, maxillipeds five-jointed. Uropods with a single branch.

Dr. Benedict distinguishes two sections of the genus, the first having the distal end of the pleon emarginate or bicuspid, the second having the end bluntly pointed.

Miss Richardson, in her analytical key to the genera of *Idoteidae*, assigns to the group including *Synidotea* the character of having the "legs all ambulatory." In *S. hirtipes*, however, the first pair are shorter and stouter than the rest, with expanded penultimate joint and reflexible finger constituting a prehensile hand. Also they close so firmly upon the mouth that their ambulatory function has probably been relinquished.

#### SYNIDOTEA HIRTIPES (Milne-Edwards).

1840. *Idotea hirtipes*, Milne-Edwards, Hist. Nat. Crust., vol. 3, p. 134.  
 1843. *Idotea hirtipes*, Krauss, Die Südafrikanischen Crustaceen, p. 61.  
 1881. *Edotia hirtipes*, Miers, Journ. Linn. Soc. London, vol. 16, p. 68.  
 1897. *Synidotea hirtipes*, Benedict, Proc. Acad. Philadelphia, p. 403.

On the description given by Miers, and quoted by Benedict, little criticism is needed, but Miers says, without reserve, that the legs are long and slender, whereas the first pair are rather short and stout. Also he speaks of the distal emargination in the telsonic segment as small and shallow. It seems to be variable.

but is usually broad and often well marked. The last three segments of the peræon are notably shorter than the rest, and the demarcation of the side-plates is very faint. In the uropods the peduncular plate has on its upper half two obliquely transverse ridges fringed with spines like those along the margin, and at the apex of its hinge margin it has two plumose setæ.

The first antennæ have the first joint short and wide, the rest narrow, the flagellar joint being about as long as the second and third joints of the peduncle combined, widening a little from its base, then tapering, fringed with about 18 pairs of filaments.

The epistome is much wider above than below, produced upward to a short median triangular point, its lower margin straight, scarcely so wide as the upper lip, which is proximally as well as distally fringed with seta-like spines, those projecting from the distal margin being very closely set; the margin itself is unsymmetrically bilobed. The lobes of the lower lip are also rather strongly fringed on the inner margin.

The mandibles have the basal part double-ridged and the extremity geniculate. The cutting plate is four-toothed, the secondary plate tridentate, its teeth horny-looking on the left mandible, slighter, pellucid, and a little setulose on the right. No spine-row was perceptible. The molar is prominent, with oval denticulate crown.

The first maxillæ have the outer plate surmounted by ten, or sometimes by eleven, spines, some of which are denticulate, none very powerful. The inner plate is narrow at both ends, and has at the apex only two setæ, which are rather long, and, as usual, plumose.

The second maxillæ have some of the spines on the inner plate plumose, those on the middle plate finely pectinate, about fifteen in number.

The maxillipeds have the first joint short, the epipod nearly parallel-sided, not reaching the apex of the process of the second joint, though extending considerably beyond the first joint of the palp; its upper margin slopes inward. The process of the second joint is shaped as commonly in the Amphipoda Gammaridea, and similarly fringed with setæ on the inner and apical margins, but here it is tied to its fellow, each member of the pair carrying a strong spine-hook for grappling the other. The first joint of the palp is small and rather obscure, the second is very large, widening distally, its distal margin flatly rounded on the inner part and externally forming a little free projection. The third joint is also very large, its inner margin almost continuous with that of the preceding joint, feebly convex, fringed with short spines, its outer margin strongly convex, fringed with seta-like spines, some of which also stand out from the surface.

The character of the first gnathopods has been already noticed in remarks on the genus.

In the first pleopods the peduncle is fringed with a dozen hooked spines. The male stilet of the second pair is produced considerably beyond the rami. None of the rami show any transverse suture.

Locality:—Specimens were taken at three stations—Cape St. Blaize

W.  $11\frac{1}{2}$  miles, 27 fathoms, fine sand; and Cape St. Blaize N.W.  $3\frac{1}{4}$  miles, 33 fathoms, mud.

Miss H. Richardson's genus *Colidotea* is distinguished from *Synidotea* by having only two joints to the palp of the maxillipeds, and the side-plates distinct and well-developed in the last three segments of the peræon. The first joint of the maxilliped palp in *S. hirtipes* is so faintly marked that in this respect it may be regarded as a link between the two genera. On the other hand, the side-plates of the peræon segments are scarcely discernible.

In his key to the species of *Synidotea*, Dr. Benedict was unable to include *S. hirtipes* (Milne-Edwards) and the var. *lacvidorsalis* (Miers), a larger, narrower form from Japan, neither of which he had seen. But he incidentally recognizes that they belong to the first of the two sections into which he divides the genus. Within this section *S. hirtipes* makes the nearest approach to *S. laticauda*, Benedict, of which Dr. Benedict remarks that "the valves of the operculum are diagonally crossed by a curved line." As already noticed, in *S. hirtipes* the valves of the opercular uropods are crossed by two such lines. No one observing one of them could well fail to notice the other, so that this may be taken as a distinctive mark separating *S. hirtipes* from *S. laticauda*, which is also a broader form. Miers, it is true, does not make any reference to the second line in *S. hirtipes*, but possibly it might not attract attention in the dried specimens which he examined. In the var. *lacvidorsalis* he figures the opercular valve with only one line which points to the conclusion that this Japanese form is specifically distinct.

#### IDOTEA INDICA, Milne-Edwards.

1840. *Idotea Indica*, Milne-Edwards, Hist. Nat. des Crustacés, vol. 3, p. 131.  
 1843. ? *Idotea Latreillii*, Guérin-Ménéville. Iconographie du Règne Animal, Crustacés, p. 32.  
 1881. *Idotea indica*, Miers, Journ. Linn. Soc. London, vol. 16, p. 50, pl. 2, figs. 4, 5.

This species bears a rather close general resemblance to *Idotea emarginata*, Fabricius, but is distinguishable from it by the rather sinuous and less convergent sides of the telsonic segment, and by the side-plates of the peræon. Miers says that these latter parts are "small, in the second segment occupying, in a lateral view,

only the anterior half of the lateral margins, in the second and third segments the middle portion of the lateral margins, in the fifth and sixth segments they reach nearly, and in the seventh segment quite, to the postero-lateral angles."

His description was taken from the type in the Paris Museum, "an adult male," 40 mm. long. It agrees well with our specimen, which appears to be a female, being without the male appendages on the seventh peræon segment and the second pleopods. The side-plates are obviously quite different from those of the male *I. emarginata*, but they also differ very considerably from those of the female of that species, which Sars (Crustacea of Norway, vol. 2, p. 85, pl. 35, fig. 2) describes and figures as "rather small and not contiguous." It is important to remember the striking dissimilarity between the side-plates in the two sexes of the species in question, although I find that at least sometimes they may be contiguous in the female as well as in the much larger male, whereas in *Idotea indica* there is no approach to contiguity, the whole series being well separated.

Miers gives the flagellum of the second antennæ as eighteen-jointed, and states that the last peræopods have "their penultimate joints thickened and considerably elongated." In his figure this is a very notable feature, and may be a characteristic of the adult male. In our specimen the flagellum of the second antennæ has on one of the pair fifteen and on the other sixteen joints; the last peræopods are not very strikingly larger than the penultimate pair.

The mouth-organs are in near general agreement in most respects with those of the type species of *Idotea*, the *I. balthica* (Fallas), as recently figured by Sars. In both species it seems to me that the upper lip has a small emargination which Sars does not indicate, and that the lobes of the lower lip are more squared than in his figure. In both species the inner plate of the first maxillæ carries at the apex three plumose setæ, but its shape is not quite the same as both, the widening being near its junction with the stem in *I. balthica*, but higher up in *I. indica*. The most notable difference is in the maxillipeds, for these in *I. balthica* have the palp very distinctly four-jointed, whereas in *I. indica* the dividing line between its second and third joints is only faintly discernible, except at the edges, nor does our specimen show any trace of the notch near the apex of the fourth joint, which at least sometimes in *I. balthica* marks the place at which a small fifth joint is lost in coalescence with the fourth. The epipod is oval. The outer apex of the second joint of the stem carries four setæ, its process is armed with one hooked spine.

Length, 27 mm.

Locality:—Hout Bay, from a depth of 9 to 20 fathoms, on fine sand and broken shells.



## FAM.: SPHAEROMIDAE.

1840. "*Sphéromiens*," Milne-Edwards, Hist. Nat., Crust., vol. 3, p. 197.  
 1847. *Sphaeromidae*, White, List of Crustacea in Brit. Mus., p. 102.  
 1900. *Sphaeromidae*, Stebbing, Proc. Zool. Soc. London, p. 552.  
 1901. *Sphaeromidae*, Harriet Richardson, Proc. U.S. Mus., vol. 23, p. 532.  
 1902. *Sphaeromidae*, Harriet Richardson, Trans. Connect. Acad. Sci., vol. 11, p. 291.

In the Proc. Zool. Soc. London for 1900 a list of authorities on this family is given, and it is scarcely necessary to repeat it here.

## Gen. : EXOSPHAEROMA, Stebbing.

1900. *Exosphaeroma*, Stebbing, Proc. Zool. Soc. London, p. 553.

**EXOSPHAEROMA AMPLIFRONS, n. sp.**

## PLATE II.

The head, which is slightly notched at the summit, is remarkable for the wall-like steepness with which it rises in front far above the eyes. A small triangular rostrum separates the cavities from which spring the bases of the first antennæ, and, on either side of these a small wing or hollowed surface of the head lies below the greatly projecting eye-lobes.

The peræon is broad, strongly imbricated, a deep cavity being formed by the dorsal slope of the first segment and the postero-dorsal slope of the head. The side-plates of the last six segments are rather abruptly bent downwards and even a little inward, the last three ending less acutely than the preceding three. The infero-lateral margin of the first segment forms an acute angle at either end, in front helping to embed the eye-lobe, behind slightly under-riding the side-plate of the second segment. A very notable peculiarity of the species is furnished by the eroded appearance caused by little pits in the integument. These are conspicuous on the lower part of the head and its adjoining appendages, over much of the first peræon segment, on all the side-plates and hind margins, and over a great part of the pleon. In the last three peræon segments the hind margins are cut into several blunt denticles, of which there are two, not always very distinct, on each of the three preceding segments.

The pleon is very strong featured, its basal portion being produced into prominent submedian bosses, and the terminal portion also having two that are even more prominent, overhanging the triangular telsonic portion, the apex of which is somewhat trilobed and curves upward beyond two little notches. There are two tufts of setules on the underside of the apex, and the medio-lateral parts of the pleon are setulose. The basal portion shows four components, the first marked by a sinuous dorsal line, the next two only by lateral sutures, but the second, third, and fourth segments are much broader than the first, and the second has a more extensive lateral margin than the rest, and one which outflanks the side-plate of the seventh peræon segment.

The eyes are dark, of irregular shape, tending to oval, with about a hundred small components.

The first antennæ have the first joint much longer than the second and third combined, the second much narrower than the first, broader but considerably shorter than the third. The flagellum of nineteen joints, carrying hyaline filaments, is shorter than the peduncle. The second antennæ are rather longer than the first, with the penultimate joint of the peduncle not shorter than the ultimate, the fifteen-jointed flagellum subequal in length and proximally in breadth to the peduncle.

The epistome and upper lip, as seen in situ with the other "or<sup>is</sup> partes," and as seen when detached, are shown in the figures. The mandibles are particularly massive, with the palp especially inconspicuous and membranaceous. The cutting edge is very dark, and looks like a single undivided tooth, very blunt. The secondary plate on the left mandible is also dark-coloured, simple but comparatively thin and small; the crown of the molar is light brown in colour, so prominent and so close to the secondary plate that no spine-row could be perceived between them. On the right mandible the secondary plate is divided into slender teeth.

The lower lip has the principal lobes quadrately rounded, rather strongly spinulose, their inner margins indented, the inner lobes pretty strongly developed.

The first maxillæ have the usual four plumose setæ on the apex of the inner plate, these setæ slightly increasing in length from the outer to the innermost. On the outer plate nine horn-coloured spines surmounted the apex on one maxilla, and ten on the other.

The second maxillæ have what I suppose to be the exopod very distinctly represented by a rather long, narrow lobe of the outer margin; of the three plates, the innermost has some plumose spines mixed with the others, while on the middle and outer plates there are to each about ten thin graduated spines.

The maxillipeds have the plate arising from the second joint more than twice as long as broad, with the greatest breadth

beyond the middle, the apical border a little oblique. Each plate has a strong coupling spine. Of the five joints of the palp the first is small, the second large, the others successively smaller, the second to the fourth produced into narrow lobes, apically tufted with setæ, like the narrow unlobed fifth.

First gnathopods—These are distinguished from the following six pairs of trunk-limbs by the triangular shape of the fifth joint, and its position overlapped on the outer side by the apical lobe of the fourth, and on the inner side under-riding the sixth joint. On the inner margin the fourth and sixth joints have each five, and the fifth has four spines, which are plumose in such a way as to give a hand-like appearance to the upper shorter ones. The finger is biunguiculate, with a seta between the outer and the shorter inner unguis. In the other limbs, the fifth joint, though smaller than any of the rest, except the finger, is similar in shape, armature, and mode of articulation to the fourth.

Pleopods—The inner apex of the peduncle has not more than three or four spines with bent tips. The male appendage of the second pair reaches a little beyond the margin of the ramus, and is blunt-ended. The sutured plate of the fifth pair is distally squamose, its projecting bosses being especially conspicuous in this respect. This character is perhaps general in the Sphæromidæ. In shape and relative dimensions the rami of the pleopods seem to show some differences from species to species, but whether the differences are stable and really specific I am not in a position to say.

Uropods—The peduncle has a strong ridge on the upper side. The fixed inner ramus is oval, setulose on its margins, and has an apical tooth directed a little outward. The movable outer ramus is longer and broader, with irregular outline, the upper surface hollowed, carrying a row of setules, the under surface having two such rows; the apex is tridentate, the middle tooth large and prominent.

Length about twice the breadth. The largest specimen, if it would submit to be unrolled, might be 16 mm. long. The smallest differed from the largest and from the one figured, which was 12.5 mm. long, in slightly bent posture, and 7.5 mm. broad, by having the telsonic apex simple, not trilobed, and by having much reduced lobes on the basal part of the telson.

Locality:—Between Bird Island and mainland, Algoa Bay, in a depth between 10 and 16 fathoms, on a bottom of sand, shells, and stones. The extraordinary appearance of the head has suggested the specific name of this remarkable form.

## EXOSPHEROMA VALLBOM, n. sp.

## PLATE 12A.

The head of this species is distinguished from that of *E. amplifrons* chiefly by the want of any eccentric elevation above the eyes, its upper line in a front view being gently convex instead of forming an almost pointed arch.

The peræon is broad, with the imbrication even more strongly marked than in *E. amplifrons*, the transverse ridges occasionally carrying four widely spaced low tubercles, which, however, were obsolete in the specimen figured. The integument is not at all eroded. The segmentation of the pleon is as in the preceding species, but here the basal part has two tubercles instead of great bosses, and the terminal part, though it carries two large bosses surmounted by two tubercles, ends in a commonplace manner, the apical margin being truncate and shallowly trifid like the British form known as *Sphaeroma prideauxianum*.

The first and second antennæ are distinguished from those of *E. amplifrons* by characters of doubtfully specific value. In the first pair the first joint is more massive, but the angular projection on the side margin is much less prominent. In the second pair the penultimate joint of the peduncle is shorter than the ultimate. That the flagella have a joint or two more than observed in the other species cannot be a matter of importance.

The upper lip on the inner side has the transverse line above the apical margin more prominent, straighter, and carrying stronger setules than in *E. amplifrons*.

The mandibles are less massive than in the species just mentioned, though generally similar, but with the cutting plate more withdrawn, the secondary plate on the left mandible trilobed, obscure, and at most very slight on the right; on both there is a distinct spine-row of five or six spines, some of which are a little denticulate. The molar has on one side above the crown a small appendage, probably common to all the species. The palp is a little stronger than in *E. amplifrons*, but as there, with the joints nearly equal, the second and falcate third fringed with spines, of which two or three at the apex of each of these joints are the longest.

The lower lip and maxillæ are as in *E. amplifrons*, but the maxillipeds have a rather differently-shaped plate to the second joint, its greatest breadth being at the middle, and the apical margin much more oblique. On one of the first maxillæ eleven spines could be counted on the outer plate.

First gnathopods—These are nearly as in the preceding species, but the fourth joint has a row of seven spines with two others out of the row, the fifth has five spines, and the sixth has six. The other limbs may show similar differences, but they are not striking.

The pleopods have from four to three hooked spines at inner apex of peduncle. In the second pair the male appendage in the specimen examined did not quite reach the extremity of the ramus. The central appendages on the seventh segment of the peræon are rather different from those of *E. gigas* (Leach), being closely adjacent and slightly curved.

The uropods differ considerably from those of *E. amplifrons*, being much simpler, the peduncle not ridged above, the fixed ramus the larger, with squared end, the outer ramus shorter, oval, with subacute apex.

The specimen figured is remarkable for the numerous purplish-brown spots with which its dorsal surface is richly sprinkled. Unfortunately, there is no constancy in the colouring of specimens.

Length, 16 mm., breadth, 8 mm.

Locality :—Between Bird Island and mainland, Algoa Bay, Dredged from depth of 10-16 fathoms.

#### EXOSPHEROMA SETULOSUM, n. sp.

#### PLATE 12B.

The head is nearly as in *E. validum*, but even less raised above the broadly rounded eye-lobes. The whole surface is pubescent, this characteristic showing most distinctly on the hind margins of the peræon segments and on the pleon. The peræon shows a tendency to develop inconspicuous tubercles on the hind margin of the otherwise smooth segments. In the pleon the basal portion has two small tubercles at its hind margin, and the terminal part has two parallel longitudinal ridges stopping considerably short of the depressed trifold apical margin, of which the centre-piece is more advanced than in *E. validum*.

The first and second antennæ are nearly as in *E. validum*, but in the first pair the first joint has the angular projection more prominent, and the flagellum, though consisting of only the same number of joints—twenty-one—is here not shorter than the peduncle. The second pair have a flagellum of eighteen joints as compared with sixteen in the much larger *E. validum*.

The epistome and upper lip show a somewhat different appearance from those of *E. validum*, as will be seen in the figures of these parts as dissected. In the other mouth organs there seem no essential differences, except in the plates arising from the second joint of the maxillipeds, these plates having a length decidedly less instead of greater than twice the breadth.

The first gnathopods have on the fourth joint five spines in a row, on the fifth four, and on the sixth four, but in each case there is an additional spine on one side of the row, and a spinule in front of the series on the sixth joint. Here, as in the preceding

species, the last three pairs of limbs are a little more slender than the three preceding pairs.

The pleopods are nearly as in the preceding species, but no male appendage was discernible on the second pair.

The uropods are as in the preceding species, except that the outer ramus is as long as the inner, with a strong outward-directed apical tooth, and that the whole appendage is strongly fringed with setules.

The specimen figured was ornamented by a narrow transverse purple band near the hind margin of each pereon segment, and by transverse and longitudinal bands on the telsonic segment, but this striking pattern was not repeated on other specimens.

Length of unrolled specimen would be 10 mm.

Locality:—Between Bird Island and mainland, Algoa Bay, dredged from depth of 10-16 fathoms.

The specific name refers to the pubescence on many parts of the integument. Between this species and *E. validum* the alliance is very close, but it has not seemed feasible to attribute all the differences mentioned to conditions of age or sex.

#### EXOSPHEROMA GIGAS (Leach).

1818. *Sphacroma gigas*, Leach, Dict. Sci. Nat., vol. 12, p. 346.

1900. *Exosphaeroma gigas*, Stebbing, Proc. Zool. Soc. London, p. 553, pl. 39.

The synonymy of the species is given and discussed in the Proceedings of the Zoological Society for 1900, in combination with that of White's *Sphacroma lanceolatum*. On the whole, it now seems to me that the two forms ought to be kept specifically separate, and that the names allotted by Leach and White may conveniently stand, although it may not be absolutely certain which of the forms Leach had before him.

The South African specimens appear to be in substantial agreement with those described and figured as *Exosphaeroma gigas* from Mr. Rupert Vallentin's Falkland Island collection, except that in point of size they by no means merit their specific name of *gigas*. They are quite small. The specimen dissected was 9 mm. long by 5 mm. broad, with the male appendages well developed, those on the second pleopods being considerably longer than the rami. The first antennæ have the flagellum 11-jointed, a little longer than the peduncle, and in the second antennæ the flagellum is 19-jointed and considerably longer than the peduncle. These numbers and dimensions contrast with those in the large Falkland Islands specimen, in which the first flagellum is 17-jointed but shorter than the peduncle, and the second has about 16 joints. These flagella, however, are notoriously subject to

much variation, so that the differences noted are of little importance compared with all the numerous points of agreement. The thick fur on the peræopods is a very conspicuous feature.

Locality:—Two miles up Buffalo River, taken with small shrimp net on a muddy bottom.

PARASPIAEROMA, n. g.

Fifth and sixth segments of the pereon laterally projecting beyond the rest. First division of the pleon with its first component segment conspicuous, the second overlapping it, and also the seventh segment of the pereon, but not the third of the pleon, of which the second, third, and fourth segments are, as usual, coalesced in the middle; telsonic segment with blunt dorsal process near the middle and shallowly concave emargination of the apex. Epistome elongate, its apex prominent beyond the rostral point of the head and between the somewhat projecting bases of the first antennæ. Second antennæ geniculate between the fourth and fifth joints. The trunk-limbs not bidentate in appearance, a slender spine lying close within the nail. Hind peræopods slender. Last pleopods without conspicuous transverse pleating.

The generic name alludes to the obvious affinity between this and other Sphæromidæ.

This genus agrees with *Dynamene*, Leach, in having a simple excavation of the telsonic apex, but several distinctive marks are presented in the above definition. *Dynamene* itself still remains obscure, the adult male form not having been determined. Bate and Westwood in their discussion of it (British sessile-eyed Crustacea, vol. 2, p. 418) say, "In our figures of the second maxilla in *D. rubra* and *Montagui*, only one of the lobes was observed on dissection." Their figures, however, show that they are referring not to the second but the first maxillæ. Both pairs are normal, as they might easily have satisfied themselves, in the two forms mentioned.

It is possible that Cunningham's *Cymodocea darwinii* if better known might be included in this genus, although that species has the outer branch of the uropods scarcely half as long as the inner, while in the species here to be described the outer branch is fully as long as the inner (see Trans. Linn. Soc. London, vol. 27, p. 499, pl. 59, fig. 1, 1871, and Studer, Isopoda of the Gazelle, p. 18, Berlin, 1884).

PARASPIAEROMA PROMINENS, n. sp.

PLATE 13.

The head is much broader than its length, bounded by a slight ridge in front of the eyes, in advance of these being folded

beneath. The first four segments of the peræon are bent sharply downwards at the sides so that in dorsal view the side plates of the second, third, and fourth are inconspicuous, but those of the fifth and sixth segments are more outstanding, so that in folding up the animal does not become smoothly globular. The first division of the pleon has been described in the account of the genus, apart from notice of a central blunt process which overhangs the hind margin of the fourth segment. This and the similar process on the following division seem slightly to vary in relative size, the former being usually the larger, and both becoming very prominent in lateral view when the animal is rolled or folded up. The telsonic segment is broad, widening to the insertion of the uropods, thence with convex sides converging to the apical emargination.

The eyes are large and prominent, their hind margins inserted in the first peræon segment. Their colour (in formalin) is purplish red.

The first antennæ have the usual geniculate joint, followed by a small second joint, which is longer than broad. The slender third joint is longer than the first. The flagellum of 22 joints is longer than the peduncle. It begins with a very short joint, followed by a long one; most of the others carry hyaline filaments.

The second antennæ have a stout peduncle, the first three joints short, the fourth a little shorter than the fifth, which is subequal to the first three combined. The flagellum of 19 joints is longer than that of the first antennæ, and in the first 9 joints much stouter, these, in addition to the apical setæ present on all the joints, having on the sides brushes of elongate setæ—probably a masculine feature.

The epistome is very much longer than the upper lip which it partially embraces with its narrow ends, the elongate trunk having slightly sinuous sides and a rounded top which folds over so as with a more or less pointed return piece to meet the apex of the rostrum. The broad basal joints of the first antennæ are yet kept completely apart instead of meeting, as they do in most *Sphæromidæ*, at or over the apex of the epistome.

The upper lip has a broad, not quite symmetrically, bilobed distal margin, and on the surface a pair of reticulated clear spaces.

The lower lip has the hinder angles more squared than is usual in this family. The mandibles are strong, the cutting plate divided into three horn-looking teeth, the secondary plate on the left mandible with three horn-coloured teeth, of which the middle one is the smallest, this plate on the right mandible being slighter with the teeth not horn-coloured. The spine-row consists of eight or nine spines closely set, most of them broad. The molar has a rounded crown fringed with teeth and traversed by faintly-marked rows of denticles, having also on the outer side



some seta-like spines. The second and third joints of the pair have numerous spines.

The first maxillæ have on the apex of the outer plate eleven or twelve spines, unequal but all slender, and on that of the inner plate four plumose setæ.

The second maxillæ have several plumose setæ on the innermost plate, all three plates having the usual spine-armature, and the outermost being articulated considerably above the middle one. Near the base of the appendage below the channelled outer margin is a very prominent lobe, fringed with upward curving setules. Such a lobe is often indicated rather than developed in other genera. In the case of *Exosphaeroma amplifrons* the suggestion has already been offered that it represents an exopod.

The maxillipeds are as in *Exosphaeroma*. The plate of the second joint is broad, the processes of the fourth, fifth, and sixth are narrow, and the seventh joint is slender.

The first gnathopods have the fourth joint as long as the third and broader, its inner margin carrying four denticulate spines, of which the small triangular fifth joint has six, and the rather long sixth joint has ten, besides two dozen smaller spines planted well within the margin on the inner surface. Between the margin of the finger and its adjacent spine there is a spinule, as in *Exosphaeroma* and elsewhere, but here these three parts lie in close proximity.

The second gnathopods have the third joint quite as long as the second, and much longer than the fourth, which is even shorter than the fifth. The latter has two or three spines on the inner margin, and within it a close-set row of eight or nine stout spines. The sixth joint is rather large, the upper part fringed with seven stout spines. The unguis is arranged as in the rest of the limbs.

The first peræopod has the second, third, and sixth joints subequal, the sixth a little longer, and the fifth a little shorter than the second or third, the fourth being the shortest of all. The third, fourth, and fifth are fringed on the inner margin with brushes of setæ. The rather elongate finger is furry on its outer margin. The fifth peræopod is more slender than the first, and has its second joint longest, the third, fourth, and fifth subequal, the sixth not greatly shorter than the second, the finger furry as in the first pair, but a little shorter.

The pleopods. The spines on the inner margin of the peduncle of the first three pairs are three in number. The male appendage of the second pair is more elongate than the rami, not acute at the apex. The third and fourth pairs have the outer branch two-jointed. The fourth and fifth pairs have both branches branchial, but not pleated, and in the fifth pair the squamiferous processes are scarcely in relief.

The uropods have the inner unarticulated branch adjacent to

the telson, the rounded end just projecting beyond the emargination of the segment; the equally long outstanding outer branch is apically acute and usually (though not in the specimen figured) rather sickle-shaped at the end.

The colour (in formalin) long retains bright orange red transverse bands, often interrupted in the middle, especially in the pleon being limited to the extent of the transverse sutures.

Length, 19.5 mm. Breadth, 9.5 mm.

Locality:—Vasco de Gama Peak S. 75° E. 13½ miles, at a depth of 166 fathoms.

The specific name refers to the prominence of the epistome.

GEN.: CYMODOCE, Leach.

1814. *Cymodocce*, Leach, Edinb. Encycl., vol. 7, p. 433.  
 1815. *Cymodocce*, Leach, Trans. Linn. Soc. London, vol. 11, p. 368.  
 1816. *Cymodocce*, Leach, Encycl. Brit., Art. Annulosa, p. 427.  
 1818. *Cymodocca*, Leach, Dictionnaire des Sciences Naturelles, vol. 12, pp. 341, 342.  
 1868. *Cymodocca*, Bate & Westwood, Brit. Sessile-eyed Crustacea, pt. 20, vol. 2, p. 425.  
 1891. *Cymodocca*, Ives, Proc. Acad. Philad., pp. 188, 194.  
 1893. *Cymodoce*, Stebbing, History of Crustacea, p. 362.

Leach, not content with using three different forms of the name of this genus, in the Linnean Transactions misquotes the earliest form of it as *Cymodyce*.

CYMODOCE UNCINATA, n. sp.

PLATE 14.

The head and peræon have no very striking peculiarities, but the tip-tilted pleon is characteristic. In large specimens its surface is rougher than that of the rest of the body, as if covered with minute hexagonal crystals. Its first division extends laterally beyond the side-plates of the seventh peræon segment, having the boundary line of its own first segment almost concealed. Of the three following centrally coalesced segments the first is the broadest, and has the longest lateral margin, but does not overlap the others; the last has two conspicuous submedian teeth projecting over its hind margin. The telsonic segment carries two large, somewhat carinate, submedian bosses, beyond which it is depressed and narrows rapidly to the trifid apex, the centre piece of which is faintly trilobed and carries on its upper surface a reverted lobe or tooth, forming the hook to which the specific name refers.

The eyes are dark, with numerous components, the margin turned towards the side of the head nearly straight, that towards the middle of the head being angularly convex.

The antennæ are normal, the flagellum of the first pair composed of eighteen joints, that of the second stouter and a little longer, with fourteen joints; in this pair the fifth joint of the peduncle is a little longer than the fourth.

The epistome is much broader than long, the apex pointed. The upper lip is rather deep, with broadly rounded outer margin. The mandibles have the characters usual in this genus, the joints subequal. In the first maxillæ eleven spines were counted cutting edge undivided, the palp slight, with its first and second on the outer plate, the inner having the usual four plumose setæ. In the plate of the maxillipeds the greatest breadth is in the upper half.

The first gnathopods, like all the other limbs, have a spine outstanding from the lower apex of the outer margin of the third joint. Owing to the channelling of this joint its outer apex seems to lose its apical position. The fourth joint has five stout and more or less plumose spines on the inner margin, the triangular fifth has four and the sixth has six.

The second gnathopods are considerably longer than the first, and closely resemble the five pairs of peræopods, all having the fifth joint similar to the fourth but shorter, both being spinose along the inner margin and on the outer apex. The sixth joint has spines along the inner margin. The bifid finger is stout. The male organs on the seventh peræon segment are elongate, tapering.

The pleopods have only three hooked spines on inner apex of peduncle. The male appendage of the second pair is much longer than the rami. In the fourth and fifth pairs the branchial ramus is strongly plicated. The covering ramus in the fifth has a transverse suture as in the third and fourth pairs.

The uropods are broad, somewhat hirsute, the movable outer ramus having a little notch at the apex of its outer margin, which is often obscured by the setules; it reaches a little beyond the inner ramus and the telson.

Length of specimen figured, in slightly bent position, 12.5 mm., breadth, 6.5 mm.

Localities:—Table Bay, 22 fathoms. Off Buffalo Bay, 30 fathoms.

#### FAM.: CYPRONISCIDÆ.

1889. *Cyproniscidae*, Giard and Bonnier, *Travaux de Wimereux*, Bopyriens, p. 221.

1893. *Cyproniscidae*, Stebbing, *History of Crustacea*, p. 397.

1900. *Cyproniscidae*, Bonnier, *Travaux de Wimereux*, vol. 8, p. 190.

## GEN.: CYPRONISCUS, KOSSMANN.

1884. *Cyproniscus*, Kossmann, Sitzungsberichte K. Akad. Wiss. Berlin, Heft 22, p. 460.  
 1887. *Cyproniscus*, Giard and Bonnier, Travaux de Wimereux, Bopyriens, p. 220.  
 1893. *Cyproniscus*, Stebbing, History of Crustacea, p. 397.  
 1898. *Cyproniscus*, Sars, Crustacea of Norway, vol. 2, p. 232.  
 1900. *Cyproniscus*, Bonnier, Travaux de Wimereux, vol. 8, p. 191.

Sars gives the following definition of the genus:—

“ Body of the adult female forming an inert curved sac wholly filled with ova or embryos, and affixed to the host by the aid of a thin flexible cord; dorsal face convex and exhibiting distinct traces of segmentation, ventral face flattened, lateral parts expanded, anterior extremity broadly produced, posterior obtusely rounded and incurved. Body of immature female sub-pyriform, bluntly truncated in front, hind extremity narrowly exserted, lateral parts not distinctly defined. Body of young female, immediately after the transformation subfusiform, very faintly segmented, front part still enveloped by the larval skin, and deeply immersed within the body of the host, being anchored by a pair of long, flexuous, root-like processes. Adult male exactly resembling the female larva of last stage, being rather slender, and without eyes; hind expansion of basal joint of antennule divided into a restricted number of teeth, coxal plates coarsely pectinate; outer ramus of uropoda much smaller than the inner. Parasitic on Ostracoda.”

The single species for which the genus was founded, and on which the above definition is based, was originally described by Sars in 1882 under the name of *Cryptothiria cypridinae*, the specimens having been found infesting *Cypridina norvegica*, Baird. So far as the material permits a decision, the new species about to be described agrees accurately with the generic definition drawn up by Professor Sars, except in one particular. In the new species the outer ramus of the uropoda is very little smaller than the inner.

In the male and last larval stage of female the type species shows the terminal segment with an undivided margin. In the new species the margin is divided into teeth. This character is found also in the larval parasite of *Aega ventrosa*, M. Sars, described by G. O. Sars as “Cryptoniscid No. 2” in the Crustacea of Norway, vol. 2, p. 246, pl. 100, fig. 3. Further, in Hansen’s Isopoden, Cumaceen und Stomatopoden der Plankton Expedition, 1895, it appears clearly in the larvæ which he designates *Entoniscus a*, *Bopyrus a*, *Bopyrus γ*, *Bopyrus ε*. That such a peculiarity should be common to the parasites of Ostracoda, of Isopoda, and of one or more higher Malacostracan groups, is worthy of notice, as one more link connecting the numerous

species which in the ovigerous female attain the most remarkable diversities of form. Professor Sars unites in the single family Cryptoniscidae parasites which MM. Giard and Bonnier distribute among the Cryptoniscidae, Cyproniscidae, Podasconidae, and Cabiropsidae, according as they respectively infest Thyrostraca, Ostracoda, Amphipoda, or Isopoda. The latter arrangement is confessedly provisional, and viewed in that light it may be allowed to have the considerable merit of convenience.

CYPRONISCUS CROSSOPHORI, Stebbing.

PLATE 15B.

24 / 1901. *Cyproniscus crossophori*, Stebbing, Knowledge, vol. 24, p. 100.

An ovigerous female, somewhat longer than broad and slightly unsymmetrical, shows no definite division into segments. Of lateral lobes the two or three in the centre are well defined, and from these sutures run both dorsally and ventrally, but without meeting in the middle either of the convex side or the flattened opposite side. Both apices are broadly rounded. The flexible cord is attached high up on the convex surface.

In the last larval stage the animal is somewhat fusiform, with fine striæ across the back. The head is rather narrowly rounded in front, widening greatly to the strongly-produced subacute postero-lateral angles, the under surface of the front showing a reflexed median point. Of the seven segments of the peræon the first is completely overlapped by the angles of the head, the sixth is the widest and slightly the longest; all have denticulate sides. The six segments of the pleon are together, about as long as the six preceding segments, and taper gradually to the insertion of the uropods, behind which the telsonic part of the sixth segment is triangular with somewhat sinuous sides and a rather rounded apex, the whole margin being cut into fourteen teeth, or twelve, if the uppermost points are not included in the reckoning.

Eyes not perceived and probably absent, in accord with the generic definition. First antennæ adjacent on underside of head; the basal expansion hand-like, showing on the inner side a short thumb and towards the outer side four fingers, and besides these two others not accurately in the same plane, one lying on the first finger, the other projecting between it and the thumb. The second joint is nearly as broad as long, and carries two short branches, of which one at least is tipped with a long seta; the small third joint carries a great tuft of divergent hyaline filaments.

The second antennæ are much longer, with a tapering peduncle of four joints, of which the first is much the stoutest, the second considerably the longest; the slender flagellum is about as long

as the last three joints of the peduncle, its own five joints successively shorter, all these eight joints with a seta a-piece, the last of them with two setæ.

The first and second gnathopods differ from the following limbs by having the fifth joint more prolonged and more strongly under-riding the hand, which is plump and oval, affording a slightly oblique palm for opposition to the short curved finger. The five pairs of peræopods have the wrist or fifth joint very small, the sixth joint somewhat tapering, seemingly with a little notch or spine near the middle of the opposable margin, though these limbs can scarcely be called subchelate since the finger is straight, except at the extreme apex. In all the trunk limbs the long second joint is attached to a pectinate coxal plate, which is prominent in a ventral view of the animal.

Pleopods. The peduncle is short but broad, its outer part forming a narrow apex, to which the outer ramus is attached; its inner margin, at least in the first pair, carries two apically bent spines; the inner ramus is rather the broader, and has its distal margin armed with five long plumose setæ; the outer ramus has four such setæ and a spine or simple seta on the outer angle.

The uropods have a peduncle as long as broad, and as long as the inner ramus; the latter has a seta at the middle of its inner margin and four setæ on the apex; the outer ramus, which is rather shorter and narrower, has also four on the apex.

The ovigerous female, with eggs not far advanced, was 8 mm. long by 7 mm. broad; the larval form was 2.5 mm. in length, and rather less than three times as long as broad. There were three larvæ in the same Ostracode with the developed female above described, and with a well developed egg of the host, *Crossophorus africanus*. In another female of the same Ostracode a single larva of the parasite occurred.

## CRUSTACEA ENTOMOSTRACA.

### OSTRACODA.

#### MYODOCOPA.

#### FAM.: CYPRIDINIDÆ.

1896. *Cypridinidæ*, Brady and Norman, Trans. Royal Dublin Soc., ser. 2, vol. 5, p. 638.  
 1900. *Cypridinidæ*, Stebbing, Willey's Zoological Results, Part 5, p. 662.

Further references are given in the last-mentioned work.

#### GEN.: CROSSOPHORUS, Brady.

1880. *Crossophorus*, Brady, Challenger Ostracoda, Reports, vol. 1, p. 157.

1888. *Crossophorus*, Sars, Arch. Naturv., vol. 12, p. 182.

1896. *Crossophorus*, Brady and Norman, Trans. R. Dublin Soc., ser. 2, vol. 5, p. 643.

Shell porcellanous, broadly rounded at hinder extremity; antennal notch overhung by subacute rostral processes. First antennæ with second joint longer than third and fourth combined; fifth joint with sensory appendage in both sexes. Second antennæ with three-jointed secondary appendage, its third joint in the male falcate, clasping; in the female continuous with the second joint and ending in a long seta. Mandibles five-jointed, with strongly bifid hairy masticatory process on first joint, and small bisetous exopod on the second. First and second maxillæ about as in *Cypridina*. Maxillipeds six-lobed, the penultimate division forming a large sub-triangular lamina continuous on the inner margin with the small apical lobe. Apex of vermiform appendage variable, the armoured spines on these limbs numerous. Caudal laminae having stout ungues interspaced with slender ones, the graduation in the length of the ungues being also discontinuous, although continuous for those of similar stoutness, except that the hindermost is shorter than the penultimate.

In his Neapolitan monograph Dr. G. W. Müller dismisses this genus as insufficiently described (p. 174, 1894). But this was before the revision of it by Brady and Norman had appeared. Those authors had the opportunity of examining a female specimen 7 mm. long, taken by the Porcupine Expedition of 1869, in the Atlantic, west of Donegal Bay, Ireland, lat.  $55^{\circ} 11'$  N., long.  $11^{\circ} 31'$  W., ~~in~~ which the genus was originally founded was a male, 84 mm. in length, taken by the Challenger from a reputed depth of 1100 fathoms, bottom temperature  $35^{\circ}.6$  Fahr., a little to the East of New Zealand, lat.  $40^{\circ} 28'$  S., long.  $177^{\circ} 43'$  E. That the two specimens belong to the same genus cannot reasonably be doubted, and, notwithstanding the enormous interval between the places of capture, Brady and Norman assign them to the same species, *Crossophorus imperator*. That they are very nearly allied may be readily allowed, but their specific identity is not so clear. The Irish specimen appears to have the antennal notch more widely open but considerably less deep than it is in the shell from the Pacific. In the figure of the latter it penetrates back decidedly beyond the middle of the valves toward the dorsal margin, while in the former it scarcely reaches the middle. Distally on its front margin the mandible has a row of 12 setæ in the Pacific specimen, but only 6 in that from the Atlantic. The little apical lobe of the maxillipeds is well marked in the Pacific specimen, but much less distinct in the other. The vermiform appendage of the male is described as almost exactly like that of *Cypridina*, whereas in the female "at the extremity one lip is in

the form of a blunt tooth; the other is divided into several (six?) finger-like curved processes, which are ciliated on the edges." In the caudal laminae the stout unguis are seven in number in the female specimen, but in the male they seem to be certainly less numerous, though here, unfortunately, we have to judge not from the spines themselves, but from the scars of their places of insertion. The differences mentioned have led me to give the Irish specimen a distinctive name, *Crossophorus imperialis*.

In discussing the large lamina in the maxillipeds of *Cypridina*, G. W. Müller suggests that it represents the coalescence of two joints, and to this view the apical lobe of the lamina in *Crossophorus* lends probability.

CROSSOPHORUS AFRICANUS, Stebbing.

PLATES 15A AND 16.

1901. *Crossophorus africanus*, Stebbing, Knowledge, vol. 24, p. 100. s/

Shell smooth, not very hard, surface diversified by oily-looking little circles; antennal notch not widely opened, reaching to the middle of the valve, the subacute rostral process finely ciliated on its lower margin.

Of eyes, median ocellus, or frontal tentacle, I have not found any trace, nor is mention of them made under this genus by Brady or by Brady and Norman. The first antennæ have the first joint long and broad, the second narrower and not quite so long, but longer than all the remaining joints together, more than twice as long as the third, which is obliquely articulated with the much shorter fourth; the fifth has an annulated sensory seta, carrying on one side a double series of branchlets, followed after a considerable interval by some very small ones at the distal end; on the two little terminal joints there are seven, mostly very unequal, setæ, three of them very long. Brady and Norman include in their character of the genus antennules with second joint only slightly longer than the third, but their figure shows it considerably longer than the third and fourth joints combined.

The second antennæ have the swimming branch divided between the long apically widened first joint and the eight following joints, of which the first is considerably the longest, the first seven each armed with one plumose seta attended by a short spine, the terminal having seven such setæ; the secondary appendage in the female is straight, its middle joint the longest, the third tapering.

The mandibles have the strongly hirsute and sharply two-pointed masticatory process projecting from distal part of first joint, with several spines adjoining on base of second, from inner margin of which issues a long plumose seta, the outer margin



carrying about nine spines below the apex, and at the apex the small pointed exopod; the third joint is short, with two plumose setæ and three or four simple setæ on the inner margin; the fourth joint is long, thickly set with spines along much of the outer and at the apex of the inner margin; the short fifth joint carries two long ungues and some straight spines.

The first maxillæ have a rather broad inner plate surmounted by numerous plumose spines or setæ; within this is another plate which carries a long plumose seta on the inner margin, then narrows to a rounded apex set with numerous spines; close by the side of it is another plate, hairy on the inner margin, and distally carrying three setæ; on the outer side is the longest and broadest part of the maxilla, carrying three slender spines on a projection of its outer margin near the base and a group at the apex, with which is articulated a short terminal joint armed with several spines, some of them denticulate.

The second maxillæ have at least a hundred plumose setæ fringing the great vibratory lamina; close to the apex of this is a small plate carrying two setæ, then a two-jointed plate with numerous slender spines, and to this succeeds a series of five lobes variously armed, the first three having each a set of graduated spines so closely placed that from one view the largest hides all the rest; on the lowest lobe there is a bunch of feathered spines.

The maxillipeds have on the lowest lobe three plumose setæ, and several shorter plumose setæ or spines on the apices of the next three lobes; the large sub-triangular lamina has its convex outer margin fringed with numerous spines and long plumose setæ, of the latter the little apical lobe carrying thirteen, the six nearer the notch considerably shorter than the distal seven.

The vermiform appendage has a head-like apex, wider than the trunk, with a brush of terminally denticulate spines on each side; the mouth is formed by a rather strong tooth over a denticulate margin, confronting what may be called the upper jaw, which consists of a cirlet of fine denticles; the annulated trunk is armed far along with at least a hundred and fifty denticulate spines.

The caudal laminæ have twenty-five ungues a-piece, more or less conspicuously dentate; the largest of all is on the apex, a rather slighter one being planted close behind this a little on the ventral margin; the apical unguis is followed by two much more slender ungues, then by two similar trios on a smaller scale, and finally by a stout unguis heading a procession of fourteen small graduated spines. In advance of the furca the margin is downy for a space, and the strongly-bent part of the dorsum is transversely corrugated, the narrowness of the numerous folds or stripes producing an annulated appearance.

As already noticed the shell surface of the preserved specimens does not present an uniform texture. The opaque ground is everywhere beset with glossy circles in great numbers, of very different sizes, though none of them are

large. Within the valves of a dissected specimen there were found in corresponding variety crystals, singly or in laminar groups, examples of which are figured on plate 15A. Professor S. H. Vines, F.R.S., President of the Linnean Society, having kindly undertaken to examine the shell and some of the detached crystals, writes :—

“As far as I can make out, these sphaero-crystals are not soluble in boiling water, but dissolve in acetic acid with evolution of bubbles of gas which is no doubt carbon dioxide.

“The examination of the piece of carapace seems to show that, for some reason or other, the carbonate of lime has crystallised out from the chitin. The crystals from the inside of the carapace are, I am inclined to think, some of the sphaero-crystals of carbonate of lime which have got free from the carapace altogether.

“I think that this separation of the lime from the chitin must be due to the action of the preservative in which the animals have been kept, though I am unable to account for it.”

In the Trans. Zool. Soc. London, vol. 16, part 4, April, 1902, Dr. G. S. Brady, F.R.S., says in regard to *Cyclasterope fascigera*, n. sp., “The antennal setae of this species are often much encumbered, or even glued together by crystalline calcareous concretions similar to those which I have already described and figured as occurring in *Philomedes sculpta*.” The latter species was described by Dr. Brady in the same Transactions, vol. 14, part 8, December, 1898. Dr. Brady, after discussing the nature of the concretions is disposed “to look upon them as pathological products which have withdrawn the lime otherwise available for shell-formation.”

Mr. W. A. Cunnington, writing from Jena, states that in his study of the common Cladoceran *Simocephalus* he happens “to have noticed that the shed shell (or Ecdysis) is always accompanied by a large number of minute crystals,” and asks, “might it be that the calcareous salts in the shell are temporarily dissolved to facilitate ecdysis, and the mineral matter is then thrown down in the presence of the excess of water?”

That there is some connexion between the presence of the detached crystals and the animal's preparation for changing its coat, seems highly probable. But the Ostracoda must be able to shed the carapace with great ease, and the adhesive character of the crystals under discussion would be so inconvenient to the living crustaceans that it will be satisfactory if the observed conditions can be definitely attributed to the action of the preservative fluid.

Size:—The largest specimen was 15.5 mm. long by 13 mm. in height, or what may be called the breadth in a lateral view.

Another specimen measures 15 mm. by 11.25 mm. The smallest specimen was 11.25 mm. by 8.75 mm., and in this there was a young one measuring 2.4 mm. by 1.66 mm. All the specimens appeared to be females.

The young one just mentioned exhibited the various appendages in a forward condition of development, with the exception of the vermiform limb, the presence or absence of which was not ascertained. The second antennæ have a single simple seta attended by a spine on the apical joint, and each of the preceding joints similarly armed. The secondary appendage is indistinctly jointed, and has a long apical seta. The antennal notch is set far back, instead of being forward as in the adult; the ventral margins of the valves are wide apart, and dorsally the valves are open anteriorly, showing bases of the two pairs of antennæ. A much less advanced embryo from the largest specimen shows the same backward position of the antennal notch, but the valves more nearly meeting in front. By comparison of these two examples, it may be supposed that the body at a certain stage develops more rapidly than the valves.

Locality:—Cape St. Blaize N. by E. 73 miles. Depth, 125 fathoms. Bottom, sand and shells. And, Cape St. Blaize N. by E. 67 miles. Depth, 90-100 fathoms. Bottom, rough.

Professor Chun, in his account of the Valdivia expedition, figures some giant Ostracoda from depths of the Atlantic and Indian Oceans. Some of the specimens were taken off the East African coast, but they do not agree in shape with the species above described, and are assigned to the family Halocypridæ (see *Aus den Tiefen des Weltmeeres*, p. 515, figures in text, 1900).

ADDENDA ET CORRIGENDA IN "SOUTH AFRICAN  
CRUSTACEA," PART I, 1900.

On p. 30 in the reference to "*Limnopsis*, White, 1847," the generic name should be *Limnopsis*. Attention was called to this by Dr. Woodward in the *Geological Magazine*, vol. 7, p. 394, where, however, the error is not traced back to its source in the report on the Challenger Macrura.

P. 33. To the list of those who have used *Astacus* as the generic name of the lobster may be added Westwood, in the *Entomologist's Text-book*, p. 101, 1836.

P. 37. In the last line the epithet "perplexing" is quite inappropriate to the statement quoted from Huxley, and the comment upon it with which the paragraph ends on p. 38 is quite beside the purpose. The mistake arose from a confusion of the eighth somite of the body with what is sometimes called the eighth thoracic somite. As my friend Dr. W. T. Calman promptly pointed out, there is only an infinitesimal difference between Huxley's observation that the second maxilliped in the lobster is without an arthrobranchia, and the explanation by Boas that this arthrobranchia is reduced to a pimple.

P. 49. In the synonymy of *AEgeon* should have been included a reference to Faxon's *Stalk-eyed Crustacea of the Albatross*, *Mem. Mus. Comp. Zoöl. Harvard*, vol. 18, 1895, where an important footnote to p. 134 discusses that genus (with the changed spelling *AEgacon*), and expresses the opinion that Bate's *Pontocaris* is to be identified with it.

Pp. 54, 55. Some modifications in the description of the first maxillæ and maxillipeds of *Paridotea unguolata* are supplied in the account now given of the family *Idoteidae*.

P. 60. It should have been mentioned that the specimen of *Sphurion laevigatum* was taken from a *Genypterus capensis*, locally known as the "King-Klipfish."